

ICD 08241

# Amateur Radio

SERVING AMATEUR RADIO SINCE 1945

JUNE 1988 \$2.50

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**Contest Results  
In This Issue:  
CQ VHF WPX 1987  
and  
1st Annual CQ RTTY**

**Famed Author and  
Vertical Antenna Expert  
Captain Paul H. Lee, N6PL**



**THE RADIO AMATEUR'S JOURNAL**

# KENWOOD

...pacesetter in Amateur Radio

All New  
Compact HF!

## “DX-citing!”

### TS-440S Compact high performance HF transceiver with general coverage receiver

Kenwood's advanced digital know-how brings Amateurs world-wide “big-rig” performance in a compact package. We call it “Digital DX-citement”—that special feeling you get every time you turn the power on!

• **Covers All Amateur bands**

General coverage receiver tunes from 100 kHz—30 MHz. Easily modified for HF MARS operation.

• **Direct keyboard entry of frequency**

• **All modes built-in**  
USB, LSB, CW, AM, FM, and AFSK. Mode selection is verified in Morse Code.

• **Built-in automatic antenna tuner (optional)**

Covers 80-10 meters.

• **VS-1 voice synthesizer (optional)**

• **Superior receiver dynamic range**

Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range. (500 Hz bandwidth on 20 m)

• **100% duty cycle transmitter**

Super efficient cooling permits continuous key-down for periods exceeding one hour. RF input power is rated at 200 W PEP on SSB, 200 W DC on CW, AFSK, FM, and 110 W DC AM. (The PS-50 power supply is needed for continuous duty.)

• **Adjustable dial torque**  
• **100 memory channels**

Frequency and mode may be stored in 10 groups of 10 channels each. Split frequencies may be stored in 10 channels for repeater operation.

• **TU-8 CTCSS unit (optional)**

• **Superb interference reduction**

IF shift, tuneable notch filter, noise blanker, all-mode squelch, RF attenuator, RIT/XIT, and optional filters fight QRM.

• **MC-43S UP/DOWN mic. included**  
• **Computer interface port**

• **5 IF filter functions**  
• **Dual SSB IF filtering**

A built-in SSB filter is standard. When an optional SSB filter (YK-88S or YK-88SN) is installed, **dual** filtering is provided.

• **VOX, full or semi break-in CW**

• **AMTOR compatible**



**Optional accessories:**

- AT-440 internal auto. antenna tuner (80 m—10 m)
- AT-250 external auto. tuner (160 m—10 m)
- AT-130 compact mobile antenna tuner (160 m—10 m)
- IF-232C/IC-10 level translator and modem IC kit
- PS-50 heavy duty power supply
- PS-430/PS-30 DC power supply
- SP-430 external speaker
- MB-430 mobile mounting bracket
- YK-88C/88CN 500 Hz/270 Hz CW filters
- YK-88S/88SN 2.4 kHz/1.8 kHz SSB filters
- MC-60A/80/85 desk microphones
- MC-55 (8P) mobile microphone
- HS-5/6/7 headphones
- SP-40/50B mobile speakers
- MA-5/VP-1 HF 5 band mobile helical antenna and bumper mount
- TL-922A 2 kw PEP linear amplifier
- SM-220 station monitor
- VS-1 voice synthesizer
- SW-100A/200A/2000 SWR/power meters
- TU-8 CTCSS tone unit
- PG-2S extra DC cable.

Kenwood takes you from HF to OSCAR!



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

# KENWOOD

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2201 E. Dominguez St., Long Beach, CA 90810  
P.O. Box 22745, Long Beach, CA 90801-5745

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NEW!

## Affordable DX-ing!

### TS-140S

HF transceiver with general coverage receiver.

Compact, easy-to-use, full of operating enhancements, and feature packed. These words describe the new TS-140S HF transceiver. Setting the pace once again, Kenwood introduces new innovations in the world of "look-alike" transceivers!

- **Covers all HF Amateur bands with 100 W output.** General coverage receiver tunes from 50 kHz to 35 MHz. (Receiver specifications guaranteed from 500 kHz to 30 MHz.) Modifiable for HF MARS operation. (Permit required).
- **All modes built-in.** LSB, USB, CW, FM and AM.
- **Superior receiver dynamic range** Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range.



- **New Feature! Programmable band marker.** Useful for staying within the limits of your ham license. For contesters, program in the suggested frequencies to prevent QRM to non-participants.
- **Famous Kenwood interference reducing circuits.** IF shift, dual noise blankers, RIT, RF attenuator, selectable AGC, and FM squelch.

- **M. CH/VFO CH sub-dial.** 10 kHz step tuning for quick QSY at VFO mode, and UP/DOWN memory channel for easy operation.
- **Selectable full (QSK) or semi break-in CW.**
- **31 memory channels.** Store frequency, mode and CW wide/narrow selection. Split frequencies may be stored in 10 channels for repeater operation.
- **RF power output control.**
- **AMTOR/PACKET compatible!**
- **Built-in VOX circuit.**
- **MC-43S UP/DOWN mic. included.**

#### Optional Accessories:

- **AT-130** compact antenna tuner • **AT-250** automatic antenna tuner • **HS-5/HS-6/HS-7** headphones • **IF-232C/IF-10C** computer interface
- **MA-5/VP-1** HF mobile antenna (5 bands) • **MB-430** mobile bracket • **MC-43S** extra UP/DOWN hand mic. • **MC-55** (8-pin) goose neck mobile mic. • **MC-60A/MC-80/MC-85** desk mics.
- **PG-2S** extra DC cable • **PS-430** power supply
- **SP-40/SP-50B** mobile speakers • **SP-430** external speaker • **SW-100A/SW-200A/SW-2000** SWR/power meters • **TL-922A** 2 kW PEP linear amplifier (not for CW QSK) • **TU-8** CTCSS tone unit
- **YG-455C-1** 500 Hz deluxe CW filter, **YK-455C-1** New 500 Hz CW filter.



### TS-680S

All-mode multi-bander

- 6m (50-54 MHz) 10 W output plus all HF Amateur bands (100 W output).
- Extended 6m receiver frequency range 45 MHz to 60 MHz. Specs. guaranteed from 50 to 54 MHz.
- Same functions of the TS-140S except optional VOX (VOX-4 required for VOX operation).
- Pre-amplifier for 6 and 10 meter band.



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220 MHz  
TH-315A  
Here Now!

## This HT Has it All!

### TH-215A/315A/415A

Full-featured Hand-held Transceivers

Kenwood brings you the greatest hand-held transceiver ever! More than just "big rig performance," the new TH-215A for 2 m, TH-315A for 220 MHz, and TH-415A for 70 cm pack the most features and the best performance in a handy size. And our full line of accessories will let you go from hamshack to portable to mobile with the greatest of ease!

- **Wide receiver frequency range.** Receives from 141-163 MHz. Includes the weather channels! Transmit from 144-148 MHz. Modifiable to cover 141-151 MHz (MARS or CAP permit required).
- **TH-315A covers 220-225 MHz, TH-415A covers 440-449.995 MHz.**
- **5, 2.5, or 1.5 W output, depending on the power source.** Supplied battery pack (PB-2) provides 2.5 W output. Optional NiCd packs for extended operation or higher RF output available.
- **CTCSS encoder built-in.** TSU-4 CTCSS decoder optional.
- **10 memory channels store any offset, in 100-kHz steps.**
- **Odd split, any frequency TX or RX, in memory channel "0."**
- **Nine types of scanning!** Including new "seek scan" and priority alert. Also memory channel lock-out.
- **Intelligent 2-way battery saver circuit extends battery life.** Two battery-saver modes to choose, with power saver ratio selection.
- **Easy memory recall.** Simply press the channel number!
- **12 VDC input terminal for direct mobile or base station supply operation.** When 12 volts applied, RF output is 5 W! (Cable supplied!)
- **New Twist-Lok Positive-Connect locking battery case.**
- **Priority alert function.**
- **Monitor switch to defeat squelch.** Used to check the frequency when CTCSS encode/decode is used or when squelch is on.



- **Large, easy-to-read multi-function LCD display with night light.**
- **Audible beeper to confirm keypad operation.** The beeper has a unique tone for each key. DTMF monitor also included.
- **Supplied accessories:** Belt hook, rubber flex antenna, PB-2 standard NiCd battery pack (for 2.5 W operation), wall charger, DC cable, dust caps.



#### Optional Accessories:

- PB-1: 12 V, 800 mAH NiCd pack for 5 W output
- PB-2: 8.4 V, 500 mAH NiCd pack (2.5 W output)
- PB-3: 7.2 V, 800 mAH NiCd pack (1.5 W output)
- PB-4: 7.2 V, 1600 mAH NiCd pack (1.5 W output)
- BT-5 AA cell manganese/alkaline battery case
- BC-7 rapid charger for PB-1, 2, 3, or 4
- BC-8 compact battery charger
- SMC-30 speaker microphone
- SC-12, 13 soft cases
- RA-3, 5 telescoping antennas
- RA-8B StubbyDuk antenna
- TSU-4 CTCSS decode unit
- VB-2530: 2m, 25 W amplifier (1-4 W input)
- LH-4, 5 leather cases
- MB-4 mobile bracket
- BH-5 swivel mount
- PG-2V extra DC cable
- PG-3D cigarette lighter cord with filter



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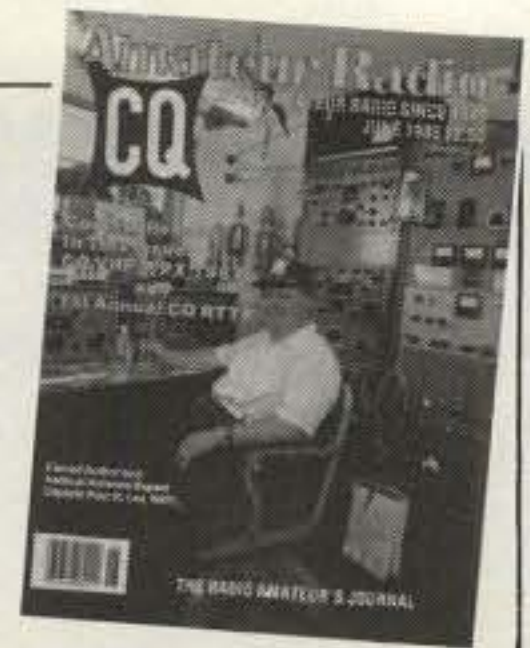
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**The Radio  
 Amateur's Journal**

**ON THE COVER:** You've read the book . . . you've enjoyed his  
 writing in CQ for over three decades. Now here's the man behind it all: Captain Paul H.  
 Lee, N6PL, USN (Ret.). Surrounding the captain is his classic SSB station with all  
 home-brew transmitting gear and ex-military receivers galore.



**JUNE 1988**

**VOL. 44, NO. 6**

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# Zero Bias

## AN EDITORIAL

**T**here was no great celebration at Charlotte this year in honor of the first anniversary of Novice Enhancement. There were, however, plenty of folks telling me about all the DX, country and zone totals, and states worked on 10 meters. Hardly anyone among the newcomers and resurrected old timers spoke of 220 MHz. License manuals sold quickly, especially Novice/Technician, which were the first to sell out. I would assume that people are using them and not starting a license manual collection. What's happening and where it's happening I guess depends on your point of view and where you live. From what I see at hamfests throughout the country, it is a very positive sign. What I'm hearing is the sound of excitement and the reports of people having fun.

The fleamarket at Charlotte had some great stuff and a few golden oldies that I remember being there in years gone by. I checked out the food concession and decided to skip it. Suffice it to say that you ate the food at your own peril. That being the one negative note, the rest of the weekend was pretty good. Everyone seemed to be taking something home from the fleamarket—a new toy, a new rig, or a new/old widget.

We added Kansas City to our itinerary this year, and as the song goes, "Everything's up to date in Kansas City." The Missouri State Convention was held at a new location this year, downtown at the Convention Center. It's a large two-block complex that can house several shows at the same time and even allow for growth. In fact, in the section next to ours, there was a high-school science and engineering fair. Some of the students managed also to find out about amateur radio that weekend. It would have been better, perhaps, if with a bit of coordination signs had been put up to invite all of the students over to see amateur radio first hand.

There was a first-rate fleamarket, and once again I found myself bringing home some goodies. One of these days I'm going to have to take a few weeks off and sort out years of hamfest accumulation. I was going to skip the food at this one, too, but I was challenged to actually eat some of it and give a first-hand report. The hot dog and Polish sausage tasted pretty much the same—bad. The nacho chips with jalapeno peppers and cheese weren't too bad, but the whole menu (which is typical of most hamfests) was strictly designed to give you heartburn and to activate Mona Loa. Stick with the soda.

The next one coming up is THE BIG ONE—Dayton. If you don't get excited over just hearing the name of the city, or wish that you were going (or going back), then you might as well pack it in. This is the place where dreams come true and fantasies are born. It's all one big amateur radio nirvana. Again, the all important word here is FUN. Don't forget it; you might be quizzed on it later. The reason why we all do the things that we do within the hobby is because it's FUN.

Speaking of fun and something enjoyable, if you haven't heard, our own Lew McCoy, W1ICP, will be presented with the Technical Achievement Award at Dayton. Lew's made a career of making learning, building, and operating FUN. For 28 years he filled the pages of *QST* with wonderful construction articles that actually taught you something about what you were doing. This August will mark the seventh anniversary of Lew's being a part of the CQ team, and he's still enhancing "The Living Legend's" legend (at least the part you can talk about). Lew is the perpetual Pied Piper of amateur radio, drawing huge crowds at hamfest seminars and at the CQ booth, where he answers countless questions on every subject in amateur radio. Thanks, Lew, for what you've done for all of us. You deserve the award.

### A Good Idea

Most hamfests, although run for two days, are really glorified one-day affairs. Sundays generally are slow in getting started and in the number of people, and the events are quick to end around mid-day. This year at the Charlotte Hamfest the committee tried a new approach which should be commended (and tried by other groups). License exams at Charlotte this year were held on Sunday. This gave prospective exam-takers an extra day to shop around for another version of a license manual and additional code-tapes, and to steep in the aura of all those goodies as an extra motivation to do well the next day. Presumably they also spent part of Saturday and Saturday evening doing some last-minute studying, which also helps. So, Sunday in Charlotte started out busy, and many licensees and upgraded amateurs went home Sunday with newly acquired gear, making them and the vendors happy. It seemed like a good idea to spark up Sunday.

### The Way Things Are

One of the problems with "reality" is

that it very rarely jibes with the way things "should be." The construct of "should be" is so subjective that it can mean practically anything. So within the confines of amateur radio, to try to define what amateur radio or an amateur radio operator "should be" is letting yourself open for a few hundred thousand definitions. What we as a group are like in mid-1988 is a far cry from what amateurs as a group were like in mid-1958. What we do, the equipment we use, the techniques at our disposal, and the frequencies we have are quite different from that of 1958.

To fixate in "should be" is like spending your time listening to *Lone Ranger* reruns when you "return to those thrilling days of yesteryear." It might be a nice place to visit, but you really wouldn't want to live there. When we fought the CB explosion with "should be," it amounted to Custer taunting the Indians. Lest we forget, the Indians won. The loser's consolation in our case was that we now have all those high-tech HTs and little rigs that are smarter than most of us. The millions of CB consumer "appliance operators" in effect paid for the R&D and technology to make our gear possible. Reality says that we're really not a big enough market on which to have spent that kind of money. Was the loss of 11 meters worth all that new gear and technology? Some would still argue the point.

What hams should be or shouldn't be is also up for interpretation. Most people will agree that the exams do not measure just what it is you have to know to be a good operator (that would be "reality"), but rather what you "should know" for some unexplicable reason. The operating logic is that it "should" exclude rather than include. Obviously, that must make sense to some people.

Reality also says that the government wants out of the amateur radio business. The FCC doesn't want to create more license classes, harder tests, more CW requirements, or anything else that may require part of their budget. Over the last several years they've worked to rid themselves of licensing exams and callsign designations, and in recent times they've even planned a change in emissions classifications to the point where CW will be called CW. "Should be" won't bring back any of it.

One thing is certain, though. Today's "reality" will be tomorrow's "should be" for the next generation.

73, Alan, K2EEK



# Handheld DX with the DX Handy™

The idea of handheld DX seems far-fetched, but it's actually very simple. The DX Handy is a battery powered (six penlight AA drycells included) SSB/CW transceiver with two watts output. DX Handy can also use nicad rechargeable batteries, or be powered with 9 VDC.

Two variable crystal oscillators (VXOs), each with 50 KHz range, can be selected with a top panel switch. Crystals for 28.250 to 28.300 and 28.300 to 28.350 Mhz are included, and other crystal ranges for the 10 meter band are also available at a nominal cost.

CW operation can be by either the built-in push button or with an external key or keyer. External speaker and microphone jacks are also provided, and the telescoping antenna is included. The DX Handy also has a top panel S-meter/ output power meter and an effective noise blanker circuit. DX Handy is housed in an attractive gray metal case comparing in size to popular VHF FM handhelds.

Ten meters is coming back strong. With DX Handy all amateurs, novice to extra class, can enjoy the thrill of working handheld DX.

**AEA**  
**Advanced Electronic Applications**

P.O. Box C2160  
Lynnwood, WA 98036-0918  
(206) 775-7373

## Specifications

### General

- Frequency Coverage: Any two 50 KHz segments in the 28.0–29.0 MHz Amateur Band (28.25–28.30 and 28.30–28.35 MHz supplied)
- Frequency Control: VXO provides 50 KHz of continuous tuning with a single crystal
- Frequency Stability: Within  $\pm 500$  Hz from a cold start
- Antenna: 50 Ohms Unbalanced, BNC connector
- Power Requirement: 8.4–9.0 VDC  
(Included): 6-AA Dry Cells (1.5 volt/cell) = 9.0 VDC  
(Optional): 7-AA NiCads (1.2 Volt/cell) = 8.4 VDC
- Current Drain: Receiving - Approx. 70 mA  
Transmitting - Approx. 620 mA
- Dimensions: (W) 66mm  $\times$  (H) 39mm  $\times$  (D) 142mm
- Weight: 710 Grams (1 lb. 9 oz.) with batteries and antenna

### Transmitter

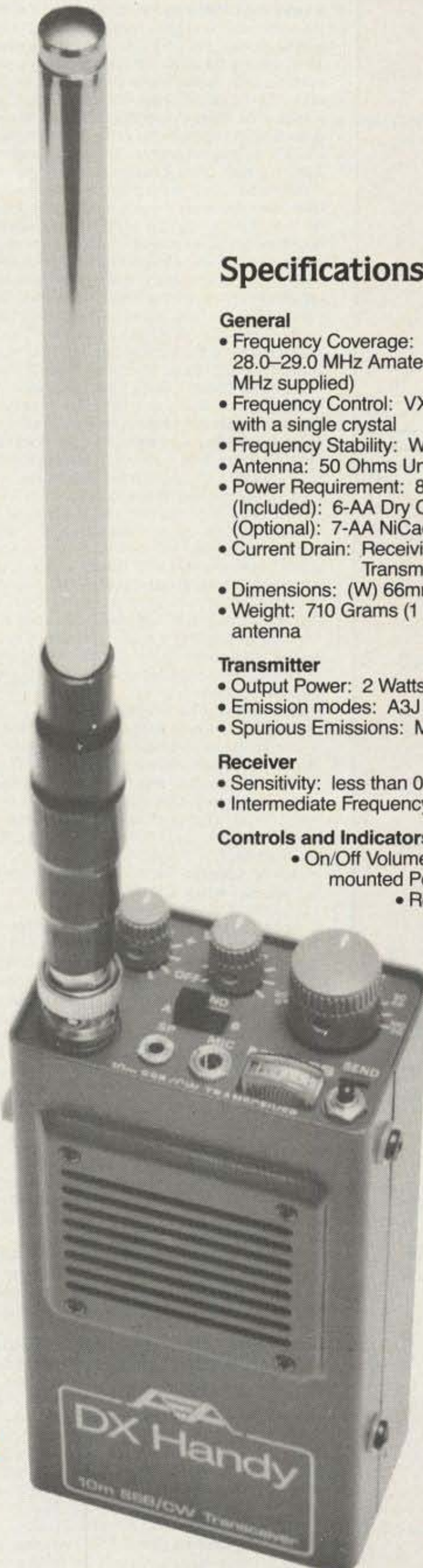
- Output Power: 2 Watts at 9.0 VDC
- Emission modes: A3J (USB) and A1 (CW)
- Spurious Emissions: More than 40 dB down

### Receiver

- Sensitivity: less than 0.5  $\mu$ V for 15 dB S/N
- Intermediate Frequency: 11.2735 MHz

### Controls and Indicators

- On/Off Volume control Top mounted Potentiometer
- Receiver Incremental Tuning (RIT): Top mounted Potentiometer with center off detent position
- Frequency: Top mounted 50 KHz VXO
- Frequency Range: Top mounted 2-position switch
- Noise Blanker: Top mounted On/Off switch
- S/RF meter: Top mounted S/RF meter
- Built in CW key: Top mounted momentary switch
- External Speaker output: Top mounted  $\frac{1}{16}$ " phone jack
- External Microphone input: Top mounted  $\frac{1}{8}$ " phone jack
- Antenna Connector: Top mounted Female BNC
- Transmit Indicator: Top mounted Transmit LED
- Push-To-Talk: Side mounted momentary switch
- External Power: Bottom mounted 2.1 mm coaxial
- External key input: Bottom mounted  $\frac{1}{8}$ " phone jack
- Mode Selector Switch: Bottom mounted 2-position switch
- Charge/External Power: Bottom mounted 2-position switch selecting 12 VDC external power function



**AEA Retail \$379.95**

**Amateur Net \$319.95**

Specifications and prices subject to change without notice or obligation.

**NOW  
FACTORY  
DIRECT!!!**

**STEP UP TO  
TELREX  
ANTENNAS  
ANTENNA SYSTEMS**

**"INVEST" in a Telrex antenna!**

Why gamble with shoddy antenna construction when Telrex makes available a professionally designed quality product.



Antennas that last **"Decades"**  
(not months)



**TB5EM/4KWP  
TB5ES/2KWP**

Some of the **WORLD'S finest.**

TB4EC 10, 15, 20 Mtr.  
TB5ES 10, 15, 20 Mtr.  
TB5EM 10, 15, 20 Mtr.  
TB6EM 10, 15, 20 Mtr.

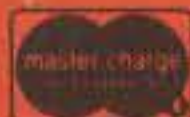
20M326 3 elem. 20 Mtr.  
20M536 5 elem. 20 Mtr.  
20M646 6 elem. 20 Mtr.

15M532 5 elem. 15 Mtr.  
15M845 8 elem. 15 Mtr.

10M523 5 elem. 10 Mtr.  
10M636 6 elem. 10 Mtr.

2MVS814, 2 Mtr. phased

Prices Subject to Change.  
All Prices FOB New Jersey



For data on the complete line of Telrex antennas phone (anytime) and leave your call sign, or write.

Phone: 201-775-7252

Write: **Telrex** P.O. Box 879  
Asbury Park, N.J. 07712

# Announcing

• **Correction**—SKANFEST, sponsored by the ARC of Skaneateles, NY, will take place on Saturday, May 28, not on May 27 as listed in the May issue of CQ.

• **Yaesu USA Consolidates Facilities**—Yaesu USA has announced the consolidation of their repair facilities at corporate headquarters in Cerritos, California. The move is effective immediately, closing the Hamilton, Ohio location. Owners of Yaesu hand-held and mobile radios can request service from Yaesu USA, 17210 Edwards Road, Cerritos, CA 90701.

• **Voice of the Andes**—"Ham Radio Today" has joined the programming line-up from the Voice of the Andes, HCJB Radio. HCJB is an international broadcasting station that has been operating from Quito, Ecuador in South America since 1931. "Ham Radio Today" is the program by ham radio operators for ham radio operators. Topics on the program include news items from all areas of the world, construction hints, propagation news, equipment reviews (both new and old), Morse code, components, RTTY, AMTOR, Packet Radio, and more. "Ham Radio Today" will be on the air every Wednesday at the following times to the following target areas (all times UTC): South Pacific 0800 and 1030, Japan 1206, Europe 2130, North America 0230 and 0630. (N. America is actually Thursday UTC day, but local time is Wednesday evening). For more information contact John E. Beck, Producer "Ham Radio Today," c/o HCJB Radio, Box 691, Quito, Ecuador, South America (tel: Intl. Access Code + 593 + 2 + 241-550 ext. 441).

• **Brookfield Zoo—Boy Scouts of America**—The Chicago Suburban Radio Association will operate from the Brookfield Zoo, Brookfield, Illinois on June 4 as part of the West Suburban Council BSA annual Scout-O-Rama. Operation will be from 1500-2300Z on SSB frequencies 7.240, 14.260, and 28.350 MHz ± QRM. A 2 meter FM station will be on 146.55 MHz. A full-color QSL card will be available to all stations that reply with their QSL card and a #10 business-size SASE to CSRA, N9BAT, Special Event, P.O. Box 88, Lyons, IL 60534.

• **Grand Forks, North Dakota**—The Forx ARC, Grand Forks, ND will operate WA0JXT on June 4 for the Northern Lights Council Boy Scout Centennial Camporall. Operation will be on SSB in the General portions of each band and is anticipated in the Novice voice portion of the 10 meter band from 1600-2400Z. For a QSL, send a QSL card and an SASE to WD0AQY at his Callbook address.

• **Madison, Ohio**—The Wireless Institute of Northern Ohio (W.I.N.O.), sponsored by the Lake County ARA, will be on the air to commemorate Ohio Wine Month on June 4 and 5. Saturday evening: 2300-0300Z on 3860 and 7235 kHz. Sunday: 1500-1900Z on 7235 and 14235 kHz. The station will be located at a winery in Madison, Ohio, and will use the call KO8O. An 8 1/2" x 11" QSL certificate will be available from: KO8O—WINO Weekend, 10418 Briar Hill, Kirtland, OH 44094 for a legal-sized SASE.

• **Sorrento, Louisiana**—The Ascension ARC will hold its annual Jambalaya Festival Special Event from June 6-12 between 1500 and 2359Z daily on the 20-15 and 10 meter bands. Special-event package contains three Jambalaya recipes (different each year), special-event certificate and card, club card with station, state and county worked, plus an honorary membership certificate for three or more stations worked. Send \$1.00 and QSL card with calls of station worked to: AARC, P.O. Box 278, Sorrento, LA 70778-0278.

• **Springdale, AR**—The Northwest Arkansas Radio Club will operate WD200DUC from June 1-17 as part of "We The People." The club will operate CW and voice on General and Novice subbands. For special "We The People" QSL card send your QSL and SASE to WD200DUC, P.O. Box 673, Springdale, AR 72765-0673.

• **Coon Rapids, Iowa**—The Western Iowa DX and Contest Club will operate KA0HIB on June 18 from 1500-2100Z to celebrate the Quasi-qui Centennial of Coon Rapids, Iowa. Suggested frequencies: 7.250, 14.250, 21.350, and 28.550. Special QSL card available for SASE to KA0HIB, 309 Grove St., Coon Rapids, IA 50058.

• **Fairmont, West Virginia**—The Mountaineer ARA will operate W200SP from June 18 at 0001Z to June 24 at 2359Z to commemorate the bicentennial of the U.S. Constitution. For special QSL card send QSL and SASE to P.O. Box 571, Fairmont, WV 26555.

• **Disneyland to Boston**—KX6B will operate mobile as part of the support team of Car #73 in the running of the 6th annual Great American Race. Operation will be from June 20 to July 4 to commemorate the 80th year since the running of the original New York to Paris Great Race, and will be daily from 1500-2300 UTC. Frequencies are the lower 25 kHz of the 40, 20, and 15 meter General phone bands and the 10 meter Novice phone band, with some evening operation of the 75 meter phone band. Mobile Packet on 145.01 and 2 meter FM on area repeaters. For QSL, send SASE to Dick Raley, KX6B, 2610 Camloop Drive, San Jose, CA 95130.

• **Escondido, California**—The E.A.R.S. will operate N6WB from June 19-25 in conjunction with the 100th anniversary of Escondido, CA. For large certificate, send QSL and large SASE to Glenn Bodeker, N6WB, 127 Walnut Hills Drive, San Marcos, CA 92069.

• **New York City, New York**—The Radio Club of Junior High School

22 N.Y.C., Inc. will operate WB2JKJ from 1100-1900Z June 27 in recognition of the first day of summer vacation for the school children of the Big Apple. Frequencies 7.238 and 21.395 only will be used. For QSL send QSO information to "The Crew at 22" via their Callbook address.

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

June 1-5, **Second Annual Convention of Chaverim International**, Harbor Island Spa, Long Branch, NJ. Contact Foster Kawaler, NV2W, 46 McGill Circle, Eatontown, NJ 07724.

June 3-4, **North Area Repeater Assn. Amateur Fair**, Minnesota State Fairgrounds, St. Paul, MN. Contact Amateur Fair, P.O. Box 857, Hopkins, MN 55343, or call 612-566-4000.

June 4, **Pine State ARC Hamfest**, Hammond Street Campground, Bangor, ME. Contact Gerry Bell, N1DQX, 207-989-4322.

June 4, **Central Ontario Amateur Radio Fleamarket**, Bingeman Park, Kitchener, Ontario, Canada. Contact Ray Jennings, VE3CZE, 61 Ottawa Crescent, Guelph, Ontario, N1E 2A8, Canada (519-822-8342).

June 4-5, **Apple City ARC Hamfest**, Rocky Reach Dam, 8 miles north of Wenatchee, WA. Contact Bob Lathrop, 919 N. Woodward Drive, Wenatchee, WA 98801.

June 5, **Newington Amateur Radio League Hamfest**, Newington High School, Newington, CT. Contact Lew Andrew, KA1KRP, 23 Grove Street, West Hartford, CT 06110 (SASE) (203-523-0453).

June 5, **Breeze Shooters Hamfest**, Swan Amusement Park, near Greater Pittsburgh International Airport, PA. Contact Jim Inverarity, K3TOQ, 2639 Sunnyfield Drive, Pittsburgh, PA 15241 (412-833-2681).

June 5, **Manassas Hamfest and Computer Show**, Prince William County Fairgrounds, Manassas, VA. Contact Ole Virginia Hams ARC, P.O. Box 1255, Manassas, VA 22110, or call Jack Gunsett, K14VP, 703-361-5255.

June 5, **Chelsea Swap 'n Shop**, Chelsea Fairgrounds, Chelsea, MI. Contact Robert Schantz, 416 Wilkinson St., Chelsea, MI 48118.

June 5, **Humboldt ARC Hamfest**, Humboldt, TN. Contact Ed Holmes, W4IGW, 501 N. 18th Ave., Humboldt, TN 38343 (901-784-3490).

June 10-11, **Tenth Annual Superfest**, Loveland, CO. Contact Bud Hayes, W0JFN, 3109 N. Douglas, Loveland, CO 80537 (303-663-3119).

June 11, **CMARA Hamfest**, Midland Community Center, Midland, MI. Contact CMARA Hamfest, P.O. Box 67, Midland, MI 48640 (SASE), or call 517-631-9228 evenings and weekends.

June 11, **Winston-Salem Hamfest and Computer Electronics Fair '88**, Dixie Classic Fairgrounds, Winston-Salem, NC. Contact Dave Ward, KA1LVO, 5573 Vienna-Dozier Rd., Pfafftown, NC 27040.

June 12, **Six Meter Club of Chicago Hamfest**, Santa Fe Park, Willow Springs, IL. Contact Mike Corbett, K9ENZ, 606 South Fenton Ave., Romeoville, IL 60441.

June 12, **Goodyear Family Hamfest**, Wingfoot Lake Park, near Akron, OH. Contact Don W. Rogers, WA8SXJ, 161 Hawkins Ave., Akron, OH 44313 (216-864-3665).

June 12, **SEMARA Hamfest**, South Dartmouth, MA. Contact Pete Kodis, N1EXA, P.O. Box 9187, North Dartmouth, MA 02747 (SASE).

June 12, **Michiana ARC Hamfest**, University of Notre Dame Athletic and Convocation Center, South Bend, IN. Contact Joe Mergen, N9GID, 2030 Trailridge North, Mishawaka, IN 46544 (219-258-0577).

June 12, **Central PA Ham and Computer Fest**, Winfield Fireman's Fairgrounds, Milton, PA. Contact Jerry Williamson, WA3SXQ, 10 Old Farm Lane, Milton, PA 17847 (717-742-3027).

June 12, **Hall of Science ARC Hamfest**, NY Hall of Science parking lot, Flushing Meadow Park, Queens, NY. Contact Steve Greenbaum, WB2KDG, 718-898-5599 (evenings).

June 12, **Ham-O-Rama 88**, Erlanger, Kentucky Lions Park, KY. Contact WA4BRM, c/o NKARC, P.O. Box 281, Florence, KY 41042 (606-371-8545).

June 12-15, **IEEE International Conference on Communications '88**, Wyndham Franklin Plaza Hotel, Philadelphia, PA. Contact ICC '88, c/o ATT Network Systems, 1800 John F. Kennedy Blvd., Suite 1300, Philadelphia, PA 19103 (1-800-ICC88PH).

June 18, **SWL Fest**, at Gilfer Shortwave, Park Ridge, NJ. Contact Paul Lannuier, N2HIE, P.O. Box 239, Park Ridge, NJ 07656 (201-391-7887, 10 a.m. to 5 p.m.). Hams welcome.

June 18, **Cortland Hamfest**, Cortland County Fairgrounds, Cortland, NY. Contact Jerry Falletta, KD2DR, 607-844-9350.

June 18, **Raritan Valley Radio Club Hamfest**, Columbia Park, Dunellen, NJ. Contact Dave, KA2TSM, 201-763-4849.

June 18, **Independent Repeater Assn. Hamfest**, National Guard Armory, Grand Rapids, MI. Contact Independent Repeater Assn., 562 92nd St. SE, Byron Center, MI 49315 (616-455-3915).

June 19, **Frederick ARC Hamfest**, Frederick County Fairgrounds, Frederick, MD. Contact Dave Durkovic, N3BKD, 7128 Limestone Lane, Middletown, MD 21769.

June 19, **Monroe County Radio Communication Assn. Swap & Shop**, Monroe County Fairgrounds, Monroe, MI. Contact Larry Linder, KB8AIZ, 2001 Ida-Maybee Rd., Monroe, MI 48161 (313-587-3663).



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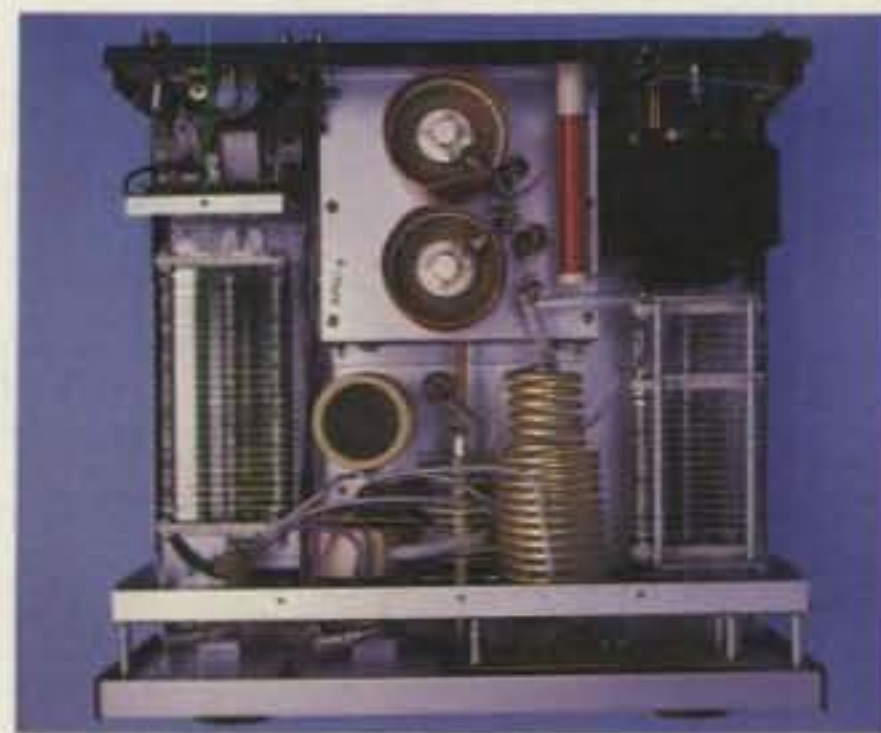
meter, a multi-meter to read grid current, forward power, reflected power or plate voltage, HI/LO plate voltage select, STBY/OPR switch and power ON/OFF switch. A red LED warns you if grid current becomes excessive and three other LEDs indicate status: WAIT, STBY and OPERATE. Vernier TUNE and LOAD controls, in combination with an outstanding RF deck design, make the Titan a real "pussy cat" to load and operate.

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The Titan has been the subject of two "product review" magazine articles. See QST, April 1986; CQ February 1986.

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## Our Readers Say

### W7PHO Remembered

Editor, CQ:

You are probably aware of the death of Bill Bennett, W7PHO. There are a lot of facts about this very unique amateur who had few peers in the DX world. Many of them were documented in my first DX column in CQ, January 1977. (W7OM was a contributing editor of the DX column until business pressures curtailed his writing for CQ.—ed.) The facts were true then and on the day he died at his operating position while taking part in the W7PHO Family Hour net on 14226.5. There are some other things that I think would be of interest to your readers.

*The Bill Bennett, W7PHO Scholarship.* The Western Washington DX Club has sponsored through the ARRL Foundation a scholarship for international studies. This will be an annual scholarship. The funds sent to the ARRL Foundation are tax deductible and all funds go to the students. All administrative costs are borne by the foundation. The nice thing about this approach is that anyone can contribute to it in anyone's memory. This will allow us to remember other DXers as they become Silent Keys. The intent is to carry on the international goodwill in which Bill gave so much of himself.

*The ARRL Outgoing QSL Bureau.* Unknown to most, Bill, W7PHO, was the major force behind the scenes that established the bureau. He worked feverishly on this project for many years. With the help of Bob Thurston, W7PGY, the Northwest ARRL Director, he laid out the campaign that won. Through other DXers, several of whom became ARRL directors, he loaded the court. The super conservatives, who were afraid of the postal service, were won over.

The DX world owes a lot to this man. Hopefully, the scholarship which is given annually from the interest (not the principal) will keep his good work in our minds, so that we may add to it.

I am going to send a copy of this note to John Attaway for consideration of Bill in the DX Hall of Fame. He has been a candidate in past years. It is somewhat sad that we recognize others when they're gone, but that is life. Hopefully, we will leave this world better off for having been here. Bill did so with our DX hobby.

Rod Linkous, W7OM  
Seattle, WA

### Not Always Our Fault

Editor, CQ:

I am writing about the article in the March 1988 issue of CQ called "A Case of Mysterious Interference Solved." I think you are right about amateur radio operators getting blamed for interference that occurs on televisions, radios, etc. When I'm in the car with my mom and we pass by a certain place, we get interference on our radio. I am glad that in the article he found out where the interference came from and that the neighbor agreed to stop using the "Bug Away."

Alfred Diedrich, KB2BED  
Coram, NY

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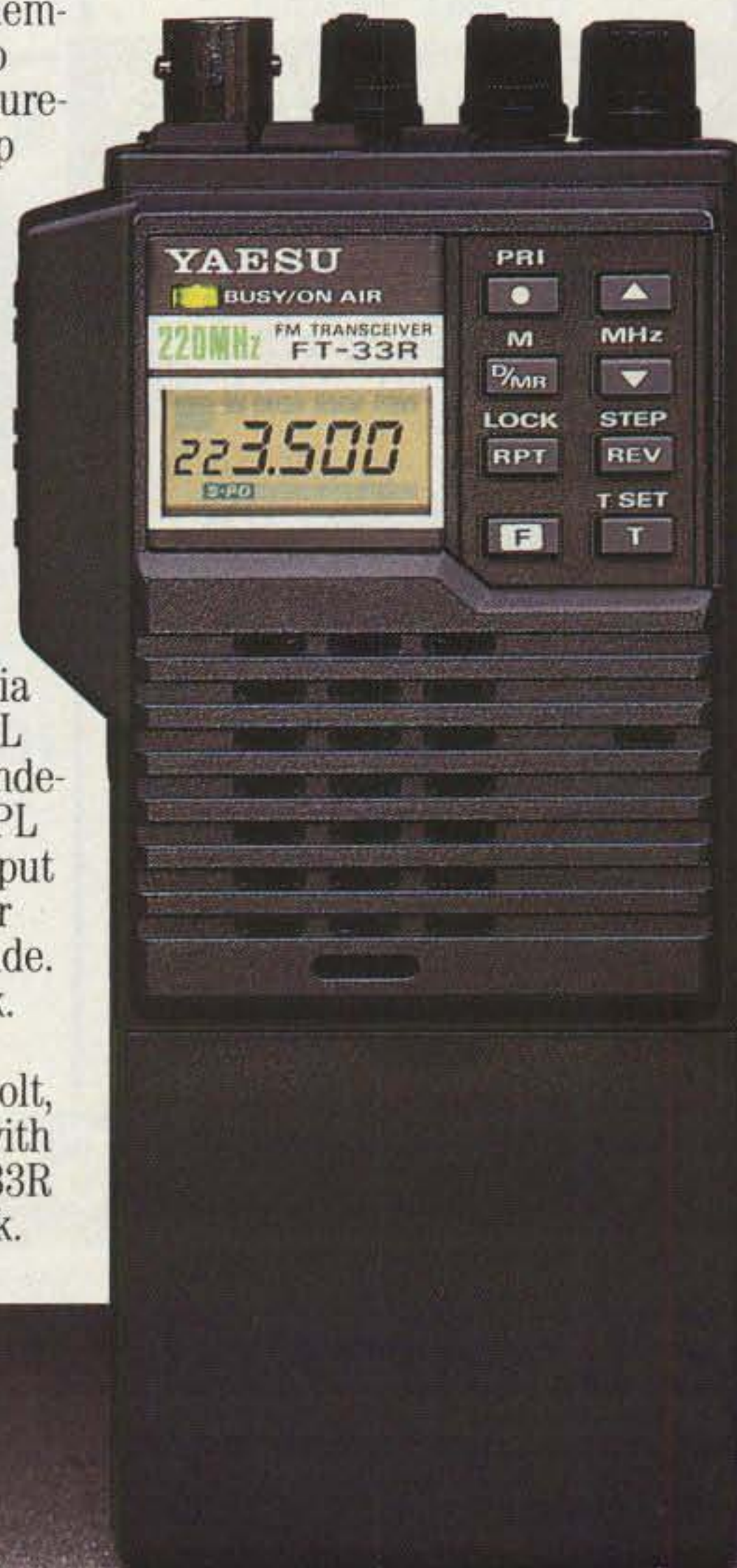
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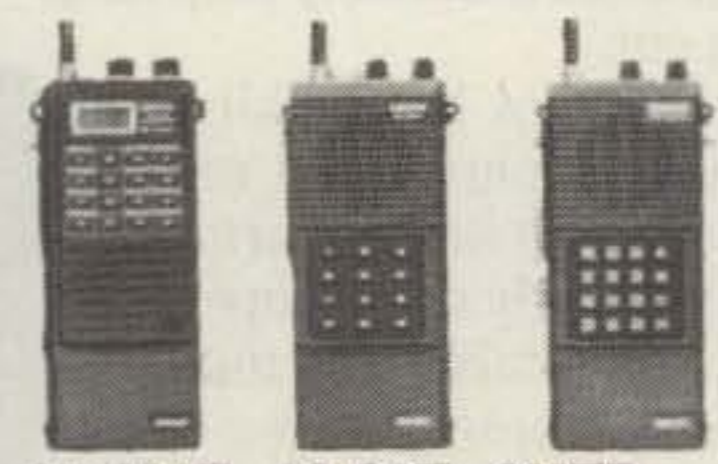
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# CQ REVIEWS:

## The Robot Research Inc. Model 1200C Color Slow Scan Converter

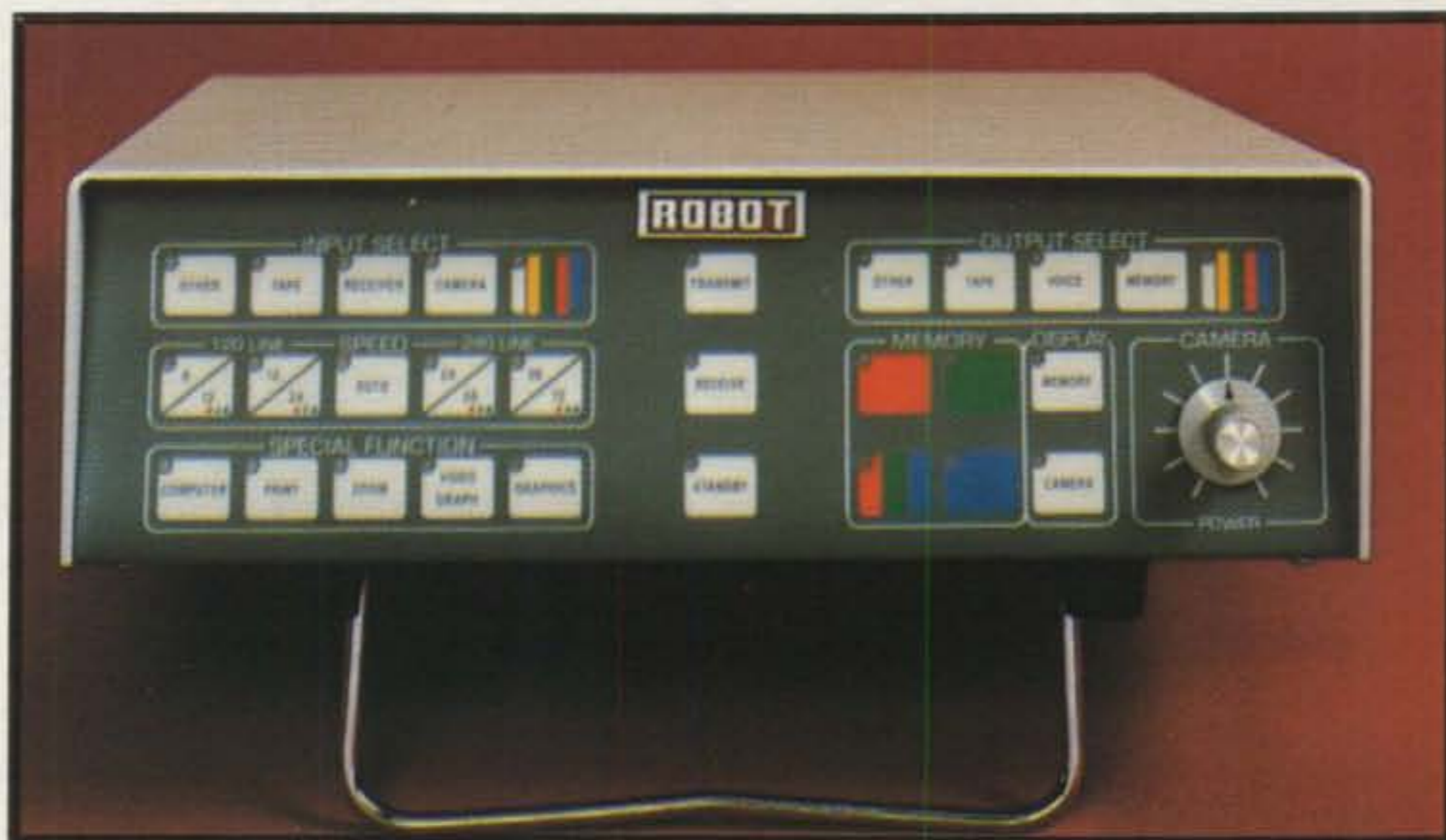
BY WILLIAM H. DEWITT\*, W2DD

*In the days when we ran a regular SSTV column, Bill DeWitt, W2DD, was its editor for several years. Bill was one of the original devotees of SSTV and that slow moving green picture. Recently, Bill's interest in SSTV rekindled and he, like you, has a whole new world of high-tech gear at his disposal.*  
—K2EEK

**S**low scan television is a still picture transmission system invented by an amateur named Copthorne MacDonald about 30 years ago. On a worldwide basis there are probably about 30,000 amateurs using SSTV at present. By gentlemen's agreement SSTV is used principally on 3845, 7171, 14230, 21340, and 28680 kHz, but a whole range of frequencies can be used in accordance with license classification.

Slow scan television has come a long way since its invention by (the then college senior) Copthorne MacDonald. In MacDonald's system, image brightness

\*2112 Turk Hill Rd., Fairport, NY 14450



Front view of the Robot Research 1200C color scan converter.

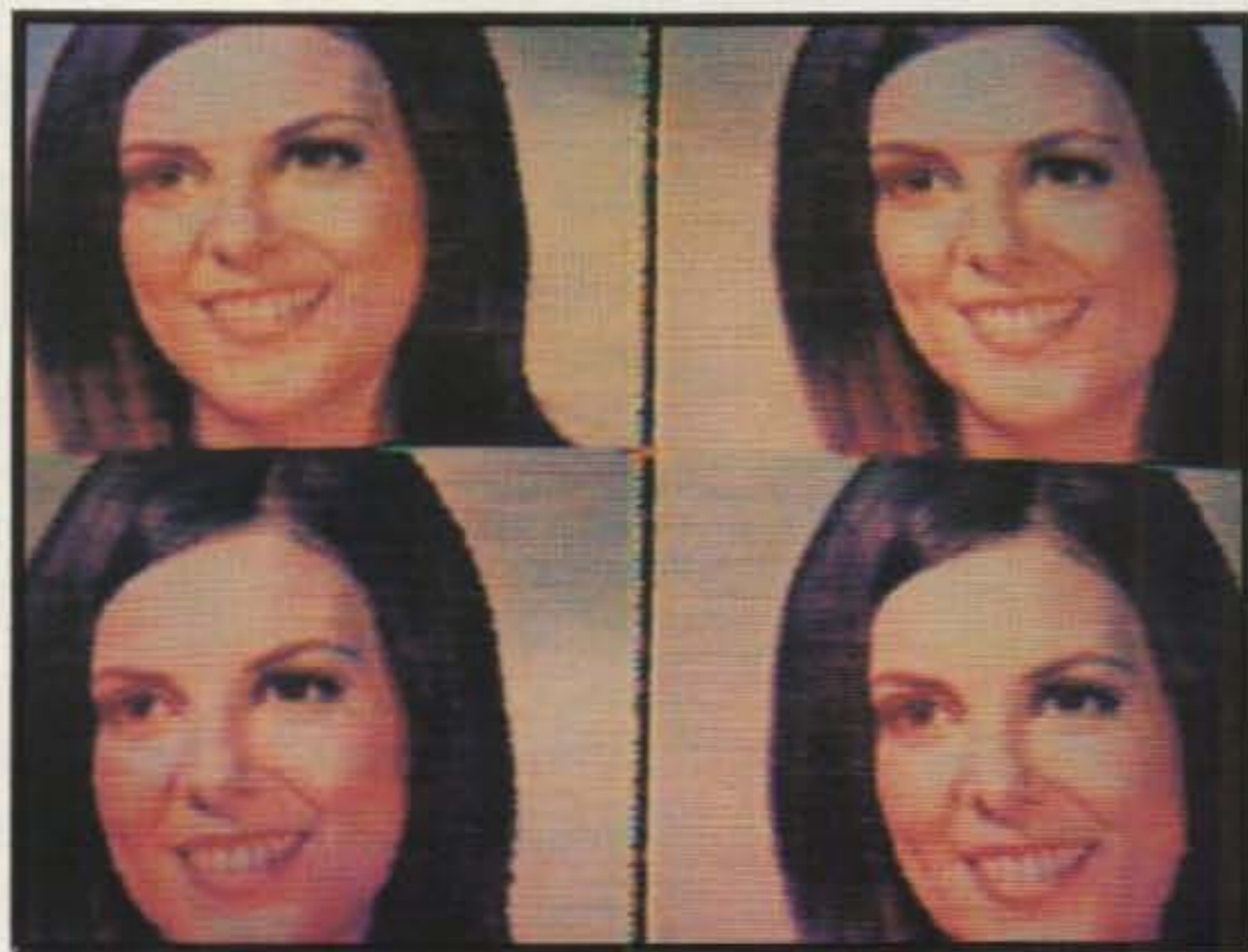
information is converted into audio tones ranging from 1500 Hz (black) to 2300 Hz (white) to create a 128-line picture in 8 seconds. This brightness to audio tone relationship is still universally used. An SSTV signal has a characteristi-

cally strong warbling sound as you tune across it.

In the early life of SSTV, pictures were displayed on a long-persistence screen CRT. There was a disturbing disappearance of the top part of the picture as



By combining pages 1 and 2, one 240-line full-color picture can be stored.



Another variation easily accomplished is "quad" operation, where up to four reduced-size pictures can be displayed.



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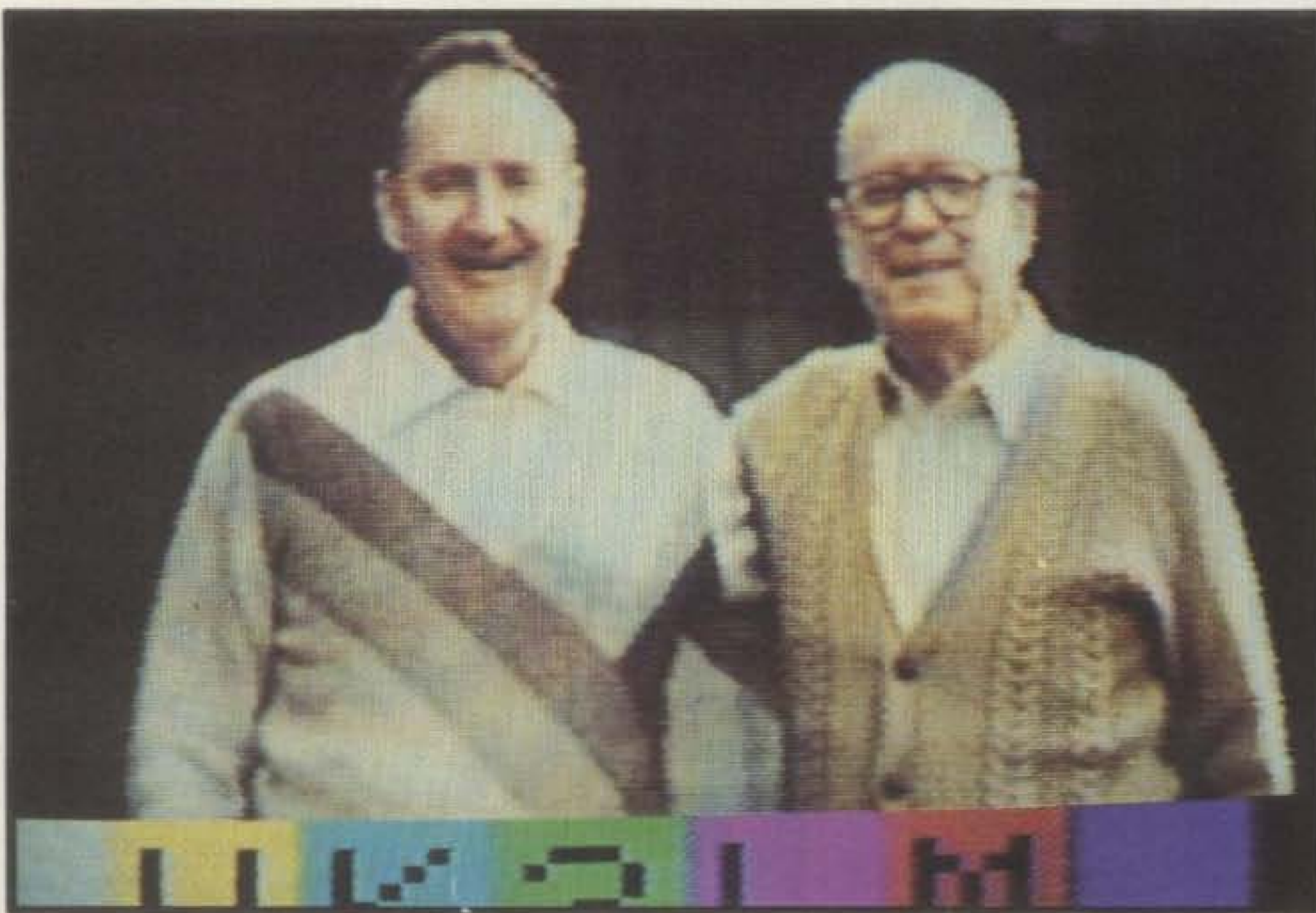
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VK3LM, John, left with VK4ZG, George, or Brisbane.

the 8 second scan ended at the bottom. However, the system did work and it provided the basis for continuing effort to improve it.

### SSTV In The Digital Age

With the advent of digitized data handling and IC storage systems the just-mentioned transient nature of SSTV pictures was eliminated, and over a period of time a number of color SSTV systems came into use. The Robot Research Inc. Model 1200C Color Scan Converter introduced a few years ago now dominates color SSTV operation in the U.S.A. and a large part of the rest of the world. Without a doubt it has also been a prime factor in the rebirth of interest in SSTV. More SSTV stations are coming on the air every week and intercontinental exchanges of color pictures have become a non-event!

Against this background, now seems like a good time to have a look at the picture quality and operating features of the Robot Model 1200C.

### First Things First

The Model 1200C I tested was well packaged and arrived in perfect condition with basic cables and instruction manual. It's a compact, low-profile piece of gear only 11.25" W x 4.0" H x 12.5" D. Power consumption is an underwhelming 10 watts.

The notebook-form instruction manual supplied is excellent. It gives specific operating instructions and tells how to make a demonstration tape that helps the user get started with the 1200C. It also includes a wealth of information regarding computer controlled operation, hard copy printout, the use of an RGB monitor,

necessary diagrams, and sample programs in Basic. My congratulations to Robot for producing a manual that can be understood by someone other than the inventor!

Now let's get down to the nitty-gritty and review the features of this little gray box that helps amateurs send pictures all over the world.

### A General Description

The Robot Model 1200C is a microprocessor-based high-resolution color video scan converter and image processor. Its design technology is based on an 8031

microprocessor system including 16K bytes of ROM and 2K bytes of RAM. Image display is supported by 1,105,920 bits of RAM. High-quality full-color images can be transmitted or received over any voice-grade communications link in as few as 12 seconds per frame. Since brightness and color data are multiplexed in transmission, images appear in full color as they are created on the monitor screen.

When combined with a suitable host computer, the 1200C will support sophisticated image processing as well as error-free digital image storage. Pictures can be held in memory for continued viewing and/or stored for future use on an ordinary cassette tape.

Many modifications have been devised and applied to the 1200C. This review deals only with the Model 1200C Color Scan Converter as sold by Robot Research Inc.

### Some Comments On Picture Quality

If you have any memories of "old-time SSTV," throw them away! *Under good conditions overall picture quality approaches that of U.S. broadcast television.* For a given receiving condition, picture quality varies in accordance with frame time. Color reproduction is excellent.

### A Few Comments About The 1200C Controls

The 1200C uses state-of-the-art concepts in control-panel design. Twenty-seven light touch switches with LED indicators are used to control all functions except camera brightness and AC input. The light touch switches are physically grouped



Treasury Building and Town Hall, Perth, Western Australia.

according to function. A logical layout of the Memory, Speed, Display, and other controls makes it easy for the operator to choose or change functions quickly. Red LEDs let you know what functions are enabled.

### Principal Features and How They're Used

1. Five signal inputs are possible on the 1200C. They include: standard color bars, received SSTV audio, taped SSTV, frame grabbed camera SSTV, and "other" for a source of your choice. Similar outputs are available for transmission.

2. Compatibility with other systems. The 1200C can send and receive 8 second B/W pictures, and its 12 second color pictures can be received as B/W on scan converters having that frame speed. These built-in features make the 1200C compatible with the thousands of stations still operating in solely the B/W mode.

As delivered, the 1200C is not compatible with a line-sequential system widely used in Europe.

3. Color and B/W Camera Capable. Almost any color camera will work with the 1200C. You can also make a composite color picture using a black-and-white camera with color filters to sequentially record (and then combine) red, green, and blue filtered images of still subjects.

4. Multiple Speeds. Four frame speeds (each) are provided for color and B/W operation. This feature lets you choose the speed that works best with the prevailing conditions.

5. A Two-Page Memory. There are six independent image memories, three to a page. These memories may be loaded, transmitted, or processed in any order desired. They can be combined to transmit or receive medium- or high-resolution full-color images.

Two 120-line pictures can be stored at the same time (one on each page).

Combining pages 1 and 2, one 240-line full-color picture can be stored; see fig. 1. Combining pages 1 and 2 also permits "QUAD" operation in which up to four (reduced size) pictures (the same or all different) can be displayed in the four quadrants of the monitor screen; see fig. 2. A dream of the sixties comes true!

6. Transmit Cursor. A full screen width cursor indicates the image line being transmitted. This is a very useful feature when transmitting pictures or taping a series of pictures.

7. A total of 262,144 possible Color Combinations. Eighteen bits of digital information define each picture element, making available a practically unlimited palette of colors. The color reproduction is truly excellent.

8. Color Bars. Standardized color bars can be enabled for set up and testing or for direct transmission. Great for adjusting your color monitor.

9. Fully Automatic Receive Operation. At the user's option the 1200C will perform all SSTV receive functions automatically when receiving color SSTV signals originating with another 1200C. This is high-tech at work.

10. Automatic Fine Tuning. ROBOT developed software detects mistuning over a 300 Hz range and compensates automatically, assuring accurate color reproduction. This feature is especially helpful to a distinguished few operators who consistently miss-tune SSB voices.

11. Computer Interface. When interfaced with a suitable host computer, the 1200C becomes a sophisticated image processor limited only by the controlling software. Great graphics from W5ZR and N6GEA demonstrate this daily.

12. Printer Interface. The 1200C can easily be interfaced with any Epson Series 80 printer with graphics capability to produce black-and-white hardcopy output. A Transtar 315 Color graphics printer is necessary for color reproduction.

13. Model 1200C units operating on 60 cycle current are configured for NTSC

composite color video; 50 cycle for PAL composite color video.

With its price tag of \$1295.00, the 1200C is not an inexpensive piece of equipment. It's also a piece of equipment with a state-of-the-art design that permits creative use of the unit by itself or in combination with computers and other graphics sources. It has a reputation for good, stable operation.

If you enjoy the excitement and pleasure of viewing good-quality pictures of faraway amateurs, their homes, families, cars, places of interest, and countless other subjects, then this gear is well worth the price.

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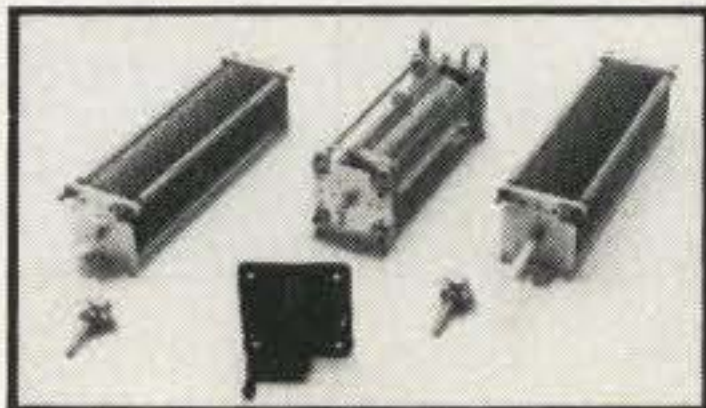
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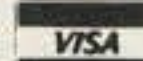
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# Results of The First Annual CQ World Wide RTTY 1987 DX Contest

ROY GOULD\*, KT1N

**W**ell, I just can't get over the level of participation in the first CQ WW RTTY DX Contest sponsored in conjunction with *The RTTY Journal*. Let me give you some history on how this came about. Having been an active amateur for many a year and being 1 away from the mixed honor roll, I found them harder to find. So, I became interested in RTTY. Now, everyone knows that no one on RTTY can type, so I thought I'd fit right in, a real natural, and no one would notice.

Before I knew it, I found myself chasing DX on the keys. It was fun, and I discovered a whole new group of friends. During this time, the *Journal* ran an annual RTTY contest. The contest was good, but it needed some work. A group of us talked about it and thought it would be great if CQ would cosponsor the contest. After all, we all know they run the best contests in the world, right?

One thing led to another, and before I knew it I was editing the "DX Column" for the RTTY Journal. I usually make the trip to Dayton, and I found myself chatting with the gang from CQ about RTTY and Contests. On one of these visits, I discovered that Dale W6IWO was the new owner of the *RTTY Journal*. In the interim, I had been talking to Alan and Dick at CQ about the contest, and now with Dale on the scene we soon found ourselves with the First CQ WW RTTY DX Contest, co-sponsored by *The RTTY Journal*. After a number of passes at the rules and the help and suggestions of many we were on our way. What better time to hold the CQ WW RTTY than the last full weekend in September, followed by the Phone and CW contests.

I was a bit skeptical about the first one. I couldn't help but wonder about the level of activity. Would the ops from Europe and Asia get into it? Then the weekend came. **WOW!** What activity. I was part of the group that went to the Galapagos as HD8CQ. I could not believe my ears, or should I say my screen. The level of activity was fantastic, and I can only envision this contest growing and growing. A great many of you have sent notes with your logs with suggestions and ideas. Many of

## PLAQUE WINNERS

**WORLD SINGLE OPERATOR:** Advanced Electronic Applications, Inc. (AEA). Won by: **Andy Mc Lellan, VE1ASJ.**

**WORLD MULTI- OPERATOR:** Advanced Electronic Applications, Inc. (AEA). Won by: **Assoc DX-EX, Ecuador, HD8CQ.**

**TOP SCORE NORTH AMERICA:** HAL Communications Corp. Won by: **Barry Gardner, W3FV.**

**TOP SCORE SOUTH AMERICA:** Association DX-EX Ecuador S.A. Won by: **Raul Gonzalez F., HK1LDG.**

**TOP SCORE ASIA:** Don Busick K5AAD. Won by: **Assaf Ekshtein, 4X6MH.**

**TOP SCORE EUROPE:** HAL Communications Corp. Won by: **Piero Giacomelli, IK5CKL.**

**TOP SCORE OCEANIA:** *The RTTY Journal*. Won by: **Joe Voelkelt, KL7LF/KH3.**

**TOP SCORE AFRICA:** George Hitz W1DA. Won by: **Jean-Louis Domange, TR8JLD.**

them are in the "soap box." Some we'll incorporate with a revision of the rules. But, first, lets get to the results, I will outline those changes later.

## Scoring and Logs

Many of you will find that your score has changed from the original log you sent in—in most cases it has gone up! The biggest confusion, was whether or not the USA and Canada count as country multipliers.

The answer is yes. The rules state that the ARRL DXCC and WAE lists will be used, and, of course, the US and Canada count on those lists. I realize now, after many hours of changing scores, that I should have clarified that point. So for future reference, remember they count! For those that didn't take the credit, I added it. Many logs came through with out summary sheets, pages not totaled, US and VE contacts with no state or province logged, etc. This time we'll overlook most of these errors, this being the first contest. The rules may not have received the widest coverage. I spent a considerable amount of time getting the logs in the kind of shape that was needed to do this report. As I stated earlier, this time okay, but next time *please* provide summary sheets and complete logs. Follow the rules.

Nearly 300 logs were received for this

inaugural RTTY contest. I am sure it is going to be *the* RTTY contest. With everyone's help, we can get the results back to you as soon as possible.

## All Bands

Andy, VE1ASJ, put in a fantastic effort to win the world with a score of 306,075 points and a QSO total of 489. Not far behind was Raul, HK1LDG, with 503 QSOs and a total of 297,400. Interesting that Andy's QSOs with the US were 2 pointers but he made up for it with more country multipliers, 103 for Andy to Raul's 76. Taking 3rd place was IK5CKL, Piero, with 265,640 points and 454 QSOs.

First USA was Barry, W3FV, with 258,000 points for 4th place World Wide, and Barry missed the first 5 hours of the contest but still put in almost 30 hours. He was followed closely by W2FG, Ted, with 251,196 in 5th place.

## Single Bands

There were a number of single band entries for almost all the bands, but of course 20 meters brought the most. 1st place in the world on 20 goes to 8R1RPN with 393 QSOs and 64 countries. A battle



OK2FD finished 6th in the world, all band.

\* P.O. Box DX, Stow, MA 01775



SV1UG netted 130 QSOs for 24,570 points to place first in Greece.



Rich, N6GG, ready to go. He finished with 269 QSOs on all bands to win W6.



Toshio, JA1BWA, took first place in Japan (all bands) with 49,228 points.

## TOP SCORES

WORLD All Band		CANADA All Band	
VE1ASJ	306,075	VE1ASJ	306,075
HK1LDG	297,400	VE6CB/3	95,360
IK5CKL	265,640	VE6ZX	52,670
W3FV	258,000	VE7YB	16,050
W2FG	251,196	VE2JR	11,160
OK2FD	247,470		
HB9BNP	232,624		
TR8JLD	219,657		
ZV2BW	192,558	World 14 MHz	
CS7NH	148,680	8R1RPN	148,224
		NB2P	125,184
		W1DA	119,865
		CX7BY	96,945
		4X6MH	96,726
USA All Band		Multi-Op	
W3FV	258,000	HD8CQ	1,447,065
W2FG	251,196	TG9VT	591,838
WB5HBR	125,545	LZ1KDP	513,280
N6GG	99,470	ED1BM	352,347
K6WZ/Ø	71,442	KA3GIK	260,463

took place for 2nd and 3rd with Dan, NB2P, taking the No.2 spot with 125,184 and George, W1DA locking in 3rd with 119,865 points. The other bands had a scattering of entries, however some good efforts by CE6EZ on 10 meters with 116 QSOs and CT4UE with 154 QSOs and 36 countries on 40 meters.

### Multi-Operator

The biggest and overall high score for the contest goes to HD8CQ from the Galapagos. 1,222 QSO's on all bands with 150 countries for a total score of 1,447,065! This group was made up of myself and three other RTTY DXers from the states along with a group from Ecuador and the island of San Cristobal in the Galapagos. The operating site was from a hill top at 1800 feet above sea level. It was a pleasure to operate from and to watch the action in this First CQ WW RTTY contest.

The gauntlet was thrown and John, TG9VT, picked it up and tried a multi from his QTH with W2JGR and others. The additional point that the HD8 gang received for each US and Canadian QSO was too much to overcome. TG9VT came in with 591,838 points for 2nd place. Not far be-

hind came LZ1KDP with 513,280. The gang from there always puts in a good effort and made 651 QSOs. 4th place goes to a great effort by ED1BM with 352,347 with 570 QSOs, brought up by KA3GIK in the State of Pennsylvania with 260,463 with 456 QSOs. They are a husband and wife team, Elizabeth and Pat, WB3FIZ, and active in all the RTTY contests.

### Changes in the Rules

The rules will stay basically the same except for the following:

1. We are going to **delete** the **160 Meter Band**.
2. Dupe sheets for each band only when the contacts are over **50** for that band.
3. The complete rules will either be in this issue or the following depending on space.

### Summary

Thank you all for your support and comments. All certificates are in the mail for the winners, and also to all entrants (everyone who sent in a log will receive a certificate of participation). Hope to see all of you in September. Mark the 24th and 25th of September.

73, Roy KT1N

### RTTY Chatter de USA

Best feature of test, was it took Hal WA7EGA and Roy KT1N out of town to HD8CQ, gave us a chance hi hi . . . KB2VO/4. Now I know what a sardine feels like after operating between 14.080 and 14.100 . . . KD6PY. Lets do it again next year!! . . . W8JAO I have been in many RTTY contests but there were many more contacts in this as any other, enjoyed repeated runs on many bands . . . K6WZ. Great contest, really enjoyed it . . . ABØY/4. Biggest surprise was CEØZIJ upside down even . . . WA3ZKZ. How about a power multiplier for 100 watts or less? . . . WA4DYD. Regular CQWW not suited for this test, and how about dupe sheets for 100 QSOs or more? . . . W6BSY. Twice the number of QSOs than any previous RTTY Contest . . . W2FG. Lots of activity for an inaugural contest, new ones 8R1, CP, and 4U1UN . . . KØBJ. One of the operators at HD8CQ said he was glad it was almost over as they were out of

Scotch!..W6IWO. First contest entered, the exchange is great! 1 buffer . . . WA6PJR. Where were KH6 and KL7? lots of fun see you next year . . . WB6WQA. XYL broke ankle, with her needing attention my rest periods look liked operating periods and vice versa see you next year . . . W4UW. Lots of good activity for 1st one, KH3 and HC8 were good catches, Good Luck . . . N8BJQ. Super contest, forgot to monitor my time and had to subtract last 3 hours of operating! GROAN . . . N6GG. Could only spend a few hours but worked 5 new ones . . . AA2Z/1. Glad to have contributed . . . N7RY. Congrats on a Super contest . . . KA7IVA. Lets make the rules for this the same as CW and Phone . . . W2KHQ. Our first experience at a RTTY contest and for most of us RTTY, how about a Multi-Multi? . . . the ops at N8ABW. Worked an LZ who loved my call, his name was IVO . . . WB2IVO. I still hear "chirping" in my sleep! . . . KD8NJ. First contest in 10 years! . . . W6OXP. Excellent participation, sorry I missed first 5 hours . . . W3FV. Worked 6 new countries . . . N2WK. Sorry we didn't hit it harder, but got discouraged by band condx here in the Pacific Northwest . . . NG7P. Good Luck, I had a great time . . . WA8FLF. The contest was great and long due, fast paced and competitive . . . NJØM. Nice to work 40 countries in 2 days on RTTY!! . . . AB9O. This has got to be the PREMIER RTTY contest, right combo of multipliers and exchange . . . W1DA. Worked WAC in 62 QSOs..W6CN. You must have shooked the trees for this one, so many stations! . . . K2PEQ. 3 hour off time is to long, how about 1 or 2? . . . WF5E.

### RTTY Chatter de DX

Keep up the good work CQ with yet another winner . . . ZL1BIL. Why not call it Digital Contest to encourage Amtor etc? . . . VU2IJ. Good participation, poor propagation . . . ISØVME. Got a new one . . . JA8RUZ. Tough one with cheap interface . . . HI8DLA. Still got this numb feeling in my fingers . . . YB1BG. Please add list of official State and VE abbreviations . . . OH2LU. I cannot find meaning of "dupe" sheet in my dictionary, hope log is ok . . . PAØYN. I am going to get CQ again just to keep up with rules and results of this one! Nice going guys, what interest!! . . . 73, Andy VE1ASJ. I am a CW man since 1950, but this was pleasure to work . . . HBØHB9NL. Good Condx, lots of activity, see you next year from GD . . . G4SKA. Don't forget to look for VE RTTY above 7.100 . . . VE3UR. How about 0 points for own, 1 for same continent, and 3 for DX? . . . DJ6QT.



John, TG9VT, advises operator Jules, W2JGR, and logger Mirna during their second place world-wide multi-op effort.

Great to work Jean F8XT after many years, good contest... VE7YB. Looking for 88 test!!... EA5FKI. Thanks Yanks, had a pile up on me on 15 and 20..unheard of!! Promise you'll do it again next year?... G0ATX. Difficult being rare DX, lost 5 for everyone worked, lots of QRM... J88BN. Where were all the AX.25 stations?..

G0AGH. No time for all bands, maybe next year... I2VXJ. Come on guys, give 10 Meters a try... CE6EZ. Tnx for the contest... ZL2AKI. Rules are to loaded in favor of USA and Europe... ops at VU4QJX. Good activity, poor timing, same as SAC Phone... SM5FUG. Biggest thrill was pulling HL1IE out of the noise 6 minutes

before the end... TG9VT. 48 hours is long time for RTTY test, say 24 hours?... ops at UZ6AWF. Several times during the contest we stopped to run outside into the mud to witness one of the brief appearances of the Sun, someone said they took a photo... ops at HD8CQ. Have never worked that many Americans in one contest!... PA3DBS. 1st RTTY contest, not sure I can do it again with this type of equipment... 9Q5NW. Lots of activity as usual as in all CQ contests... CS7NH. Boy! this is a lot tougher than phone or CW... VE6CB/3. I was amazed at the signal strength of HD8CQ and TG9VT on 40 Meters... JA1WVK. Nice contest, see you next year... 4X6MH. At the end of the contest, I discovered I could use my CW filter for RTTY!!... HC1BI. A New STAR is born! Great Fun... TR8JLDJ

### Station Operators Multi-Op

KA3GIK & WB3FIZ. NG7P & K9VFY. N8ABW & K8AQM, KA8POW, KB8BVW and K8INX. KL7PG & WL7AWJ. ED1BM: EA1AVN, EA1DWI, EA1PJ and EA1CIM. LA3T: LA2KGA, LA7ECA, LA7SP and LA7QM. LZ1KDP: LZ1IU AND LZ2UU. OK3KII: OK3CDV, OK3CNJ. TG9VT & W2JGR/TG9, TG9AWS/KQ6U. UZ6AWF: UA6CQ, UA6AX, UA6AZ. UZ9CWA: UA9CG, UA9CR, UW9CT, UA9CFV and UA9CGA. JH7ZZO: JH7AJD, JH7LVK & JG7DEQ. VU4QJX: VU2JX, VU2NTA, VU2LBW. YU7KMN & Mijic Zlatko. 4U1UN: NA2K & NA2J. HD8CQ: HC2CG, HC2DZ, HC2FG, HC5K, HC5T, HC8GR, HC8VB, KE7PN, KE7PL, WA7EGA and KT1N.

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, Zones, Countries and State/Canadian Provinces. Winners are in Bold Face.

#### SINGLE OPERATOR NORTH AMERICA UNITED STATES

Call		Score	QSO's	Zones	Countries	US/VE
W1AX	A	32,370	102	40	70	2
AA2Z/1	"	12,963	94	20	26	41
KT1O	"	4,704	37	20	27	9
N1DGC	"	551	9	8	10	1
W1DA	14	119,865	431	25	61	4
KA1MP	"	7,965	66	14	27	18
W1GQR	"	6,419	60	11	24	14
WB1AQA	"	6	1	1	1	0
W2FG	A	251,196	462	60	115	6
NQ2O	"	42,504	136	41	68	45
NO2T	"	37,224	137	33	56	43
W2KHQ	"	30,000	106	39	60	26
N2WK	"	26,691	101	34	59	30
WB2IVO	"	16,212	93	27	40	17
W2AYJ	"	11,461	61	20	45	8
NA2K	"	3,280	28	15	25	0
W2PHT	"	943	14	11	12	0
W2FCR	21	7,242	52	17	32	3
NB2P	14	125,184	422	25	67	3
KC2FD	"	17,479	110	17	37	23
KJ2N	"	4,784	41	12	27	7
W3FV	A	258,000	412	60	111	6
N3UN	"	38,760	122	43	66	27
WA3ZKZ	"	14,900	76	29	42	29
KC3ST	3.5	304	15	3	3	13
AB8Y/4	A	67,184	272	19	79	3
KB2VO/4	"	67,080	285	29	65	35
K8UNP/4	"	37,628	128	35	56	23
W0YVA/4	"	16,928	80	28	46	18
KI4MI	"	16,402	122	30	44	44
W4UW	"	13,857	64	32	44	17
WA4DYD	"	2,944	35	21	10	15
K4JYS	14	34,974	177	21	43	23
KD4DM	"	5,040	44	12	24	9
K2PEQ/4	"	2,014	22	12	21	5
K7HCP/4	"	891	16	10	11	6
NU4N	"	598	14	8	7	8

WB5HBR	A	125,545	374	48	72	9
KF5YE	"	51,460	171	44	66	45
W5HEZ	"	36,703	127	41	60	26
KA5CQJ	"	35,154	109	40	63	23
KA5YSY	"	12,298	65	28	39	19
KA5LGP	"	837	19	9	9	9
NN5T	"	12,382	88	27	30	25
N5HB	"	11,074	59	44	35	19
WF5E	14	39,000	222	23	44	37
KE9EQ/5	"	26,690	203	19	31	35
N6GG	A	99,470	269	51	76	7
K6EID	"	79,002	207	53	79	77
W6IWO	"	39,543	182	37	42	68
WA0QII/6	"	33,976	157	35	46	43
W6JOX	"	33,060	150	38	42	65
WB6WQA	"	21,056	107	31	38	43
W6BSY	"	11,592	73	31	32	29
W6ZH	"	11,562	75	28	32	34
W6OXP	"	9,047	61	26	30	27
WA6PJR	"	6,300	42	23	28	12
KE6T	"	1,440	16	15	16	1
KD6PY	"	726	12	11	11	0
W6CN	14	9,792	77	16	27	25
W6HT	"	1,421	19	12	15	2
N6CBK	"	1,178	29	7	6	18
N7RY	A	50,616	209	35	49	6
KT7H	"	20,332	155	22	25	42
KA7IVA	"	10,530	81	23	28	30
KF7BF	14	17,510	129	22	33	30
AB9O/7	"	16,660	94	21	42	22
W7MI	"	12,996	79	18	39	19
AB7Y	3.5	418	19	5	4	10
AB8K	A	39,905	122	36	69	1
W8JAQ	"	13,846	64	28	48	10
N8BJQ	"	8,748	52	34	28	19
KD8NJ	"	8,249	66	22	27	24
W8LNL	"	7,700	53	23	31	16
WA8FLF	14	5,916	49	14	25	12
KB8ZM	"	1,645	23	8	10	9
WB8SFF	"	525	11	8	10	2
KA9PJZ	A	21,340	83	27	56	1
NE9U	"	16,564	89	32	41	28
W9FFQ	"	1,344	25	10	14	5
K9JNB	"	640	11	9	11	0
K9GWT	14	2,145	23	11	20	2



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CT4UE	21	32,240	154	17	36	27
CR6AUR	14	48,380	249	16	38	28
CT1BHX	"	24,708	146	14	32	25
CT1BKK	"	2,212	36	7	14	7

**SARDINIA**

ISØVME	14	48,504	229	16	44	2
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**SPAIN**

EA5FKI	A	118,440	258	42	90	4
EA3CZM	"	28,050	94	34	49	27
EA3EGI	"	13,440	73	23	42	15
EA3FNI	"	12,300	75	23	44	8
EA3ELD	"	9,975	72	12	33	12
EA3FPT	"	7,755	53	15	30	10
EA3FIM	"	5,472	54	14	31	3
EA1AW	"	2,250	25	11	19	0
EA3EGB	21	3,102	33	9	11	13
EA1YW	"	2,448	26	12	14	8
EA2BUQ	14	7,672	63	10	35	11

**SWEDEN**

SM5FUG	A	25,517	117	22	25	2
SM7BGE	"	10,726	64	20	35	7
SM5APS	"	153	6	4	5	0
SM7AIO	14	1,430	24	8	16	2
SM4JCY	"	465	14	5	10	0
SM4CMG	7	13,122	115	15	35	4

**SWITZERLAND**

HB9BNP	A	232,624	402	54	107	5
HB9DCQ	"	63,510	185	39	85	21
HB9AAA	"	32,340	120	33	54	18

**WALES**

GWØANA	A	5,684	51	14	30	
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**YUGOSLAVIA**

YU7AM	A	49,407	152	43	63	2
YU3MJ	"	3,735	41	16	29	0
YT2GW	14	59,984	253	17	41	2

**OCEANIA**

**AUSTRALIA**

VK2KM	14	15,360	90	19	41	
VK2BQS	"	10,416	66	19	34	3

**INDONESIA**

YB5NOF	14	43,758	192	26	48	
YB5QZ	"	20,223	109	21	38	4
YB1BG	"	8,131	62	17	29	1

**JOHNSTON ISLAND**

KL7LF/KH3	A	58,850	185	28	32	4
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**MARSHALL ISLANDS**

KX60I	A	54,180	178	40	39	2
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**NEW ZEALAND**

ZL2AKI	A	17,640	90	24	34	1
ZL1BIL	14	3,600	34	14	18	4

**PHILIPPINES**

DU1TV	14	300	9	6	6	
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**SOUTH AMERICA**

**BRAZIL**

ZV2BW	A	192,558	332	48	95	5
PT7AQ	21	12,265	78	12	24	19

**CHILE**

CE4UW	A	28,910	109	27	48	2
CE6EZ	28	23,253	116	16	24	29
CE3BFZ	21	9,540	61	14	22	17
3G2Z	14	32,800	145	22	34	2

**COLOMBIA**

HK1LDG	A	297,400	503	42	76	8
HK4BHA	"	15,498	83	42	34	6
HK6HPZ	"	14,350	61	28	28	26
HK4DUM	"	12,416	69	16	11	37
HK4GVD	"	10,974	63	13	24	22
HK4AHX	"	518	20	4	6	4
HK4ETN	"	192	8	5	5	2
HK4HPH	"	140	8	4	4	
HK4RK	"	99	7	4	4	1
HK4ZM	"	42	3	3	3	1
HK4LRM	"	8	2	2	1	1
HK4FYZ	21	88	7	3	2	2
HJ4XYZ	"	28	3	2	2	0
HK4JYE	"	16	3	2	2	0
HK4GFD	14	49	4	3	3	1
HK4KLV	"	42	5	2	2	1
HK4GGF	"	42	3	3	3	1
HK4MZQ	"	15	2	2	2	1
HK4FYY	"	9	1	1	1	0
HK4IES	"	9	2	2	2	1
HK4FTA	"	4	1	1	1	0
HK4LII	7	120	5	4	4	2

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FL10/100	100	44 MHz	57 MHz	60 db	1.8 - 30 MHz	\$29.50*
FL6/1500	1000	55 MHz	63 MHz	70 db	6 meter	\$49.50*
FL6/100	100	55 MHz	63 MHz	50 db	6 meter	\$34.50*

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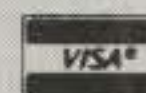
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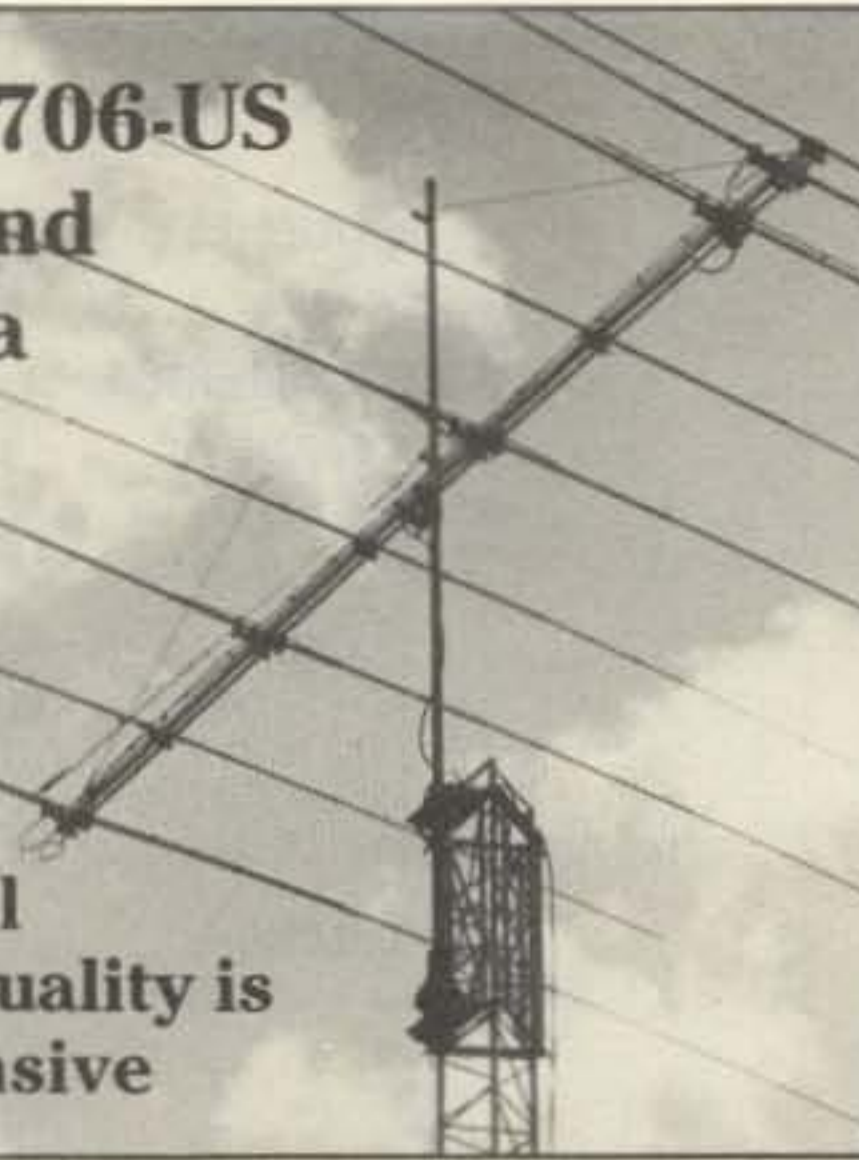
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HJ4NPX	"	112	9	3	3	2
HK4HOU	"	49	4	3	3	1
HJ4NBX	"	25	2	2	2	1
HJ4MYQ	"	25	3	2	2	1
HJ4NNM	"	25	3	2	2	1
HK4HQT	"	25	3	2	2	1
HK4MDH	"	9	1	1	1	1
HJ4NHS	"	9	1	1	1	1
HK4KAO	"	9	1	1	1	1
HJ4OGA	"	6	3	1	1	0
HJ4MBO	"	4	2	1	1	0
HK4KNK	"	4	1	1	1	0

### ECUADOR

HC1BI	A	65,065	159	42	51	5
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### GUYANA

8R1RPN	14	148,224	393	25	64	3
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### URUGUAY

CX7BY	14	96,945	293	24	54	3
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### VENEZUELA

YV5KAJ	14	58,104	187	20	56	3
YV5IZE	"	5,586	47	14	25	9

## MULTI-OPERATOR NORTH AMERICA

### UNITED STATES

KA3GIK	260,463	456	56	86	9
NG7P	130,174	194	37	57	100
N8ABW	81,780	239	52	71	51

### ALASKA

KL7PG	9,960	73	17	21	22
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### U.N. NEW YORK

4U1UN	61,596	228	31	41	46
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### GUATEMALA

TG9VT	591,838	764	66	114	15
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### ASIA

#### JAPAN

JH7ZZO	28,710	101	32	51	16
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#### INDIA

VU4BJX	145,863	345	67	85	14
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### ASIATIC RUSSIA

UZ9CWA	197,001	387	44	111	22
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### EUROPE

#### BULGARIA

LZ1KDP	513,280	651	74	176	7
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#### CZECHOSLOVAKIA

OK3KII	56,889	179	36	77	16
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#### DENMARK

OZ7SAC	14,430	79	23	40	11
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#### NORWAY

LA3T	49,608	185	24	53	29
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#### SPAIN

ED1BM	352,347	570	63	131	6
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#### YUGOSLAVIA

YU7KMN	103,620	256	38	77	50
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### EUROPEAN RUSSIA

UZ6AWF	147,087	352	45	111	21
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## SOUTH AMERICA GALAPAGOS ISLANDS

HD8CQ	1,447,065	1222	84	150	17
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CHECKLOG: Our thanks to the following stations who sent in checklogs: KJ2N, NM2I, WA9TMU, SM6EZI, SP2UU/1, SP3BGD, UA9FBV, VK5RY, LA7SP and VU2AP.



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IC-761 HF xcvr/SW rcvr/ps/AT .....	2699.00	<b>Regular SALE</b>	2369
HM-36 Scanning hand microphone	47.00		
SP-20 Ext. speaker w/audio filter ..	149.00	<b>139<sup>95</sup></b>	
FL-101 250 Hz 1st IF CW filter .....	73.50		
FL-53A 250 Hz 2nd IF CW filter ....	115.00	<b>109<sup>95</sup></b>	
FL-102 6 kHz AM filter .....	59.00		
EX-310 Voice synthesizer.....	59.00		



IC-751A 9-band xcvr/1-30 MHz rcvr	1699.00	<b>1449</b>
PS-35 Internal power supply .....	219.00	<b>199<sup>95</sup></b>
FL-32A 500 Hz CW filter (1st IF)....	69.00	
FL-63A 250 Hz CW filter (1st IF)....	59.00	
FL-52A 500 Hz CW filter (2nd IF)...	115.00	<b>109<sup>95</sup></b>
FL-53A 250 Hz CW filter (2nd IF)...	115.00	<b>109<sup>95</sup></b>
FL-33 AM filter.....	49.00	
FL-70 2.8 kHz wide SSB filter .....	59.00	
RC-10 External frequency controller	49.00	



IC-735 HF transceiver/SW rcvr/mic	1099.00	<b>959<sup>95</sup></b>
PS-55 External power supply .....	219.00	<b>199<sup>95</sup></b>
AT-150 Automatic antenna tuner ...	445.00	<b>389<sup>95</sup></b>
FL-32A 500 Hz CW filter .....	69.00	
EX-243 Electronic keyer unit .....	64.50	
UT-30 Tone encoder .....	18.50	

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IC-2KL 160-15m solid state amp w/ps	1999.00	<b>1699</b>
PS-15 20A external power supply .....	175.00	<b>159<sup>95</sup></b>
SP-30 Systems p/s w/cord, 6-pin plug	349.00	<b>319<sup>95</sup></b>
MB Mobile mount, 735/751A/761A....	25.99	
SP-3 External speaker .....	65.00	
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CR-64 High stab. ref. xtal for 751A....	79.00	
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SM-6 Desk microphone .....	47.95	
SM-8 Desk mic - two cables, Scan.....	89.00	
SM-10 Compressor/graph EQ, 8 pin mic	149.00	<b>139<sup>95</sup></b>
AT-100 100W 8-band auto. antenna tuner	445.00	<b>389<sup>95</sup></b>
AT-500 500W 9-band auto. antenna tuner	589.00	<b>519<sup>95</sup></b>
AH-2 8-band tuner w/mount & whip	659.00	<b>589<sup>95</sup></b>
AH-2A Antenna tuner system, only ....	519.00	<b>449<sup>95</sup></b>
GC-5 World clock .....	91.95	<b>89<sup>95</sup></b>

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IC-475H 75W 440 FM/SSB/CW.....	1599.00	<b>1429</b>
IC-575A 25W 6 + 10m xcvr w/ps	1399.00	<b>1249</b>



IC-471H* 75W 430-450 ...	<b>CLOSEOUT</b>	1399.00	<b>989<sup>95</sup></b>
PS-35 Internal power supply .....		219.00	<b>199<sup>95</sup></b>
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**\*AG-35 \$9<sup>95</sup> with IC-471H Purchase**

<b>Other accessories for IC-471H</b>			
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TS-32 CommSpec encode/decoder....	59.95		
UT-15 Encoder/decoder interface...	34.00		
UT-15S UT-15S w/TS-32 installed....	96.00		

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IC-290H 25W 2m SSB/FM	<b>CLOSEOUT</b>	639.00	<b>549<sup>95</sup></b>

<b>VHF/UHF/1.2 GHz FM</b>		<b>Regular SALE</b>
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IC-27A 25w 2m FM/TTP mic	<b>CLOSEOUT</b>	429.00	<b>349<sup>95</sup></b>
IC-27H 45w 2m FM/TTP mic	<b>CLOSEOUT</b>	459.00	<b>399<sup>95</sup></b>
IC-37A 25w 220 FM/TTP mic	<b>CLOSEOUT</b>	499.00	<b>399<sup>95</sup></b>
IC-47A 25w 440 FM/TTP mic	<b>CLOSEOUT</b>	549.00	<b>469<sup>95</sup></b>
PS-45 Compact 8A power supply ...	145.00	<b>134<sup>95</sup></b>	
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SP-10 Slim-line external speaker ...	35.99		
IC-28A 25W 2m FM, regular mic.....	429.00	<b>349<sup>95</sup></b>	
IC-28A 25W 2m FM, TTP mic .....	469.00	<b>409<sup>95</sup></b>	
IC-28H 45W 2m FM, TTP mic .....	499.00	<b>439<sup>95</sup></b>	
IC-38A 25W 220 FM, regular mic .....	459.00	<b>369<sup>95</sup></b>	
IC-38A 25W 220 FM, TTP mic .....	489.00	<b>429<sup>95</sup></b>	
IC-48A 25W 440-450 FM, regular mic	459.00	<b>369<sup>95</sup></b>	
IC-48A 25W 440-450 FM, TTP mic....	509.00	<b>449<sup>95</sup></b>	

HM-14 Extra TTP microphone .....	59.00	
UT-28 Digital code squelch .....	39.50	
UT-29 Tone squelch decoder .....	46.00	
HM-16 Speaker/microphone .....	34.00	

IC-900A Transceiver controller.....	639.00	<b>569<sup>95</sup></b>
UX-19A 10m 10W band unit .....	299.00	<b>269<sup>95</sup></b>
UX-29A 2m 25W band unit.....	299.00	<b>269<sup>95</sup></b>
UX-29H 2m 45W band unit.....	349.00	<b>319<sup>95</sup></b>
UX-39A 220MHz 25W band unit....	349.00	<b>319<sup>95</sup></b>
UX-49A 440MHz 25W band unit....	349.00	<b>319<sup>95</sup></b>
UX-59A 6m 10W unit .....	349.00	<b>319<sup>95</sup></b>
UX-129A 1.2GHz 10W band unit ...	549.00	<b>499<sup>95</sup></b>
IC-3200A 25W 2m/440 FM w/TTP....	695.00	<b>579<sup>95</sup></b>

UT-23 Voice synthesizer .....	34.99	
AH-32 2m/440 Dual Band antenna ...	39.00	
AHB-32 Trunk-lip mount .....	35.00	
Larsen PO-K Roof mount .....	20.00	
Larsen PO-TLM Trunk-lip mount....	22.00	
Larsen PO-MM Magnetic mount ....	22.00	
IC-1200A 10W 1.2GHz FM Mobile.....	699.00	<b>629<sup>95</sup></b>
IC-1271A 10W 1.2GHz SSB/CW Base	1269.00	<b>1129</b>

AG-1200 Mast mounted preamplifier	105.00	
PS-25 Internal power supply .....	125.00	<b>114<sup>95</sup></b>
EX-310 Voice synthesizer.....	59.00	
TV-1200 ATV interface unit.....	139.00	<b>129<sup>95</sup></b>
UT-15S CTCSS encoder/decoder ...	96.00	

RP-1210 1.2GHz 10W 99 ch FM xcvr	1529.00	<b>1349</b>
RP-2210 220MHz 25W repeater .....	1499.00	<b>1329</b>
RP-3010 440MHz 10W FM repeater...	1299.00	<b>1149</b>



<b>Hand-helds</b>		<b>Regular SALE</b>
IC-2A 2-meters.....	289.00	<b>259<sup>95</sup></b>
IC-2AT with TTP.....	319.00	<b>279<sup>95</sup></b>
IC-3AT 220 MHz, TTP	349.00	<b>299<sup>95</sup></b>
IC-4AT 440 MHz, TTP	349.00	<b>299<sup>95</sup></b>
IC-02AT/High Power	409.00	<b>349<sup>95</sup></b>
IC-03AT for 220 MHz	449.00	<b>389<sup>95</sup></b>
IC-04AT for 440 MHz	449.00	<b>389<sup>95</sup></b>
IC-u2AT for 2m w/TTP	329.00	<b>289<sup>95</sup></b>
IC-u4AT 440 MHz, TTP	369.00	<b>329<sup>95</sup></b>

**IC-u2A for 2m w/o TTP**  
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**Accessories for micros - CALL**

<b>Aircraft band handhelds</b>		<b>Regular SALE</b>
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A-2 5W PEP synth. aircraft HT.....	525.00	<b>479<sup>95</sup></b>
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LC-14 Vinyl case for Dlx using BP-7/8 .....	20.50	
LC-02AT Leather case for Dlx models w/BP-7/8	54.50	

<b>Accessories for IC and IC-O series</b>		<b>Regular</b>
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BP-3 Extra Std. 250 mah/8.4V Nicad Pak ....	39.50	
BP-4 Alkaline battery case.....	16.00	
BP-5 425mah/10.8V Nicad Pak - use BC35	65.00	
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CP-10 Battery separation cable w/clip.....	22.50	
DC-1 DC operation pak for standard models	24.50	
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RB-1 Vinyl waterproof radio bag.....	35.95	
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ML-1 2m 2.3w in/10w out amplifier.....	<b>SALE</b>	<b>99.95</b>
SS-32M Commspec 32-tone encoder .....	29.95	

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RC-11 Infrared remote controller....	70.99	
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FL-63A 250 Hz CW filter (1st IF) ....	59.00	
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EX-257 FM unit.....	49.00	
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RC-12 Infrared remote controller....	70.99	
EX-310 Voice synthesizer .....	59.00	
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# MFJ TUNERS

The world's most popular 3 KW roller inductor tuner with cross-needle meter gives you the widest range matching network available for coax, balanced lines and random wires *plus* you get antenna switch, dummy load and balun - all at a super price . . .

The MFJ-989B is a compact 3 KW PEP roller inductor tuner with lighted Cross-Needle SWR/Wattmeter that handles the highest power of any MFJ tuner! Its roller inductor allows you to get your SWR down to the absolute minimum. And you get other outstanding features like an antenna switch, dummy load, balun and more -- all at an outstanding price.

At only 10<sup>3</sup>/<sub>4</sub>x4<sup>1</sup>/<sub>2</sub>x15, the MFJ-989B matches the new, smaller rigs.

Why can you get your SWR down to minimum every time? Because the MFJ-989B has a roller inductor with 3-digit turns counter plus a spinner



MFJ-989B \$349<sup>95</sup>

knob for precise inductance control. And because it has the widest range matching network available for coax, balanced lines and random wires. And it covers 1.8 to 30 MHz continuously.

The MFJ-989B's 2-color, lighted Cross-Needle Meter not only gives you SWR automatically with no controls to set but also forward and reflected power at a glance!

Plus . . . 6-position antenna switch, 50 ohm dummy load, 4:1 balun for balanced lines, ceramic feed-through, and flip-stand for easy viewing. Meter light requires 12 V

## MFJ's Best VERSA TUNER II



MFJ's all-in-one Deluxe Versa Tuner II gives you a clutter-free shack and all the features you could ever want at a super price. Here's what you get: coax/balanced line/random wire 300 watt tuner for 1.8-30 MHz, Cross-Needle SWR/Wattmeter, 50 ohm dummy load, 4:1 balun and 6-position antenna switch . . . all in a compact 10x3x7 inch cabinet that matches the smaller new rigs.

You can tune out SWR on dipoles, vees, long wires, verticals, whips, beams and quads.

A lighted Cross-Needle meter\* gives you SWR, forward and reflected power -- all at a glance. A 6-position antenna switch lets you select 2 coax lines, direct or through tuner, random wire/balanced line and dummy load. 1000 volt capacitors, efficient airwound inductor, heavy duty switches.

## MFJ's smallest VERSA TUNER

MFJ-901B \$59<sup>95</sup>

The MFJ-901B is our smallest -- 5x2x6 inches -- (and most affordable) 200 watt PEP Versa tuner -- when both your space and your budget is limited. Matches dipoles, vees, random wires, verticals, mobile whips, beams, balanced and coax lines continuously 1.8-30 MHz.

Excellent for matching solid state rigs to linears. Efficient airwound inductor. 4:1 balun.

## 144/220 MHz VHF TUNERS

MFJ-920 \$49<sup>95</sup>

MFJ-921 \$69<sup>95</sup>

MFJ's newest VHF tuners cover both 2 Meters and the new Novice 220 MHz bands. They handle 300 watts PEP and match a wide range of impedances for coax fed antennas. MFJ-921 has SWR/Wattmeter.



## MFJ's Fastest Selling TUNER



The MFJ-941D is MFJ's best selling MFJ-941D 300 W PEP antenna tuner! Why? \$99<sup>95</sup> Because it has more features than tuners costing much more and it matches everything continuously from 1.8-30 MHz. It matches dipoles, vees, verticals, mobile whips, random wires, balanced and coax lines.

SWR/Wattmeter reads forward/reflected power in 30 and 300 watt ranges. Antenna switch selects 2 coax lines, direct or through tuner, random wire/balanced line or tuner bypass. Efficient airwound inductor gives lower losses and more watts out. Has 4:1 balun. 1000 V capacitors. 11x3x7 inches.

## MFJ's Mobile TUNER



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

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

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

## 2 KW COAX SWITCHES

MFJ-1702, \$19.95. 2-positions. 60 dB isolation at 450 MHz.

Less than .2 dB loss. \$29<sup>95</sup> MFJ-1701

MFJ-1701, \$29.95.

6-positions. Unused positions grounded.

For desk or wall mount.



## MFJ's 1.5 KW VERSA TUNER III



The MFJ-962B lets you use your barefoot rig now and have the capacity to add up to a 1500 watts PEP linear amplifier later. Its small size -- 10<sup>3</sup>/<sub>4</sub>x4<sup>1</sup>/<sub>2</sub>x15 inches -- matches the new compact rigs.

A lighted Cross-Needle SWR/Wattmeter makes tuning a snap and gives you SWR, forward and reflected power -- all at a glance.

6-position antenna switch handles 2 coax lines, direct or through tuner, wire and balanced lines. 4:1 balun, efficient airwound inductor with heavy duty ceramic switch, 6 KV capacitors. Flip-stand tilts tuner for easy viewing.

## MFJ's Random Wire TUNER

MFJ-16010 \$39<sup>95</sup>

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

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\$79<sup>95</sup> MFJ-931

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



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# MFJ multi-mode data controller



**MFJ shatters the 6 mode barrier and the price barrier with the MFJ-1278 and gives you . . . Packet, RTTY, ASCII, CW, WEFAX, SSTV and Contest Memory Keyer . . . 7 digital modes . . . for an affordable \$249.95**

**Amateur** radio's newest multi-mode data controller -- the MFJ-1278 -- lets you join the fun on Packet, RTTY, ASCII, CW, Weather FAX, SSTV and gives you a full featured Contest Memory Keyer mode . . . you get 7 modes . . . for an affordable \$249.95.

**Plus** you get high performance HF/VHF/CW modems, software selectable dual radio ports, precision tuning indicator, 32K RAM, AC power supply and more.

**You'll** find it the most user friendly of all multi-modes. It's menu driven for ease of use and command driven for speed.

**A** high resolution 20 LED tuning indicator lets you *tune in signals fast in any mode*. All you have to do is to center a single LED and *you're precisely tuned in to within 10 Hz* -- and it shows you which way to tune!

**All** you need to join the fun is an MFJ-1278, your rig and any computer with a serial port and terminal program.

**You** can use the MFJ Starter Pack to get on the air instantly. It includes computer interfacing cable, terminal software and friendly instructions . . . everything you need to get on the air fast. Order MFJ-1282 (disk)/MFJ-1283 (tape) for the C-64/128 and VIC-20 or MFJ-1284 for the IBM or compatible, \$19.95 each.

## Packet

**Packet** gives you the fastest and most reliable error-free communications of any amateur digital mode.

**With** MFJ's super clone of the industry standard -- the TAPR TNC-2 -- you get **genuine TAPR** software/hardware plus more -- not a "work-a-like" imitation.

**Extensive** tests published in *Packet Radio Magazine* ("HF Modem Performance Comparisons") prove the TAPR designed modem used in the MFJ-1278 gives better copy with proper DCD operation under all tested conditions than the other modems tested.

**Hardware** DCD gives you more QSOs because you get reliable carrier detection under busy, noisy or weak conditions.

**A** hardware HDLC gives you full duplex operation for satellite work or for use as a full duplex digipeater. And, it makes possible speeds in excess of 56K baud with a suitable external modem.

**Good** news for SYSOPs! New software lets the MFJ-1278 perform flawlessly as a WORLI/WA7MBL bulletin board TNC.

## Baudot RTTY

**You** can copy all shifts and all standard speeds including 170, 425 and 800 Hz shifts and speeds from 45 to 300

baud. You can *copy not only amateur RTTY but also press, weather and other exciting traffic*.

**A** high performance modem lets you copy both mark and space for greatly improved copy under adverse conditions. It even tracks slightly drifting signals.

**You** can transmit both narrow and wide shifts. The wide shift is a standard 850 Hz shift with mark/space tones of 2125/2975 Hz. *This lets you operate MARS and standard VHF FM RTTY*.

**You** get both the American Western Union and the international CCITT character sets, Autostart for unattended reception and selectable "Diddle".

**A** receive Normal/Reverse software switch eliminates retuning and Unshift-On-Space reduces errors under poor receiving conditions.

## ASCII

**You** can transmit and receive 7 bit ASCII using the same shifts and speeds as in the RTTY mode and using the same high performance modem. You also get Autostart and selectable "Diddle".

## CW

**You** get a Super Morse Keyboard mode that lets you send perfect CW effortlessly from 5 to 99 WPM, including all prosigns -- it's tailor-made for traffic handlers.

**A** huge type ahead buffer lets you send smooth CW even if you "hunt and peck".

**You** can store entire QSOs in the message memories, if you wanted to! You can link and repeat any messages for automatic CQs and beaconing. Memories also work in RTTY and ASCII modes.

**A** tone Modulated CW mode turns your VHF FM rig into a CW transceiver for a new fun mode. It's perfect for transmitting code practice over VHF FM.

**An** AFSK CW mode lets you ID in CW.

**The** CW receive mode lets you copy from 1 to 99 WPM. Even with sloppy fists you'll be surprised at the copy you'll get with its powerful built-in software.

**You** also get a random code generator that'll help you copy CW faster.

## Weather FAX

**You'll** be fascinated as you watch WEFAX signals blossom into full

*fledged weather maps on your printer*. Other interesting FAX pictures can also be printed -- such as some news photographs from wire services.

**Any** Epson graphics compatible printer will print a wealth of interesting pictures and maps.

**Automatic** sync and stop lets you set it and leave it for no hassle printing.

**You** can save FAX pictures and WEFAX maps to disk if your terminal program lets you save ASCII files to disk.

**Pictures** and maps can be *printed to screen in real time or from disk* on IBM and compatibles with the MFJ-1284 Starter Pack.

**You** can transmit FAX pictures right off disk and have fun exchanging and collecting them.

## Slow Scan TV

**The** MFJ-1278 introduces you to the exciting world of slow scan TV.

**You'll** not only enjoy receiving pictures from thousands of SSTVers all-over-the-world but you can send your own pictures to them, too.

**You** can print slow scan TV pictures on any Epson graphics compatible printer. If you have an IBM PC or compatible you can print to screen in near real time or from disk with the MFJ-1284 Starter Pack.

**You** can transmit slow scan pictures right off disk -- there's no need to set up lights and a camera for a casual contact.

**You** can save slow scan pictures on disk from over-the-air QSOs if your terminal program lets you save ASCII files.

**The** MFJ-1278 transmits and receives 8.5, 12, 24, and 36 second black and white format SSTV pictures using two levels.

## Contest Memory Keyer

**Nothing** beats the quick response of a memory keyer during a heated contest.

**You'll** score valuable contest points by completing QSOs so fast you'll leave your competition behind. And you can snag rare DX by slipping in so quickly you'll catch everyone by surprise.

**You** get iambic operation with dot-dash memories, self-completing dots and dashes and jamproof spacing.

**Message** memories let you store contest RST, QTH, call, rig info -- everything you used to repeat over and over. You'll save precious time and work more QSOs.

**You** get automatic incrementing serial numbering. In a contest it can make the difference between winning and losing.

**A** weight control lets you penetrate QRM with a distinctive signal or lets your transmitter send perfect sounding CW.

## More Features

**Turn** on your MFJ-1278 and it sets itself to match your computer baud rate. Select your operating mode and the correct modem is automatically selected.

**Plus . . .** printing in all modes, threshold control for varying band conditions, tune-up command, lithium battery backup, RS-232 and TTL level serial ports, watch dog timer, FSK and AFSK outputs, output level control, speaker jack for both radio ports, test and calibration software, Z-80 at 4.9 MHz, 32K EPROM, and socketed ICs. FCC approved. 9x1 1/2x9 1/2 inches. 12VDC or 110VAC.

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# CQ REVIEWS:

## The Three-Band Big Horn Delta Loop Beams

BY LEW McCOY\*, W1ICP

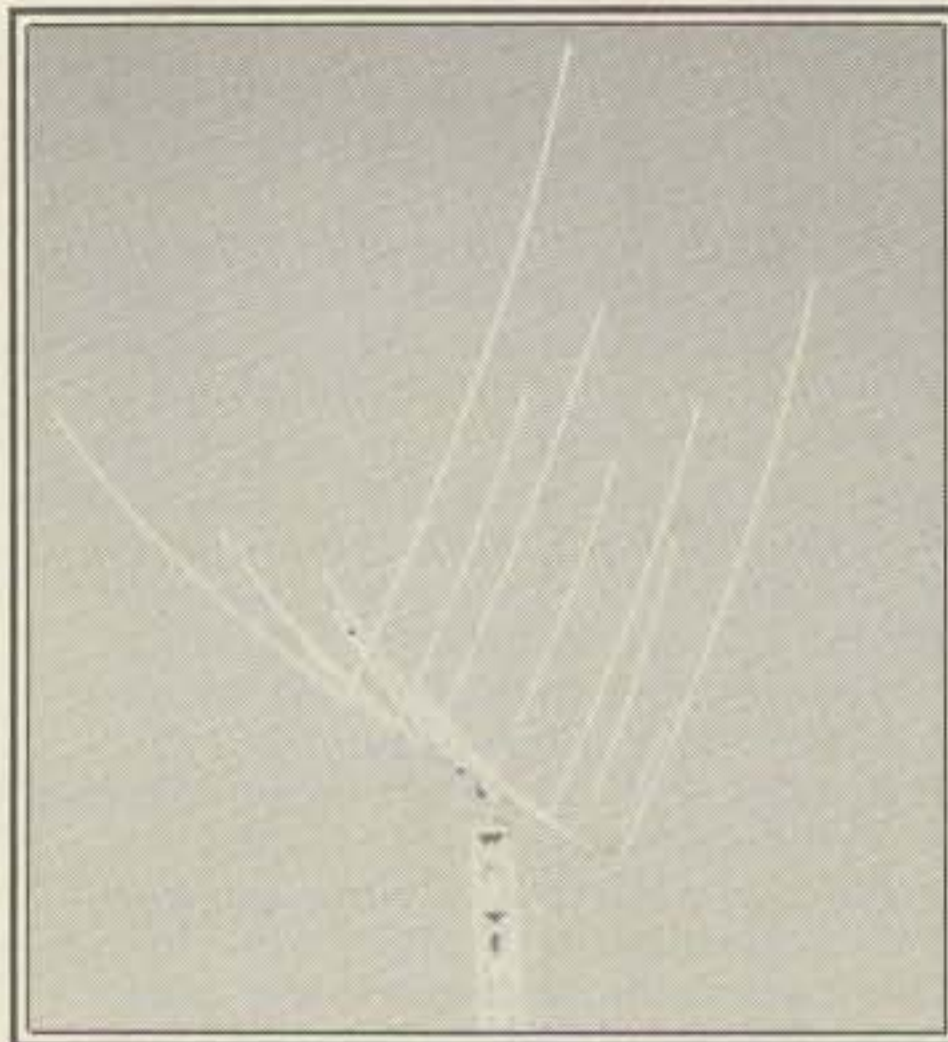
**D**elta Loop Antennas, Inc. recently announced a new three-band Delta Loop which I had a chance to field test and review. While the antenna technically could be called a tribander, I would avoid using the term because it gives the impression of trap beams. This is not to say that trap beams are all bad, but any antenna expert will be the first to tell you that they are "compromise" antennas when compared to monobanders.

The Delta Loop, or Big Horn, covered in this review is actually three separate beams—20, 15, and 10 meters on one boom. And, in fact, three separate feed lines are required, one for each beam. However, before going into the review, let me pass along some history and information on the Delta Loop antenna, as I was involved with its development from almost the start.

Harry Habig, K8ANV, a brilliant amateur, invented the Delta Loop back in the 1960s. Harry sent a letter to ARRL headquarters describing a full-wave antenna in a triangular configuration. Several of us in the Technical Department saw the advantage of such an antenna, and the result was a series of articles, nearly all written by me.

The name "Delta Loop" has an interesting origin. At the time, the antenna had no name and we had arguments over a "Three-Sided Quad" or a "Triangular Quad" (which are contradictions in themselves!). Then Doug De Maw, W1FB, came up with the name "Delta Loop," which was both appropriate and catchy. That's how the antenna was named. I eventually built 20, 15, and 10 meter Deltas and had tremendous success with them. Doug pioneered the use of single Delta Loops on 80 meters, which are very popular antennas today.

What makes a Delta Loop such a good antenna? In the first place, it is a full-wavelength antenna (as is a quad) rather than a half wavelength. The effective



*This is the three-band Delta mounted on the 50 foot tower. As discussed in the text, the top radiating portions of the antenna are much higher—70 plus feet on 20 meters, for example.*

aperture (some amateurs like to use the term "capture area," but there really is no such thing) is twice that of a half wavelength. That and other factors make the gain of the antenna almost 2 dB over a half-wavelength dipole. Second is the fact (and it is a fact regardless of what you may read or hear) that the angle of radiation is slightly lower than a half-wavelength antenna.

Some years back there was a series of articles in *QST* on stacking half-wavelength antennas and the changes in angle patterns derived from stacking (also the gain derived). Jim Lawson's book *Yagi Antenna Design* also has a complete chapter on beam stacking. If you look at the configuration of a full-wave quad loop, the current points of the antenna are at the center of the bottom and the center of the top. Depending on the quad's configuration, diamond or square, the minimum current spacing point with the square configuration would be about  $\frac{1}{4}$  wavelength or more. The diamond or Delta form would give greater spacing.

Slightly more than half-wavelength spacing provides the greater gain, but even at one-quarter spacing the gain is there, and more important, in many cases the angle of radiation is lower. With quarter-wave spacing of the current points the angle is lowered by only a few degrees. In many cases, however, a few degrees, particularly on long-distance DX, can be the difference between working and not working a station.

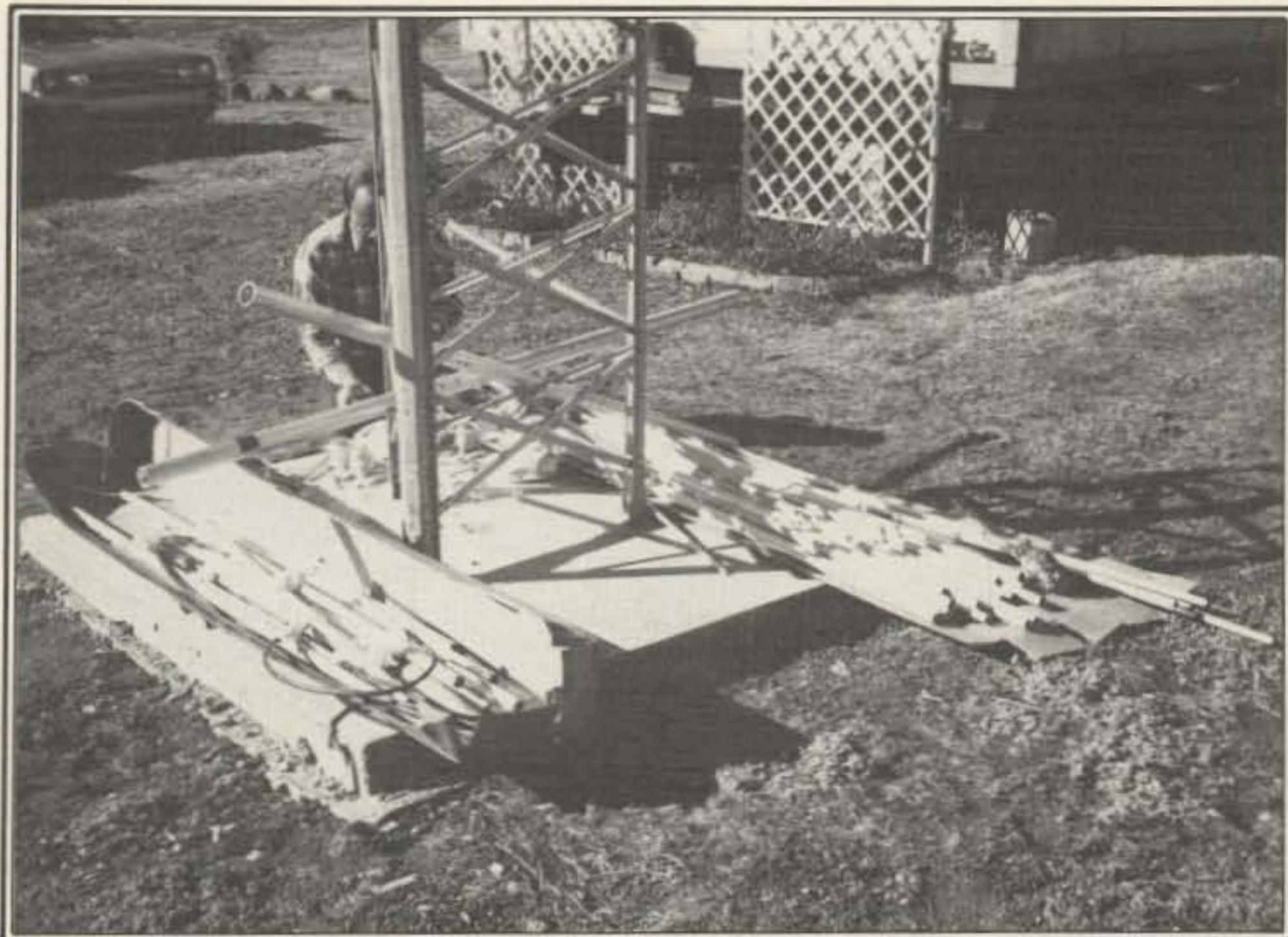
Those few degrees may not be much, but it can be enough on long hops to make one big difference, even to the point of eliminating one extra hop and the resultant signal attenuation. I frankly think this is why quads (or even better, Delta Loops) "open" a band sooner and are the last to be heard when a band goes dead. Note that in the last sentence I said, "or even better, Delta Loops." Simply, the current points are farther apart (better stacking) than in a quad. The triangular configuration does that for us.

The Delta Loop is also similar to the quad in that it is a closed loop, has Low Q, and is inherently broad band. Clarence Moore, the inventor of the quad, devised the quad looking for an antenna that would not be subjected to corona problems at extremely high altitudes (Quito, Ecuador). The Low-Q closed loop did that and also offered a lower noise antenna than a half-wavelength Yagi beam.

The Delta Loop is also beneficial in that it provides us with a much higher antenna than a regular Yagi for the same tower height. Always keep in mind that one of the radiating or current points of the Delta Loop is at the center of the top. For example, in this review the tower used is a 50 footer. Actually, on 20 meters the Delta arms go up another 20-plus feet, putting our 20 meter fields at 70 feet!

The Big Horn Delta Loop that we tested is a two-element beam on 20 and 15, and three elements on 10. The company makes several versions of monobanders—two-, three-, and even four-element jobs—but the three-band antenna is one of their newer products. Let me first say a word about the Big Horn company. It is

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



Getting ready to go to work! The antenna comes in two cartons.

owned by Bob Hobert, KA1UJ, who is a very active DXer. His company manufactures aircraft and missile components, so Bob sets some pretty high mechanical standards for his products. For example, all the hardware on his antennas is stainless steel—and I do mean all *stainless*. Recently, an amateur complained to me about another antenna manufacturer who advertised stainless hardware, and most of it was. But the screws that held the elements were not, and they rusted out, causing all kinds of electrical and

mechanical problems. Being aware of this fact, you can bet I examined all the hardware on this antenna. I guarantee it is all stainless. Additionally, the antenna uses solid machined parts, not castings. All aluminum tubing is AL 6061-T, which is the highest possible quality.

The antenna is shipped via UPS, and ours arrived in fine shape. We laid out the parts on the ground, and construction time (there were three of us; I read the directions while the other two guys did all the work) was 2 hours to put the antenna



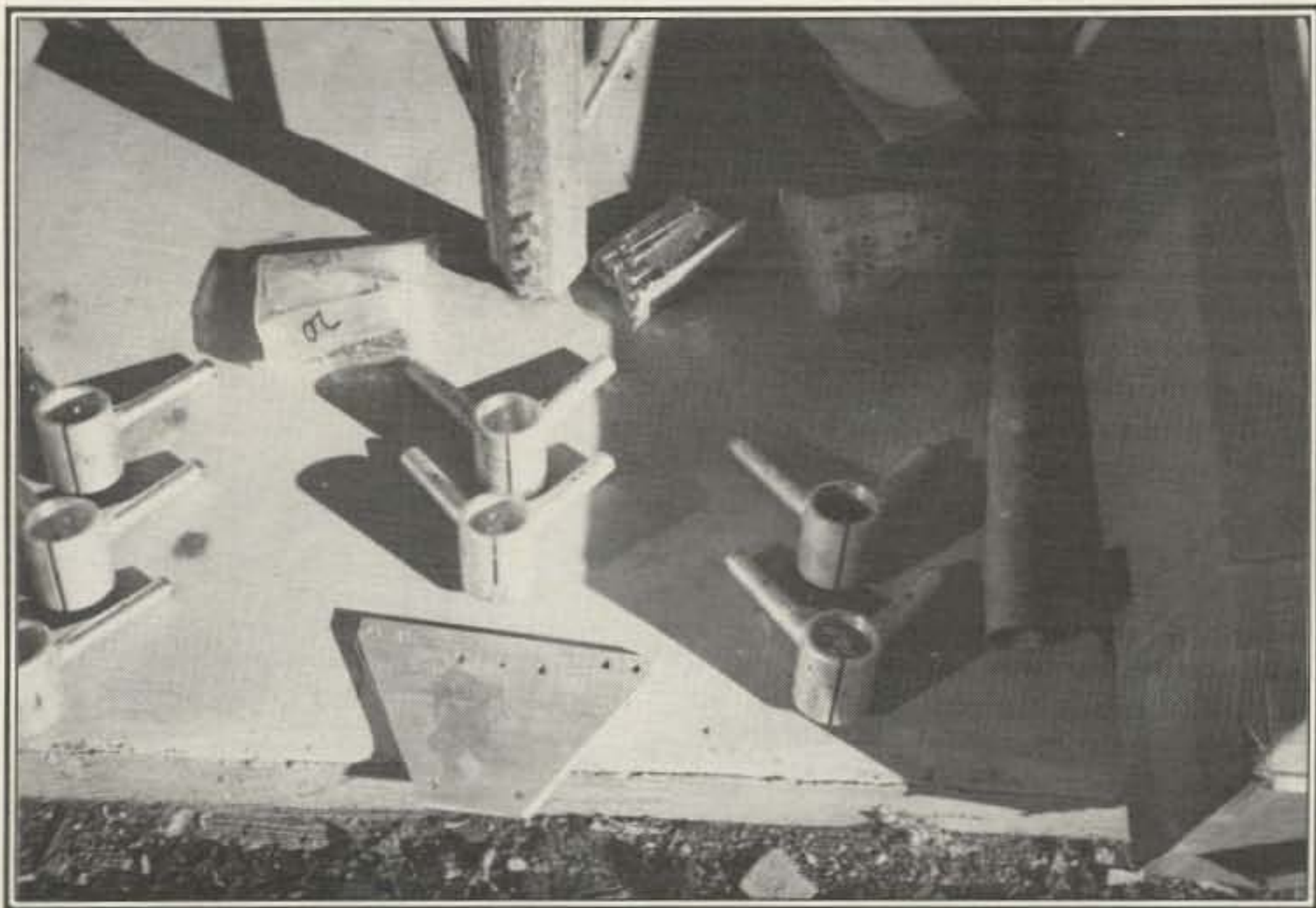
Here is one of the element supports.

together and another 2 hours to raise it up the tower and install it in place. There are two triangular-shaped plates that are mounted on the mast from your tower (see photo). When the antenna is hoisted into place, bolts are slipped through this triangular fixture, making the whole system a hinged arrangement. The antenna can then be swung over to its permanent position (or swung over with the boom parallel to the tower in the event you want to work on the beams).

The antenna elements are color-coded for bands and for driven, reflector, or director elements, so putting them together is easy. The instruction manual is more than adequate and gives a check-off step-by-step procedure for construction. To give the reader an idea, I quote from the part about mounting the elements to the boom: "Note: Refer to the Element Assembly photograph. Observe that the elements are assembled on the boom (from the rear of the array) in the following order: (1) 20 meter reflector, (2) 10 meter reflector, (3) 15 meter reflector, (4) 10 meter driven with gamma facing outward, etc." The rest of the manual is just as easy to follow.

Big Horn doesn't go into gain figures in any detail in the manual, and I can't help but admire Bob, KA1UJ, who tells me he wants to avoid gain arguments. However, from my own experience with antennas I am not reluctant to do so. The 20 meter and 15 meter beams, two elements each, consisting of a reflector and a director should easily produce an honest 7.0 dB gain plus as measured against a half-wave dipole. On 10 meters, with three elements, you can count on over 9 dB. Both theory and previous range measurements have verified these figures.

In front-to-back measurements more arguments exist than in anything else. The front-to-back attenuation will depend on the angle of the signal being received. In some cases F/B could be zilch, and in other cases (same antenna) it can be un-



The V-shaped pieces are the boom mounting units that support the elements. The triangular piece is one of the units for supporting the boom to the mast.

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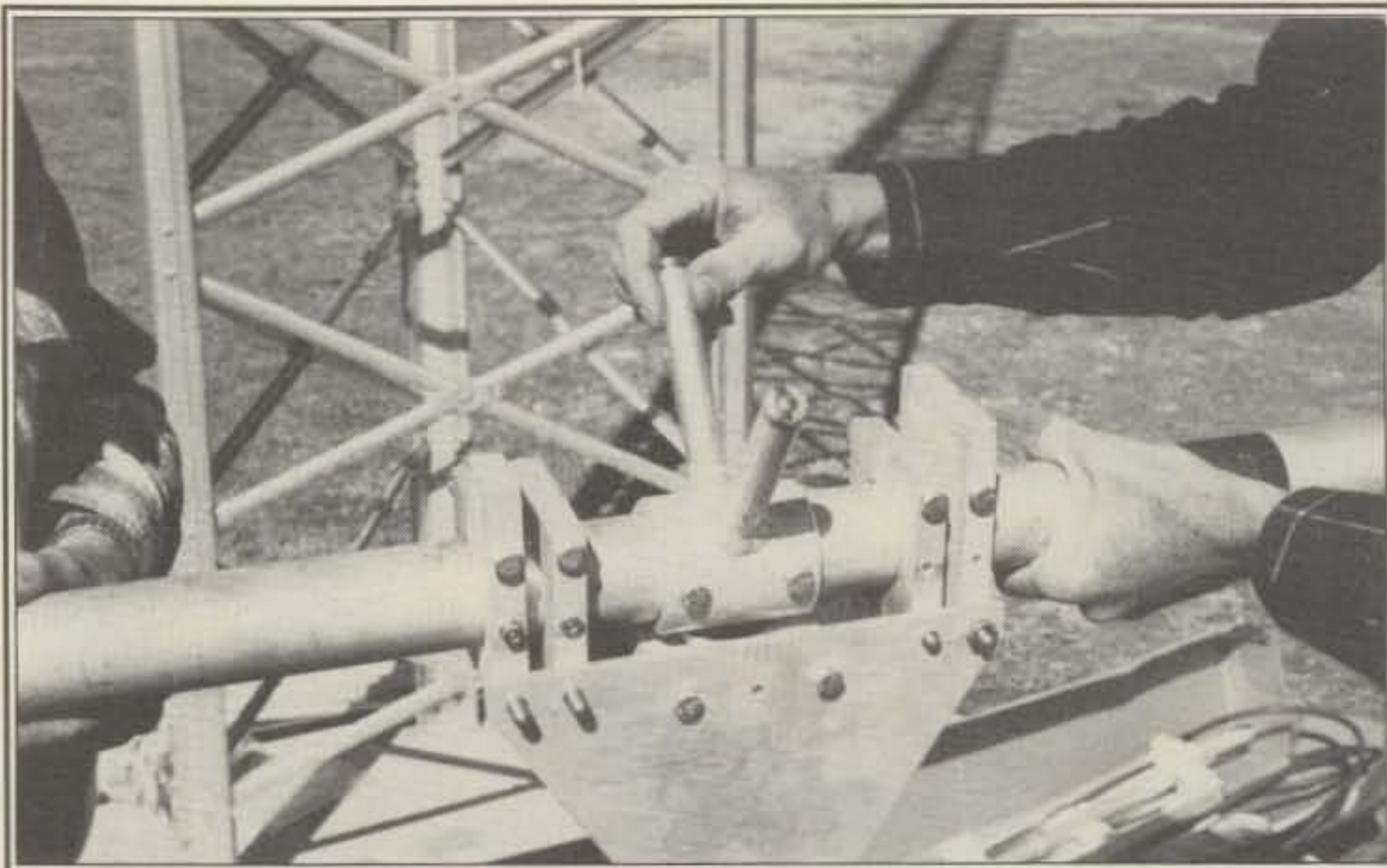
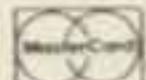
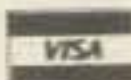
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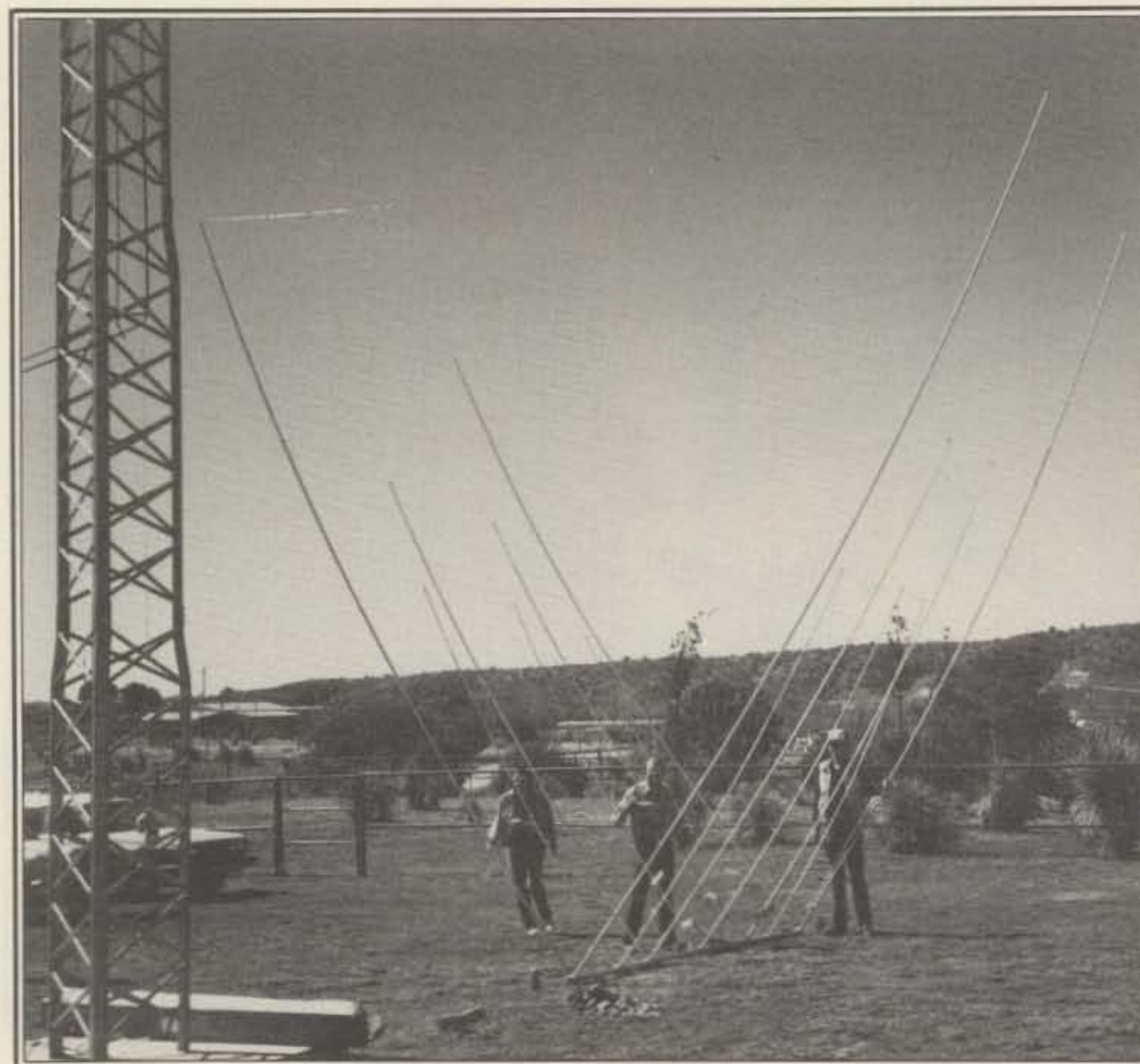


This is the boom/mast support. By removing three bolts, the boom can be swung over on the fourth bolt. We tested this on the tower and it worked FB.

believable. I have made many tests on all three bands using the S meters of three different popular modern transceivers. Some signals that were S9 or more off the front were actually not readable or inaudible off the back. In other cases the F/B might have been only a couple of S units. But I should pause here and state that there were *no* instances of less than two

S units on any signal or any band. What I am really saying is that it is impossible to put a hard and fast front-to-back ratio on any beam. In the best cases these beams showed as much as 40 to 50 dB F/B, and probably 10 dB for worst case.

What I just said should have been said a long time ago simply because antenna manufacturers are put into an impossible



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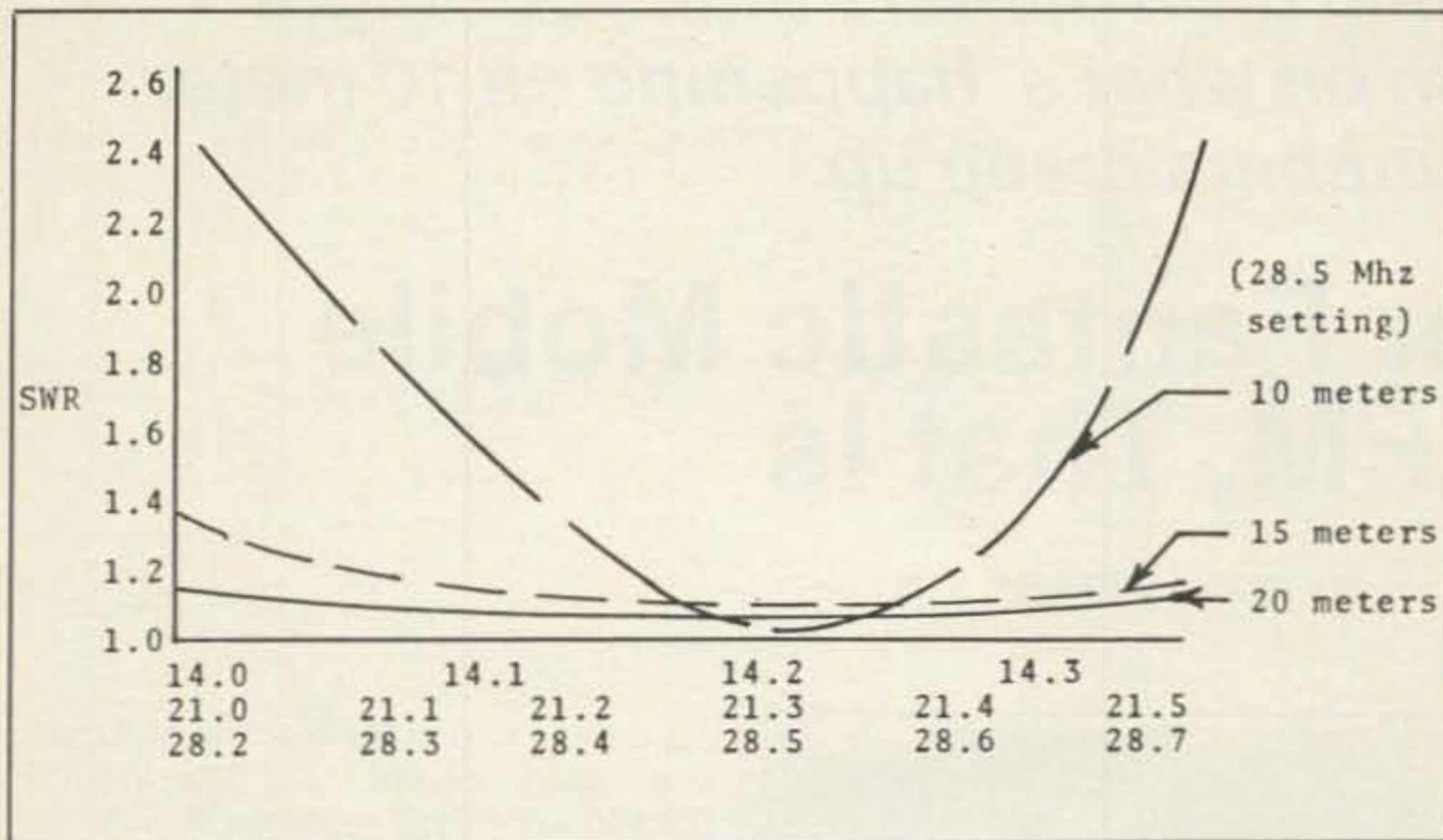


Fig. 1—Manufacturer SWR curves. We found them to be identical in most respects in our tests.

position by amateurs. The amateurs want to know what the front-to-back is, and the manufacturer is faced with providing an honest answer that is impossible to give.

This is also true of standing-wave-ratio figures. It is impossible to manufacture an antenna that will provide a perfect matched condition for all locations (unless the antenna is a dummy load!). A manufacturer makes an antenna, his engineers design a matching system, they test the antenna at 50 feet, for example (a popular height), and they set the match for this height. However, what many amateurs fail to realize is that the impedance of an antenna is primarily determined by its height above ground, a good conducting ground, plus the proximity of the antenna to nearby objects. No two installations are identical, and of course this puts the manufacturer in a bind. It is really a catch 22 situation. Well, I got that off my chest. Like I said, the front-to-back on a Delta Loop beam, as with any beam, can be outstanding on some signals and not so good on others.

When we got the antenna up and feed lines connected, my natural inclination was to go looking for DX. I hadn't listened with a Delta Loop for nearly 20 years, and I had forgotten how "quiet" the antenna was. We did the usual thing of switching bands, turning the antenna to see about the front-to-back, and so on. There was no doubt in my mind that here was a really impressive antenna.

The next step was to check out the match. The Big Horn uses individual gamma matches, and we quickly went through the three bands and found that we matched the manufacturer's curve (fig. 1). It was late in the afternoon New Mexico time and we found that all three bands were open. I tried 15 first, aiming the beam at the Pacific and called "CQ

DX, Pacific," signing W1ICP/Portable, New Mexico. Yeh. You guessed it, a whole slew of East Coast USA amateurs called me! So much for front-to-back. However, I did pick out a ZL and then a VK who called. They were not reluctant to have me test the beam, and in both cases they gave me 5/9 off the front and inaudible off the back. What did I say about F/B? I then moved the beam around and worked a bunch of JAs. Incidentally, I was running about 100 watts. I got the usual "You are the loudest station from the States" from one JA. Next, we moved to 10 and worked a bunch of South Americans, and then up to 20 to do likewise.

Here are some more vital statistics. The turning radius is 14 feet, and the boom length 13 feet 6 inches. The element arm lengths are: 12 feet on 10, 16 feet on 15, and 24 feet on 20. On a 50 foot tower with the boom at the top of the tower, the top of the antenna (20 meters) is at 70 feet plus. The weight of the antenna is 81 pounds. Just a few days after installing the antenna we had winds of 60 miles per hour (not unusual here at 6500 feet on the Continental Divide). The antenna rode the storm as if there was no wind at all. (Nothing like an aircraft manufacturer to make an antenna!) Power rating on the beams is 2 KW PEP, but I see nothing that wouldn't take more power if we could run that much. If the FCC is reading this I am only joking, but the antenna is very rugged. One last feature if I failed to mention it earlier is that the Delta Loop is not as likely to receive rain and snow static because it is a closed Low Q loop.

The price class for the three-bander is \$769.00. It is manufactured by Delta Loops Antennas, 44 Old State Rd. Unit #18, New Milford, CT 06776 (phone 800-223-3718 or 203-355-3718). A catalog is available on request.

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## 10 Meter Fantastic Mobile FM, That Is

BY BOB CUTTER\*, KI0G

I was sitting in the car in front of my motel near Andover, Maryland when I heard Ted's call: "WB0PDU, Grand Junction, Colorado." I quickly flipped the offset switch to repeat and gave him a call. "KI0G, that you Bob?" "Roger, Roger Ted," I came back. "You are not very strong. Just a minute and I'll go fire up the 2 meter rig and give you a call." "No, Ted, I am in Maryland, Mary Land!" But too late, the 10 meter FM channel (29.68 MHz) was quiet except for the squelch tail from KD9FA/R near Chicago. Pretty soon I heard Ted give me a call again, and while I am not certain, I think I convinced him it was really me on the other end before the skip changed and my signal faded out.

I am sure that had we been further into the sunspot cycle, such a transcontinental repeater contact would have been routine, but right now the 10 meter band is subject to distinct openings and the effect of sporadic-E propagation. Also, I had not bothered to tell Ted I was going on vacation, so he had no reason to suspect I was outside our respective 2 meter repeater ranges.

I had decided to do something different for a mobile rig on vacation and dug out a converted CB rig I had put away when 10 seemed to die a few years ago. I bought the rig at a swapfest and had used it to make a few contacts before putting it aside for the next solar cycle. The rig put out about 5 watts and covered what is considered the FM portion of 10 meters—29.50 to 29.70 MHz. The converted rig had a scanning feature which is nice but not really necessary, as 10 FM operation is on even numbered channels with 29.60 considered the simplex channel. A glance at the *ARRL Repeater Directory* will show what frequencies are in use, and you can monitor the one of your choice.

I did not want a permanent mobile installation, so I built the rack shown in the photo using  $\frac{1}{4}$  inch plywood, and it fit well over the center console of the car and doubled nicely as a rack for maps and



*An easy-to-build plywood rack holds the converted CB rig for 10 meter FM mobile operation. There's even room left over for other traveling aids.*

tour books. A magnet-mount CB antenna, which had been trimmed to give a decent SWR, and a Radio Shack cigarette lighter/inline fuse adapter completed the installation. The rest was just pure amateur radio with other friendly operators.

For those of you who have not tried 10 meter FM, let me give you a little introduction to this unique band and mode combination, one that gives you the best of both worlds—distance-spanning skip and repeater convenience. Operating on 10 FM generally results in one of three kinds of contacts—remote base, simplex, or through a repeater that operates much the same as 2 meters.


The remote base is generally a 10 meter transceiver that is connected to a 2 meter or UHF repeater. What the 10 meter base transceiver hears is fed to the repeater, and what is heard by the repeater is sent out over the 10 meter FM transceiver. This arrangement allows a 2 meter user to also make contacts over 10 meters. One particular contact comes to mind that involved a 10 meter remote base.

I was driving in western Colorado dur-

ing the last part of the trip. The band had been quiet except near the W0IA/R (29.56/29.66 MHz) repeater in Boulder, Colorado, when I heard a station calling CQ on 29.60 MHz. I switched the rig to simplex and gave him a call. It turned out that I was going through a remote base which operated in conjunction with a 2 meter repeater near Phoenix, Arizona. I suspect we were on opposite ends of a sporadic-E propagation area, since neither one of us could hear any other stations during our QSO. As a rule, remote base stations are not on all the time, the control operators of the repeater having some means to bring up and take down the 10 meter machine at will.

The simplex calling frequency is recognized as 29.60 MHz, and unless your rig has the ability to scan, I would suggest you leave it on that frequency while informally monitoring. If propagation is in and the band is open, stations will generally move off 29.60 MHz after initial contact is made. Skip on 10 meters can often be one way, so while you do not hear anyone else, you may nevertheless be causing interference to another QSO in progress. Good operating practice is to move off the calling frequency.

Repeater operation does not require any special technique other than that commonly found on 2 meter FM. I have, however, noticed a big difference between the effective power of the direct-or ground-wave propagation and the sky-wave or ionospheric propagation with 10 FM. At least in my own case while a few watts can work across the nation using a distant repeater, I almost have to be in sight of the receive antenna to use a repeater by direct propagation. The direct range in my limited experimenting seems to be considerably less than the direct range of 2 meter FM.

In all, 10 meter FM was a delightful low-profile amateur radio part of my vacation, and I found the operators very friendly and excited about the increasing sunspots and additional attention 10 meters is receiving through Novice Enhancement. Ten meters is a band to watch, and 10 FM is a very interesting part of it. 

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# Results of the 1987 CQ WW VHF WPX Contest

BY STEVE KATZ\*, WB2WIK

**T**he third annual VHF WPX competition, July 18-19, 1987, was at once gratifying and disappointing. The typical oppressive July heat was the impetus that drove many to the mountains, lakes, and oceans for relief, causing a slight downturn in activity levels. The fabulous E-skip that favored us contesters for the June VHF QSO Party was not as evident in mid-July; however, there was excellent if spotty propagation all over the world according to comments made by entrants to the VHF WPX.

Here in the States there were several close races, and records fell to indicate the tremendous enthusiasm of the true contesters in our ranks. For the first time ever a new country was activated on the VHF/UHF bands during a major contest activity. And 4U1UN, the United Nations station in New York City (manned by the stalwart W1XX contest crew), made 959 stations very happy to have been active contest weekend. Not only did the 4U1UN group outscore all other multi-multi ompetition worldwide, but they set a new North American record high score, just narrowly missing the all-time world-wide high score set the previous year by 14EAT/3. Will it remain intact for '88?

Other U.S. races show WA2UDT edging out KH6CP/1 for a first-place in single-multi QRP; N2BJ overtaking K5UR for single-multi QRO; and KB1XD foiling K7IDX/7 in FM only. Barry, N2BJ, really outdid himself this time, after making a second-place national showing in the '86 VHF WPX with 106,108 points. His score climbed to 177,300 this year, a 67% increase. KB7IJ/5 made another remarkable showing in single-single QRO, with 81,243 points on 6 meters. N5HYV ran away with the single-single QRP class, showing a 14K-plus point margin over second-place competitor KS9J/0. The WB5RUS multi-single group made an excellent showing with 43,078 points and walking away with the class. In multi-multi notable scores include NN8H (technically the highest U.S. score, since 4U1UN is "international") with 264,480; KT2B (the SCORE group) with 110,187; and W5TEX (the Texas Armadillo Wranglers, Goat Ropers, and Bull Shippers Association) with 71,920, an excellent showing for a first-time entry. Another notable score was the Portable class entry from VE3JAR, who with 16,038 points amassed the highest score north of the border.

A few people have asked why our SCORE group didn't do better this year, to which I can only reply we really blew it. We started out with a bad feedline to our stacked 6 meter beams (it was over 200 feet long and had so much loss that the VSWR looked terrific!) and didn't replace the line until Sunday morning, when most of the propagation was gone. Two meters played fine, and we caught the Friday night tropo into the midwest. However, all our anten-



W1XX, N2ATT, and KA3V at the UHF/SHF operating position set up just below roof level at United Nations headquarters. The 4U1UN station set a new North American record with 335,340 points.

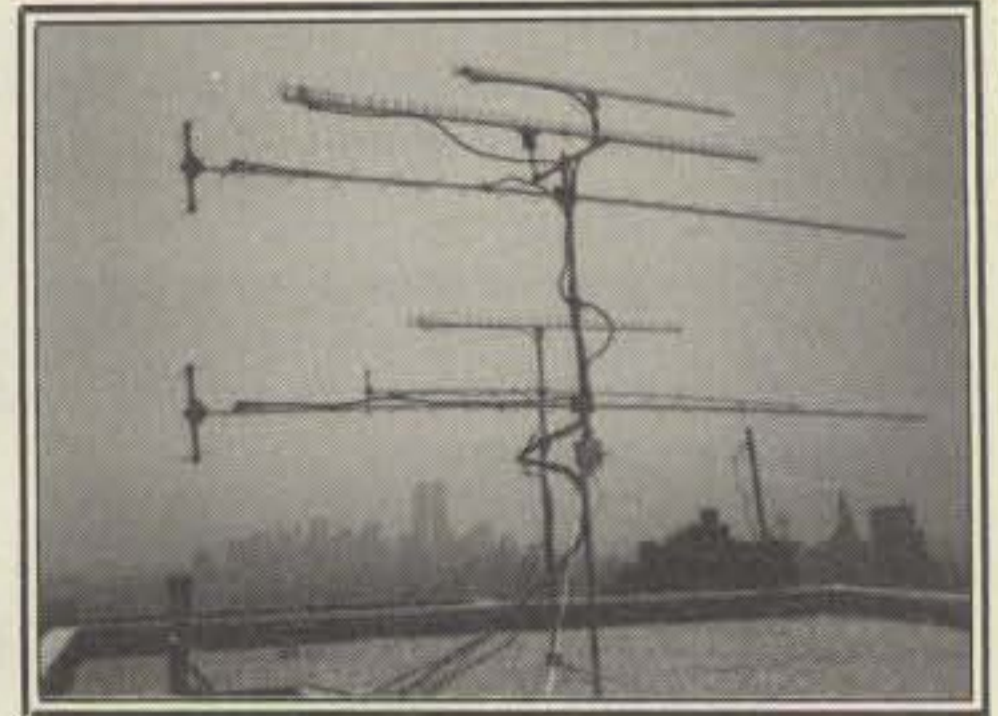
nas for 70 cm and above were still on the ground at the start of the contest, not to be erected until noontime Saturday. Once they were up, the multi-stacked arrays (84 elements on 70 cm; 92 elements on 33 cm; 220 elements on 23 cm) worked great, but we missed two key activity hour sessions, including the ones Friday night when all our competition was enjoying the enhanced conditions. To summarize, we did all the things I always warn contesters not to do. We weren't ready, and our score suffered.

The Portable WW4T/3 group, who trounced all competition in the class with 103,075 points, would have placed fourth among North American multi-ops had they chosen the multi-multi category. KU4V entered an excellent score for a two-man portable operation, with 46,080 points placing them second in the competition.

In Europe, multi-op group PA6VHF led all other entrants with a superb single-band score of 115,500, making 875 QSOs on 2 meters. Single-op YU2WV wasn't far behind with 662 Qs on 2 meters and a 95,328 point tally. Other European high scorers included DL2OM (18,768 points) edging out FC1BBD (16275 points) for second place in single-single QRO; OK1ADS/p leading the single-single QRP standings with 9,840; OK2PZW/p (55,440) narrowly defeating IK4DCO (50,630) for the single-multi QRO title; multi-single group DF0CQ scoring 32,970 in a first effort; and a fine Portable score of 20,254 submitted by IO6IQU/6.

Former European single-single front-runner GJ4ICD intentionally missed the contest to give others a chance to beat his record of 89,612 points set in the '86 VHF WPX. Well, Geoff, you had better try again in '88, because YU2WV has set a new record.

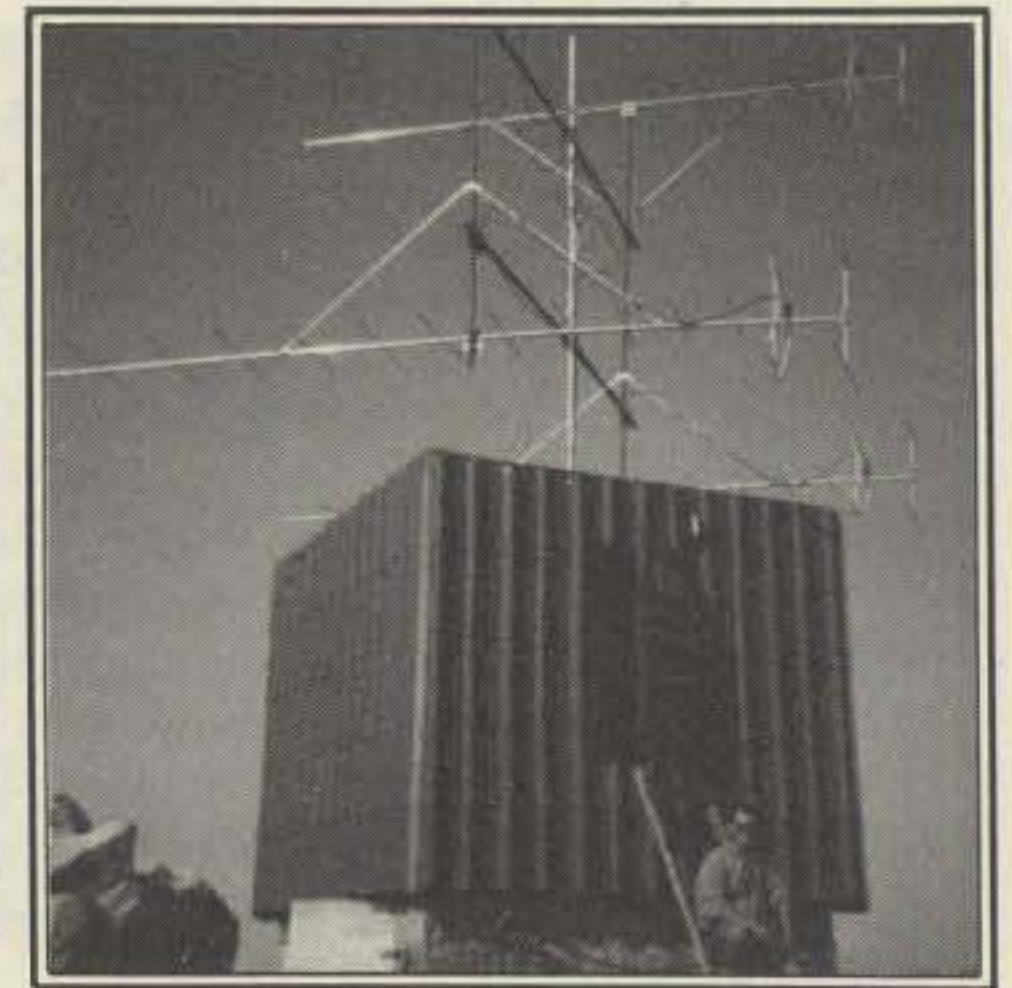
ZS4NS, ZS6WB, and ZS6OB all entered scores from South Africa and hope for increased activity in future VHF WPX contests.



The UHF/SHF antenna systems at 4U1UN were temporarily installed just above the roof of the United Nations tower. This shot must be looking south, as the World Trade Center's "twin towers" dominate the horizon.

YD0UVO/1 entered the only non-JA Asian score, showing 24 QSOs in the FM-only class.

The Japanese are a bit befuddled by our rule which requires a grid-square exchange, since the Maidenhead grid locator system is all but completely unknown there. This is one of the reasons why we've been avoiding the inclusion of grids in our scoring system. However, 18 JAs entered the VHF WPX, and their logs indicate that more than 500 stations were active during the contest. JA2TLL made a fine single-single QRP showing with 4,794 points, while JA1RJU/7 used the single-single QRO category to capture the highest score ever made from Japan, with 31,450 points. JE1PIK entered an amazing 2,592 point score in the FM only category, making 36 QSOs on 1260 MHz!



YU2WV set a new single-single European record, operating 2 meters from this site on 1,643 meter Mt. Velebit. That 56-element stacked array probably didn't hurt a bit.

\*153 Rodman Court, Eatontown, NJ 07724



This was their third try, and they finally made it—top score, multi-multi U.S. (although 4U1UN took top honors for North America). The NN8H contest crew included (left to right, standing then sitting): N8ABW, KA8THW, K8AQM, WB8ATA, KA8POW, KD8SF, KE8JZ; NN8H, N8INX, KA8MXF, KB8BVW, KE8FX.

It bears mentioning that we had to correct a large number of scores, as nearly 20% of all entries had errors in logging, duping, or scoring. While some scores were reduced, many were actually increased by the corrections! These were generally cases where the entrant miscounted prefixes, used grids (instead of PXs) as multipliers or made mathematical errors in score calculation. We hope this trend doesn't continue, as it makes our job a lot tougher!

In all, the third annual VHF WPX Contest was a success, as is revealed by the following comments from entrants. The 1988 VHF WPX Contest is scheduled for July 16-17. Plan now to be active, and don't forget to enter! Logs/entry forms are available for the asking: Write to SCORE, P.O. Box 1325, Eatontown, NJ 07724 or to CQ. Tremendous thanks to co-chairman Pete Putman, KT2B, who keyed all entries into his computer and made mailing labels for the certificates. Trophies and certificates are scheduled for mailing just prior to the 1988 VHF WPX as an incentive for those who did well last year to try again and do even better.

### Operators' Comments

We did nothing special in our planning stages to isolate potential downtown Manhattan noise problems. We came to regret this on the 220 band as TV Channel 13, on the Empire State Building, put out steady S9 +10 dB garbage. Our 400 watt signal on 220 was an alligator, for which we apologize... six meters suffered desense from nearby Channel 2... our 903 transverter lost its IF amplifier which made it necessary for stations to be very loud to be worked... the 2 meter FM station, at 150 watts output, vaporized the 2 meter SSB GaAsFET preamp (Oh, what a tangled web we weave when we practice to transceive—KT2B)... We made 135 FM contacts (on 2 meters)... Thunderstorms moved in Sunday afternoon, which encouraged us to begin the tedious tear-down... getting all the equipment and operators back down the 41 stories. It began with carrying the equipment down the stairways 4 stories to the 37th floor... then to load up the elevator for the 40 story drop to the garage area... then the repacking of the vehicles. After a score of trips, the 4U1UN operation in the CQ VHF WPX was silent... we celebrated our efforts at Clancey's on 2nd Avenue with beer and pizza as we toasted our gracious hosts of the United Nations Recreation Council Amateur Radio Club... W1XX for 4U1UN. This was the first annual operation of the Texas Armadillo Wranglers, Goat Roapers and Bull Shippers Association, a division of the South Texas Amateur Radio Society. One of our highlights was working Tony, W0ORE (astronaut), when he was mobiling across Texas during the contest... K7VAY

## The 1987 CQ World-Wide VHF WPX Contest Trophy Winners

### North America

N5HYV	21,318	S/S QRP	Sponsor: The "PX" Shack
KB7IJ/5	81,243	S/S	Sponsor: South Florida DX Assn. W5DZF Memorial
WA2UDT	8,777	S/M QRP	Sponsor: The Mt. Airy VHF Club (Packrats)
N2BJ	177,300	S/M	Sponsor: Warren Whelan, WB2ONA
WB5RUS	43,078	M/S	Sponsor: The "PX" Shack
4U1UN	335,340	M/M	Sponsor: Cushcraft Corporation
KB1XD	6,760	FM	Sponsor: Steve Katz, WB2WIK
WW4T/3	103,075	Portable	Sponsor: The Rochester (NY) VHF Group

### Europe & Africa

OK1DAS/p	9,840	S/S QRP	Sponsor: Pete Putman, KT2B
YU2WV	95,328	S/S	Sponsor: Microwave Modules Ltd.
IV3VFP	4,797	S/M QRP	Sponsor: David Penttila, K1COW
OK2PZW/p	55,440	S/M	Sponsor: Warren Whelan, WB2ONA
DF0CQ	32,970	M/S	Sponsor: Antennes Tonna (F9FT)
DG9NBE	2,176	FM	Sponsor: Steve Katz, WB2WIK
IO6IQU/6	20,254	Portable	Sponsor: Geoff Brown, GJ4ICD

### Asia

JA2TLL	4,794	S/S QRP	Sponsor: Warren Whelan, WB2ONA
JA1RJU/7	31,450	S/S	Sponsor: Mike Crawford, WA2VUN
J13BFG	2,356	S/M	Sponsor: SCORE
JA1YAD	4,797	M/S	Sponsor: Don Busick, K5AAD
JE1PIK	2,592	FM	Sponsor: David Penttila, K1COW

for W5TEX. We had a super time. Tnx for a great contest... WW4T/3. Confirmed that 7 watts battery powered works FB from a good mountaintop QTH... W1QK/2. Had lots of fun. Good opening to the east coast. Where were the VEs?... K5CBL. Operated most of the contest in a bathing suit to stay cool, ran to the pool every hour for a dip. Thank God for 6 meters; it saved us again... WD9IIX. Operated 10 to put EN20 on the air. Once station was set up, propagation was lost... AJ0E.

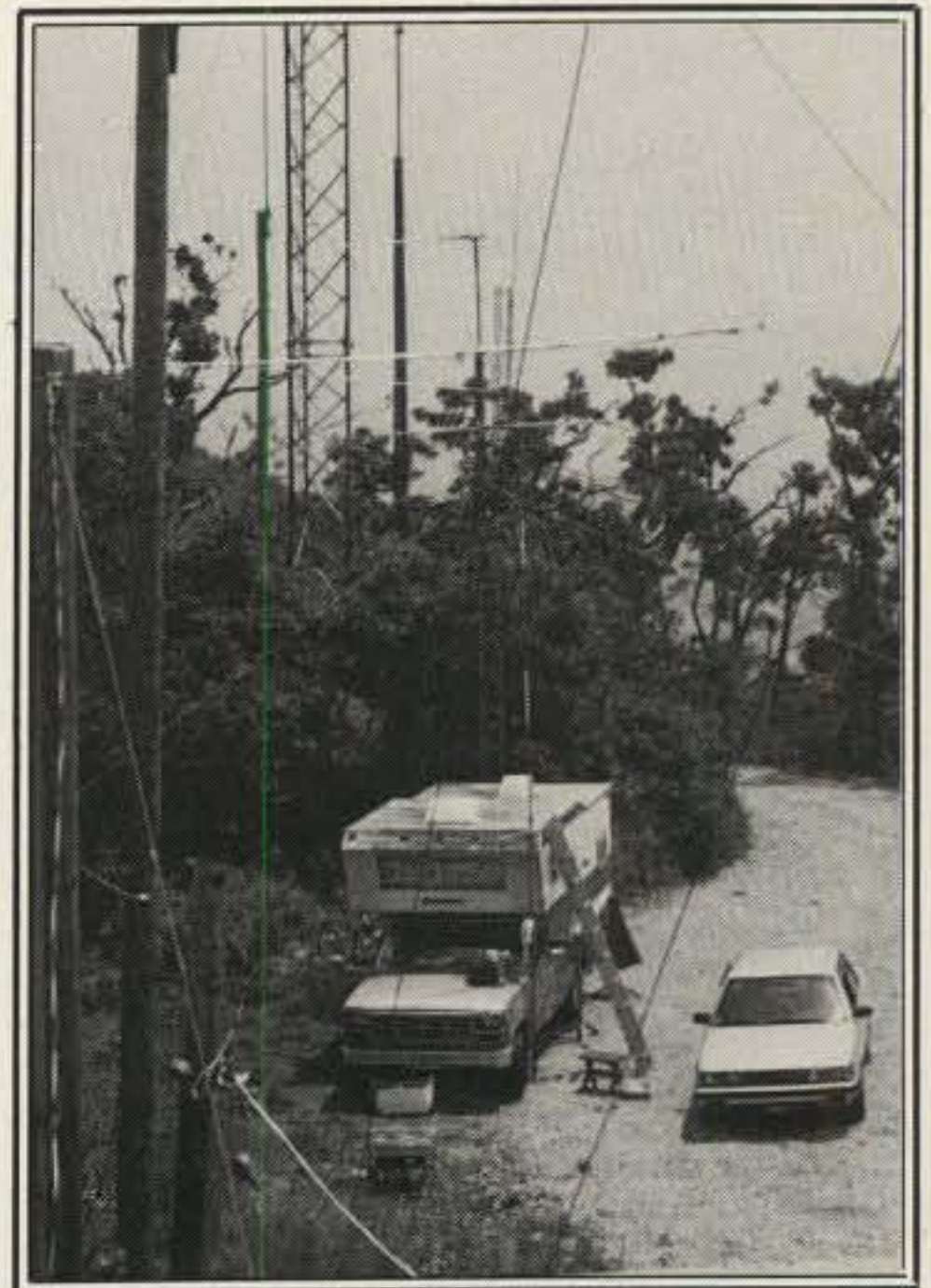
Contest could be shortened to 24 hours, or maybe spread out over two weekends... KA8MRI/9. It had been lots of fun being rare DX. Everyone was glad to work me for the prefix and the rare grid (EN85). I made 41 QSOs Friday night, and thought tomorrow would be great. Wrong! Saturday was dead... NC9F. Good tropo Friday night. Low activity on 220 and 1296. My rotor stopped working one hour before the end of the contest!... N2BJ. We put a lot of effort and planning into this year's contest. We came out to compete with any and all stations world wide, and I think we did it!... NN8H. Sure nice to have a 2 meter E opening begin about 45 minutes before the contest and continue off and on for the first 1 hour, 40 minutes of the contest. Our 1986 (last year's) entry was intended to be in the Portable class. In the results we were listed with the regular multi-ops, while in the portable group we would have been #1 in the U.S. by quite a margin... W0KEA. (ed. note: Entrants may choose any category for which they qualify, but only one category may be selected. The 1986 W0KEA entry listed multi operator as the class. Apologies to the W0KEA crew!)

Just wish I could have put in more time as this is one contest I look forward to. Maybe next year!... WA2UDT. Had another good time but the band went dead at 1557 UTC Sunday... N5HYV. Very interesting. Looking forward to next year... W2HRW. Wish there was activity like this every weekend!... KZ3X. Working 4U1UN and DN90 made it all worthwhile... WB3DNA. Not much activity in midwest this year on 2. Maybe everyone was over on 6. Still, this contest is fun. Hope it grows into the major VHF event of the year... NA9N. Great 2 meter opening; 29 grids, 42 contacts in 5 hours work using 75 watts and a single Yagi at 28 feet... KA2VCW. Band was open to Great Britain and California shortly before contest started... AC1J. (It figures.—ed.) I like the trend. I got 77 points in 1985, 792 in 1986, and 2,460 in 1987... WA7TUX.

The first and last two hours on 6 meters were fantastic! Only ran 8 watts, but still had a little VCR interference. Have to have a beam with low power. I'll def-

initely have it for next year!... KS9J/0. Spent a fortune filling my TVI-prone neighbors' RV gas tank and sending him on a trip... spent even more sending XYL home to mother... but it was worth it! Had more fun than a 5 foot pig in a 7 foot wallow... KB7IJ/5. I would like to see a 6 meter, 10 meter contest like this... WB8IGY. The band started out great with openings to California, then died most of Saturday and Sunday with sporadic openings to 1, 2, 5, and 9's. Lots of fun... WB4NIX.

Big thrill working DX (4U1UN) and grabbing 2 new grids for only 3 hours' work in the contest... KA2BPP. Made VUCC on 432 Friday evening and Saturday



KU4V and WD4ABZ set up on Rich Mountain near Boone, North Carolina to make 46,080 points in the Portable class, highest score in the W4 area. That big tower in the background looks like it may have been there before the guys arrived!

morning. . . worked more grids than prefixes! . . . N2WK. Biggest thrill was snagging VP5D (on 6 meters) . . . WB4WXE. Where was all the CW on 2 meters? . . . KG2H. Helped KT6V put his antenna up contest morning, and then he beats me . . . N6CW. 4-plus hours of on-off band opening to midwest made contest very interesting . . . WB1BXS. Because of the QTH here in EN73, I get a lot of practice working stations off the back of the antenna . . . WB2SHR/8. On 6 meters I worked two KQ3s but not a single WA3. I guess you don't need a 2x1 call to be rare! . . . WA3YON. Picked up a new state and new grid (MD and FM19) . . . WD8IFC. Ran a TS600 and 4-element Yagi from Burley Mountain at 4900 feet . . . KA7YOU.

Excellent openings Friday night and Saturday morning yielded the best VHF contest score yet. Great contest. Thanks for the QRP class . . . VE3VET. If you missed Friday night, then you missed the contest on 6 meters! . . . KT6V. For the second year in a row, VE1XH and I operated the VHF WPX contest from atop Crabbe Mountain in southwestern New Brunswick, grid square FN66. We were determined to double our 1986 score. As we set up, the prospects looked good; the bands were hopping. But by 0001Z conditions had deteriorated dramatically . . . we hobbled along until mid-afternoon Sunday when a brief but excellent 6 meter opening netted us enough contacts to achieve our goal. Already plans are cooking for next year's contest. . . maybe from Miscou Island, FN77 or FN78 . . . VE1BF for VE1MUF. I showed the contest rules to my computer and trust the resulting output will be satisfactory! Was considerate of you to have the band so wide open for the first few hours; the HH7 is my longest DX thus far on 50 MHz . . . KA7MCX.

Not a barn-burner, but it (my score) is somewhat of an improvement. Except for repeaters, 2 meters is really underutilized in central California . . . N6EJG. Two new states bring my 6 meter total to 47 . . . K8OOK. Was not able to work anyone on 6 meters, 902 or 1296—no activity and some equipment was not working, hi . . . KA1LMR. Good Es to southwest and tropo to east Friday night. Nothing Saturday or Sunday, but had a great time . . . K8NTK. Sure glad 4U1UN was on 6 meters. New country #56 . . . N0LL. Biggest thrill was adding 4U1UN to my country total . . . K9DZE. Friday night was hot . . . N8AXA (Did he mean the weather or the bands?—ed.) FB opening Friday night, then blah. Always fun, CU next year . . . W7ABX. Excellent summer weather isn't helping activity . . . K1TR. (You mean the family won't go for a contest vacation?—ed.)



PA3BIX (left) and PE1DCY operate the high-powered 2 meter station at multi-op PA6VHF, European high scorer in the 1987 VHF WPX. These fellows used two transceivers driving separate 400 watt output amplifiers and antenna systems to make 875 QSOs with 132 PXs.

Back on VHF after several years. Six was in good shape most of the time. Next time I'll spend a little more time on 144 . . . AA4LB. Sunday was a bust. Please add grids to the scoring system . . . KK6C. E opening on 2 meters. 65 mph winds during night on mountaintop, temperature 40 degrees . . . NW7O/7. (Brrr.—ed.) We operated from Roan Mtn, NC in grid EM86. All equipment was operated from 12 volt batteries (the generator would not crank!). We did not get on until late Saturday, and had problems with 6 meters so did not do much there . . . KJ4BF. (What a great location! Try it again this year, and use gear that's been all tested out. I know you can knock 'em dead from that spot.—ed.) 97 degree heat with 70 percent humidity. What a weekend to go portable . . . KS9O. WB5WIV at 9 minutes before the end of contest: What's this grid square business you're talking about? (Still). I'd suggest you incorporate grid squares as part of the scoring to encourage even more participation . . . KU4V.

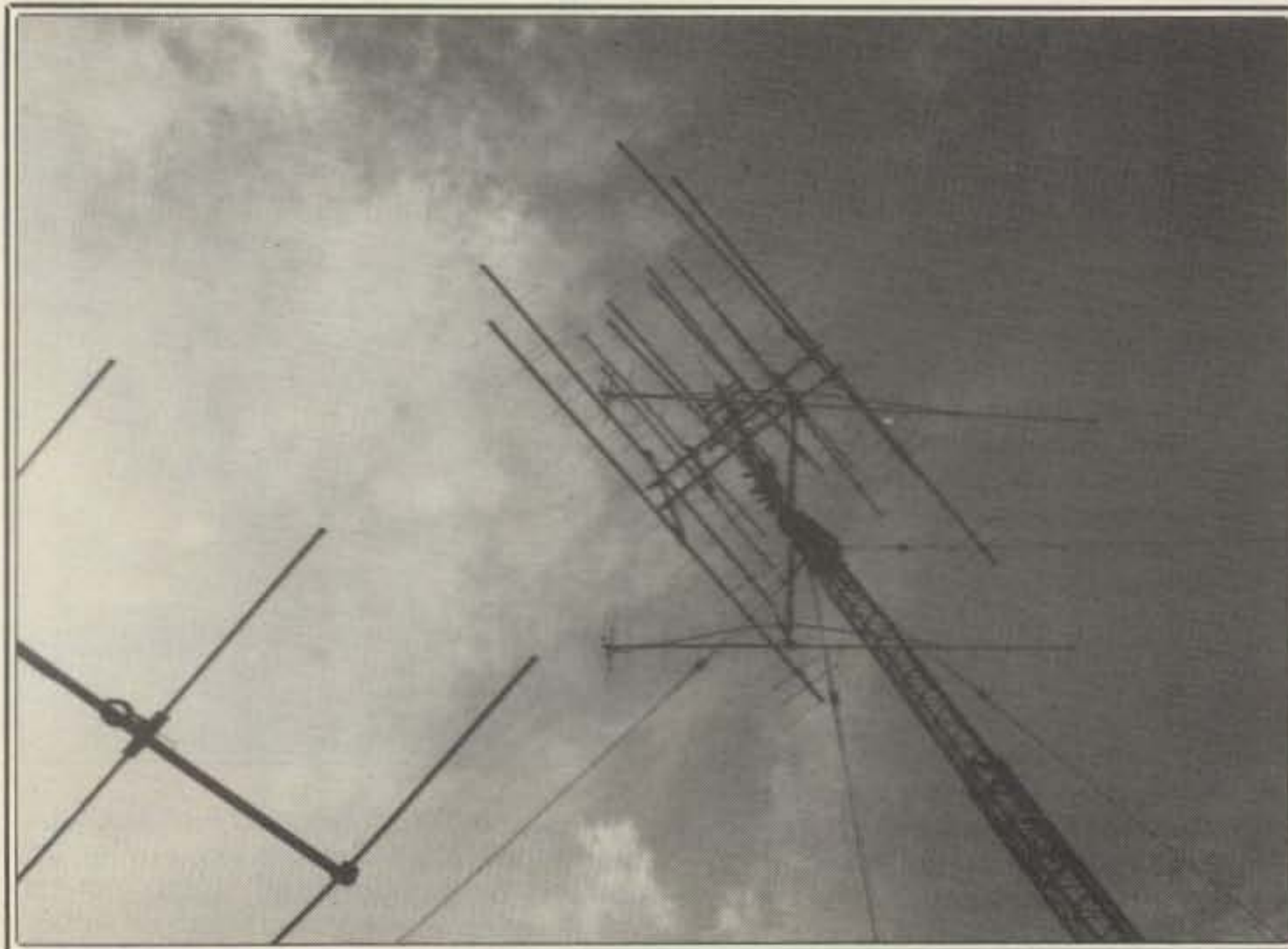
DF0CQ is the club station of the ARC of Leichlingen, a small town between Cologne and Dusseldorf. It's holiday season now . . . DL1EK for DF0CQ. We operated from Leusden in the centre of Holland (JO22RC). Although activity level in western Europe

was low, we managed 875 contacts. This proves that it was quite an advantage using a special callsign. We had reasonably good weather, but quite poor conditions. As best DX we worked OL3VKO/p at about 1000 km. We expect to be active again as PA6VHF in the next CQ WW VHF WPX Contest . . . PA3BIX for PA6VHF. If I had not been a student preparing for the entrance examination, I could have been in the contest full time! . . . JP1AVZ. There was a fox-hunting event this same weekend that made my friends unavailable for contesting. They were too busy preparing, or too tired afterwards! . . . YD0UVO.

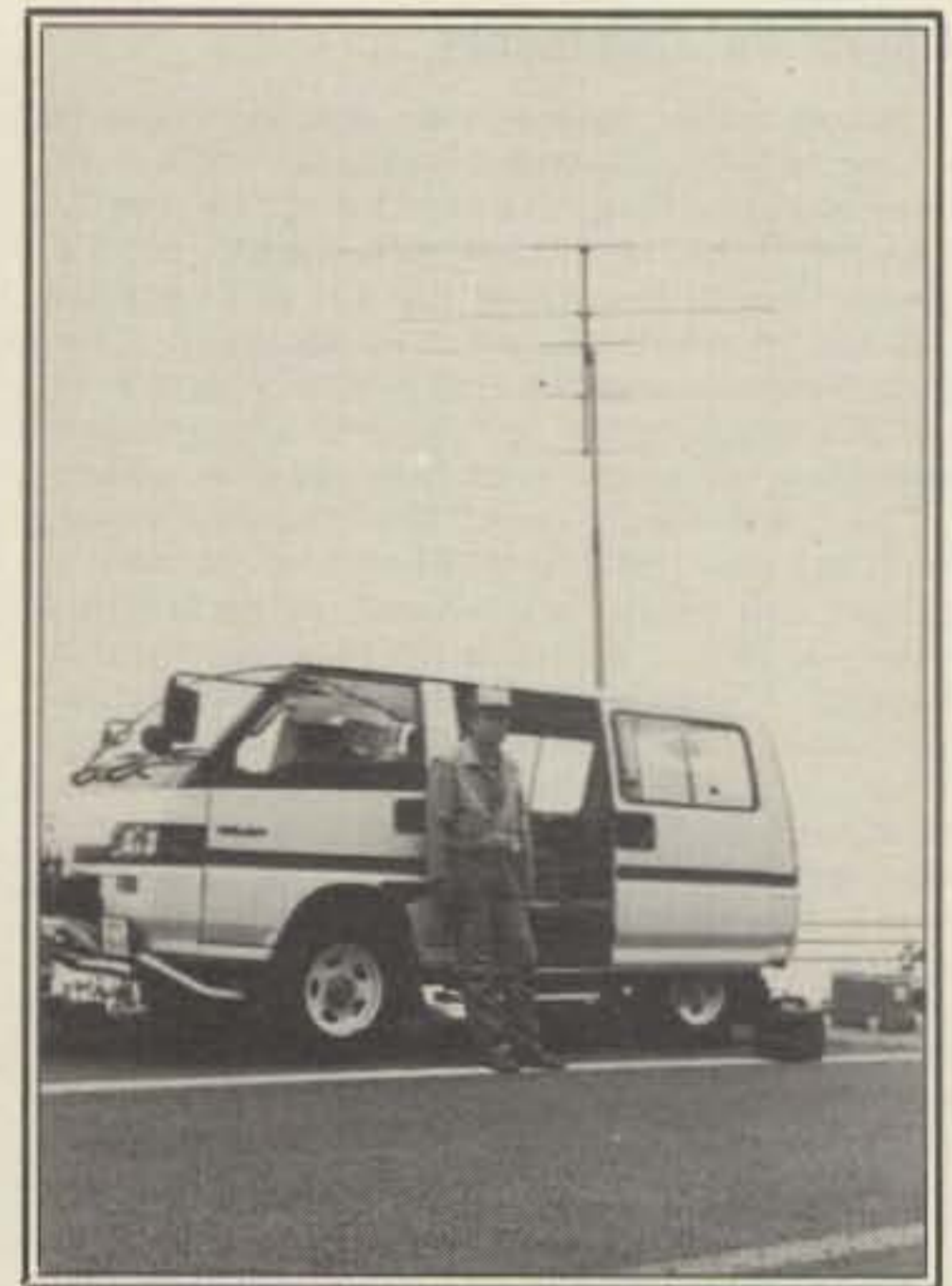
I hope the scoring system should be changed (QSOs x PX's + grids), like as well as in CQ HF WW DX Test (zones + countries) . . . JI3BFG. (We're working on it.—ed.) Operated on 1600 meter high Bandai Mtn., Fukushima Pref. (QM07DQ) . . . JA1RJU/7. (So that's how one makes 425 Q's on 6 with an FT625!—ed.) I used special call IO6IQU/6. Very special thanks for the best contest any time . . . IO6IQU/6. Would like to congratulate you for good idea. Contest is still unknown, but good tropo openings to DL. WX was good but windy. I spent 5 days on Mt. Velebit (1643 m.). Tnx and see you next contest . . . YU2WV. Thanks a lot for the new VHF WPX fun contest. Here in Spain north, condx were vy bad for VHF. A great depression over the Bizka Gulf between England and Basque country made it impossible to repeat the score of last year.



PA0GMM (operating) and PA0NZH (computer logging, facing away) operate PA6VHF. The setup was contained by an old henhouse usually used by club station PI4AMF. These guys look like they're really having fun!



Some of the antenna farm at WD9IIX, first-place single-multi W9 winner.



JA1RJU/7, national high-scorer for Japan, made 425 contacts with 74 prefixes on 6 meters from this portable site.

# Best Amateur Tribanders Available — KT-34A\*/KT-34XA

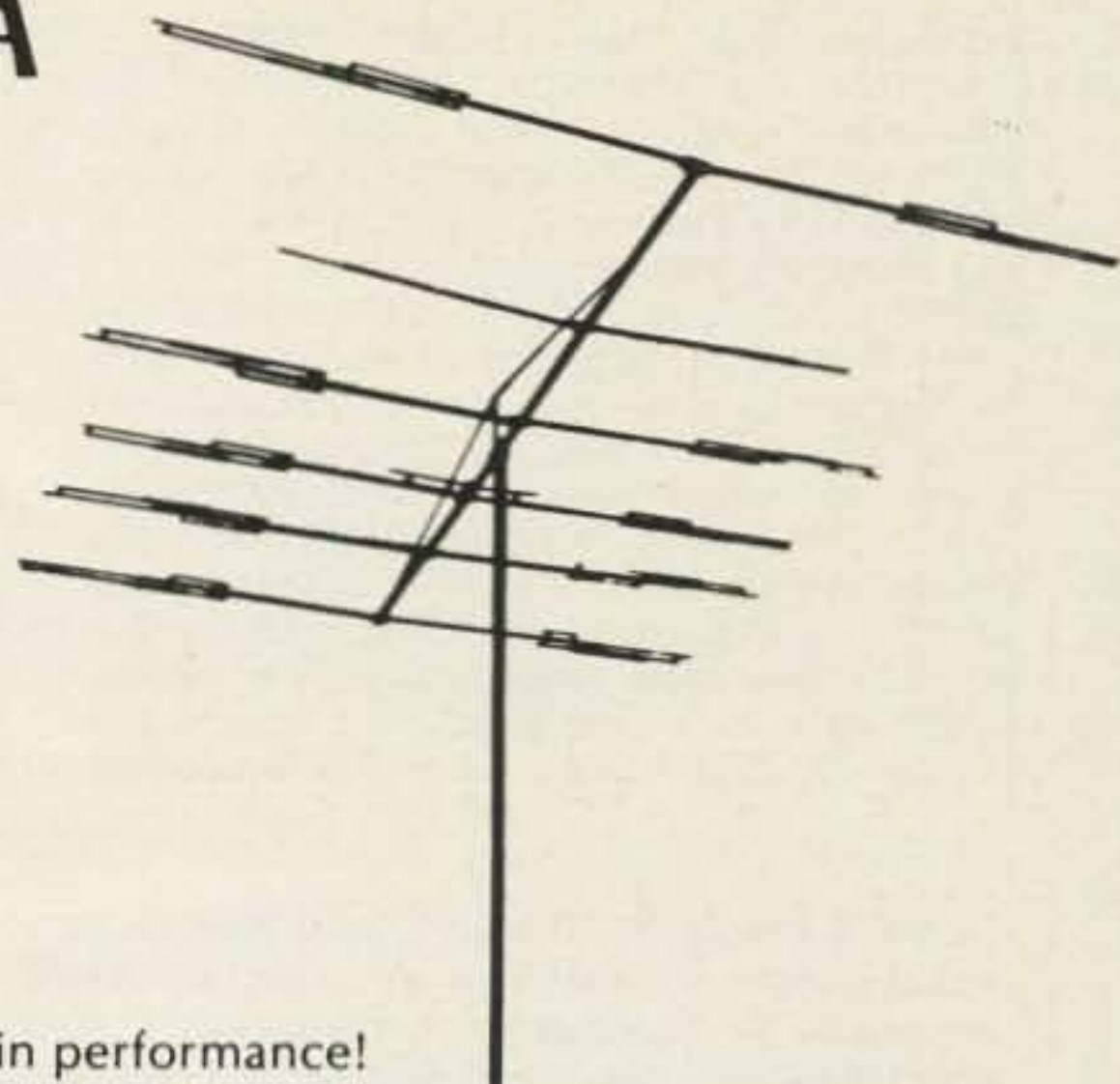
## SPECIFICATIONS — KT-34XA

### ELECTRICAL

• Bandwidth .....	14.0-14.350 MHz	• VSWR .....	1.5:1
	21.0-21.450 MHz	• F/B .....	20 dB
	28-29.7 MHz	• F/S .....	40 dB
• Gain .....	8.5-9 dB	• Feed Imp .....	50 Ohms with balun
	9-9.5 dB	• Balun .....	4:1, 5 kW PEP
	11-11.3 dB		

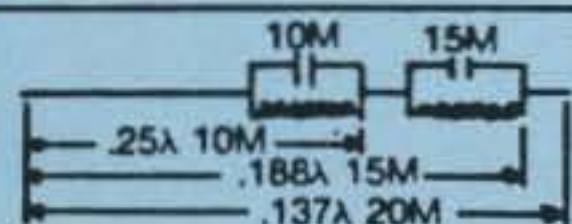
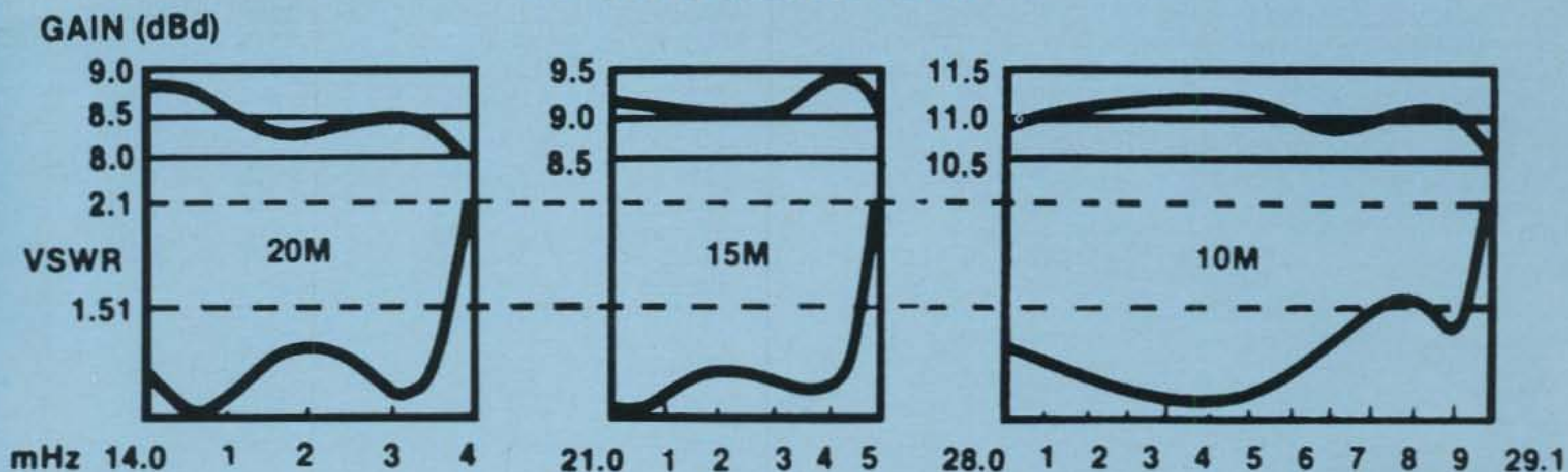
### MECHANICAL

• Element Length .....	24 ft.	• Windload .....	9 sq. ft.
• Boom Length .....	32 ft.	• Weight .....	68 lbs.
• Turn Radius .....	21.5 ft.	• Mast .....	2 in. O.D.



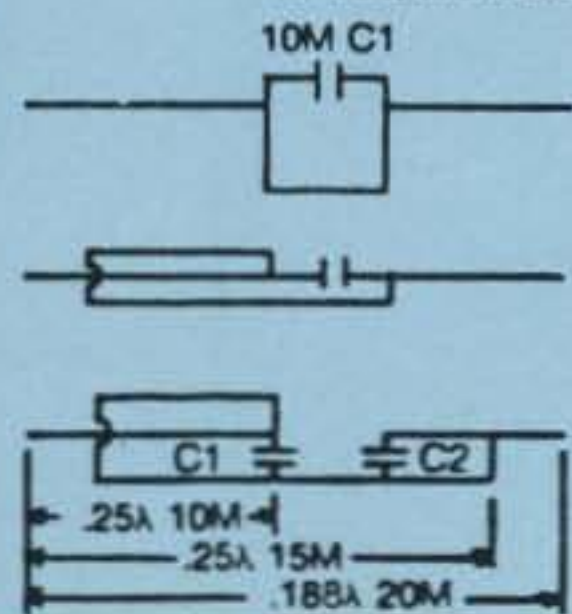
\*Lack of space or funds? How about a KT-34A? It's upgradable to a KT-34XA and similar in performance!

### KT-34XA Gain vs. VSWR



Conventional tribander element

#### Development of the KT-34XA Element



1. Replace coils with lossless linear loading.
2. Fold back and symmetrically place linear loading for mechanical strength and balance.
3. Extend element to 1/4 wave on 15M. Fold back and decouple tip with C2.
4. Extend tip for 20M. Tuning of 15 and 20M is independent.

The KT-34XA's design represents the first major advancement in tribander technology in over 20 years! The conventional traps, coils, and capacitors have been discarded in favor of integral linear loading and hi-Q air capacitors, all composed of aluminum tubing. These give the KT-34XA a conservative power handling capability of 5KW PEP and an unusually high level of operating efficiency. Linear loading also makes full 1/4-wave elements possible on 10 and 15 meters, and brings 20 meters much closer to the desirable 1/4-wave than any conventional tribander. The etch above diagrams the profound differences between the KT-34XA and a typical tribander element and the electrical activity of its various sections. Note also the lower windloading profile!

Mr. W.M. Scott  
Mirage/KLM  
P. O. Box 1000  
Morgan Hill, Ca. 95037

Hello Scotty

Just want you to know that once again your KT34XA is the king of the 10/15/20 meter bands!

In 1987, just closed, I worked 268 countries on 10/15/20 SSB with your KT34XA - and this was done in only 11 months - (since I spent October in China at BY4 RA and BY4 AOM in Shanghai - away from my home qth.) - congratulations, Scotty, on providing the finest tri-bander available anywhere - and you can quote me!

73/Ken Miller  
KG9R/3

(See the Feb. issue of S.E.R.A. Repeater Journal's "Dream Farm" story - reprints available).

**MIRAGE/KLM**  
COMMUNICATIONS EQUIPMENT, INC.

P.O. BOX 1000 MORGAN HILL, CA 95037  
(408) 779-7363  
(800) 538-2140 (outside CA)

CIRCLE 27 ON READER SERVICE CARD

But I hope next year it will go better . . . EA2AMU.

No conditions. What a pity! Pse remember, last year we had I4EAT! . . . IO0KHP. (Who could forget? Send them back!—ed.) Biggest thrill was working A22 and A25 via meteor scatter, and when W5UN was heard via moonbounce working A22KZ . . . ZS6OB. With the help of A22KZ, ZS4TX, and ZS6BCR chose this weekend to put Botswana on 6, probably for the first time ever. Frosting on the cake for them was a QSO with W5UN via EME. They went to a lot of trouble and expense for a total of 7 QSOs. Our thanks to them . . . ZS6WB. On Sunday, a big dust storm caused QRM and QRN the same as on the 80 meter band . . . ZS4NS. While vacationing in C6A, I happened to make some contacts during the contest. Conditions were not too good, but I liked to give others the multiplier . . . DG1PJ/C6A. Tnx nice contest

for my QRP! . . . YO3AIS and YO5AVN/3. Thank you very much for this contest. Quite good condx made it interesting. I hope to be QRV next year on 23 cm also. Hope next year the activity will be much higher . . . OK2PZW/p.

### Multi-Op Station Operators

**DF0CQ:** DK3KD, DL1EK, DB8EH, DG6EAO. **EA6TC/p** & EA6NP, EA6VQ. **JA1YAD:** JP1DMX, JS1DSC, JH9AMJ, K. Nakamura. **JP1AVZ** & logger. **PA6VHF:** PA0GMM, PA0NZH, PA3BIX, PA3CEE, PA3CEF, PA3CNX, PA3EPT, PD0PDN, PE0WGA, PE1APP, PE1BNK, PE1DCY, PE1IWS, PE1LAU. **YO2KJF/2:** YO2II,

YO2SB, YO2AMO. **YO9KRV/9:** YO9DEF, YO9DFQ. **KT2B** & KC2PX, WA2VUN, WB2BHC, WB2WIK. **NE3X** & KD3AQ. **WW4T/3** & N4ORP, WA4VCC, KB4CSE. **KU4V** & WD4ABZ. **KJ4BF** & WQ4V. **WB5RUS** & K5LZO, N5IVF. **W5TEX:** W5OZI, N5TX, K5ZMS, K7VAY. **KI6X/6** & AA4BE. **N7AMA** & WA7JTM, W7QNO. **NN8H** & N9ABW, K8AQM, KA8POW, KA8MXF, KA8THW, N8INX, KB8BVW, KD8SF, WB8ATA, KE8FX, KE8JZ, WD8LCD, NT8B, WD8DPA, WA9HDD, KA8ALN. **KS90** & KA9DVY, N9FIS, N9GME. **W0KEA** & N0GVT. **AJ0E** & N9BD, N0HOB, K0TLM, NJ0X. **4U1UN:** HB9RS, W1XX, W3UBQ, KA3V, NJ2L, KB9NM.

**Tabulated Results:** Entrants are listed in order of descending score, regardless of category of competition, within each call area or country. Certificate winners are the highest scoring entrants in each category of competition, in each state (U.S.), province (Canada), call area (Japan), or country. Entries contain information as follows: Station callsign, state (U.S. only), QSO total, prefix total, score, competition category, bands used.

**Key to score annotations:** Classes of competition are shown as (1) Single-operator/single-band QRP; (2) Single-operator/single-band QRO; (3) Single-operator/multi-band QRP; (4) Single-operator/multi-band QRO; (5) Multi-operator/single-band; (6) Multi-operator/multi-band; (7) Portable; (8) FM only. Bands used are shown as (A) 50 MHz; (B) 144 MHz; (C) 220 MHz; (D) 432 MHz; (E) 902 MHz; (F) 1296 MHz.

#### North America United States

##### 1st District

WB1BXS	CT	160	65	10400	(2)	B
KB1I	CT	100	59	7552	(4)	B,C,D
KB1XD	CT	81	40	6760	(8)	B,C,D,F
K1TR	NH	86	53	5035	(4)	A,B,D
AC1J	NH	78	51	4539	(4)	A,B,C,D
KH6CP/1	CT	66	52	4160	(3)	A,B,C,D,F
AA2Z/1	CT	59	49	3724	(4)	A,B,C,D
AB1U	CT	33	29	1479	(3)	B,C,D,F
WA1HYN	RI	31	29	1363	(4)	B,C,D
WA1TBV	VT	45	30	1350	(2)	A
NA1G	MA	41	23	943	(1)	B
WA3EEC/1	MA	10	9	90	(3)	A,B
KA1LMR	NH	9	8	80	(7)	B,D

##### 2nd District

N2BJ	NY	611	225	177300	(4)	A,B,C,D,F
KT2B	NJ	448	189	110187	(6)	A,B,C,D,E,F
W2HRW	NJ	245	142	37448	(4)	A,B,D
N2WK	NY	103	61	9394	(4)	B,D
WA2UDT	NJ	106	67	8777	(3)	A,B,C,D
W3MR/2	NY	131	45	5895	(2)	B
W1QK/2	NJ	73	44	3652	(7)	B,D
KA2VCW	NY	42	23	966	(2)	B
KG2H	NY	40	21	840	(2)	B
N1ABY/2	NJ	26	20	520	(7)	A
WB2ZSY	NY	22	16	352	(1)	B
KA2BPP	NY	6	6	36	(2)	B

##### 3rd District

WW4T/3	PA	512	175	103075	(7)	A,B,D
WA3YON	PA	160	101	17675	(4)	A,B,C,D
NE3X	PA	147	70	10220	(6)	A,B,D
K3AKR	MD	107	73	8322	(4)	A,B,C,D
AC3T	DE	78	49	3822	(2)	A
KA3NTX	MD	85	38	3230	(2)	B
K3BSY	PA	69	39	2691	(2)	A
WB3DNA	PA	41	32	1312	(2)	B
W3KJM	PA	25	24	600	(2)	A
KZ3X	PA	27	18	486	(2)	B

##### 4th District

KU4V	NC	339	128	46080	(7)	A,B,D
N4MM	VA	223	115	27140	(4)	A,B,D

WS4F	GA	159	93	18507	(4)	A,B,C,D,E,F
W4OO	FL	188	96	18048	(2)	A
K4SC	FL	165	90	14850	(2)	A
WB2QLP/4	FL	160	88	14080	(4)	A,B
AA4LB	AL	123	77	9471	(4)	A,B
KJ4BF	NC	73	42	4872	(7)	A,B,C,D,E,F
WB4NIX	AL	80	49	3920	(2)	A
N4HB	VA	40	32	1568	(4)	A,B,C,D
AK4T	GA	42	31	1302	(4)	A,B
WB4WXE	GA	26	23	598	(4)	A,B

##### 5th District

K5UR	AR	518	218	134942	(4)	A,B,C,D,F
N5HHS/5	TX	523	180	99180	(4)	A,B,D
KB7IJ/5	TX	531	153	81243	(2)	A
W5TEX	TX	490	145	71920	(6)	A,B,D
WB5RUS	TX	362	119	43078	(5)	A
K5CBL	OK	244	89	21716	(2)	A
N5HYV	LA	187	114	21318	(1)	A
N5JNK	TX	243	82	19926	(4)	A,B
KI3L/5	NM	157	81	12717	(2)	A
N5JBZ	LA	96	47	4612	(1)	A
N5JDT	NM	19	12	228	(8)	A

##### 6th District

KI6O	CA	273	105	28665	(2)	A
WB4AYE/6	CA	180	87	16182	(4)	A,B,C,D
KT6V	CA	160	74	11840	(2)	A
N6CW	CA	140	62	8680	(2)	A
KK6C	CA	85	51	4335	(2)	A
W6XD	CA	52	38	1976	(4)	A,B
KI6X/6	CA	62	21	1302	(7)	B
N6EJG	CA	8	7	56	(7)	B

##### 7th District

NS7P	OR	215	84	18060	(2)	A
NW7O/7	NV	178	84	15120	(7)	A,B,D
N7AMA	AZ	175	79	13825	(5)	A
ND7M	NV	160	84	13440	(2)	A
NF7X	WA	171	70	11970	(2)	A
KT7V	WY	151	62	9362	(2)	A
KA7MCX	WA	143	65	9295	(2)	A
WB7FDQ	AZ	92	56	5152	(1)	A
W7ABX	NV	87	41	3567	(2)	A
K7IDX/7	WA	118	29	3422	(8)	B
WA7TUX	UT	60	41	2460	(1)	A
KI7T	WA	45	26	1170	(7)	A
KB7M	WY	32	22	704	(1)	A
KT7G	WA	32	20	640	(2)	A
KA7YOU/7	WA	28	19	532	(7)	A
NW7O	NV	1	1	4	(1)	F

##### 8th District

NN8H	OH	859	228	264480	(6)	A,B,C,D,F
WB8IGY	OH	257	126	34146	(4)	A,B,D
KA8IFC	OH	259	82	21238	(2)	B
KA8ZOK	OH	100	66	6864	(4)	A,B,D
KB8ZW	OH	71	58	5220	(4)	A,B,C,D
K8NTK	MI	94	48	4512	(2)	B
N8AXA	OH	89	62	2344	(3)	A,B,C,D,F
N8FEH	MI	60	38	2280	(2)	B



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W8NJR	OH	52	36	1872	(4)	A,B
WD8AAX	MI	52	34	1768	(2)	B
NC9F/8	MI	46	27	1242	(7)	A
N8CSV	MI	45	19	855	(2)	B
K8OOK	MI	32	24	768	(1)	A
WB2SHR/8	MI	30	24	720	(2)	B
KI8J	MI	44	11	484	(7)	B
K8CV	MI	25	17	425	(2)	B
WD8IFC	OH	17	13	221	(2)	B

**9th District**

WD9IIX	IL	394	154	65912	(4)	A,B,C,D,F
KS9O	IL	300	126	37800	(7)	A,B
NE9O	IN	212	116	27144	(4)	A,B,D
KA8MRI/9	IN	158	76	12388	(4)	A,B,C,D,F
K9DZE	IN	61	38	2318	(1)	A
NA9N	IN	33	20	660	(2)	B
WD9IYT	IN	23	18	414	(1)	A
W9YCV	IN	15	15	225	(2)	B

**10th District**

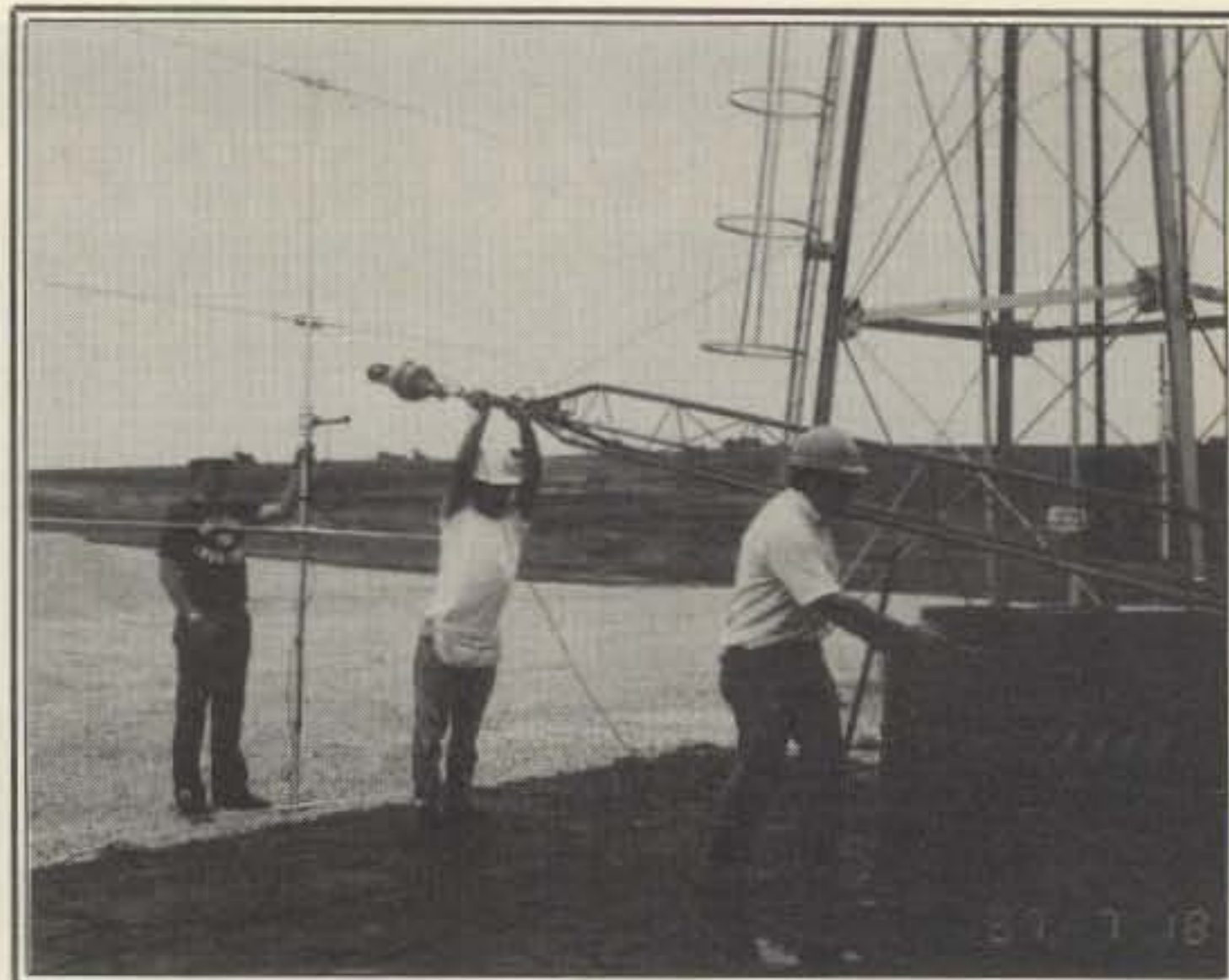
N0LL	KS	369	141	53439	(4)	A,B,D
W0KEA	CO	248	117	29016	(7)	A,B
W0BJ	NE	166	96	15936	(4)	A,B,D
AJ0E	MO	160	84	15204	(7)	A,B,C,D,F
KS9J/0	KS	109	59	6431	(1)	A
KA0TLJ	IA	150	37	5550	(2)	B
WA0DCB	IA	66	49	3283	(4)	A,B,D
AK0M	MO	56	39	2184	(4)	A,B
KD0RN	IA	46	33	1518	(4)	A,B

**International**

4U1UN	UN	959	270	335340	(6)	A,B,C,D,E,F
VE3JAR	ONT	107	41	16038	(7)	A
VE5LY	SK	108	55	5940	(2)	A
VE3VET	ONT	107	40	4280	(1)	B
VE1MUF	MAR	63	35	2205	(6)	A,B
DG1PJ/C6	BAH	6	4	32	(4)	B,D

**Europe & Africa**

CT3DK		22	13	286	(1)	A
DF0CQ		314	105	32970	(5)	B
DL2OM		204	92	18768	(2)	B
DF1ZE		64	48	3072	(2)	B
DG9NBE		64	34	2176	(8)	B
DK3GI		48	28	1184	(8)	B
EA6TC/P		80	26	2080	(5)	B
EA2AMU		55	17	1088	(7)	B,D
EA7FTH		29	15	435	(1)	B
EB7NK		23	18	414	(1)	B
EA5DGC/P		25	13	325	(1)	B
EB3BJH/P		25	10	250	(7)	B
EB5FSX		20	9	180	(1)	B
EA3ABK		19	9	171	(1)	B
EA2BUF		10	5	50	(2)	B
FC1BBD		217	75	16275	(2)	B
HG8KAX		19	13	247	(1)	B
IK4DCO		276	122	50630	(4)	B,D,F
IO6IQU/6		174	82	20254	(7)	B,D,F
IV3VFP		69	39	4797	(3)	B,D,F
IW2BZY		106	33	4092	(3)	B,D
IK4DCO		276	122	50630	(4)	B,D,F
IO0KHP		40	18	846	(3)	B,D
LZ2WY		10	7	70	(1)	B
OF3GD		21	13	325	(3)	B,D
OK2PZW/P		431	120	55440	(4)	B,D
OK1DAS/P		240	41	9840	(1)	B
OK1PG		104	11	1144	(2)	B



Three of the AJ0E multi-op portable group who entered the highest score from Missouri (left to right): K0TLM, NJ0X, N9BD work to erect the 6 meter beam.

ON1KNT		88	51	4488	(2)	B
PA6VHF		875	132	115500	(5)	B
PE1DAM		64	24	1536	(1)	B
UO5OB		20	9	180	(1)	B
UT5JCW		18	9	162	(1)	B
YO2KJF/2		32	22	704	(5)	B
YO3HL		38	16	608	(1)	B
YO3AIS		27	14	378	(1)	B
YO9CAB/6		27	13	351	(1)	B
YO9CAD/6		29	12	348	(1)	B
YO9BBH		9	7	63	(1)	B
YO8MI		11	5	55	(1)	B
YO8ALA		10	4	40	(1)	B
YO9CRV/9		7	5	35	(5)	B
YO5AVN/3		8	4	32	(1)	B
YU2WV		662	144	95328	(2)	B
ZS6OB		87	18	1980	(4)	A,B,D,F
ZS6WB		57	20	1680	(4)	A,B,D,F
ZS4NS		21	4	84	(2)	B

**Asia**

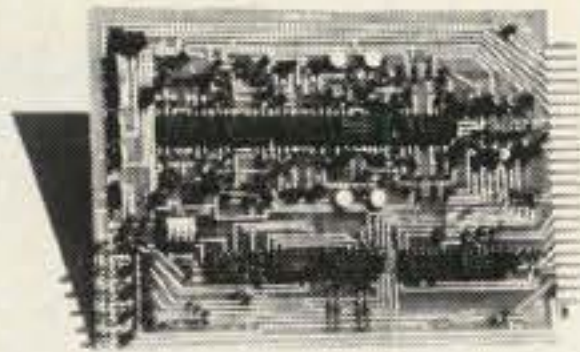
**Japan**

JA1RJU/7		425	74	31450	(2)	A
JA6RJK		270	51	13770	(2)	A
JA1YAD		117	41	4797	(5)	A
JA2TLL		94	51	4794	(1)	A
JA2DDN		71	40	2840	(1)	A
JE1PIK		36	18	2592	(8)	F
JJ3OYH		59	38	2356	(4)	A,B,D
JP1AVZ		50	15	1500	(5)	D
JS1IPA		11	7	77	(8)	B
JG1JQJ		8	5	40	(1)	A
JH4UYB		5	5	25	(4)	A,B
JL1MWI		4	3	21	(3)	A,D
JE1MWM		4	4	16	(1)	A
JN1IRZ		4	3	12	(8)	A
JP1LRT/8		3	39	(1)	A	
JO1RAD		2	24	(1)	A	
JA4GXS		1	11	(1)	A	

**Other**

YD0UVO		24	4	96	(8)	B
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SSD-6*	160-80-40-20-15-10M	SPACE-SAVER DIPOLE 71' LONG	.....\$125ppd
SSD-5*	80-40-20-15-10M	SPACE-SAVER DIPOLE-SPECIFY L. 42'-\$105, 52'-\$108ppd	
SSD-4*	80-40-20-15M	SPACE-SAVER DIPOLE-SPECIFY L. 46'-\$ 93, 60'-\$ 96ppd	

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WLA23m	4	23	12	83
WLA24m	3	20	18	109

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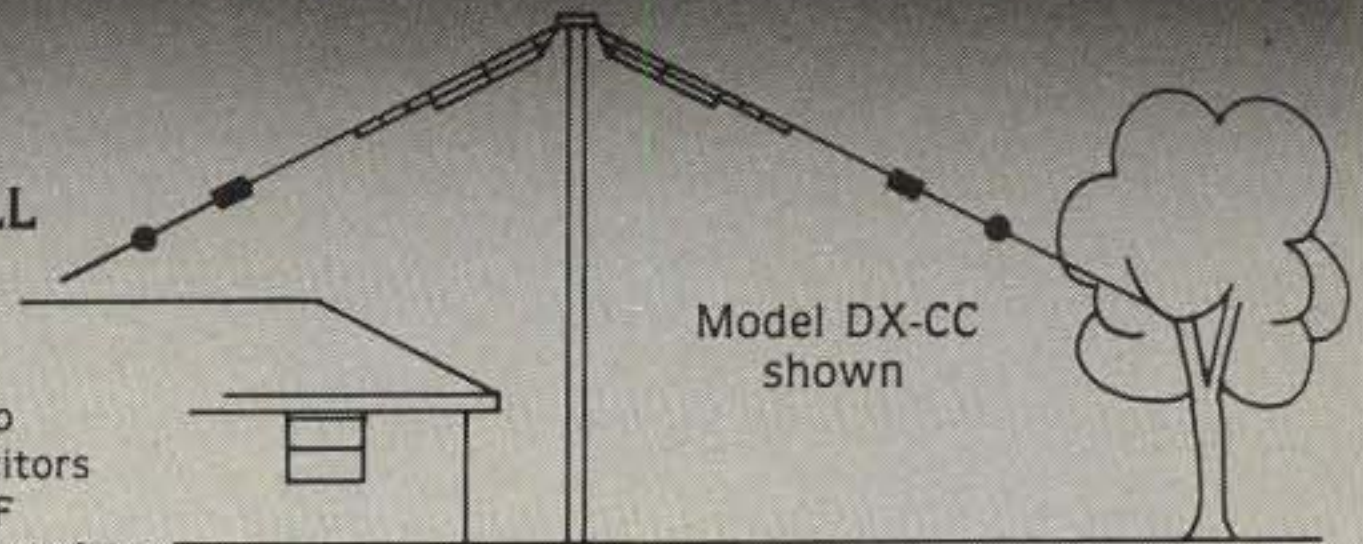
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# CQ REVIEWS:

## Ten-Tec's Paragon HF Transceiver

### Part III – Operating Results and Accessories

BY JOHN J. SCHULTZ\*, W4FA/SV0DX

**T**he Paragon tested (serial No. 00102) has been in almost constant use over a six-month period, usually with a Titan linear amplifier. All modes were used, but the concentration of operating time was on SSB. About the best understatement I can make is that the Paragon is suitably named. Starting with the first operating day, I had the impression that the Paragon represented a different class of transceiver, and that impression remains to this day.

If I had to find a few words to summarize my impressions about the Paragon, I would choose quietness, convenience, and punch. The quietness on receive has two main advantages: Weak signals seem to pop out of an almost totally quiet background for enhanced readability, and using the receive mode for extended periods does not become tiring. DXers as well as those who spend a lot of time just "listening to the mail" will appreciate its receive performance, especially since it is coupled with a very smooth main tuning knob action. Once you become used to the giant keypad around the main tuning knob, the convenient way it is laid out becomes more and more apparent. The keys that you are likely to use most often are grouped closest around the main tuning knob. One of the LEDs or some change on the main display alerts you to any status change of the transceiver. The analog controls have a firm but smooth feel to them. I would have voted for a slightly different arrangement of the controls, particularly grouping all of the selectivity-type controls more around the AF gain control, but that is strictly a personal preference.

The punch of the transceiver was amply demonstrated numerous times as I cut through the huge European pileups to work DX like 9V, 6W, and BY stations. At the same time, many stations, especially those from G-land, took time out to men-

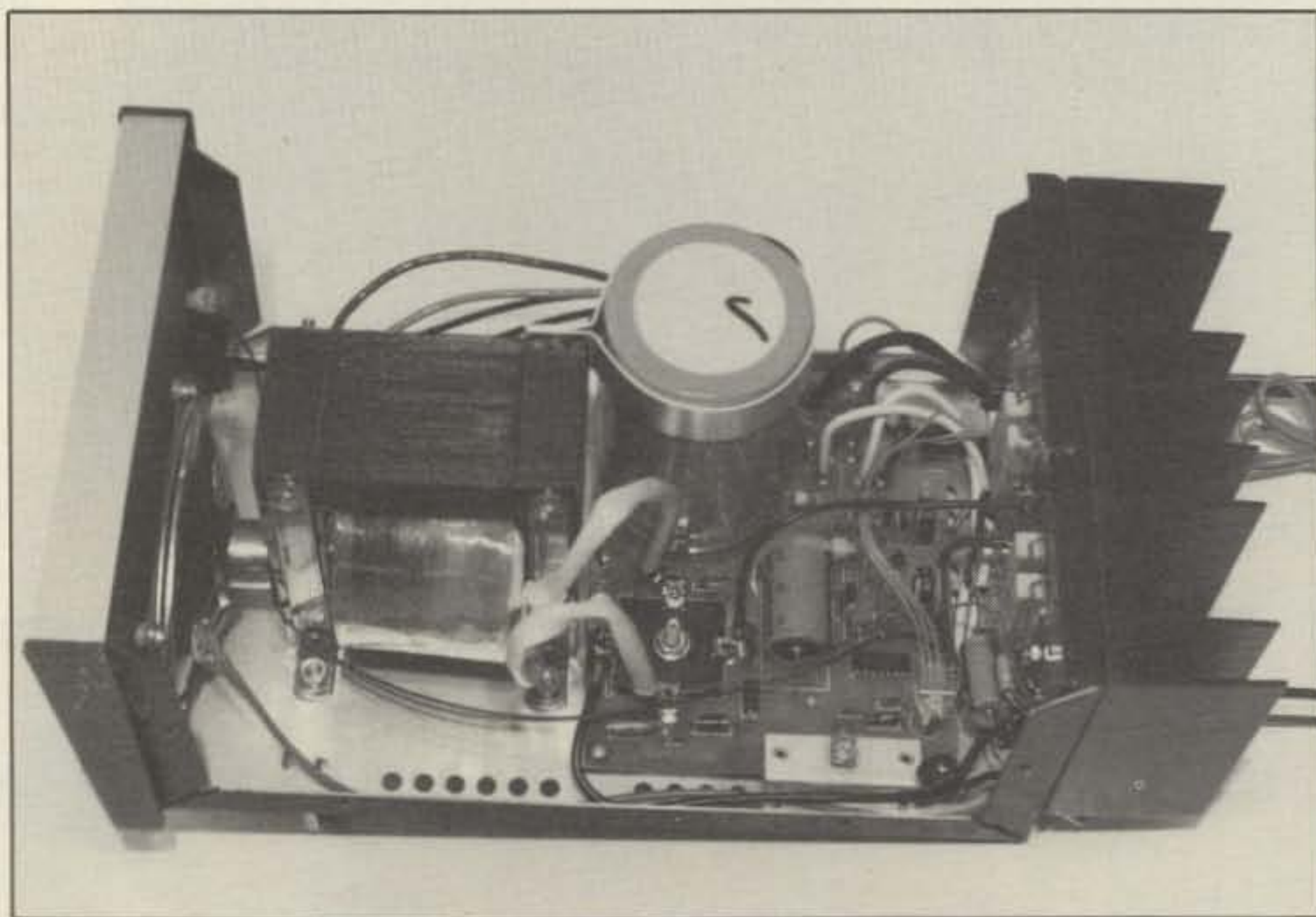
tion that my audio sounded strong and dominant, but not rough (I almost always left the processor turned on). One operator at HZ1AB summarized it best, I guess, when he simply commented that the audio sounded "superb."

With regard to CW operation, I received many compliments regarding the keying quality of the Paragon. I could only test the QSK up to 20 wpm plus because of my own operating ability. However, a single "dit" at 20 wpm would easily be discernable as I was transmitting so I could break my transmission to listen. I estimate the full QSK to be viable to at least 35 wpm for dyed-in-the-wool CW buffs.

I still haven't filled all of the 62 memories, but over a period of time I have entered quite a few beacon frequencies, broadcast frequencies, and DX net infor-

mation. The tag display is immensely useful to keep track of net times and things like beacon locations. If you obtain some of the optional filters, you will rapidly appreciate the fact that although a memory will store filter and mode information, the filter and mode functions are completely switchable even after a memory channel has been recalled. Any filter can be selected in any mode (except FM where the 15 kHz one is automatically selected). Therefore, one can enjoy quasi hi-fi on SSB receive using the 6 kHz filter when conditions permit, at one extreme, and try to dig a shortwave broadcast station out of the QRM or noise using the narrow SSB filter.

Besides being a more than state-of-the-art radio from a technical viewpoint, I just plain found the Paragon to be a thoroughly enjoyable radio to use. It sort of in-



An internal look at the Model 960 Power Supply. From left to right are the internal speaker, power transformer, main filter capacitor, rectifier/regulator board, and the heavy heat sink on the rear of the unit.

\*c/o CQ magazine

Input Voltage: 109-125 VAC or 218-250 VAC, 50-60 Hz  
 Output Voltage: 13.8 VDC, internally adjustable from 11.5 to 15.0 VDC  
 Output Current: 20 amps full load, 22 amps maximum for 5 minutes  
 Current Limiting: Electronically disables output. Factory set threshold at 22 amps  
 Regulation: - 3% at output connector for no load to 20 amps full load  
 Ripple: 20 mV peak to peak at 20 amps  
 Speaker Impedance: 8 ohms

Table I- Specifications for the Model 960 Power Supply/Speaker.

vites you to use it rather than present a front panel which challenges the operator to remember how to use it.

## Manual

The manual supplied with the Paragon guides you very easily as to how to use its features. It initially gives installation guidelines which are complete enough except if you're using a full QSK amplifier. I did have to refer to the Titan manual also to get the interconnections to the amplifier correct. The manual then goes on to a one-page condensed operating instruction summary which is great. It quickly points out all the control settings and frequency selection methods so you can

have the transceiver operating on amateur band SSB or CW within a very leisurely 5-10 minutes.

The next section of the manual is entitled "Detailed Operating Instructions," and this is where you really get to know how to use the transceiver. The information is conveyed rather neatly in little "tidbits." Small, logically connected groupings of the keys or analog controls are discussed in individual blocks, or some blocks may illustrate and explain just one key function or analog control. With the transceiver in front of you, all of the information is very easy to understand. Trying out all of the functions is quite interesting, and I would suggest that this part of the manual be digested in leisurely steps.

Other parts of the manual go on to give operating hints, what-to-do in case of trouble hints, options installation information, and circuit descriptions. The demand for the Paragon sort of overwhelmed Ten-Tec, and the latter section of the manual was not included with early production runs, although by now all owners of the transceiver should have received the complete manual.

I worked with preliminary copies of various diagrams, and it was quite evident that Ten-Tec was determined to get them complete and correct before incorporating them in the manual. The diagrams with which I worked contained quite complete information regarding things such as component identification and test-point voltages on each PC board. The information, overall, does not constitute a complete alignment and service manual. However, an experienced amateur can certainly use the diagrams to track down minor problems, if they should ever arise, or use them for technical communications with the Ten-Tec service people.

## Options/Accessories

The filter options, mentioned previously, have been available since the Paragon

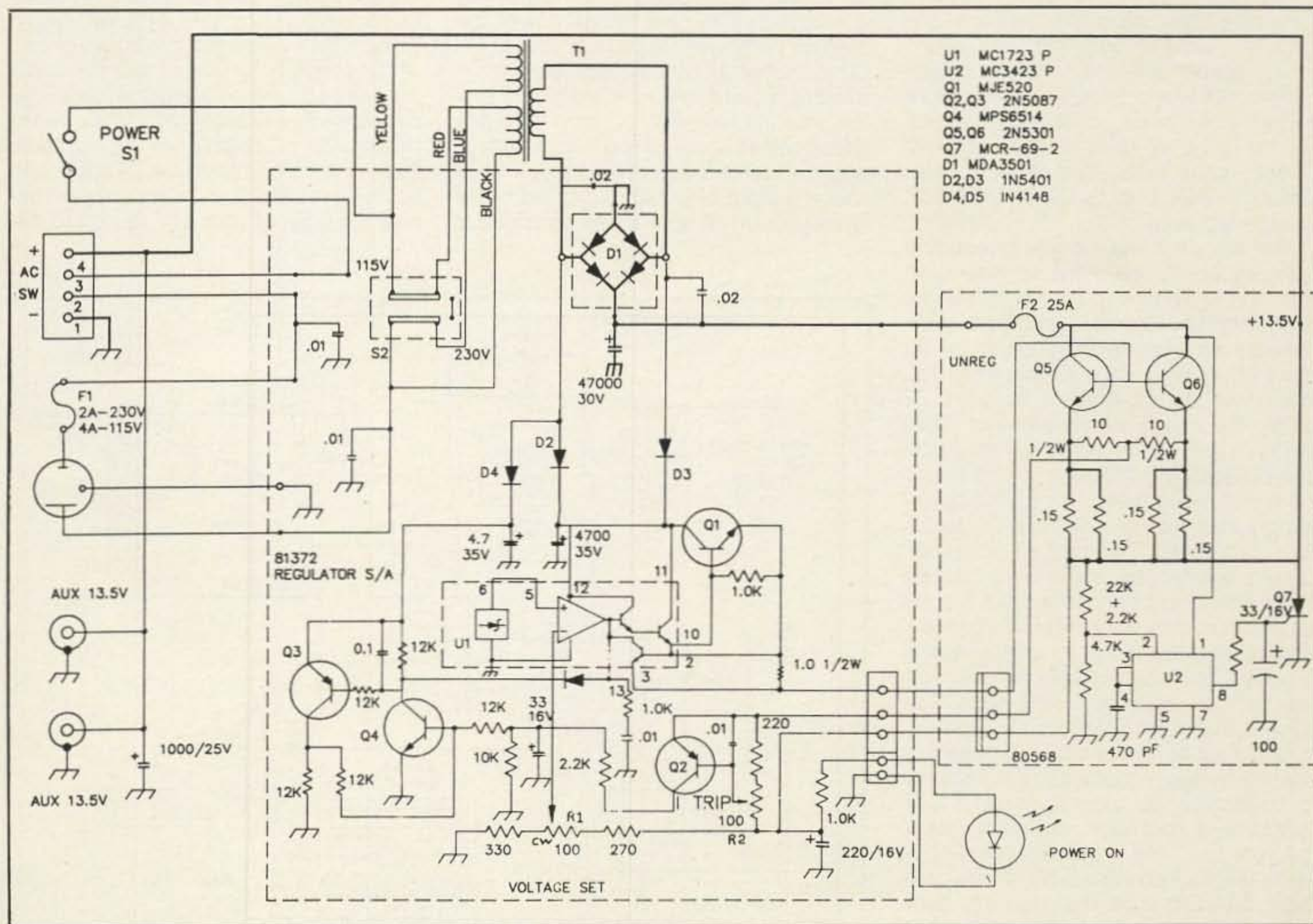


Fig. 1- Schematic of the Model 960 Power Supply.

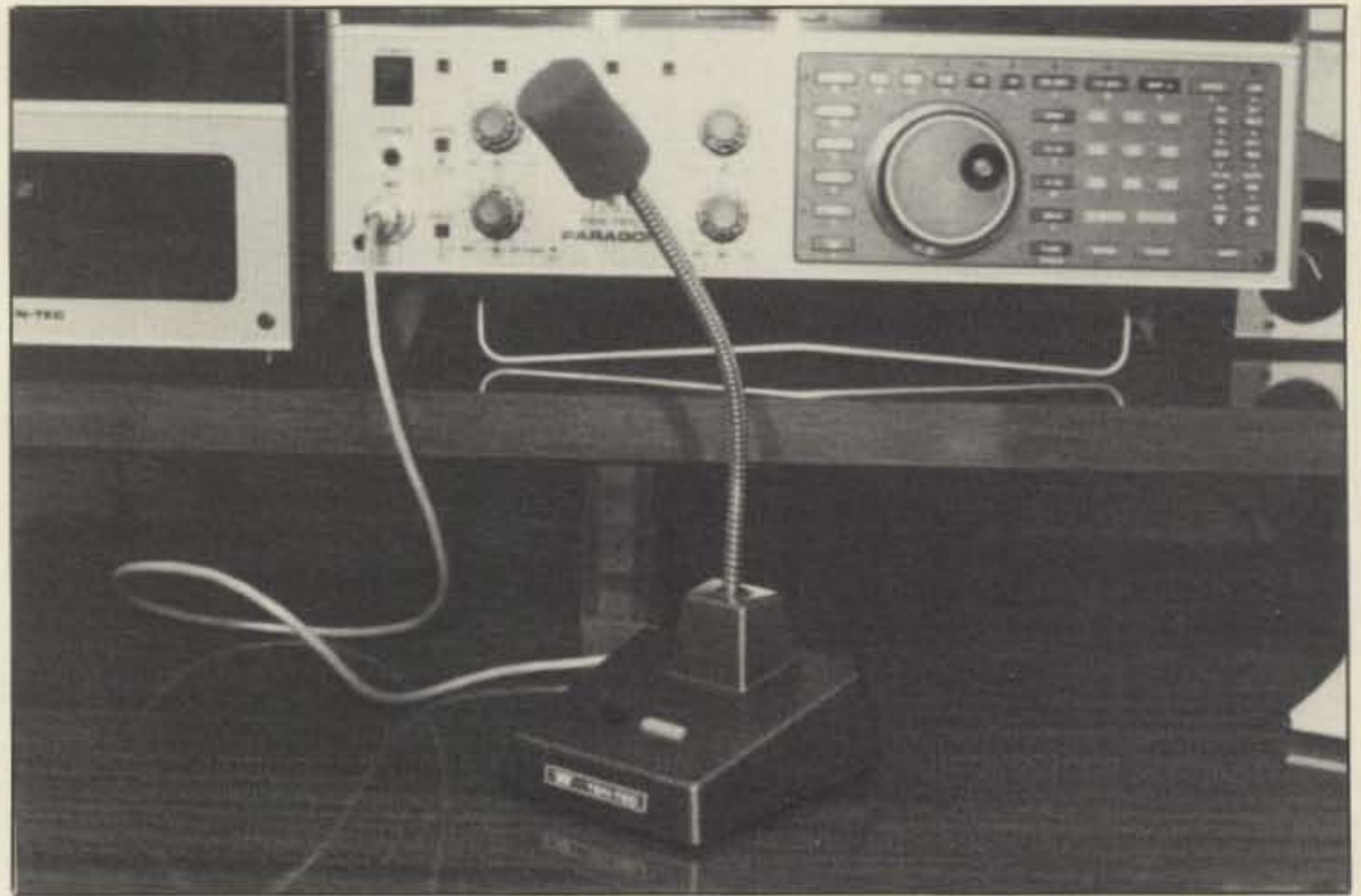
was introduced. The Voice Readout, RS232 Interface, and FM Adaptor options were all held up from lot production due to the initial demand for the transceiver. They should be available now. The Voice Readout option, Model 257, announces the displayed frequency whenever the **VOICE** key is displayed. The output level is adjustable. The RS232 Interface, Model 258, provides computer interface. It comes as a package that includes a plug-in PC board, RS232 connector and cable, and a listing of the command codes to access the Paragon's microprocessor. The FM Adaptor option, Model 256, is a PC board that locates within the transceiver near a synthesizer sub-chassis. It provides transceive  $\pm 5$  kHz FM deviation.

Two Ten-Tec accessories that were actually used with the Paragon that was tested were the Model 960 Power Supply/Speaker and Model 705 Electret Microphone.

The Model 960 Power Supply is a rugged unit that supplies 20 amps at 13.5 VDC (regulated) from a 115/230 VAC, 50/60 Hz source. Table I presents the specifications for the unit. You might note the wide input voltage acceptance range and the relatively "stiff" regulation even at 20 amps output.

Fig. 1 presents a schematic of the power supply. The in/out connections are quite standard, except that you might note that *two* auxiliary 13.5 volt output connectors are provided for accessory items. The basic circuitry revolves around D1, a full-wave rectifier, and two 2N5301 pass transistors (heavily heat-sinked) as controlled by U2, an MC3423P voltage regulator.

The circuitry has several interesting features which are more sophisticated than those evident in previous Ten-Tec power supply designs. Q3 and Q4 provide over-current shut-down action driven indirectly by the voltage drop across R2. When the output current exceeds 22 amps, the power supply will shut down until you recycle the on/off switch on the power supply (not the power on/off switch on the Paragon transceiver). The power supply also has over-voltage or "crowbar" protection. This type of protection dates back decades as far as broadcast transmitters are concerned, but it's not all that common in amateur designs. Basically, it's a protective circuit that *shorts* a power supply output when an over-voltage output condition takes place. The idea is that it's better to blow a power-supply fuse or have a circuit breaker trip than to damage an expensive transmitter or transceiver component. In order to be effective, a "crowbar" operation has to be very fast, and it certainly cannot be done unless a power supply is very carefully designed such that repeated overloads ("crowbars") activate only the protective circuitry in a power supply and do not cause damage to the main transform-



The Model 705 microphone makes a smart matching addition to the Paragon.

er or solid-state devices. The "crowbar" circuit (U2 and Q7) in the Model 960 does just that and is set at a threshold voltage of 15.9 VDC. Even momentarily high supply output voltages (e.g., those caused by a lightning strike near the AC power line feeding the power supply) will cause SCR Q7 to "crowbar" and either trip the over-current circuit or blow the line fuse (F1) or the internal fuse (F2, 25 amps). In any case, unless some *very* unusual voltage spike or current peak takes place at *either* the input or output terminals of the power supply, it is very well equipped to

protect itself. The worst that can happen is that you will be faced with the minor inconvenience of replacing the line fuse (externally accessible) or the doubly-protective 25 amp fuse (internally accessible) or having to recycle the on/off switch to reset the overcurrent protective circuit.

The supply has a built-in speaker which provides a bit more "presence" to the received audio as compared to the upward facing internal speaker in the Paragon. The front-panel plexiglass window can easily be removed, and you can insert behind it a label of your own design to dis-

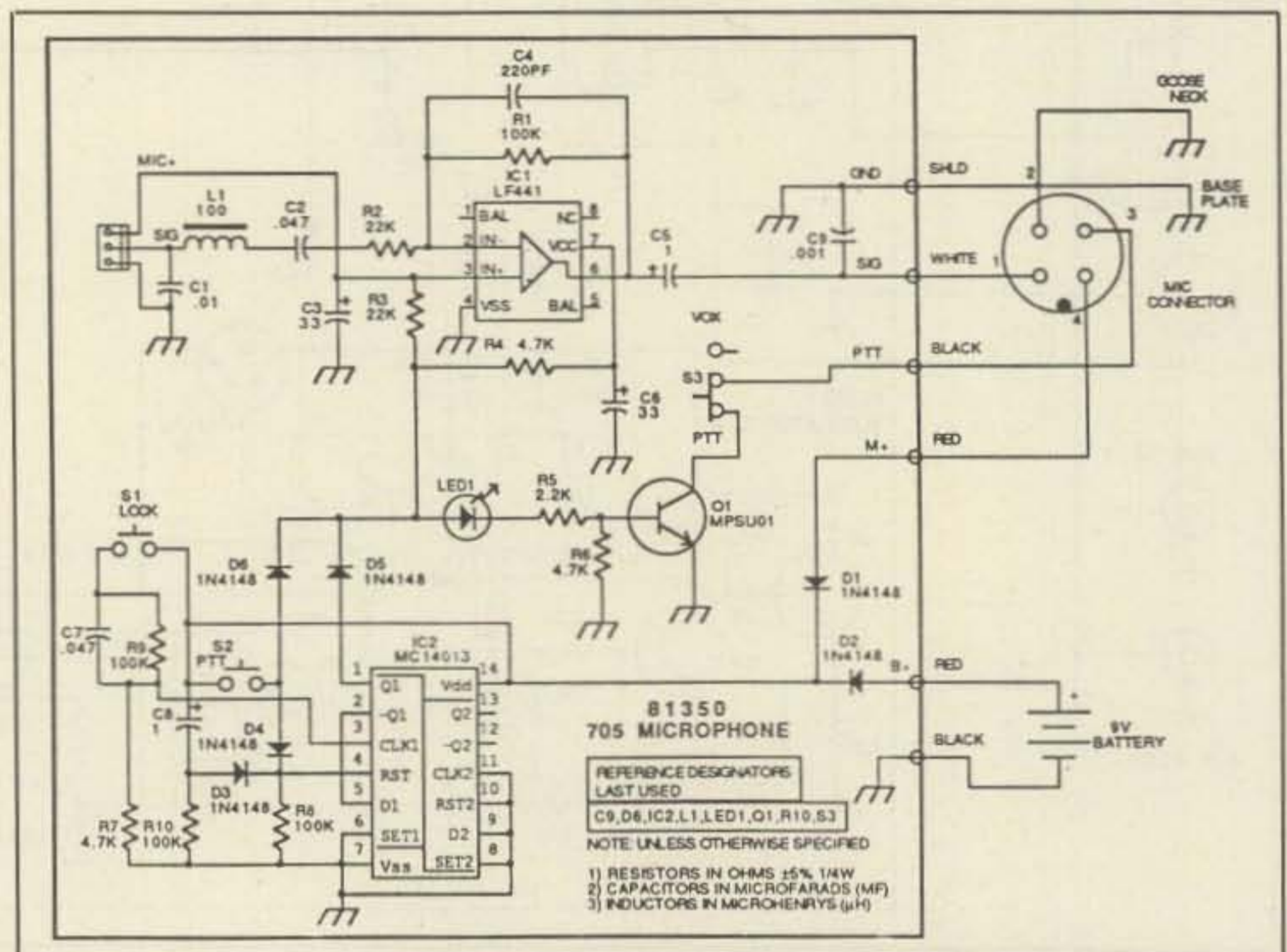


Fig. 2—Schematic diagram of the Model 705 Microphone.



play a station's call sign. Overall, the supply is extremely well designed, and it's hard to imagine how almost any sort of electrical abuse could damage the unit.

The Model 705 microphone is a very light-weight electret type. The specifications for it are shown in Table II. It is an amplified type of microphone, and its schematic is shown in fig. 2. IC1 is a low-noise preamplifier, while IC2 in conjunction with Q1 forms a latching/switching circuit to provide either for momentary or locked PTT operation via two key switches on the microphone. An LED signals that the PTT line has been grounded. The microphone can be powered by an internal 9 volt battery or directly over the microphone cable from most Ten-Tec transceivers, including the Paragon.

The unit is so light (about 8 ounces without a battery) that at first you tend not to develop too much respect for the unit. However, it is really a quite good microphone. I didn't do a frequency response run on the microphone, but I did audibly compare its response to that of several other microphones I had in the shack. The 705 has a clear, very intelligible response with, what I would call, not being bassy or overly crisp. I suspect it all comes about from a combination of the electret element itself plus a bit of frequency shaping as provided by the dimensioning of the components associated with the low-noise preamplifier, IC1.

Type: Electret condenser microphone  
Sensitivity: -52 dBv (0 dBv = 1 v/μBar at 1 kHz)  
Output Impedance: Works into any circuit of 100 ohms or more  
Maximum Sound Pressure Level: 130 dB  
Battery Type: 9 volt alkaline transistor battery  
Electronics: C-Mos PTT switch, C-Mos signal amplifier, NPN T/R transistor  
Current Required: Receive mode less than 2 microamperes; transmit mode 2 milliamperes typical, with 9 volt battery  
Semiconductors: 2 ICs; 1 transistor; 7 diodes  
Weight: 12 ounces including battery

Table II—Specifications for the Model 705 Desk Microphone.

If you do invest in a Paragon, I would also strongly advise considering the purchase of the 960 Power Supply and 705 Microphone.

### Epilog

Through a rather inept move on my part, I had to call on Ten-Tec's service department. I tried to reposition the annunciator screen on the transceiver, but in the process the screen fell off. I had the feeling that I was turning a minor thing into a disaster, since I had the front panel partly removed to get at the screen, and I had also disconnected many cable leads.

I sent the transceiver back to Ten-Tec. Within ten days it was back. Not only had a new screen been installed, but the bottom internal cover had been replaced by an updated one, the transceiver had been

realigned, a cold solder joint on an IF filter had been repaired, and the software had been updated to the latest version! There was no service charge. Now if that isn't top-of-the-line service for a top-of-the-line rig, I'm lost for words.

Here are some last-minute notes of interest. The Paragon now comes with a 100-plus page combined operating and service manual which is absolutely complete with detailed circuit descriptions, board circuit traces, component layouts, etc. Serial numbers 395 and above incorporate a 3 ma trickle charge to the 9 volt memory back-up battery so a nickel-cadmium type can be used. Earlier serials can be modified easily. Also, several options are now available as to how the "spot" button can be used via a programmed plug-in chip. It's all explained in the manual.

BT

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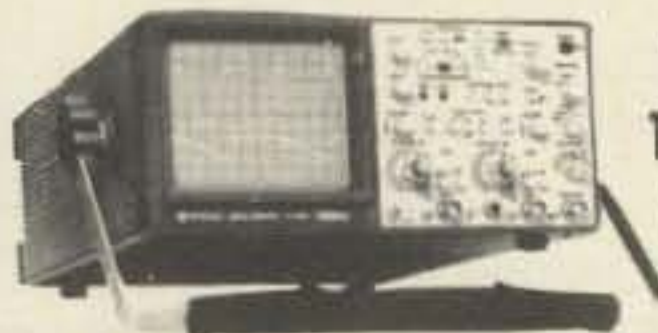


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# The Second Annual CQ World-Wide RTTY DX Contest

0000 UTC Saturday - 2400 UTC Sunday  
September 24-25, 1988

**Objective:** For amateurs around the world to contact other amateurs in as many CQ zones and countries as possible using the digital modes.

**Contest Period:** 0000 UTC September 24, 1988 to 2400 UTC September 25, 1988. The total contest period is 48 hours, but no more than 30 hours of operation are permitted for single operator stations. The 18 hours of OFF time can be taken any time during the contest period, but OFF periods may NOT be less than 3 hours. All ON and OFF periods must be clearly noted in the log and summary sheets.

**Note 1:** Multi-Operator stations may operate the full 48 hours.

**Note 2:** A Single Operator MAY operate more than 30 hours, but only the FIRST 30 hours of operating will count toward the official score.

**Operator Class:** A. Single Operator. B. Multi-Operator, Single Transmitter (ALL BAND ENTRY ONLY).

**Entry Categories:** A. All Band. B. Single Band.

**Modes:** Contacts can be made using Baudot, AMTOR (FEC/ARQ), ASCII, and AX. 25. (NO digipeated QSOs allowed.)

**Bands:** 80, 40, 20, 15, and 10 meters.

**Valid Contacts:** A given station may be contacted only ONCE per band regardless of the digital mode employed. Additional contacts are allowed with the same station on each of the other bands as well.

**Exchange:** Stations within the 48 Continental United States and the 13 Canadian areas must transmit RST, state, or VE area and CQ zone number. All other stations must transmit RST and CQ zone number.

**Countries:** The ARRL and WAE DX Country lists will be used. Note: USA and Canada count as countries.

**QSO Points:** One (1) QSO point for contacts within your own country. Two (2) QSO points for contacts outside your own country but within your own continent. Three (3) QSO points for contacts outside your own continent.

**Multiplier Points:** One (1) multiplier point for each U.S. state (48) and Canadian area (13) contact on each band. One (1)

multiplier point for each DX country in the ARRL DXCC and WAE lists on each band. NOTE that KL7 and KH6 are country multipliers ONLY, and not state multipliers. One (1) multiplier point for each CQ zone worked on each band. A maximum of 40 per band.

**Note:** Canadian areas are VO1, VO2, VE1 N.B., VE1 N.S., VE1 P.E.I., VE2, VE3, VE4, VE5, VE6, VE7, VE8 N.W.T., VY Yukon.

**Final Score:** Total QSO points times the total multipliers equals the total claimed score.

**Contest Entries:** All entries must include a SEPARATE log for EACH BAND, a DUPE sheet for EACH BAND, a MULTIPLIER check list for EACH BAND, and an OVERALL summary sheet. All logs MUST show date, time, callsign of the station worked, RST exchanged, state or Canadian area (where applicable), CQ zone, and points claimed per contact.

**Note:** Standard CQ World-Wide DX Contest sheets are appropriate for use in this contest.

**Disqualifications:** Operating in an unsportsmanlike manner, manipulating scores or times to achieve a score advantage, or failure to omit duplicate contacts which would reduce the overall score more than 2% are grounds for disqualification. Decisions of the Contest Committee are final.

**Awards:** Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third place. Certificates will be awarded to the first-place finishers in each of the U.S. and VE call areas. Certificates will be awarded to the first-place finishers in each DX country.

**Logs and Entry Forms:** Standard CQ contest log and summary forms should be used. Sample log forms and summary sheets are available from CQ. Please include an SASE or appropriate postage (stamps or IRCs).

**Deadline:** All entries must be post-marked NO LATER than December 1, 1988. An extension may be given if requested. Logs should be mailed to CQ RTTY CONTEST, Roy Gould, KT1N, P.O. Box DX, Stow, MA 01775 USA.



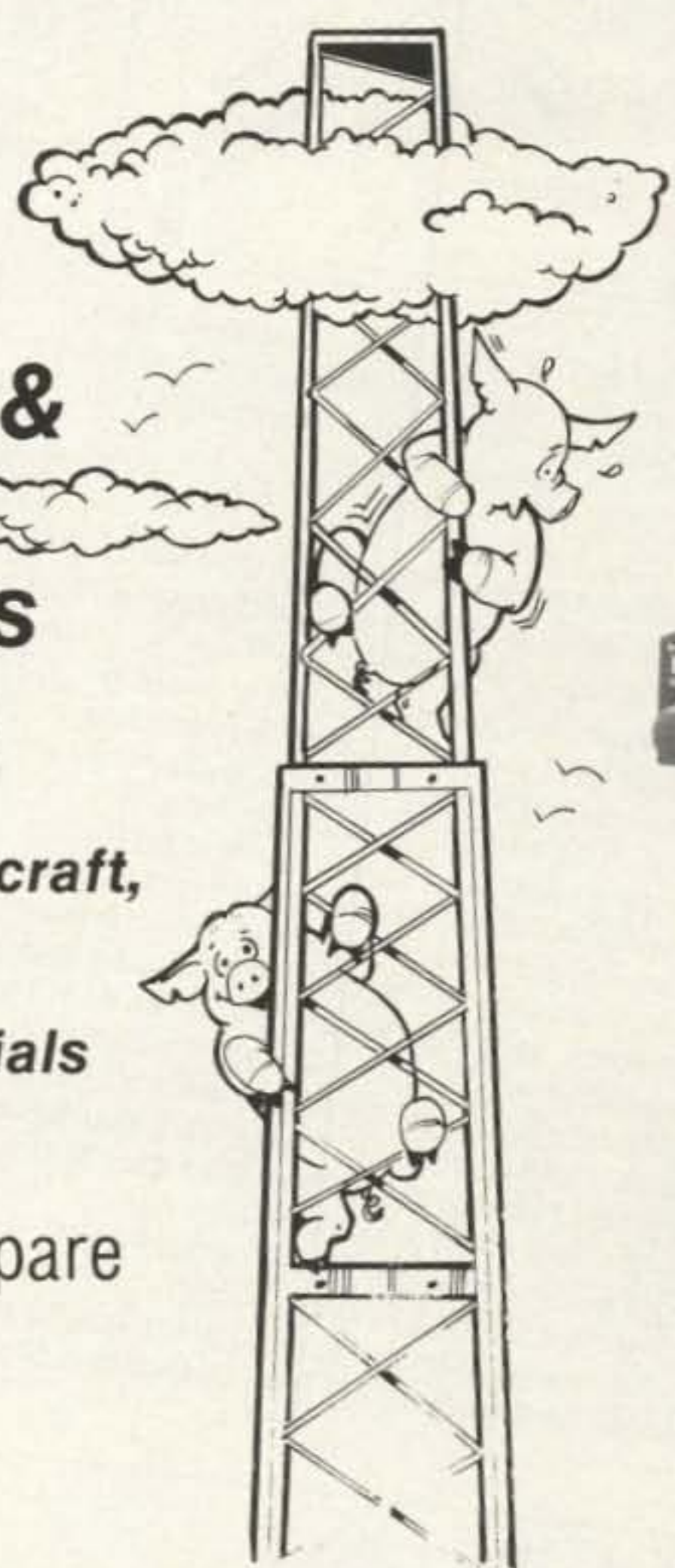
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CIRCLE 80 ON READER SERVICE CARD

## A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

### We Get Letters

**S**urprisingly, over the past six months we've received several inquiries about a long-forgotten antenna we commented on in our sixth column for *CQ*, in August 1980. This was the T2FD, or "Terminated Tilted Folded Dipole." Writes Dale W. Avery, KC7MM, in a recent letter:

"In your column for August, 1980, you make reference to a T2FD antenna. Because of antenna and area availability restrictions at my new QTH, I would like to try building an antenna of that type. It especially interests me because of its multiband capabilities. Your article was somewhat vague as to dimensions and measurements, and I am having a heck of a time locating additional information on the T2FD. I have looked at all the more recent periodicals, antenna handbooks, etc., and none give any information at all on this setup. Let me explain my situation and then ask a few questions."

"I have recently moved to a new QTH and am not allowed towers. I have installed a HF5V (vertical) with 44 radials laid down in a nonsymmetrical fashion (in a) pie-shaped yard with the house in the center. It is almost satisfactory on 10-40 meters, but leaves a lot to be desired on 75/80. My chief modes of communication now are CW and low power (60-100 watts) RTTY. I have several tall Ponderosa pine trees on my lot, which should make good supports for a folded dipole. One set of these trees is 60 feet apart, the other set is 70 feet apart. Numerous others will serve to shield the antenna from the neighbors."

Dale went on to describe the plans he had for the antenna, and wrapped up with several questions he had about it. As I pointed out to him, I've not had firsthand experience with the T2FD. Rather, I presented it as something for experimentation in my 1980 column.

Actually, the antenna goes back much farther than that, being a variant of the familiar sloper dipole (fig. 1). The T2FD was first proposed by Don Stoner, W6TNS, in his *CQ Novice Column* for June 1957. In Don's design, the antenna is configured as a sloping folded dipole, terminated at a point opposite the feed-point in a noninductive, i.e. carbon, resistance equal to the feedline impedance, nominally 300-400 ohms. A length of 40 feet is selected for the antenna, which Don indicated should load well on 80, 40, and 15 meters. The antenna is fed directly with 300-450 ohm twinline, openwire line, or ladderline. It can also be fed with coaxial cable through a balun transformer. Fig. 2 shows construction details.

As a sloper, the T2FD should enjoy most of the operating benefits enjoyed by this type of antenna. It should be a good DX producer with a relatively low angle of radiation. Indeed, considering the slight directional possibilities and typically low angle of radiation, sloper enthusiasts rank the antenna higher than the inverted

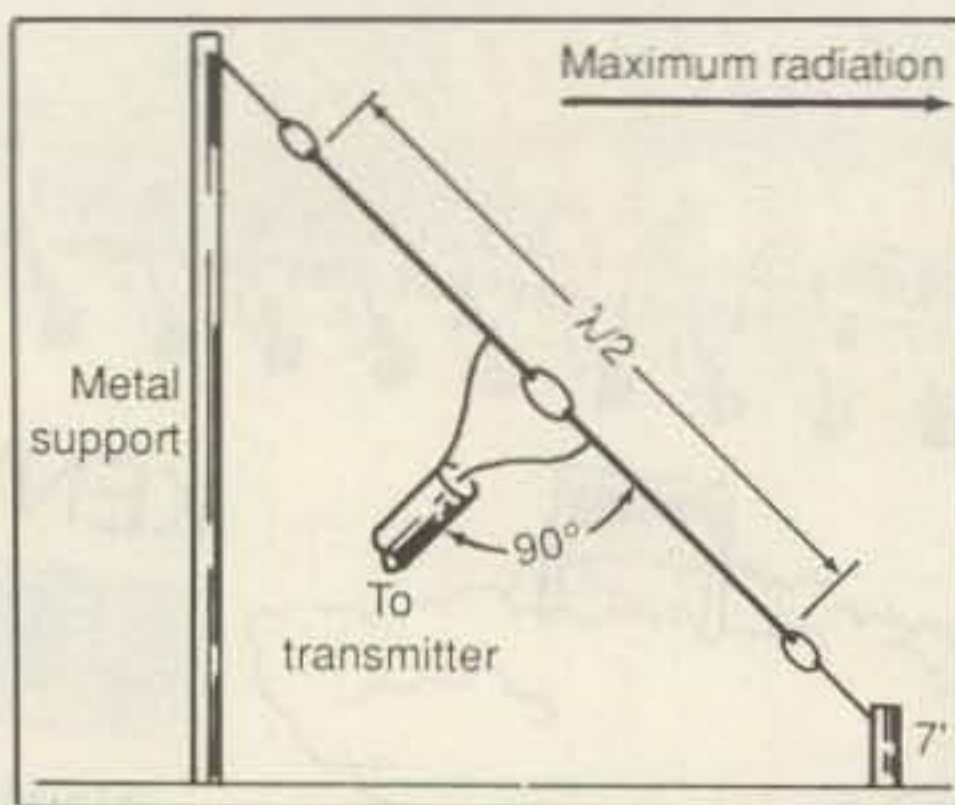


Fig. 1—The sloper, usually a half-wavelength dipole, exhibits a low angle of radiation. The arrow indicates the direction of maximum signal concentration.

vee and considerably higher than the horizontal dipole when it comes to laying down a respectable signal at a distant point.

However, in looking back at the design, I now wonder if the possibly power-absorbing terminating resistor is more trouble than it is worth. You can get into trouble, for example, if you try to substitute an easier-to-find inductive (wirewound) resistor. Thus, it might be simpler and easier to configure the antenna as a 40-foot nonresonant dipole (rather than a folded dipole), feeding the antenna directly with openwire line via a wide-range transmatch. Neither the length of the antenna nor the feedline is critical, though if you can approach about 67 feet for the flattop, 80-meter performance should be improved. Alternately, making the flattop length 51 feet would make the antenna a sloping, half-size G5RV.

I'd be interested in learning of the results obtained by anyone using the T2FD or one of the

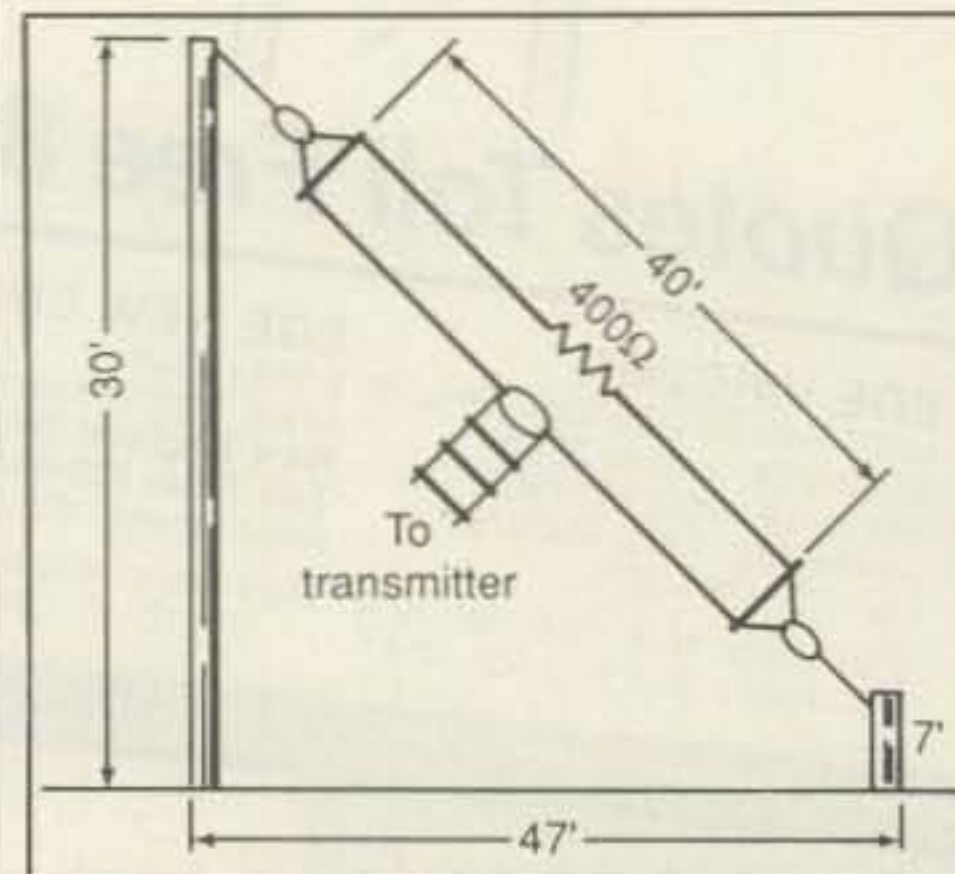


Fig. 2—The T2FD can be considered a multi-band sloper. The resistor must be a non-inductive type of sufficient power handling capabilities to dissipate approximately 1/2 the transmitter output power.

alternatives suggested here, especially on 80 meters.

### G5RV Questions de NR5A

Jerry Felts, NR5A, wrote us some time ago with a lengthy letter about making his good-working full-size G5RV work even better. Extracting from Jerry's letter:

"I live in a mobile home park on the corner lot; my landlord is great—doesn't really care what I put up antenna-wise *Where are these landlords?*—ed. But I try to keep a semi-low profile. At the corner of my lot I have a small tower with a home-brew Yagi. About halfway between the trailer and tower is a 14AVQ vertical with about 75 feet of RG-213 buried in the ground."

"I installed the G5RV with its apex on the tower at 21 feet; the two ends are each 10 feet above the ground. I had 30 feet of ladderline so I attached it to the center of the G5RV and let it fall to the ground; about six feet of the ladderline runs parallel to the ground, about 1 1/2" above it. At this point I attached a 25-foot piece of RG-8X and ran it over to the vertical, where I used a coax switch to attach it to the RG-213 coax used to feed the vertical. It was put up in this configuration just to see if it would work, and so far nothing has been changed. SWR on 20 meters is about 1.4:1. On the other bands, the SWR is less than or close to 2:1—with the antenna tuner not being used. I'm quite happy with it, but I'd like to make it better if possible."

Jerry went on to ask a number of questions about improvements to the system, especially in terms of using a mixture of coax and ladderline vs. ladderline all of the way, routing ladderline and other openwire feeders into the hamshack, and using buried twinlead. Since his system is working nicely, there's little point in "fixing something that's not broken." But a couple of points he inquired about should be addressed.

Some amateurs do experience loading and matching problems when using the "classic" G5RV design which makes use of a short length of openwire or twin line as an impedance transformer, into a coax transmission line to the hamshack. Use of a balun at the openwire/coax junction can also cause problems. It's probably better, all-around, to go with ladderline all of the way to the shack and use a wide range antenna tuner at the transmitter or transceiver.

Ladderline, or any openwire line, does present a problem in getting it into the hamshack. It should be brought into the shack through small holes drilled in a windowpane, or using a "wall-through" tube such as sold by Radio Shack. Ordinary twinlead or ladderline shouldn't be buried or run close to the ground, though it is possible to buy shielded twinlead and bury it if necessary for some reason, such as RFI suppression. However, with the G5RV, the feedline is to some extent a radiating part of the antenna—a good reason not to bury the lead-in. In many respects, the G5RV acts like a

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**10-Band, 16 Channel • No-crystal scanner**  
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 Bands: 29-54, 136-174, 406-512 MHz.  
 The Bearcat 145XL is a 16 channel, programmable scanner covering ten frequency bands. The unit features a built-in delay function that adds a three second delay on all channels to prevent missed transmissions.

### Bearcat® 175XL-SA

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**11-Band, 16 Channel • Weather Search**  
**Priority control • Search/Scan • AC/DC**  
 Bands: 29-54, 118-174, 406-512 MHz.  
 The Bearcat 175XL has an automatic search feature to locate new frequencies. Priority, lock out, delay and scan speed are all included.

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multiband dipole using tuned feeders, if it's fed with openwire line all the way.

Looks like Jerry is one more happy G5RV user!

## Eminent Domain?

Does your elaborate antenna installation, a vital part of your amateur radio hobby, have any dollars-and-cents value should your home be purchased by a government agency for a highway, urban development, or other public project? If your home is condemned, what about the costs of removing your antennas and reinstalling them at a new QTH?

We won't stir things up by mentioning a name or callsign, but some months ago we received a letter from an Eastern amateur whose home was about to be purchased by his state's highway department, in order to build a bypass around town. It seems that the highway department had little experience in dislocating an amateur, so they didn't have a good precedent as to how much to allow for a set of amateur antennas and costs associated with their removal and reinstallation.

This amateur elected to build a home on a nearby lot about a mile from town, where, unlike his former location, there were no trees from which to string his antennas—necessitating his erecting a couple of masts for his dipoles. To complicate things, the gentleman is about 70 years of age and has health problems which preclude his installing and climbing masts and towers. He would have to get some amateur friends, or a professional crew, to do the physical work in getting him back on the air.

The highway department tentatively offered him \$2500 cash for all of the costs associated with his inconvenience, though it has had some second thoughts about this seemingly high initial offer.

What's a fair settlement in such a case? The particular amateur wrote me for advice, though I had to admit up-front that I'm not an expert in such matters, and certainly had no legal qualifications. My feeling, however, is that the highway department's responsibility is (or at least should be) to restore the amateur to roughly where he would have been had he not been required to relocate his home and its amateur radio equipment and antennas. Because of the gentleman's age and physical condition, it's reasonable to expect to hire and pay someone to do the physical work involved. Thus, there's more than just nominal cost involved.

It seems to me that if the individual is satisfied with a simple wire antenna involving no beam, masts or tower, then \$2500 could be high for a settlement. But if the lack of suitable trees on the new property dictates installation of several supports in order to "work out" reasonably well, then the \$2500 figure seems reasonable. One would have to buy the masts and hardware, leadin, and other accessories, and then have someone install and test it, including the usual pruning and tuning.

While I don't think that the highway department can be expected to compensate one for the past time invested in installing and perfecting an antenna system, one should be compensated for the cost and time involved in getting things working again. Still, the fact that all this relates to a hobby-type activity, with the antennas not representing the loss of economic assets, may result in one getting a lower settlement than might be expected or hoped for.

I'd like to hear from readers who have had



A TNC and demodulator offered by I6NOA.

experiences with eminent domain proceedings, or from lawyer-hams who may have been involved with amateur relocations. I suspect that the variety of situations and results may prove almost as interesting and frustrating as antenna zoning controversies!

## Atari Notes de DK5AD

Knut Baczko, DK5AD, sent me a short note, updating me on the widespread amateur use of the ST computer in Germany. Knut told me something of the excellent ST software that's coming out of Europe these days, such as a two disk set of multipurpose German-developed amateur radio logging, contesting, and utility programs which have English language documentation. While I don't sport an ST to evaluate the programs, the sample screen photos and printouts certainly look professionally developed. I don't have pricing information or other details, so suggest that if you're looking for ST software, you correspond with the programs' author: Wolfgang Cramer, DK4BV, Bluetenstr. 20, D8500 Nuernberg, West Germany.

## Hustler News

Tony Martin, marketing manager of Newtronics Antenna Corp., sent me a note about



Alex, I6NOA, hard at work on an antenna project.

Hustler's recent "rejuvenation" and merger with Antler Antennas under new management. In subsequent telephone conversations with Tony (whom we need to persuade to get that amateur ticket), it appears that the changes mean a stronger company with a steady stream of new amateur antenna products.

Hustler is, of course, well known for its CB, monitor, and amateur antennas, including the popular HF 4BTV and 5BTV fixed station verticals and numerous HF/VHF mobile antennas, mounts, and resonators. Tony also sent us samples of some new mobile products, including the RMX 10-meter "Super Mobile" antenna and the accessory 12-meter and 17-meter resonators. Hustler is obviously banking its marketing efforts on solid occupancy of the higher HF WARC bands as the sunspot cycle begins its upward climb. For spec sheets, contact Newtronics Antenna Corp., One Newtronics Place, Mineral Wells TX 76067.

## SWL Slopers and G5RVs

From "The World Book Marketplace" comes word of several SWL receiving antennas for broadband HF use. One new antenna is "The Eavesdropper," a 65-foot sloper that is furnished completely assembled at \$49.95 plus shipping. Also available is "The Original Eavesdropper," a rugged 40-foot trap receiving antenna. It is available as the Eavesdropper-F, using balanced twinline feeder, at \$59.95. The same antenna using a coax feedline is available as the Eavesdropper-C at the same price.

A half-size, 51-foot G5RV is also offered for 3-30 MHz use. Based on the popular G5RV multiband design, the antenna comes assembled and designed for coaxial feedline. Though designed primarily for receiving use, the antenna is rated at 1500 watts for transmitting. It's \$39.95. For more details and shipping information, contact The World Book Marketplace, PO Box 241, Radnor Station, Radnor PA 19087.

## MufMap

The "MUF people," James Dolson, WB8ZBD, and William Dolson, K8DDV, at Base (2) Systems, have come up with what is probably the most unusual and innovative addition to their line of propagation prediction software, hard on the heels of *Mufplot* for the Commodore 64 and *BandAid* for the IBM-PC. Their new IBM-PC product is *MufMap*.

What's a *MufMap*? Most of us are familiar by now with what propagation programs do, and we may make at least occasional use of their capabilities in predicting point-to-point propagation paths. However, while a MUF (Maximum Usable Frequency) propagation program is good for telling you when the bands are open to a given area of the globe, it won't provide a panoramic view of propagation conditions around the world—in other words, where you're most likely to get results.

The new program lets you see worldwide propagation conditions at a glance. *MufMap* displays all 10, 15, and 20-meter band openings on a world map, all at the same time. By using different colors (if you have a color monitor), or by different types of crosshatching on a black-and-white monitor, you can graphically see, for any given time of the day, to what part of the world the bands are likely to be open.

The fact that you can see where the band openings are projected to be all over the world at a glance is a tremendous plus. The program

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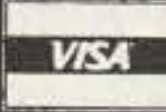
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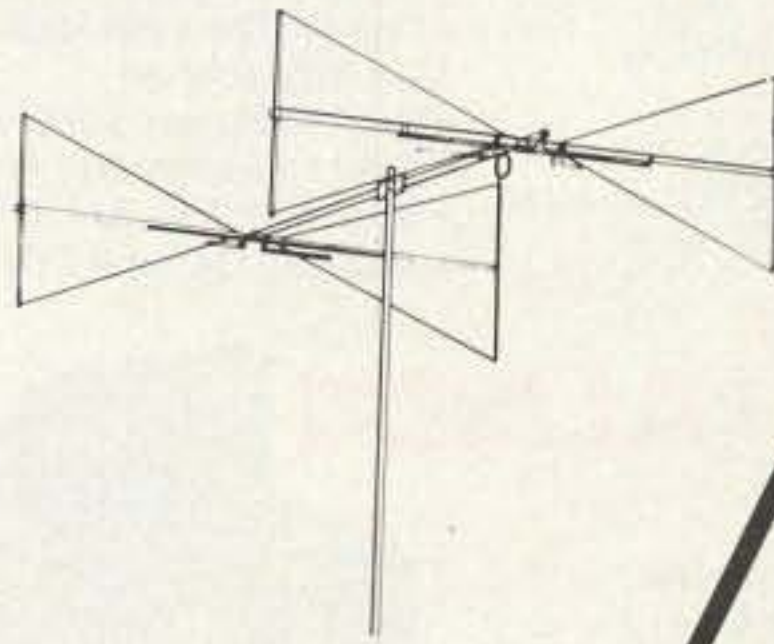
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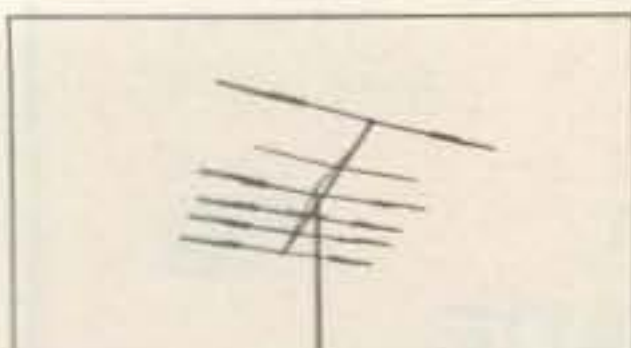
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directly answers the question, "where are the bands open to right now?" Too, you can use the program to plan your operating schedules in contests more effectively, decide whether it's worth getting up at "zero-dark-thirty" to see what conditions are like, and more realistically set up and maintain skeds with DX stations.

Another nice plus is the ability to create and view flicks known as MufMovies on your computer display. You can set up *MufMap* to produce a running movie showing conditions on a given date in fixed time increments—something like watching a fast-motion satellite weather map on TV. By seeing what band conditions will be like during the selected cycle, you can make sure you're using your operating time most productively. This option is also quite educational if you experiment varying the date, time of day, and solar flux to see what each parameter does to projected band conditions around the globe.

*MufMap* is designed for a 256K IBM-PC or compatible. Currently, it supports register compatible CGA cards, but it does not work with Hercules graphic cards. It supports the 8087 math coprocessor for faster operation. It's \$59 from Base (2) Systems, 2534 Nebraska St., Saginaw MI 48601.

### C-64 Update de I6NOA

Last fall, Alessandro ("Alex") Novelli, I6NOA, corresponded with us to let us know of his computer and amateur radio activities. Extracting from Alex' interesting letters:

"I own an electronics firm here in Chieti, near the Adriatic Sea in central Italy. We prod-

uct RTTY/CW/ASCII/AMTOR/packet radio TUs and TNCs, and software and hardware for the Commodore, Apple IIe, and IBM-PC and compatible computers. Most of the products are programs or special cartridges and boards."

Alex said that he has been into amateur radio computing since 1980, writing and exchanging many programs, and several years later started building computer TUs and packet TNCs for the European market. He plans to export some products to the USA, and sent us as an example an excellent multipurpose EPROM expansion and utility cartridge for the C-64 along with a draft English language product catalog. Adds Alex:

"I manufacture a C-64 diagnostic cartridge that checks all chips and functions ... and I also make many amateur radio related cartridges. I can put any program on cartridge in 15 minutes including color WEFAX, SSTV RX and TX, and FAX RX and TX for both the IBM-PC and the C-64 that need no interface—just send audio to one pin of the C-64's user port; an audio filter is optional."

Alex advised that he was looking for interested dealers and distributors, but will sell directly to interested customers. The English language catalog should be available by now, by writing to Hardsoft Products, Alessandro Novelli, I6NOA, PO Box 90, Chieti 66100, Italy. I'm sure that Alex would appreciate a couple of IRCs to help with postage.

### Effortless Shorthand

I've got to admit that I'm a "junkie" for novel computer utility programs. I found a great one in *Effortless Shorthand* from Bi-Intelligence, Inc. that's much more than a novelty.



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This program is actually several different applications packaged as one, best described as a plain English macro and "boilerplate" generator. It's of most use to someone who's heavily involved in wordprocessing, database management, or number-crunching spreadsheets, but it can be used to automate popular amateur radio software packages and store commonly used words and phrases ("shorthand" or "boilerplate") for automatic transmission in RTTY and packet operation.

The program comes with several preconfigured, ready-to-use sets of macro commands used to help automate and simplify the issuing of commands to popular wordprocessing, database, and spreadsheet programs. It also includes several example dictionaries containing abbreviations and other "shorthand" text. A number of freebies are tossed in for good measure, including a label and envelope addresser, a signmaker, a travel expense recordkeeper, and a novel two-finger speed typing course. It's a program designed to save repetitive typing efforts, as it can take up to 360 keystrokes or commands and store them under a single one- to seven-character abbreviation. Whenever you type that abbreviation, the computer obediently types all of the commands and text you stored.

If you're like me, you avoid using macro commands and even boilerplate text in most of your programming, since as a rule they're just too hard to set up and work with. However, this \$49 memory resident "pop-up" program works like gangbusters, making working with macro commands and canned text a snap. So far, I've used it mostly for wordprocessing and spreadsheets, but I see immediate application in the hamshack to store contest exchanges, QTH and QSL information, and other boilerplate in popular RTTY, CW, and packet software programs that have limited text storage capabilities.

As long as your application program will let you use a resident utility with it, all you have to do is call up Effortless Shorthand with a couple of keystrokes and "pump in" the desired text (and/or commands) to your application program—just as though you'd manually typed the message or instructions yourself. The beauty of all this is because the program is memory resident, and can be operating "in the background," you can use it with programs that don't by themselves have the capability to handle macros or store text messages. For more information, contact Bi-Intelligence, Inc., 210 East 86th Street, Suite 501, New York NY 10028.

73, Karl, W8FX

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1140 RG214/U dbl silver shld mil spec.....	1.85
1705 RG142B/U dbl silver shld, teflon ins .....	1.50
1310 RG217/U 50 ohm 5000 watt dbl shld .....	98
1450 RG174/U 50 ohm .100" od mil spec .....	14

### ROTOR CABLE-8 CONDUCTOR

8C1822 2-18ga and 6-22ga .....	21/ft.
8C1620 2-16ga and 6-20ga .....	39/ft.

### CONNECTORS-MADE IN USA

NE720 Type N plug for Belden 9913 .....	\$3.95
NE723 Type N jack for Belden 9913.....	4.95
PL259 standard UHF plug for RG8,213.....	.65
PL259AM Amphenol PL259 .....	.89
PL259TS PL259 teflon ins/silver plated.....	1.59
PL258AM Amphenol female-female (barrel).....	1.45
UG175/UG176 reducer for RG58/59 (specify).....	.22
UG21DS N plug for RG8,213,214 Silver.....	3.35
UG83B N jack to PL259 adapter, teflon .....	6.50
UG146A SO239 to N plug adapter, teflon .....	6.50
UG255 SO239 to BNC plug adapter, Amphenol.....	3.29
SO239AM UHF chassis mt receptacle,Amphenol.....	.89

### GROUND STRAP-GROUND WIRE

GS38 3/8" tinned copper braid .....	.35/ft.
GS12 1/2" tinned copper braid .....	.50/ft.
HW06 6ga insulated stranded wire .....	.35/ft.
AW14 14ga stranded Antenna wire CCS .....	.14/ft.

\*Shipping: Cable \$3/100, Connectors \$3.00, Visa/Mastercard \$30 min, COD add \$2.00  
Call or write for complete price list. Nemal's new 36 page CABLE AND CONNECTOR SELECTION GUIDE is available at no charge with orders of \$50 or more, or at a cost of \$4 with credit against next qualifying order.

**NEMAL ELECTRONICS, INC. 12240 NE 14th Ave. N. Miami, FL 33161**  
(305) 893-3924 Telex 6975377 24hr FAX (305)895-8178

Please send all reader inquiries directly.

# 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	\$CALL
HG52SS	52 ft	9 sq ft	\$CALL
HG54HD	54 ft	16 sq ft	\$CALL
HG70HD	70 ft	16 sq ft	\$CALL

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	228	\$379
HBX48	48 ft	10 sq ft	303	\$489
HBX56	56 ft	10 sq ft	385	\$569
HDBX40	40 ft	18 sq ft	281	\$459
HDBX48	48 ft	18 sq ft	363	\$559

\*Your Total Delivered Price Anywhere in Con-  
tinental 48 States. Antenna Load Based on 70 MPH  
Wind.

**ROHN**

## Guyed Tower Packages

- World Famous Rohn  
Quality and Dependability
  - Rugged high wind survival—  
provides safe installation
  - Multi purpose towers  
satisfy a wide range of needs
  - Complete packages  
include: guy hardware,  
turnbuckles, guy assemblies,  
w/torq bars, concrete base,  
rotor plate and top section  
per manufacturers specs.
- Packages shown below are  
rated for wind zone "B" (86  
mph wind). Zone "C" (100  
mph wind) design prices slightly  
higher. All tower packages shipped  
freight collect from our Plano, TX  
warehouse, in stock for prompt  
delivery.

	Model 25G	Model 45G	Model 55G
50'	\$ 699	\$1239	\$1529
60'	769	1399	1719
70'	829	1539	1879
80'	989	1719	2079
90'	1069	1999	2249
100'	1149	2179	2439
110'	1359	2329	2839
120'	1429	2499	3039



These rugged crankup  
towers and masts now avail-  
able from Texas Towers!  
Check these features:  
✓ All steel construction  
✓ Hot dipped galvanized  
✓ Totally self-supporting—  
✓ No guys needed

Coax arms, Thrustbearings  
Masts, Motor drives, Re-  
mote controls, Hinged  
bases, Rotor bases, & Raising  
fixtures also in stock.

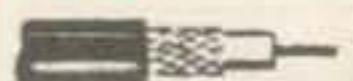
**CALL FOR SALE PRICES!**

Model	Min.Ht.	Max.Ht.	Ant.load*	Sale price
MA40 mast	21'	40'	10 sq ft	\$629
MA550 mast	22'	50'	10 sq ft	999
TX438	22'	38'	18 sq ft	919
TX455	22'	55'	18 sq ft	1385
TX472	23'	72'	18 sq ft	2279
HDX555	22'	55'	30 sq ft	2079
HDX572	23'	72'	30 sq ft	3559

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

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

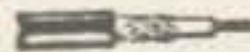
### RG-213U



\$ .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

### 9086



\$ .39/ft \$379/1000 ft

- Same specs as Belden 9913
- Lower loss than RG8U
- 100% shielded-braid & foil

### HARDLINE/HELIX®



Lowest Loss  
for VHF/UHF!

- 1/2" Alum. w/poly Jacket ..... \$ .79/ft.
  - 1/4" LDF4-50 Andrew Helix® ..... \$1.79/ft
  - 1/4" LDF5-50 Andrew Helix® ..... \$3.99/ft
- select connectors below.  
Helix® is a Registered Trademark of the Andrew Corp.

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	5.8
9086	50	.4	.64	1.7	3.1
1/2" Alum	50	.3	.5	1.2	2.2
1/4" Helix	50	.2	.4	.9	1.6
1/4" Helix	50	.1	.2	.5	.9

### HARDLINE & HELIX® CONNECTORS

Cable Type	UHF FML	UHF MALE	FML N	MALE
1/2" Alum	\$25	\$25	\$33	\$33
1/4" Helix®	\$29	\$29	\$29	\$29
1/4" Helix®	\$55	\$55	\$55	\$55

### COAX CONNECTORS

Amphenol Silver PL259	\$1.25
UG218 N Male	\$2.95
9086/9913 N Male Connector	\$4.95

### ANTENNA WIRE & ACCESSORIES

Stranded Copper 14ga.	\$ .10/ft.
1/4 mile 18ga copper-clad steel wire	\$30
Dog bone end insulator	\$ .79 ea.

### Van Gorden

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

### ALPHA DELTA

DX-A 160-80-40 Sloper ..... \$49

### CUSHCRAFT

A3 3-el Tribander	\$259
A4S 4-el Tribander Beam w/S.S. Hdwre.	\$349
A743 & A744, 30/40 mtr KIT for the A3 & A4	\$ 89
AP8 80-10 mtr Vertical	\$139
AV5 80-10mtr Vertical	\$119
D40 40mtr Dipole	\$159
40-2CD 2-el 40 mtr Beam	\$339
A50-5 5-el 6 mtr Beam	\$ 98
215 WB NEW 15-el 2 mtr Beam	\$ 89
230 WB NEW 30-el 2 mtr Beam	\$229
4218 XL 18-el 2 mtr Beam	\$129
3219 19-el 2 mtr Beam	\$109
220B 17-el 220MHz Beam	\$109
424B 24-el 432MHz Beam	\$ 89
ARX2B 2 mtr Vertical	\$ 45

### hy-gain

Discoverer 2-el 40-mtr Beam	.....
Discoverer 3-el Conversion Kit	.....
EXPLORER-14 SUPER-SPECIAL	.....
QK710 30/40 mtr. Add-On-Kit	.....
V2S 2-mtr Base Vertical	.....
V4S 440MHz Base Vertical	.....
TH5MK2S Broad Band 5-el Triband Beam	.....
TH7DXS 7-el Triband Beam	.....
TH3JRS 3-el Triband Beam	.....
205BAS 5-el 20-mtr Beam	.....
155BAS 5-el 15-mtr Beam	.....
105BAS 5-el 10-mtr Beam	.....
204BAS 4-el 20-mtr Beam	.....
64BS 4-el 6-mtr Beam	.....
12 AVQ 20-10 mtr vertical	.....
14 AVQ 40-10 mtr vertical	.....
18 AVT/WB 80-10mtr Vertical	.....
18HTS 80-10 mtr Hy-Tower Vertical	.....
23BS 3-el 2 mtr Beam	.....
25BS 5-el 2 mtr Beam	.....
28BS 8-el 2 mtr Beam	.....
214BS 14-el 2-mtr Beam	.....
28DQ 80/40 mtr Trap Dipole	.....
58DQ 80-10 mtr Trap Dipole	.....
BN86 80-10 mtr KW Balun W/Coax Seal	.....

### HUSTLER

6BTV 80-10 mtr Vert	\$149	SBTV 80-10 mtr Vert	\$129
48TV 40-10 mtr Vert	\$99	G7-144 2-mtr Base	\$129
G6-144B 2-mtr Base	\$89		
Mobile Resonators	10m 15m 20m 40m 75m		
400W Standard	\$16 \$17 \$19 \$22 \$26		
2KW Super	\$20 \$22 \$25 \$29 \$39		
Bumper Mounts - Springs - Folding Masts	In Stock!		

### BUTTERNUT ELECTRONICS CO

#### HF6V 80-10m Vertical \$129 Delivered

- Full Legal Power
- Highest Q Tuning Circuits

#### HF2V 80-40m Vertical \$129 Delivered

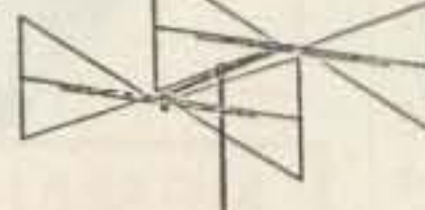
- Full Legal Power
- Automatic Band Switching

#### Accessories:

RMK II Roof Mtg. Kit	\$49
STR II Stub-Tuned Radials	\$29
TBR160 160m Coil Kit	\$49
30m Add-on Kit	\$29
20m Add-on Kit	\$39
17/12m Add-on Kit	\$27

FREE UPS on ACCESSORIES when pur-  
chased w/antenna

### HF5B "Butterfly" 20-10m Compact Beam \$199.00



- Unique Design  
Reduces Size
- Turns w/TV Rotor  
• Boom Length 6 Feet
- No Lossy Traps  
• Element Length 12.5 Feet

FREE UPS Shipping in Continental USA

### MIRAGE/KLM

KT34A 4-el Broad Band Triband Beam	\$399.95
KT34XA 6-el Broad Band Triband Beam	\$589.95

### ROTORS

Alliance HD73 (10.7 sq ft rating)	\$119.95
Alliance U110 (3 sq ft rating)	\$49
Telex CD 45II (8.5 sq ft rating)	\$Call
Telex HAM 4 (15 sq ft rating)	\$Call
Telex Tailwister (2Q sq ft rating)	\$Call
Telex HDR300 Heavy Duty (25 sq ft rating)	\$Call

### ROTOR CABLE

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

### ROHN GUYED TOWER SECTIONS

10 FT. STACKED SECTIONS			
20G	\$48.00	45G	\$133.00
25G	\$56.00	55G	\$165.00

ALL ACCESSORIES IN STOCK—CALL

### ROHN FOLDOVER TOWERS

Model	Height	Ant. Load*	Price
FK2548	48 ft.	15.4 sq. ft.	\$1049.
FK2558	58 ft.	13.3 sq. ft.	1099.
FK2568	68 ft.	11.7 sq. ft.	1149.
FK4544	44 ft.	34.8 sq. ft.	1389.
FK4554	54 ft.	29.1 sq. ft.	1469.
FK4564	64 ft.	28.4 sq. ft.	1579.

25G Double Guy Kit	\$279.
45G Double Guy Kit	\$299.

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

### TOWER/GUY HARDWARE

3/16 EHS Guywire (3990 lb rating)	\$ .15/ft
1/4 EHS Guywire (6650 lb rating)	\$ .18/ft
5/16 EHS Guywire (11,200 lb rating)	\$ .29/ft
5/32 7 x 7 Aircraft Cable (2700 lb rating)	\$ .15/ft
3/16 CCM Cable Clamp (3/16" or 5/32")	\$ .45
1/4 CCM Cable Clamp (1/4" Cable)	\$ .55
1/4 TH Thimble (fits all sizes)	\$ .45
3/8EE (3/8" Eye & Eye Turnbuckle)	\$6.95
3/8EJ (3/8" Eye & Jaw Turnbuckle)	\$7.95
1/2 x 9EE (1/2" x 9" Eye to Eye Turnbuckle)	\$9.95
1/2 x 9EJ (1/2" x 9" Eye & Jaw Turnbuckle)	\$10.95
1/2 x 12EE (1/2" x 12" Eye & Eye Turnbuckle)	\$12.95
1/2 x 12EJ (1/2" x 12" Eye & Jaw Turnbuckle)	\$13.95
5/8 x 12EJ (5/8" x 12" Eye & Jaw Turnbuckle)	\$16.95
3/16" Preformed Guy Grip	\$2.49
1/4" Preformed Guy Grip	\$2.99
6" Diam - 4 ft Long Earth Screw Anchor	\$14.95
500 D 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)	\$ .32/ft
HPTG4000 Guy Cable (4000 lb rating)	\$ .52/ft
HPTG6700 Guy Cable (6700 lb rating)	\$ .72/ft
9901LD Cable End (for 2100/4000 cable)	\$9.95
9902LD Cable End (for 6700 cable)	\$11.95
Socketfast Potting Compound (does 6-8 ends)	\$16.95

### GALVANIZED STEEL MASTS

Length	5 FT	10 FT	15 FT	20 FT
12 in Wall	\$29	\$49	\$69	\$89
18 in Wall	\$49	\$89	\$129	\$149
25 in Wall	\$69	\$129	\$189	\$249

**ORDER TOLL-FREE 1-800-272-3467**

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# TEXAS TOWERS

Mon-Fri: 9am - 5 pm  
Sat: 9am - 1 pm

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

(Prices & Availability Subject To Change Without Notice)

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

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**TS-940S**  
NEW Top-of-the-Line  
HF Transceiver  
• 100% Duty Cycle  
• 40 Memory Channels  
CALL FOR SPECIAL PRICES!!



**TS-440S NEW!**  
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**TS-140S**  
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**TS-711A TS-811A**

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**TW4100A**  
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**TR-751A**  
All Mode 2m Mobile



COMPACT 2M FM MOBILE

TM 2570A (70W) TM 3530A (25W)  
TM 2550A (45W) TM 221A (45W)  
TM 2530A (25W)

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**TH 205 AT**  
High Tech 2M  
HT XCVR

**TH215A**  
2m HT XCVR  
TH-25AT  
TH21BT, TH31BT  
TH41AT Also in Stock  
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# YAESU



**FT 767 GX HF/VHF/UHF**  
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**FT2700RH NEW 2M/70cm**  
Dual Band Transceiver  
Full Duplex-Cross Band  
Operation  
CALL FOR PRICE-SAVE \$\$!



NEW FT290R 2m Portable  
NEW FT690R 6m Portable  
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**FT 209/709 RH**  
NEW HIGH  
Tech HT's  
5W Output

**New!**  
**FT727 RH**  
2m/70 cm HT  
• 5w Output  
• 10 memories  
• Battery saver  
Call For Sale Prices



**FT 23R 2m HT**  
**FT 73R 70 cm HT**  
• compact size  
• up to 5W output W/FNB 11  
CALL FOR SALE PRICES!

## ASTRON POWER SUPPLIES

**Heavy Duty - High Quality - Rugged - Reliable**  
• Input Voltage: 105-125 VAC Output: 13.8 VDC ± .05V  
• Fully Electrically 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

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**IC-761 New HF XCVR**  
• Built-in AC Power Supply  
• Built-in Automatic Tuner  
• PBT Plus IF Shift  
• QSK Up To 60 WPM

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**IC735 NEW General Coverage**  
Ultra Compact  
CALL FOR SPECIAL PRICE!



**IC-27A IC-27H**  
**IC-28A IC-28H**  
**IC-37A IC-47A**  
**IC-38A IC-48A**

CALL TODAY FOR SPECIAL ICOM PRICES!



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**IC03AT - 220 MH**  
**IC04AT - 70cm**  
High Tech  
HT XCVRs

**NEW**  
**IC-µ2AT**  
2m HT

• micro design covers  
140-163 MHz  
• 10 mem. w/scan  
• LCD Readout  
CALL FOR SALE PRICE



**PARAGON**  
General Coverage HF Transceiver  
Microprocessor Controlled Multi-Scan  
62 Memories Call For Special Sale Price  
**561 Corsair II** ..... \$ CALL  
**960 Power Supply** ..... \$ CALL  
**229 2KW Tuner** ..... \$ CALL  
**425 Titan Amplifier** ..... \$ CALL

## MIRAGE

Model	Band	Pre-amp	Input	Output	Sale Price
A1015	6M	Yes	10W	150W	\$289
B23A	2M	Yes	2W	30W	\$129
B10B	2M	Yes	10W	80W	\$159
B1016	2M	Yes	10W	160W	\$259
B3016	2M	Yes	30W	160W	\$229
D1010N	440	No	10W	100W	\$319

## concept

**rfc 2-317 2M**  
30W In = 170W out  
LIST \$299.00

Model	Band	In-Out	List Price
2-23	2M	2-30W	\$112.00
2-217	2M	2-170W	\$299.00
2-117	2M	10-170W	\$299.00
2-417	2M	45-170W	\$299.00
3-22	220	2-20W	\$112.00
3-211	220	2-110W	\$299.00
3-312	220	30-120W	\$264.00

Call For Sale Prices

# AMERITRON AL80A



AL80A ..... \$985.00 ATR10 ..... \$325.00  
AL84 ..... 479.00 ATR15 ..... 380.00  
AL1200 ..... 1825.00 RCS4 ..... 134.50  
AL1500 ..... 2370.00 RCS8V ..... 134.50

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## AMP SUPPLY



Model	List	Model	List
LK450	\$899	LK450NT	\$1199
LK500ZC	\$1395	LK500NT	\$1595
LK800A	\$2695	LK800NT	\$2995
LK550	\$1895	AT 3000	\$ 499

CALL AND SAVE \$\$\$\$

## AEA



**PK-232 Packet Controller** ..... \$299.95  
**144 MHz Isopole** ..... \$49.95  
**440 MHz Isopole** ..... \$59.95

Other AEA products also in stock call!!!



**ALINCO**  
ELH-230G ..... CALL  
ELH-230D ..... CALL  
ELH-260D ..... CALL

Other items in stock - call!

## Kantronics



**KAM All Mode Terminal Unit** ..... \$289.95  
**KPC II Packet Controller** ..... \$159.90  
**KPC 4 Node Controller** ..... \$299.90

## MJ

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**1224/1229 Interface** ..... \$89.95/\$159.95  
**202/204 Antenna Bridges** ... \$59.95/\$79.95  
**250 Oil Load** ..... \$39.95  
**260/262 Dry Loads** ..... \$29.95/\$59.95  
**407/422 Elect. Keyers** .... \$69.95/\$119.95  
**901/941D Tuners** ..... \$59.95/\$99.95  
**949C/989 Tuners** ..... \$139.95/\$299.95

## NYE VIKING

**MBV-A 3KW Tuner**



• Low Pass PI-Network Tuning  
• Built-in Antenna Switch/Balun  
New-RF Power Monitor System \$249.95  
CALL TODAY TO SAVE \$

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**DVK-100 Digital Voice Keyer**



• Built-in Auto Repeat Function  
• Essential For Contesting  
• Fully Compatible With All Xcvrs  
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**FREE SHIPPING-UPS SURFACE**  
(continental USA) (most items, except towers/antennas)

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# TEXAS TOWERS

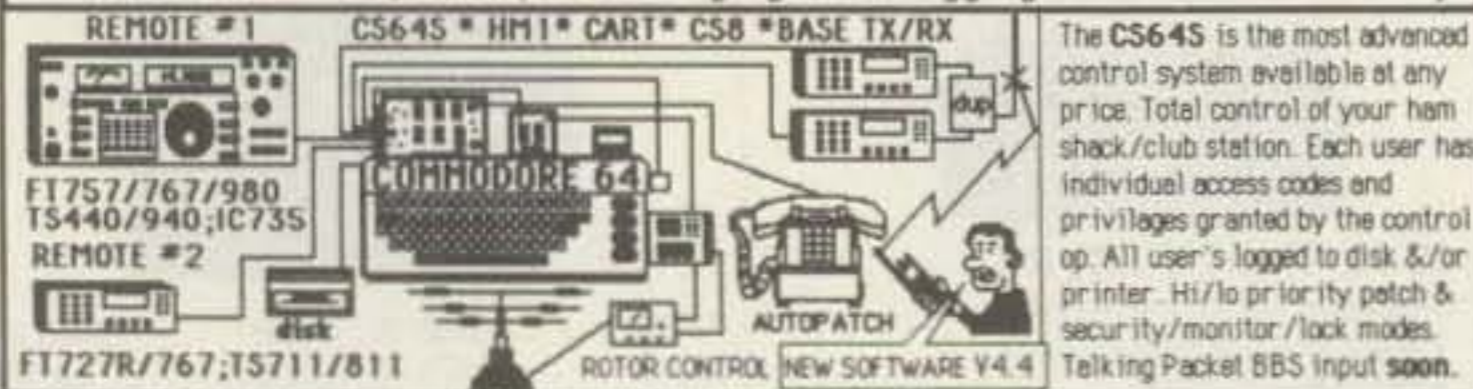
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Programable Repeater Controller/HF & VHF Remotes/Autopatch  
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The CS64S is the most advanced control system available at any price. Total control of your ham shack/club station. Each user has individual access codes and privileges granted by the control op. All users logged to disk &/or printer. Hi/lo priority patch & security/monitor/lock modes. Talking Packet BBS Input soon.

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| <p><b>REPEATER CONTROLLER</b></p> <ul style="list-style-type: none"> <li>*Change all variables remotely</li> <li>*Synthesized voice adj. pitch/speed</li> <li>*Program mail box or select ID tail mess. with touchtones from HT</li> <li>*Alarm clock &amp; auto excite mode</li> <li>*Macro commands/user logging</li> <li>*Individual user access codes</li> <li>*Code practice &amp; voice readback</li> <li>*Multifunction voice alarm clock</li> </ul> <p><b>H.F. REMOTE #1</b></p> <ul style="list-style-type: none"> <li>*20 Macro mem./auto mode sel.</li> <li>*Scan up/down sel. rate or step</li> <li>*Voice edit. all control commands</li> </ul> | <p><b>AUTOPATCH &amp; REVERSE PATCH</b></p> <ul style="list-style-type: none"> <li>*1000 (18 digit)tel. #'s stored</li> <li>*300 users/CTCSS &amp; 2 tone paging</li> <li>*50 enable/disable tel. #'s</li> <li>*Individual access privileges</li> <li>*Directed/general &amp; reverse page</li> <li>*Full or Half duplex (level cont.)</li> <li>*Security mode/TT readback on/off</li> <li>*Store MCI/Sprint tel. #'s</li> <li>*Reverse Patch active all modes</li> <li>*Call waiting/quick dial &amp; reset</li> </ul> <p><b>Y.H.F. REMOTE #2</b></p> <ul style="list-style-type: none"> <li>*Dual VFO's/Rev/Split/DOR detect</li> <li>*Set Scan Inc. &amp; offset/var. resume</li> </ul> | <p><b>Super Comshack CS64S \$349.95</b><br/>* \$4.00 ship USA; incl. computer interface, disk, cables &amp; manual (simplex version inc. on request)</p> <p><b>SYSTEM OPTIONS</b></p> <ul style="list-style-type: none"> <li>*External Relay Control 3 DPDT relays + 5 open collector outputs. <b>CS-8 \$79.95</b></li> <li>*EPROM Auto boot Cartridge customized with your system <b>CART \$99.95</b></li> <li>*Beam control; speaks bearing and rotates beam, 1 degree inc. <b>HM1 \$49.95</b></li> <li>*Manual (Refunded) <b>MM1 \$15.00</b></li> <li>*Row &amp; col. freq. control. <b>RAP \$149.95</b></li> <li>*C64 D.C. Switcher P.S. <b>DCPS \$119.95</b></li> </ul> |
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# 1987 CQ WW DX CW Contest High-Claimed Scores

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

<p><b>DX Single Operator All Band</b></p> <p>P40GD 8,589,608 HD5X 8,545,280 FY5YE 8,299,487 9Q5NW 7,587,905 NP4A 7,562,526 D44BC 7,393,176 CR9BZ 6,533,268 EA8XS 6,193,845 5L7U 6,157,830 5B4TI 5,819,985 VP2MU 4,797,732 8P9HT 4,429,824 I4IND 4,188,034 5H1HK 3,213,756 N3JT/HK0 2,875,839 OH0BH 2,848,711 KC6CS 2,618,226 PJ7X 2,556,145 VE1ASJ 2,470,105 4U1UN 2,470,032 HA0MM 2,361,485 TA1KA/2 2,232,819 G3MXJ 2,224,482 HZ1HZ 2,181,480 F6BEE 2,152,032 OZ1LO 2,124,752 VE6OU/3 2,117,920 VE3IY 2,060,180 TR1G 2,010,970</p> <p><b>Single Operator Single Band 28 MHz</b></p> <p>4M7A 741,312 PY5CA 695,728 AY6EF 552,448 LU1E 492,140 AY4F 353,682 KH2F 320,528 VU2Z 230,338 9Q5DA 229,437</p> <p><b>21 MHz</b></p> <p>LO8WW 1,391,355 5H3BH 1,098,810 ZS6BLR 989,820 CX7BY 972,257 YB0ARA 712,076 LU1AF/D 693,765 KH2D 493,476 LZ1KDP 483,610</p> <p><b>14 MHz</b></p> <p>EA8ID 1,701,324 CW8D 1,011,036 8P9EL 911,400 VO1QU 575,380 4N7N 575,355 HL9EP 548,856 NY6M/KH2 438,248 JA1BWA 428,472 LA2IE 411,264 JA7FTR 407,543</p> <p><b>7 MHz</b></p> <p>YW1O 758,898 YU3ZV 709,104 YX5A 621,489 XE1FUX 548,977 JA7HMZ 477,450 HB9CIP 417,028 YT7A 387,393 FM5ES 335,844 HA9RE 307,840 F6BBJ 300,032</p>	<p><b>3.5 MHz</b></p> <p>ZC4DX 445,568 DL3HAH 145,260 OH2JA 137,016 HC7SK 103,273 SM6DYK 95,304 CU3AA 84,286 OZ1FTE 84,200 SP5CTY 81,954</p> <p><b>1.8 MHz</b></p> <p>HB9AMO 97,064 SV1NA/SV9 77,183 CT1AOZ 71,336 OK1DFP 60,270 G3KTT 47,808 OK3CWO 33,796 YU3MM 30,016 VE3INQ 25,696 KH6CC 22,724</p> <p><b>Multi-Operator Single Transmitter</b></p> <p>EA8AGD 9,822,810 V31A 6,141,472 OK5R 6,091,245 HG5A 5,885,842 HG6N 4,979,744 VP5W 4,858,920 G0AAA/LX 4,716,256 HG9R 4,525,434 F5IN 4,172,288 HG1S 4,074,477 HG7B 3,922,032</p> <p><b>Multi-Operator Multi-Transmitter</b></p> <p>KP2A 26,177,442 J6DX 13,375,437 OK7AA 11,980,725 LX9BV 8,747,440 NL7G 7,225,672 PA6DX 6,928,293 YT2R 5,961,228 DL0KF 4,771,602 OH1AA 3,004,918</p> <p><b>QRPP All Band</b></p> <p>VE7DX 687,690 YU3BC 512,148 G4ELZ 359,883 LZ2QV 282,741 W8VSK 248,638 DL8CM 213,048</p> <p><b>USA Single Operator All Band</b></p> <p>K1EA 4,024,620 W1KM 3,932,242 W3GRF 3,828,883 N2LT 3,587,045 K1TO 3,444,319 K3TUP 3,363,110 K1CC 3,194,147 W9RE 2,957,682 K3LR 2,640,990 N6AR/4 2,513,260 W4RX 2,507,115 W2REH 2,476,368 N5AU 2,472,192 NY2L 2,347,822 K4PQL 2,330,211 K1XA 2,318,818 K1VR 2,271,980 N3AD 2,176,697 K8CC 2,089,519 K0RF 1,976,620 N3CXV 1,800,162 WZ4F 1,758,708 K2LE 1,689,800 W2VJN 1,684,254</p>	<p>W3VT 1,680,445 K3IPK 1,634,919 N4KG 1,629,994</p> <p><b>Single Operator Single Band 28 MHz</b></p> <p>N4EJW 109,074 K1ZZ 104,244 KU2Q 46,228 K7QQ 40,824 KA2AEV 35,112 N9RD 26,936 WA1FCN 25,272</p> <p><b>21 MHz</b></p> <p>K5GO 451,764 W5VX 421,850 K1RM 395,508 W1WEF 373,320 K1ZX/4 370,800 KA5W 323,963 WB2Q 280,960</p> <p><b>14 MHz</b></p> <p>K3RV/4 553,415 KS8S 508,950 K1RU 502,152 WX4G 463,696 NX7K 430,761 N5CR 408,924 NN7L 367,964 WD8LLD 306,195 N2ME 304,732</p> <p><b>7 MHz</b></p> <p>W6YA 350,546 KM6B 348,600 N2DT 315,530 W4XJ 300,852 K2DM 280,140 K5RR 269,698 K8MFO 261,648 N6GG 260,898</p> <p><b>3.5 MHz</b></p> <p>W1FV 270,692 WB8JBM 120,636 K5RX 116,584 KD2RD 114,760 W8UVZ 95,676 W4NL 92,055</p> <p><b>1.8 MHz</b></p> <p>K5UR 28,635 WB9HAD 24,382 W0ZV 18,054 K5NA/2 17,940 K4TEA 13,632 N4SU 9,686</p> <p><b>Multi-Operator Single Transmitter</b></p> <p>K1GQ 5,524,602 N2RM 5,262,321 N3RS 4,979,475 N4WW 4,732,000 W3BGN 4,485,280 N6RO 4,229,248 N4RJ 3,996,947 AA1K 3,559,869 K8AZ 3,537,100 K3OO 3,064,812</p> <p><b>Multi-Operator Multi-Transmitter</b></p> <p>W3LPL 10,589,568 NR5M 7,977,668 N4ZC 5,461,580 K4VX/0 5,449,570 N1CQ 5,384,214 W3GM 4,846,886 K4JPD 4,732,655 W0AIH/9 4,301,010</p>
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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

## Equipment and Accessories—Part I of II

This is intended to give new and potential amateurs a brief introduction to equipment and accessories that are commonly used in amateur radio stations. This article should be particularly interesting to people who are ready to purchase and install the items that will constitute their first stations. Previous Novice and Basics columns have covered specific related subjects; such columns are summarized, at the end of this article, for the benefit of readers who have access to (or may desire to purchase) previous issues of *CQ*.

References to equipment (in this article) are intended to denote transceivers, or transmitters and receivers. References to accessories are intended to mean everything else related to an amateur radio station. Typical accessories are AC power supplies, external loudspeakers, remote frequency controls, antenna tuners, telegraph sending devices (handkeys, electronic keyers, paddles, etc.), headsets, antennas, computers, visual display terminals, SWR/power meters, and several other auxiliary units. Accessories also include narrow-band filters, noise blankers, FM adapters, and other devices that can be added to modern transceivers to provide expanded and/or improved operating capabilities.

Modern transceivers often include built-in devices which previously had to be purchased separately, and were usually installed external to the transceiver. Some of these items are the SWR bridge, second frequency control, antenna tuner, electronic keyer, digital frequency display, and 4-digit clock. Old equipment commonly required antenna changeover circuitry, sidetone oscillators, and other devices which are built into modern transceivers.

Q-multipliers, preselectors, converters, and transverters are older accessory items that are not used with modern equipment. The Q-multiplier enables an operator to put a peaking spike under the desired signal to boost it over noise and other signals in a receiver's passband; it also enables an operator to drop an interfering signal below the level of a desired signal. Preselectors are wide-band radio frequency amplifiers. They boost the received signal before it is fed to the receiver. These devices are not needed with



Rudolf Klos, DK7PE/9H3DX, took this picture of a code practice session at the Maltesian Amateur Radio Liga in Valetta, Malta. Marn, 9H1GB, in the center, is shown during a break in the code practice. Rudolf recently operated his DXpedition station of 9H3HF.

modern receivers. Adding an external preselector would degrade the performance of a modern receiver. Some relatively recent receivers feature effective built-in preselectors. Converters are normally used to convert a VHF (30–300 MHz) or UHF (300–3000 MHz) band (50–54, 144–148, 220–225, 420–450 MHz, etc.) to a frequency that can be tuned with an HF (3–30 MHz) rig. Converters usually produce an output on the 10 meter band. A separate transmitter is needed to communicate on the VHF/UHF band when using a converter. Separate external converters are a thing of the past for most amateurs. Transverters enable you to retain the excellent operating features of HF equipment while operating on VHF/UHF bands. The HF equipment output (usually 10 meters) is converted to a transverter output on the desired VHF or UHF band. The received VHF or UHF signals are converted to the desired HF band for normal processing. Transverters are internally mounted accessories with some relatively recent equipment.

### Equipment

The major piece of equipment in a modern shack is a transceiver. It has been many years since receiver and transmitter matched pairs were offered as new equipment. Transceivers continue to improve, and the amateur radio transceiver has long been the best dollar value on the market in electronics. Considering the reduced value of the dollar during the past two decades, a top-quality new transceiver costs less than a combina-

tion of a matching receiver and transmitter sold 20 years ago. In addition, a new transceiver is lighter, smaller, and performs much better than older equipment. The capabilities of a present-day transceiver are far superior to those of equipment marketed just five to ten years ago. To state the existing situation clearly and simply, new amateur radio equipment is fantastic despite its very reasonable price. Before transceivers became popular with amateurs, one purchased a receiver and a transmitter. In addition to these two units, the antenna changeover relay and circuitry had to be added to most of these combinations. Hookup and operation of the separate receiver and transmitter combination is more difficult than experienced with a transceiver.

After all those glowing words about transceivers, it is appropriate to mention a few of their shortcomings. Novices and Technicians need code operating experience to increase code proficiency to the point where they can pass code tests required to upgrade licenses. Transceivers are primarily designed to provide mobile voice communications; they are not primarily designed to provide code (A1A radiotelegraphy) communication capability.

Most transceivers are never mounted in a vehicle. The only time they are in a car is when the amateur is bringing the unit home. The small size required of mobile equipment necessitates small switches, knobs, and meters. Tiny controls are not as easy to use as large con-



Chuck Lemarbre, KA8OIZ, of Grand Rapids, Michigan has been licensed as a Novice since May 1986. Chuck has contacted amateurs in 48 states and 20 countries, plus Antarctica. His station includes a Kenwood TS-130 transceiver, an antenna tuner, and a bazooka dipole antenna. Chuck likes radiotelegraphy.

2814 Empire Ave., Burbank, CA 91504



Here is Daniel Nardreau, VE2III, of Fermont, Quebec, Canada. Fermont is an isolated small mining town above the 52nd parallel. Due to his isolated location, Daniel had to learn the code, theory, and regulations without the help of an instructor. Most of his operation is in the 80 meter code segment.

trols. Miniaturization, compactness, and complexity combine to make it almost impossible to repair today's transceivers. It is better (and perhaps less expensive overall) to have equipment serviced by the manufacturer's trained maintenance people. That is a hard statement for an old do-it-yourself homebrewer to make, but it is true.

As far as Novices and Technicians are concerned, the most obvious shortcoming of transceivers is the extremely short delay between the time one opens the key (lets it up) and the time when the receiver is reactivated. One of the three VOX (Voice Operated Xmit/transmit) controls is the *delay* control. It is supposed to be adjusted to the point where it provides a suitable delay between the time when you stop talking and the time when the receiver section comes out of the mute (silent) mode, restoring it to normal reception operation. You do not want the transceiver to continuously shift back and forth between the transmit and receive modes due to slight pauses as you are talking. On the other hand, you want the unit to automatically shift from transmit to receive when you stop talking to listen to the other amateur. The delay control is adjusted to provide a suitable delay between transmit and receive modes. The problem is that the delay required for normal voice operation is much shorter than the delay needed for slow code operation. Consequently, even with the delay set to maximum, the transceiver continuously shifts between transmit and receive modes as you send slow code. If the transceiver has a switch to permit manual changeover between the transmit and receive functions, that switch should be used to avoid the annoyance of continuous mode changes while operating slow code. Appropriately, this switch is usually labeled **Manual** or **XMIT**.

Since transceivers are fundamentally voice communication equipment, most

of them are not sold with a suitably narrow filter for code operation. The typical voice range processed by amateur transceivers (during single sideband operation) is about 300 to 3000 Hertz. In many cases, this 2700 Hz range is wider than what is used; 2400 Hz is also common. The width of an A1A code signal is approximately four times the keying speed, assuming a properly designed transmitter. It is to your advantage to just listen to as much spectrum as you must cover to hear the signal you want to copy. Consequently, if you are talking with an amateur who is sending code at 15 wpm, a 60 Hz filter would suffice. If you are using a 3000 Hz SSB filter, you are listening to noise and other stations in 50 times more spectrum than is necessary. Some filters are as sharp as 40 Hz, but 200 is the approximate minimum width of a useful filter. Sharper filters are subject to ringing. A 200 to 250 Hz (narrow band) code filter is suitable. Even a 300 to 500 Hz filter is good for code operation; it cuts out most of the unwanted noise and signals that could otherwise be heard along with the desired signal.

Noise is fairly evenly distributed across a band; there is no sense in listening to any more of it than is necessary. A narrow-band code filter is needed to optimize code reception. Code filters are available as accessories to most transceivers. A glance through amateur radio publications will show that filters are also available from other than the transceiver manufacturers. Selectivity (narrowing the width of received frequency spectrum) can also be achieved by adding an external audio filter between the output of the receiver section and the external speaker or headphones.

Dual frequency control is a feature of several newer transceivers. This feature enables you to transmit and receive on different frequencies without having to frantically tune between them. A simple example of how this feature is used should help. During the May Armed Forces Day activities amateurs are allowed to contact military stations. The military stations transmit on their own frequencies just below (code) or above (voice) the amateur bands, and they state the frequency they are listening to (in the adjacent amateur band) for answers. As an example, a military station might transmit on 20.997 MHz and listen on 21.130 MHz. In this case the amateur sets one frequency control to receive 20.097 MHz and sets the second frequency control to transmit on 21.130 MHz. This split-frequency operation enables one to easily work such stations. The older transceivers do not include the dual frequency control feature; they require a separate (usually external) second frequency control (remote VFO) to accomplish this function.

This concludes the first segment of



This is 8-year-old Chris Balazs, WH6BLP, of Honolulu, Hawaii. His mother is WH6BMA and his father is WH6BLQ. His father went on a work trip to Johnston Island and Chris contacted him there. Chris is also an active Cub Scout. Chris has worked Argentina, Brazil, Japan, New Guinea, Vanatu, and other countries.

this two-part article. The second part covers accessories.

### Printed Aids

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



This is John Ladato, KA2NZS, of Clifton, New Jersey. His station includes a Kenwood TS-520 transceiver, 5-band ground-mounted vertical antenna, and 10 meter Yagi-Uda. John is retired, and he particularly enjoys contacting other senior citizens.

## A LOOK AT THE WORLD AROUND US

### *A Triple Treat: QRP, Classic Rigs, And 30 Meters*

**T**his month's column was inspired by your words of encouragement and notes of interest in three closely related areas: QRP, classic rigs, and 30 meters. Visualizing that combination while reflecting back on the occasional multimovie specials of yesteryear's neighborhood theaters, we assembled this triple-feature column for your home tinkering and operating pleasure. Enjoy our views and ideas. If you become irresistibly inspired with our highlighted old-time rigs (naturally!), additional views and ideas are featured in my new book *Golden Classics of Yesteryear* advertised in this issue of *CQ*. It's packed with collection and restoration notes, easily assembled one- and two-tube transmitters and receivers, unusual bugs and keying devices, winking antennas, and other favorite items of eras past. In fact, I must confess to test-building and thoroughly enjoying operating those rigs and keys on 30 meters during recent times rather than writing this column in our usual dedicated manner. It's easy to get hooked on classic rigs. They're a blast of fun!

I'm not alone in these classic-rig adventures. John Hagey, WB6GTI/4, for example, recently unloaded his deluxe modern gear and set up a vintage station that looks like it's right out of the French Resistance of World War II. We wanted to include a photo, but John's lighting was too original-era for a proper exposure. Wow! Quint Galbraith, K5TVC, also hopped on the bandwagon by repurchasing his original first rig sold to a friend over 20 years ago. That restored-to-new and 30 meter adapted setup is shown in the photos.

I've worked Quint several times on 30 meters with that setup, and his signals sounded very good.

That brings to light an important point. Don't listen *only* on your transmit frequency after calling CQ on 30 meters. Tune your receiver a few kHz for callers. Many QRP and classic-rig buffs are crystal controlled and may be calling you 1 or 2 kHz up or down the band. Likewise, many amateurs are operating the exceptionally clear range of 10.120 to 10.150 MHz rather than trying to "squeeze in" to the 10.100 to 10.110 MHz area. Thirty



*Your nostalgia-struck author in true ham heaven! This close-up view shows only a few of the classic rigs we are assembling and enjoying on 30 meters. Truly the good life!*

meters is 50 kHz wide. Use and enjoy it accordingly!

#### **The Attraction of 30**

The barefoot rig plus power limitations and exclusion from official DX awards programs makes 30 meters ideal for conducting friendly QSOs in a pleasant and relaxed manner. The band's low profile also assures equal communicating rewards to every operator—fixed, mobile, and portable.

A 5 watt signal in a 100 watt world is always better odds than a 5 watt signal in a 1500 watt world. That does not mean, however, our CW-only 30 meter band is lacking in DX action. Indeed not! You can work VKs, ZLs, JAs, and numerous Caribbean stations with only a few good watts of power and a small antenna, and small pileups usually occur only during weekends. I've personally worked over 25 countries on 30 meters while using rigs of 10 watts or less, and others have surely done better.

This band's location between 40 and 20 meters is perfect for enjoying simple homebrewed transceivers or vintage rigs

that "drop off" in performance on higher frequencies. Basic-style antennas also work like a champ in this range, and a large field is not necessary for skywire experimenting. Don't merely "take our word" for those statements; try 30 meters yourself and see. Avoid assuming the band is dead because of its quiet nature. Listen close. Sometimes all the activity is DX. Beautiful!

#### **QRP and 30 Meters**

If you enjoy the true QRPp operations, 30 meters is a sheer delight. Using the little 250 milliwatt transmitter shown in fig. 1, for example, I've "spare time" worked a half-dozen states and several Caribbean islands. The rig is handwired on a 1 inch piece of perfboard stuffed into a cigarette lighter case. It is self-powered by a tiny Radio Shack 12 volt battery normally used for electronic lighters. The crystal is a subminiature HC-18 item ordered from Jan Crystals in Florida. A promising expansion of this rig involves adding a frequency-warping capacitor in series with its crystal, switching to a high-

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<p><b>RM-A SERIES</b></p>  <p><b>MODEL RM-35M</b></p>	<p><b>19" X 5 1/4" RACK MOUNT POWER SUPPLIES</b></p> <table border="1"> <thead> <tr> <th>MODEL</th> <th>Continuous Duty (Amps)</th> <th>ICS* (Amps)</th> <th>Size (IN) H x W x D</th> <th>Shipping Wt. (lbs.)</th> </tr> </thead> <tbody> <tr> <td>RM12A</td> <td>9</td> <td>12</td> <td>5 1/4 x 19 x 8 1/4</td> <td>16</td> </tr> <tr> <td>RM-35A</td> <td>25</td> <td>35</td> <td>5 1/4 x 19 x 12 1/2</td> <td>38</td> </tr> <tr> <td>RM-50A</td> <td>37</td> <td>50</td> <td>5 1/4 x 19 x 12 1/2</td> <td>50</td> </tr> </tbody> </table> <p>• Separate Volt and Amp Meters</p> <table border="1"> <tbody> <tr> <td>RM-35 M</td> <td>25</td> <td>35</td> <td>5 1/4 x 19 x 12 1/2</td> <td>38</td> </tr> <tr> <td>RM-50 M</td> <td>37</td> <td>50</td> <td>5 1/4 x 19 x 12 1/2</td> <td>50</td> </tr> </tbody> </table>	MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)	RM12A	9	12	5 1/4 x 19 x 8 1/4	16	RM-35A	25	35	5 1/4 x 19 x 12 1/2	38	RM-50A	37	50	5 1/4 x 19 x 12 1/2	50	RM-35 M	25	35	5 1/4 x 19 x 12 1/2	38	RM-50 M	37	50	5 1/4 x 19 x 12 1/2	50											
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\*ICS—Intermittent Communication Service (50% Duty Cycle 5 min. on 5 min. off)

CIRCLE 178 ON READER SERVICE CARD



K5TVC's classic rig for 30 meters consists of a Hallicrafter's SX-28, Heathkit DX-20, and Speed-X bug. The amber glow of the dials is sheer nostalgic bliss.

er power PNP transistor, and adding a single IC to make it a stand-alone transceiver. My infatuation with classic rigs supercedes my plans for making these modifications, however, so I will "napkin note" share my ideas for your creative thinking.

A couple of years ago the English QRP magazine *Sprint* featured a clever "Foxy" transceiver designed by GM3OXX. Although the rig used several transistors, its combination RF output and receiver "front-end"/direct-conversion detector was a single 2N3905A transistor. It functioned in the usual manner on transmit, but mixed incoming and local oscillator signals on receive. The resultant signal was developed across a switched-in emitter resistor, audio amplified, and applied to earphones.

Adapting the previous concept to fig. 1,

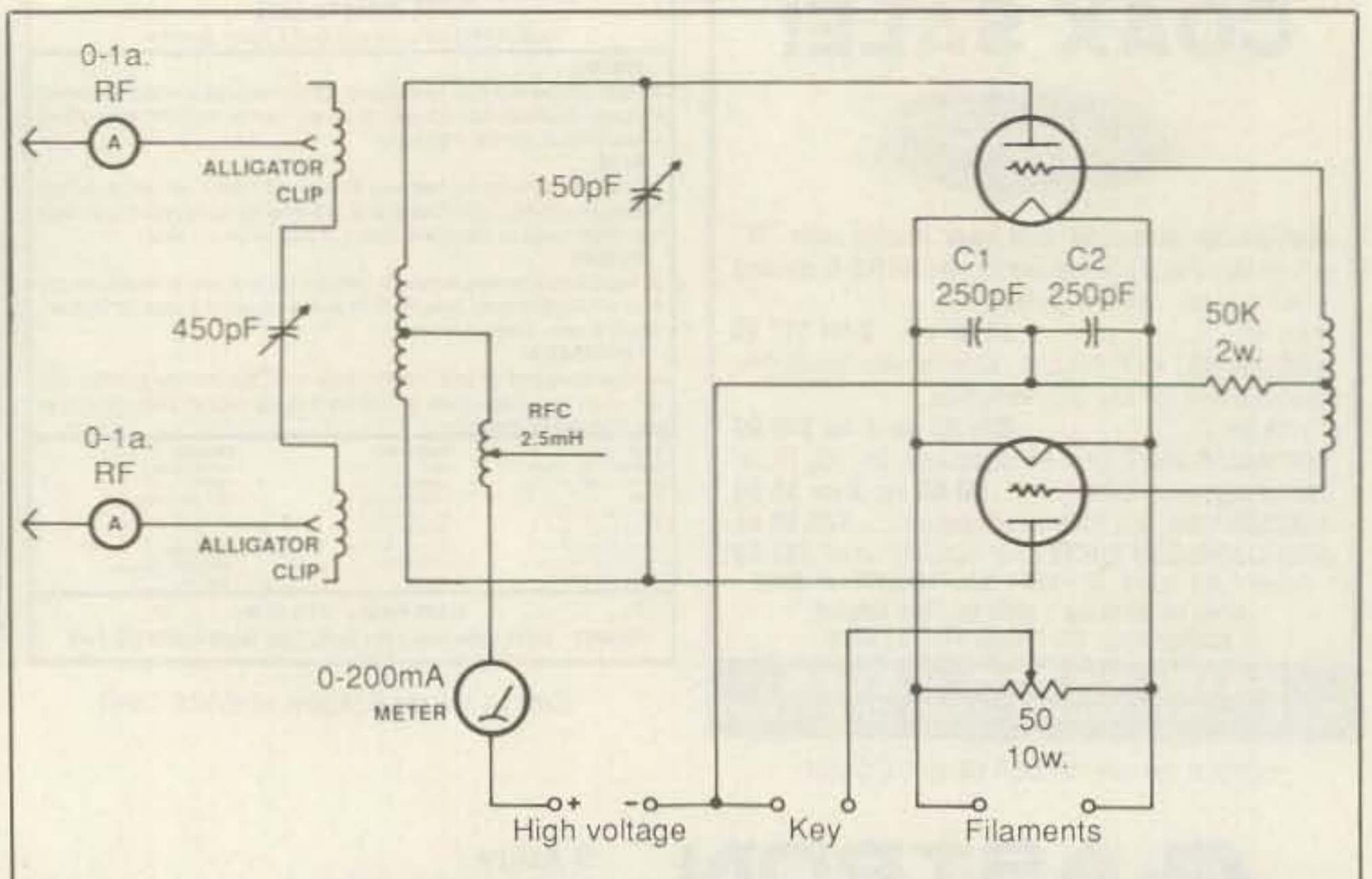


Fig. 2—Schematic diagram of the classic push-pull TNT transmitter with tuning condenser values for 30 meters. The unit chases everything from rare DX on. Discussion in the text.

we might add a resistor in series with the transistor's negative voltage lead and connect its derived signal to the input of an LM386 audio amplifier stage (note additional circuitry in fig. 1). The resistor's value must be determined experimentally. It must be high enough to develop a good signal for the LM386 but low enough to allow the transistor's circuit to continue oscillating at a lower level for mixer/detector operation. A 47K ohm potentiometer is a good starting point for those experiments. Finally, a key is wired to short out the added (47K) emitter resistor during transmit. That disables the receiver's input while raising the transistor's output to maximum for transmitting (a unique

style of full break-in, eh?). As previously mentioned, this idea has not been "fine tuned," and reflects a good project for solid-state QRP buffs.

### Classic Rigs and 30 Meters

While small solid-state transceivers are ideal for portable or mobile 30 meter operations, they simply can't compare to fixed station activities with a self-assembled vacuum-tube rig and vintage bug. The heart-warming beauty of a steel-wool-polished copper tank coil, soft glowing filaments, and antenna winking with your transmitted CW is equalled only by a starlight night in mid June. Yes, indeed! This is amateur radio at its golden best!

Return with us now to those thrilling days of yesteryear when open-air transmitters sparkled with color, keys flashed with high voltage, and every night's operation was an exciting new adventure. Pursuing those romantic times when every QSO was a proud and gratifying achievement, we dedicate the unique TNT transmitter shown in fig. 2. Look closely at this rig, gang. It's a *push-pull oscillator*; not an ordinary push-pull amplifier. Classic gems of this nature are now rare as hen's teeth, and you can have one of the genuine articles right in your own shack!

Our 30 meter delight uses a pair of old-time triodes in a tuned plate, not tuned grid configuration guaranteed to blow the knobs off those wimpy 12 volt jobs. Type 245 tubes are our preferred choice for this masterpiece because they were widely available in the good old days, still appear at hamfest fleamarkets, and require only small power supplies. Select the round dome or "light-bulb"-shaped 245s for maximum eye appeal. Alternate-

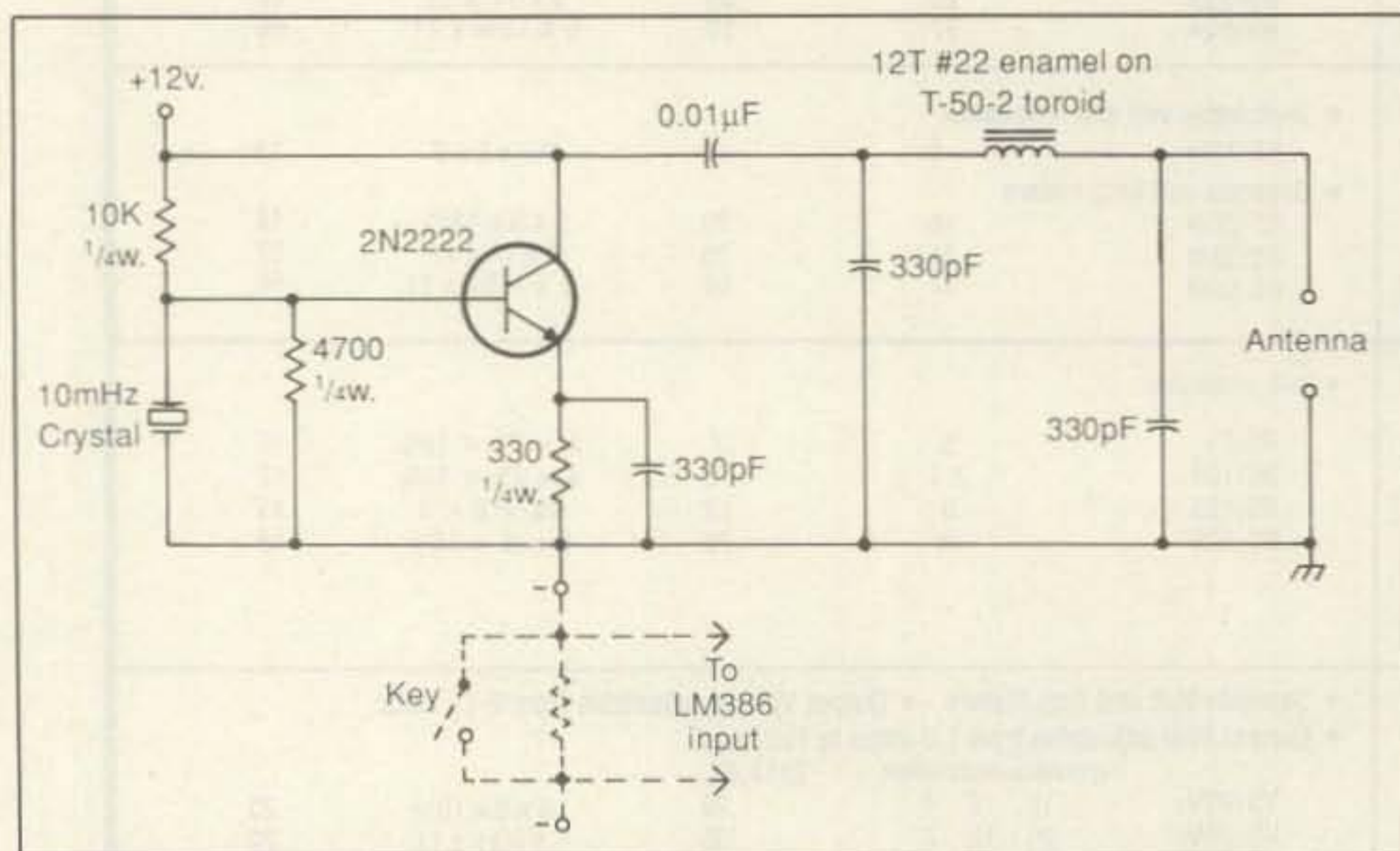


Fig. 1—A 250 milliwatt pocket transmitter for 30 meters. Dotted-line circuitry indicates text-discussed transceiver modification.

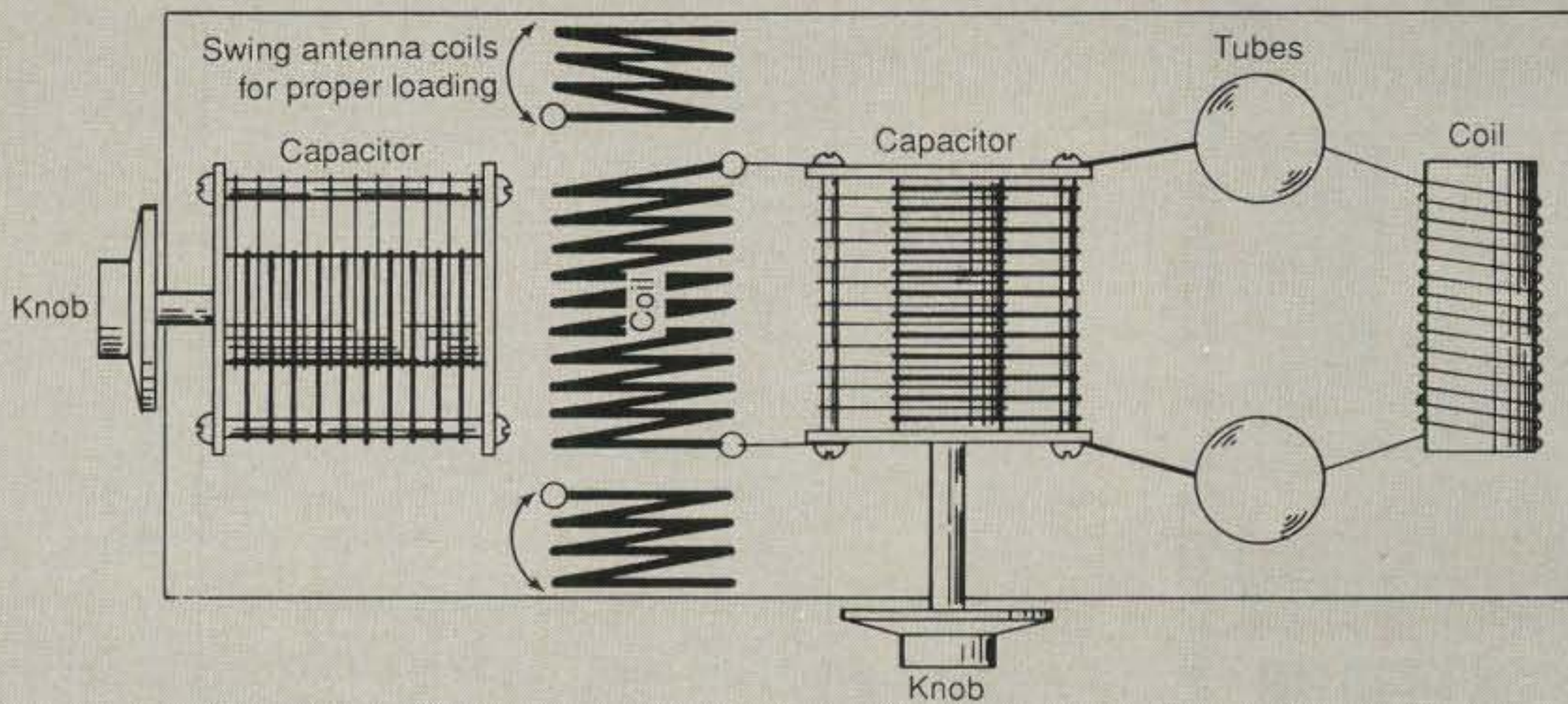


Fig. 3—Layout guide for the classic push-pull TNT transmitter.

ly, you can change the filament supply from the 245's required 2.5 volts at 3 amps to 6.3 volts at 3 amps and use a pair of ever-famous 210 or Taylor T-20 tubes. Either way, use a plate voltage of 350 to 400 volts. The rig will draw 50 to 100 ma of plate current, indicating 17 to 40 watts input—plenty of QSO power with low generation of QRM.

Specific plate tank and grid coil values determine this rig's operating frequency range. That's good in that you can often adapt junkbox tuning condensers, but it also means tinkering to assure smooth in-band operation before connecting an outdoor antenna. The plate coil is 6 turns of  $\frac{1}{4}$  inch copper tubing wound with an ID of  $2\frac{1}{2}$  inches and stretched or spaced to a  $4\frac{1}{2}$  inch length (bigger than your KW amplifier's tank coil, eh?). The coil should be tapped on its underside in the exact center for RF choke connection. If you are a true nostalgia buff, that 2.5 mH choke can also be homebrewed by winding a  $\frac{1}{2}$  inch wooden dowel, 2 inches in length, with one full layer of number 36 silk-covered wire (no substitutes here, please).

A plate tuning condenser of 150 or 200 pFd will cover 30 meters with plenty of overlap. Indeed, my TNT's range of 10.0 to 11.3 MHz was returned to reality by substituting a 50 pFd variable parallel with a fixed 150 pFd condenser in a span-limiting manner. Circulating RF currents are quite high, so use wide-spaced variables, transmitting grade components, and heavy interconnecting leads.

The antenna coils are three turns each of copper tubing, just like the plate coil. They should be wound in the same direction as the plate coil for maximum RF pickup. Each coil is bolted to a beehive "standoff" insulator on one end so it can be swung for tuning.

The grid coil consists of 28 turns of number 28 insulated or cotton-covered wire close-wound on a 1 inch form. It

should be tapped in its exact center (14 turns).

An assembly outline for this masterpiece is shown in fig. 3 and the photo. Everything fits smoothly on a lightly stained pine board or decoupage plaque approximately 8" x 14". Old style "acorn" condensers, body-end-dot resistors, breadboard tube sockets, and genuine Fahnestock clips are used for authentic beauty. All wiring is direct/point-to-point with large buss wire for maximum frequency stability. If you need a power-supply schematic guide for the push-pull TNT, see fig. 4.

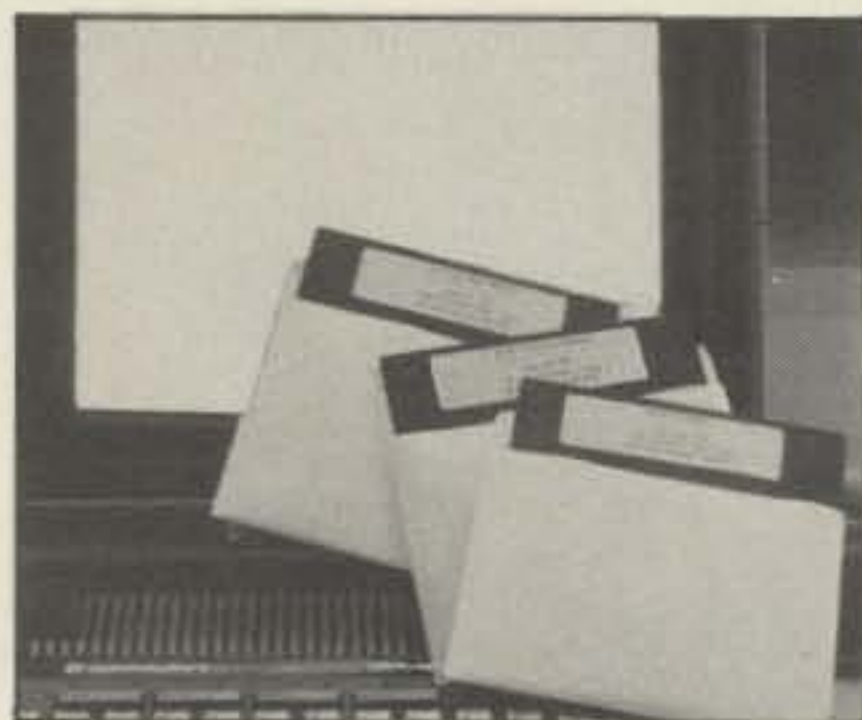
The easiest way to initially check out and calibrate the push-pull TNT is using your modern transceiver with general-

coverage receiver to "spot its signal" and evaluate its bandspread. Do not connect an antenna to your transceiver so the TNT's signal will "stand out like a sore thumb." Also, **DO NOT connect an antenna to the TNT until you are sure its signal is clean and within 10.100 to 10.150 MHz allocations!** Remember our previous notes on parallel/series limiting condensers and you'll soon settle this "transmit on any frequency" gem into a high bandspread 30 meter only rig. If an unstable CW note is detected, add or delete one or two turns on each side of the grid coil and check power-supply filtering/regulation. Key-up/key-down variations should not exceed 30 volts. If a beautiful 1988-quality note is still not apparent, add a 50 volt 6



Layout of K4TWJ's big bottled push-pull TNT before addition of antenna coils. The tube's glow is fantastic!

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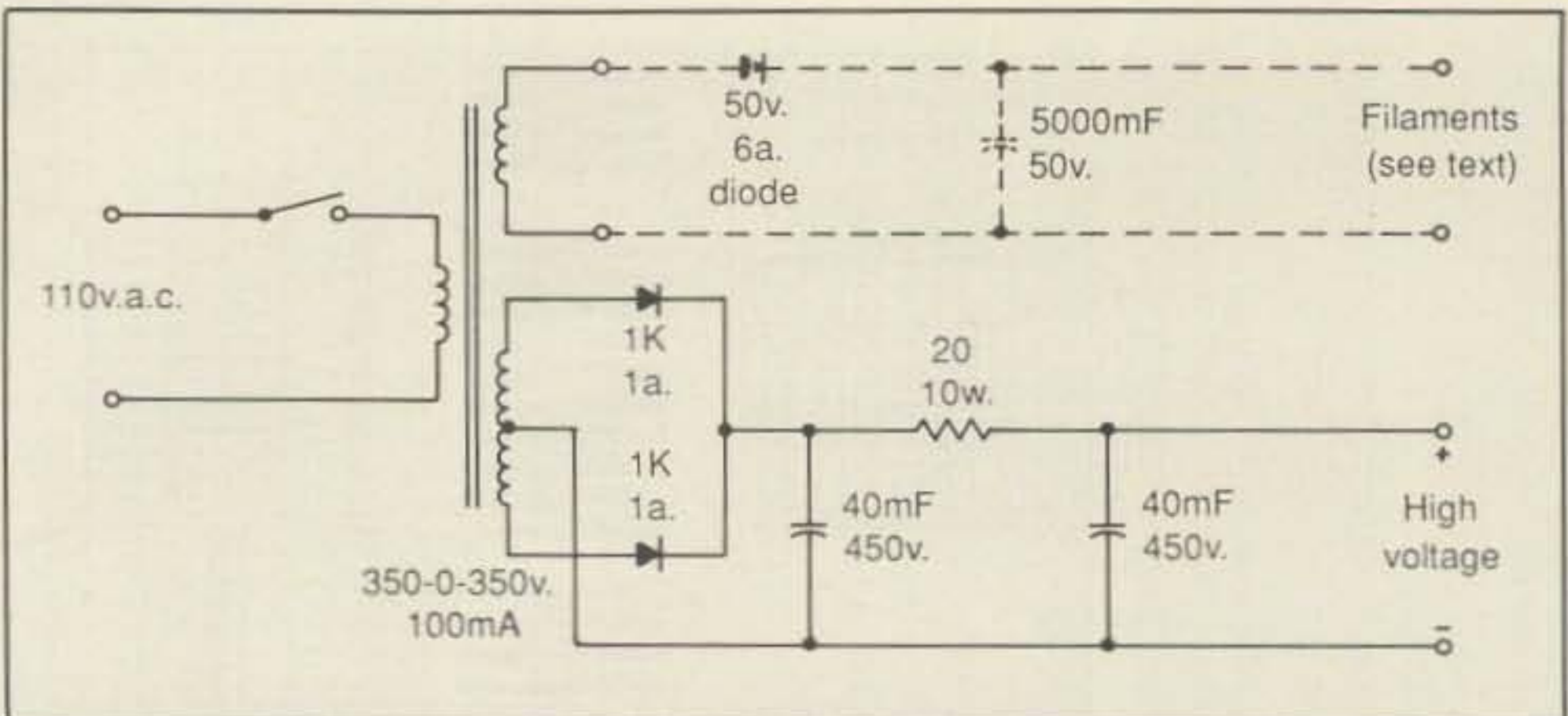


Fig. 4—Power supply for the classic push-pull TNT transmitter. Optional dotted-line circuitry is explained in the text.

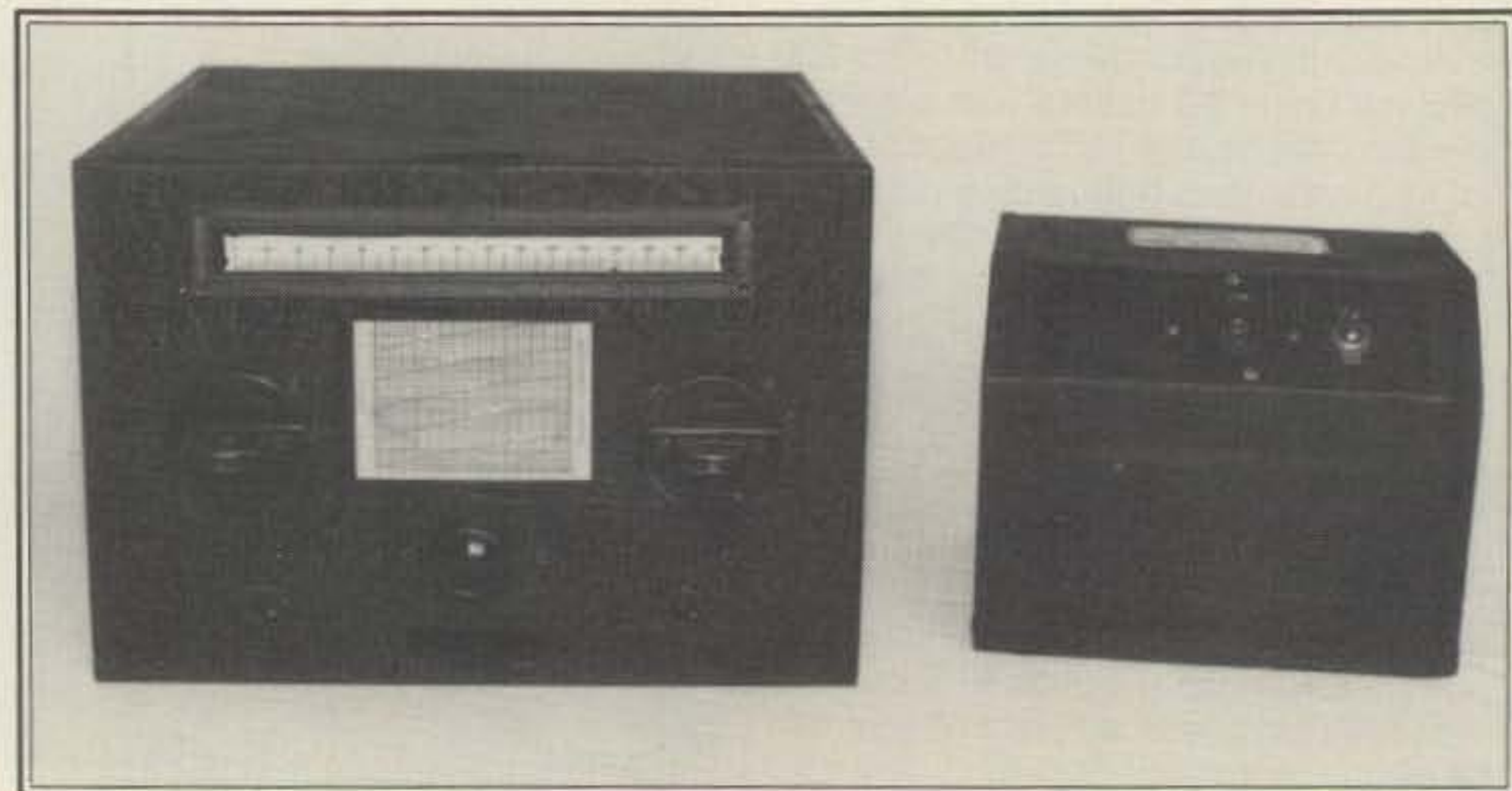
amp diode and 5000 mFd capacitor to the filament supply to obtain pure DC.

After smooth operation is achieved, connect a doublet-type antenna with open-wire feeders and carefully adjust each antenna coil for equal RF pickup in each feeder. Two hamfest-obtained RF ammeters are ideal here, but you can "fake it" by clipping a small neon lamp on each coil's output. You can also add small neons on each side of the antenna for tuning. Yes, indeed! Then you can tune the rig by watching for equal antenna glow in the night! Swing each coil (**only when the high voltage is removed!**) while varying alligator tap points and antenna condenser tuning until both neons are equally illuminated. Next back each coil away from the plate coil until a slight reduction in output/neon-intensity is noticed. This assures light coupling and consequent high frequency stability. Finally, add a deluxe-style bug (its chrome base is perfect for highlighting voltage flashes) and get ready for big-time 30 meter DXing.

Assuming you become incurably hooked on classic rigs, there's only one path of gratifying progression: Gung ho! Add a comparable-era receiver like the classic National FB-7 shown in the photo, liberally sprinkle the new setup's desk with old *radio* and *QST* magazines, and then add a Tiffany lamp and place a dust cover over your SSB rig for the duration. Add some wooden tailenders to the classic station's walls for DXing supreme. Say hallelujah if you remember tailenders!

Enough, enough! We best conclude this brief romp through yesteryear, ere the ghost of times past chop our Zeppelin's tuned feeders into little pieces and readers have us committed to the fabled funny farm for fanatics. We thus nuzzle our insatiable enthusiasm for this month and invite you to read our new book *Golden Classics Of Yesteryear* for more romantic rig views and recollections from amateur radio's glamorous past. Good luck, and we will be listening for you on 30 meters!

73, Dave, K4TWJ



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## Aries-1 Amateur Radio Integrated Entry System

```

ID(Sta): IK1ABC      Name: Enrico      City: Genoa      State: Italy
Date: 83-10-88      Begin: 20:56      End: 950:        Freq: 14.085.2
Type (mode): FSK    My RST:          His RST:         Power:  QSL:R
Remarks: Enjoys Sailing and fishing on his 30' boat 'TOMAR'
Data: 2) 10-31-87 / 17:27 to 17:48 / USB / 21.215.0 / RST 55 / His 57
Status: [I/R] [CLS] RTTY 45 Baud Normal [CLD] [5e/F] [Qu/eX]
    
```

Log of NY2I

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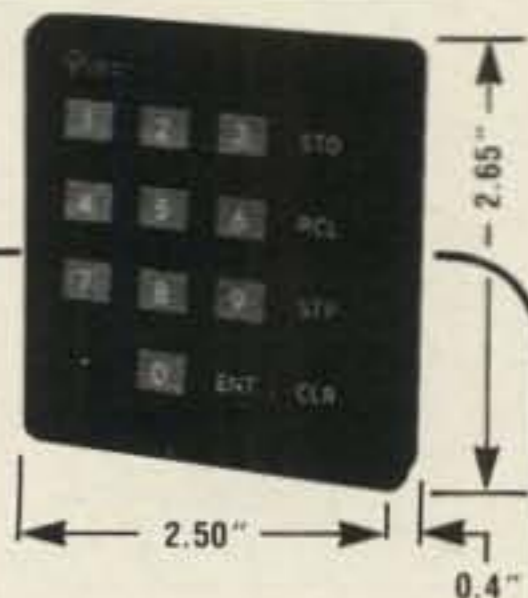
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CIRCLE 23 ON READER SERVICE CARD

## THE ART OF VERY LOW POWER OPERATING

### Your First Homebrew QRP Rig—The TWOFER

The October 1987 QRP column provided background on the genesis of the QRP-ARCI club project during the QRP bash at the 1986 Dayton Hamvention. As you may recall, the G-QRPC had come across the pond with a stock of "ONER" simple transistor transmitter kits which sold out almost immediately. The QRP-ARCI then decided to design its own simple transmitter, market it in kit form, and sponsor a QRP Homebrew Contest to emphasize homebrewing in this country.

833 Duke St. #83, Vermillion, SD 57069

The "TWOFER" plus Homebrew Contest strategy is aimed at enticing all you appliance types into taking the big step of building an easy, "guaranteed to work right off the bat" transmitter with a guaranteed opportunity to work other QRPers operating similar rigs. Fantastic idea! In one stroke we eliminated the two major deterrents to homebrewing, judging from my mail and chats with many QRP and non-QRP operators.

The first problem in homebrewing is parts acquisition. All components for just about any project can be obtained via mail order, but you have to know where to find parts. Providing a complete kit solves that problem. Many home-

brewers have then complained that once they go through the frustrating process of waiting for ordered parts, they finally toss together a rig in a couple of hours and then can't find any QRPers to work with the thing. The winter and summer Homebrew Contests solve that problem. In addition, the QRP nets listed in the QRP column for January 1988 on page 75 provide the opportunity to work other QRPers on four days of each and every week throughout the year. I've had several cards from fellows who gave the nets a try as a result of that column, and they worked a bunch of QRPers. The bottom line is if you've been reluctant to jump into homebrewing because of those two problems

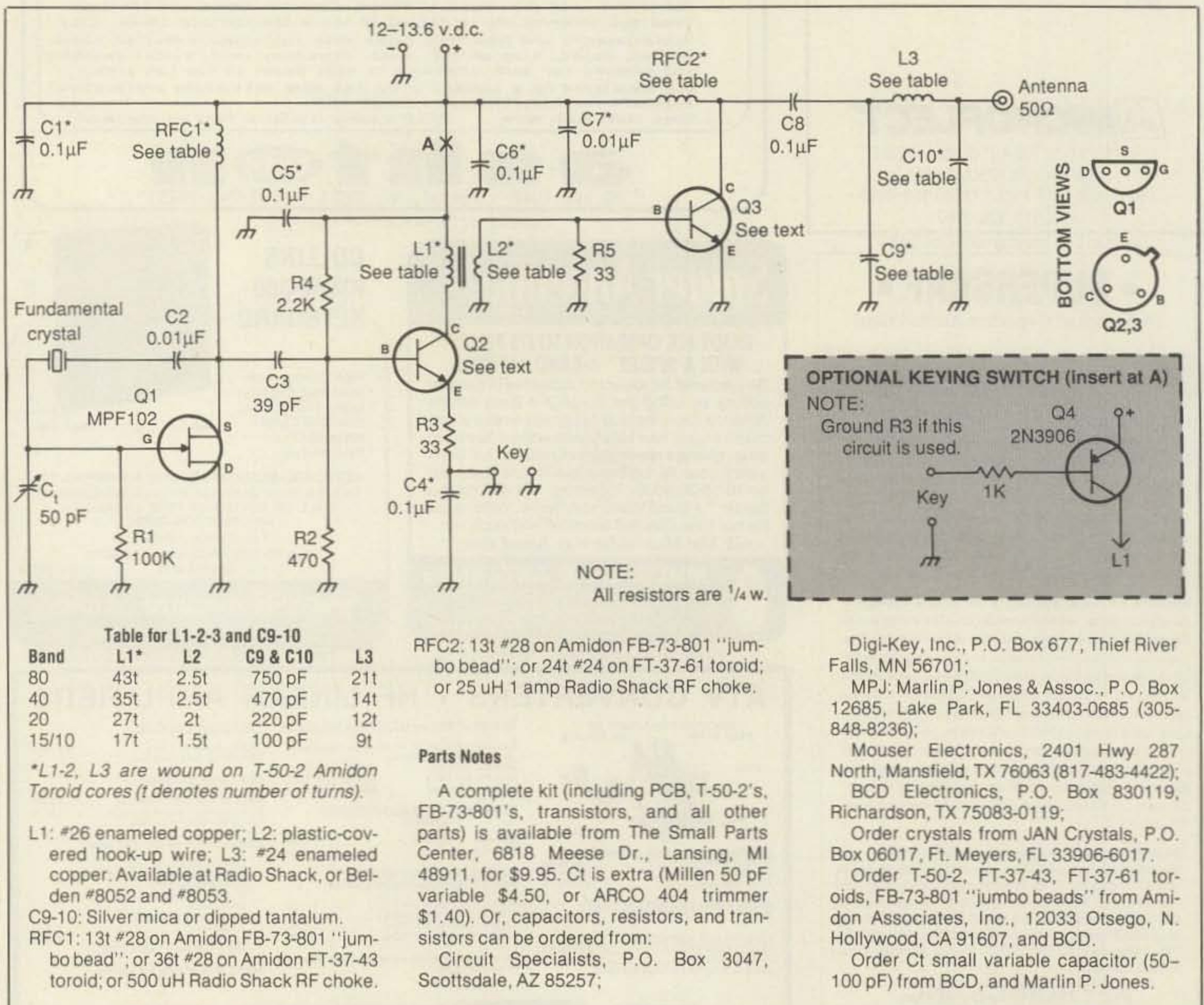


Fig. 1—Schematic of the TWOFER, including a table for L1-2-3 and C9-10.

in the past, there isn't any excuse now!

As with all group projects, it took longer than expected to implement these ideas than was originally expected. But everything is in place now. John Collins, KN1H, designed the "TWO-FER" transmitter with an assist from Mike Michaels, W3TS, by October 1986, about four months behind schedule. The kit concept was "market tested" at the 1987 QRP gathering at Dayton and was a stunning success. Most of the 20 kits offered by Fred Turpin, K6MDJ, and Bob Speidel, W6SKQ, of the Zuni-Loop Mountain Expeditionary Force were sold before the QRP-ARCI had a chance to set up its booth. Quite a few guys were miffed because they didn't have a chance to buy one. Talk about a hot item!

The club went forward full-throttle and gave Bill Harding, K4AHK, hard-working treasurer and subscriptions manager, the job of acquiring parts for about 100 kits. Bill had done it as of January 1988, and they're ready for shipment! By the time this appears they might be gone, so it would be a good idea to check first before ordering from John Collins, RR2 Box 427, Cornish, NH 03745 (\$22.50 postpaid, not including crystal). However, the availability of club kits is no problem. The Small Parts Center—operated by Chris Hethorn, KM8X, a veteran QRP homebrewer who decided to solve his own and every homebrewer's parts problems by marketing a complete selection—has put together a complete kit (not including crystal) for the TWO-FER version featured in this article (including PC board) for \$9.95 postpaid (see details in the parts notes section of fig. 1).

Since the implementation of the TWO-FER kit phase of the project took so long, activity in the first Winter Homebrew Sprint didn't benefit from the potential existence of at least 120 homebrew rigs which could have been on the air. Moreover, the Sprint was announced too late to be included in this column. Even so, there was an opening burst of activity on December 12, 1987 for about the first hour of the four hour sprint lasting from 2000–2400 UTC. Results are not yet in, but a few scattered comments have surfaced.

Bob Brown, NM7M, reports that "The Homebrew Sprint started with a bang but tailed off here in about 90 minutes. I worked 23 QRPers, about half of them with homebrew gear, but after 2130 UTC, I just ran out of people to work." Wes Hayward, W7ZOI, notes that "It turned out to be a really great event. I made 27 contacts on 40, 20, and 15 meters, and of the 27, twelve sent 'HB' [homebrew] as part of the exchange. Guess that's to be expected." Rich Arland, K7YHA, QRP columnist for *World Radio*, didn't comment on the number of QRPers worked, but noted that he had just put up a 4BTW vertical with three radials and accumulated "some interesting data" comparing it with a G5RV during the sprint, which saw a QSO with an NL7 in Alaska first on the list! He must have worked enough stations to come up with the data.

I was on with 1.5 watts output from a homebrew miniature 20 meter transceiver which has traveled to England several times, and I worked a lot of U.S. DX courtesy of G4BUE's fantastic 4-element Yagi. I worked eight QRPers in the first hour, but added only five more during the remaining three hours of on-off listening. Now if all those TWO-FER kits had been on, all would have had to push hard to work everyone! There would have been no end to the list! So let's all get to work on a rig for the summer Homebrew Sprint scheduled for July

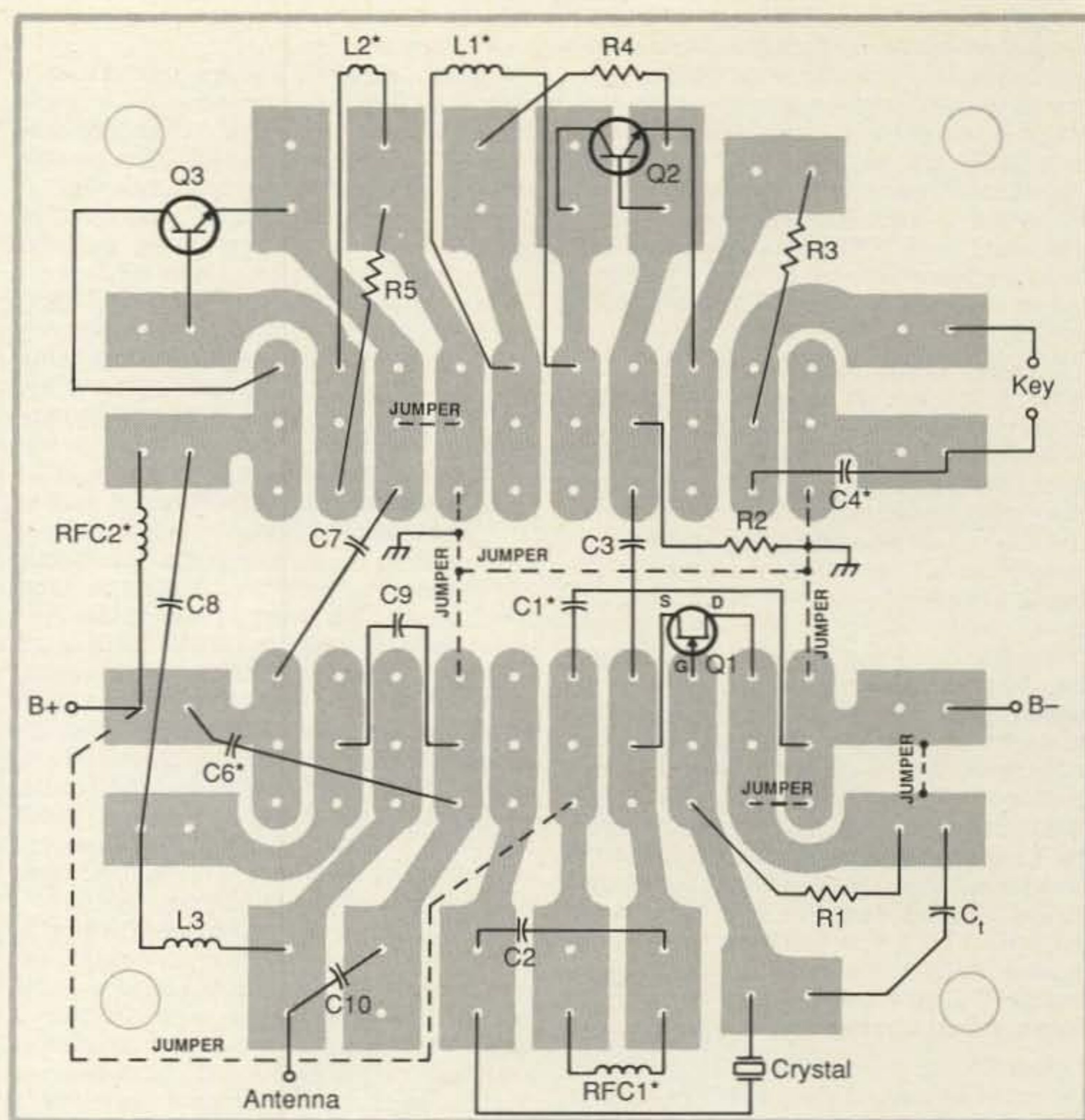


Fig. 2—PC board template and overlay.

10, 1988, from 2000–2400 UTC! Get a kit, or follow the route discussed in the remainder of this article—build your own from scratch.

### The TWO-FER

The credit for the TWO-FER design goes to John Collins, KN1H, with assistance from Mike Michaels, W3TS, and they did a good job! I literally haywired my version on a Radio Shack 20-pin dual-in-line PC board. I ignored all my previous experience with homebrewing, dismissing usual considerations such as ground loops, perfectly wound toroids, etc. The only problem I encountered was caused by a "pulled" MPF102 FET at Q1. It was "dead," which is why it had been pulled from a previous circuit in the first place. Once I plugged in a good device, the oscillator took off and drove the buffer-amplifier stages to a healthy output. Photos of the haywire and compact second version are shown along with the circuit in fig. 1 and the PC board overlay is shown in fig. 2. I was impressed with the fact that the circuit worked right off with a whole passel of NPN transistors pulled from old computer PC boards. The only critical components are the inductors at L1-2 and L3, and the only care that need be taken is to put the specified number of turns on the toroid. The circuit is simple and foolproof. KN1H discussed it in "Build the TWO-FER" in the October 1986 issue of the *QRP Quarterly*, and we'll extract relevant comments.

**Oscillator.** With respect to the Pierce crystal

oscillator stage, KN1H noted: "The advantage of the Pierce oscillator, besides its obvious simplicity, is its lack of parallel capacitance. This means that the variable capacitor on the gate of Q1 will vary the oscillator frequency from about 4 kHz on 80 meters to 15 kHz on 20 and 15 meters." The oscillator works on the crystal's fundamental frequency, and "crystal type is noncritical—every one of my junk box crystals worked fine." I had the same results. In addition, I tried several third overtone crystals for 15 meters and found that they worked on 40 meters, their fundamental frequency. Also, HC7/U and FT243 types both worked equally well.

**VXO Circuit.** The addition of the tuning capacitor  $C_t$  across the gate of Q1 transforms the circuit into a VXO or variable frequency crystal oscillator. As  $C_t$  is increased, the crystal is loaded and oscillates at a lower frequency. Given the downward shift in frequency produced by  $C_t$ , choose a crystal frequency so that the center of the spread is on a QRP calling frequency (i.e., 3560, 7040, 14060, 21060, and 28060 kHz). Hence, a choice of 7042 kHz for 40 meters will permit swinging 2 kHz above and below the center of activity. While a 50 pF capacitor is specified, I used a 100 pF variable to produce additional "rubbering," but not much more than the spread noted by KN1H. The addition of  $C_t$  has a second effect in that it creates an RF path between gate and ground which permits additional RF current to flow into the gate, thereby increasing the output from Q1. This effect occurs at about 15 pF and a

downward shift of about 1 kHz on 40 meters. The difference in RF voltages and output at the high (minimum capacitance at  $C_t$ ) and low ends of the VXO frequency range in my two units is shown in fig. 1. I should note that the leads to  $C_t$  are frequency sensitive. They should be stiff and firmly anchored; otherwise, any vibration or jostling will cause the frequency to jump. Similarly, RFC1 should be mounted solidly; a soldering iron can be used to melt any kind of candle wax onto RFC1 and the PC board to "wax" it in place.

**RF Chokes.** KN1H noted that the "values of the two RF chokes are not especially critical. For the oscillator choke (RFC1) I tried several values from 100  $\mu$ H to 1 mH and all worked satisfactorily." In addition to standard Radio Shack units, he wound his own from 36 turns (#28 wire) on an Amidon FT-37-43 powdered iron toroid core. I took him at his word and tried several chokes of unknown value, and all worked. The purpose of the RF choke is to isolate the Q1 source from any RF on the B+ line. One trick (if no scope is on hand) to see if this is happening is to shunt a 1 mF or so capacitor across C1. No change in oscillator frequency will occur if the choke is doing its job. I ended up using 13 turns of #28 wire on an Amidon FT-73-801 powdered iron "jumbo bead" core. The 73-mix exhibits an  $\mu$  of 2500, and 13 turns produces a quite large inductive value. For RFC2, KN1H used 24 turns of #24 wire on an FT-37-61 core. I went with the same value as used in RFC1. If a Radio Shack choke is used at RFC2, it should be rated at 1 amp or more to avoid DC loss in the amplifier circuit.

**Driver.** The Q2 driver stage is a simple Class A amplifier with link coupling to the base of Q3. With respect to the value of C3, KN1H noted: "Output from the oscillator is dependent on crystal activity, and the 39 pF coupling capacitor was chosen to limit transmitter output to 1.5 watts using my most active 80 meter crystal. As designed, power output is 1.2 watts on 40 meters, 1.1 watts on 20 meters, and 650 mw on 15 meters." My versions showed similar outputs, although the transistors tried at Q2 and Q3 produced considerable variations. The biasing resistor values given by KN1H were optimum with the 2N2219, 2N2222, and 2N2224 transistors. However, other common NPNs produced lower outputs. For example, the RMS voltages developed across R5 with a single-turn L2 link ranged from 0.22 volts RMS to 0.95 volts RMS for the following devices listed from low to high value: 2N697, 2N3053, 2N706, 2N2102, 2N3553, and 2N3642, with the '2200 series (2N2219, 2N2222, and 2N2224) giving the high value of 0.95 (B+ of 13.6 VDC). Resistor values could be changed experimentally to optimize the circuit for other transistors, but the wide availability of the last three types makes such an effort extraneous. Interestingly, one in-house marked Motorola "pull" put out 1.17 volts RMS.

I made one significant change in the Q2 driver circuit by eliminating the keying switch transistor Q4 and using simple emitter keying. Fewer parts, and there's no decided advantage in using the keying switch (it is shown in the schematic in case you prefer to use it). The values for L1-2 are shown in the table with fig. 1. The L1 tank circuit does not include a tuning capacitance. The internal collector-emitter capacitance of Q2 serves the purpose. The L2 link of about 2½ turns of plastic-covered hook-up wire is positioned at about the mid-point of the L1 winding, away from the high-impedance

end of L1. Don't attempt to increase drive power by adding turns to L2.

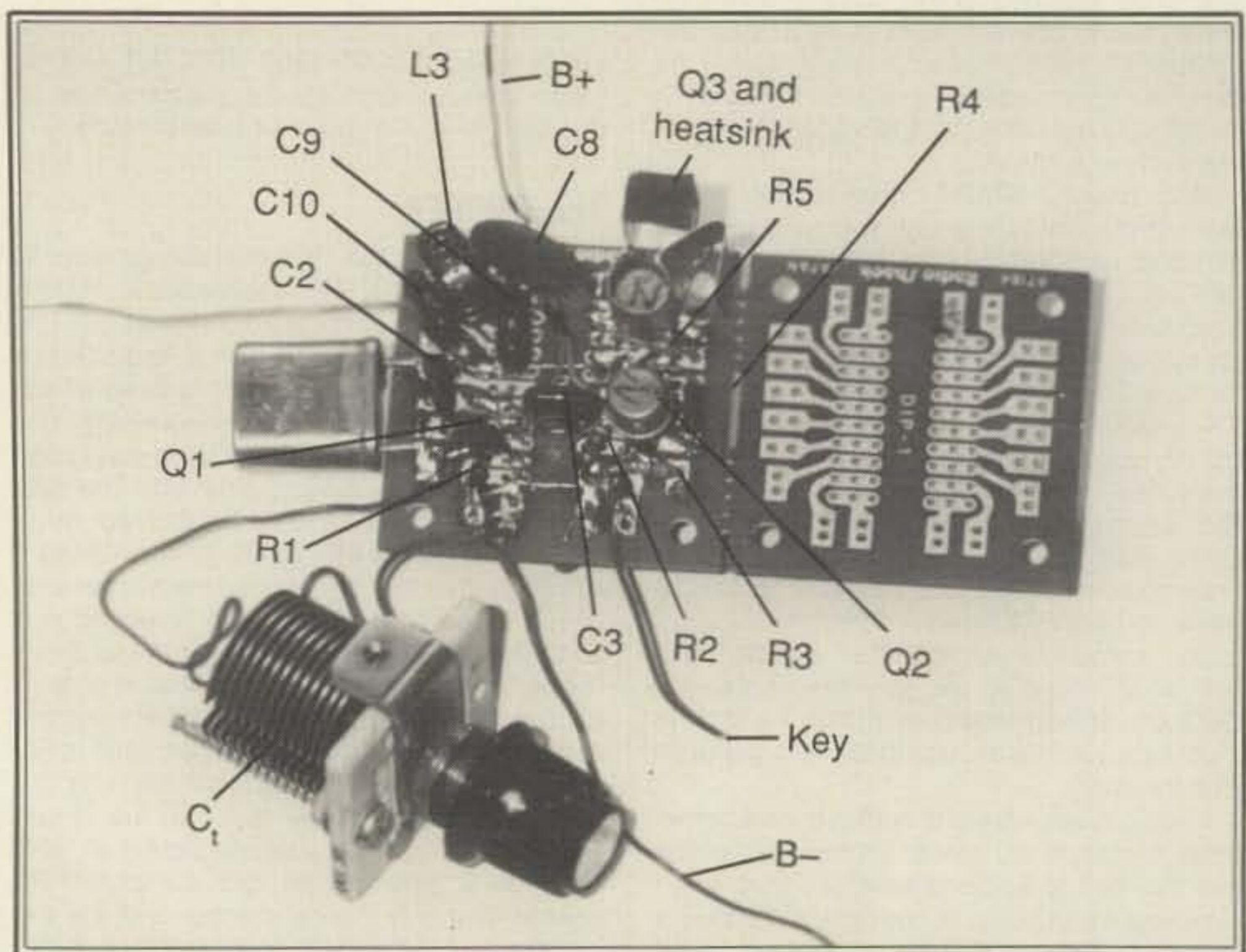
**Amplifier.** The amplifier stage at Q3 is a standard Class C type connected to the antenna through a pi-net output filter. R5 at once provides a fixed resistive load for Q2 in parallel with the dynamic base-emitter junction RF resistance while establishing a fixed DC bias point for Q3, thereby enhancing stability. KN1H recommended using NPN RF transistors such as the 2N3137, 2N3866, and 2N3553 at Q3, and cautioned: "Be careful not to overdrive a 2N3866 or other UHF transistor in the PA. They will give about 5 watts out for a few seconds and then open up. The reasons are their very high gain, especially at 80 meters, and the very close tolerances in the transistor—the very qualities that make them so good at UHF. The 2N3553 is probably the most reliable choice, as it will survive pretty outrageous SWR for those who like to tune-up for hours on end." My 2N3866 showed lower output than either the '2200 series or the 2N3553. It might be a dud that was roasted in another circuit, since it was a "pull." The 2N3553 will cost several dollars and produce more output than the cheapie "22" series. For example, on 40 meters with the B+ at 13.6 VDC and an L2 of 2½ turns, the 2N2224 showed a maximum of 1.4 watts into 50 ohms, while the 2N3553 put out 1.8 watts. The difference isn't worth \$3.00 to me and won't make any difference on the air.

With respect to heatsinking the final amplifier transistor, this is not really necessary unless, as KN1H put it, you like to tune-up for hours on end. There really is no need for that! It took a half-minute of key-down operation at maximum output for the 2N2224 to begin to heat up noticeably. To stay on the safe side, a standard slip-on TO-5 heatsink could be used, or a homebrew sink made from thin copper or

aluminum "shim stock" or flashing will do the job (see photo). Simply cut a ¼" x 1" or so piece of material and then wrap the middle of the strip around the transistor case and crimp tightly. The remaining material can then be bent to form two vertical fins. Finally, the output pi-net filter values (L3, C9, and C10) should be followed closely. The cut-off frequency of the low-pass filter is slightly above the frequency band and designed for 50 ohm terminations, which corresponds well with the collector load impedances for power outputs in the range obtained with the TWOFER. Increasing or decreasing the number or spacing of turns will produce a variation in output, but this should not be misinterpreted as an improvement in efficiency, etc. It usually indicates an introduction of distortion onto the signal waveform. If you'd like to learn more about building and adjusting a simple transmitter like this, a detailed discussion about circuit functions, debugging, and test procedures can be found in *The Joy of QRP* (available from CQ's Bookshop).

### Construction of the TWOFER

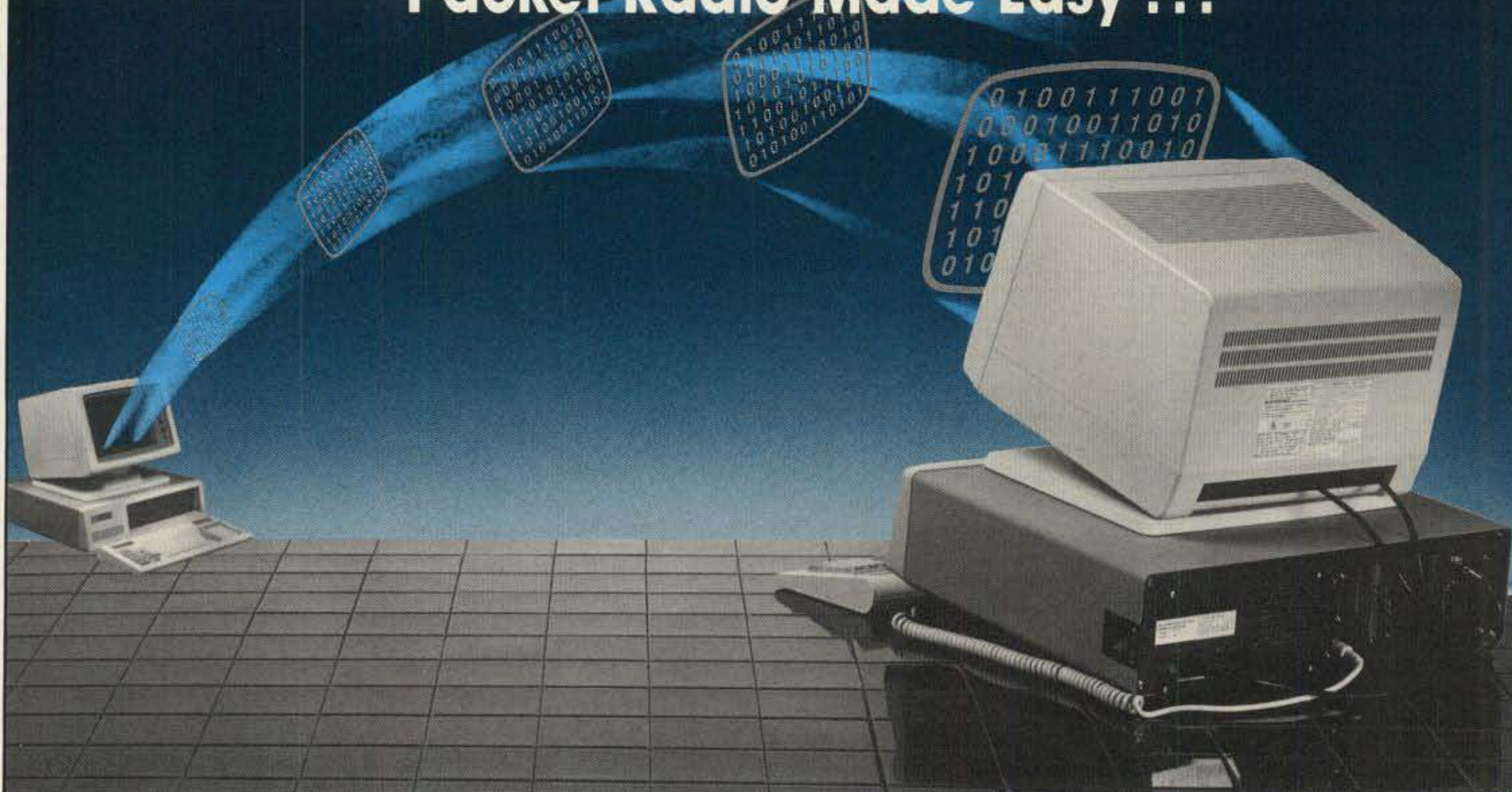
The only critical aspect of construction consists of making correct connections. Beyond that, the components can be mounted (or unmounted as in the "ugly construction" approach!) in any configuration. I've always found that PC boards make life simpler. The ready-made 20-pin double-in-line boards available at Radio Shack were first brought to my attention by N0ARQ (see his version of my HW-8 RIT circuit in CQ, May 1982, pp. 98-99, also included in the reprints of my HW-8 modification series). One glance convinced me that the approach was a real "winner," and I've been using these boards for working up circuits ever since! There must be a million holes and a whole bunch of pads on these things so that



The amplifier fills the top half of the Radio Shack #276-159 PC board with (left to right) C9-L3-C10-C8 to the left of Q3, which uses a heatsink as described in the text. Driver Q2 is below Q3, while Q1 is at the bottom left corner beside the crystal, which is soldered directly to the proper pads. One-quarter watt resistors are flush against the PC board and soldered directly to the pads. The B+ lead is at the top, antenna lead at the left, and B- and key leads at the bottom to the right of tuning capacitor  $C_t$ .



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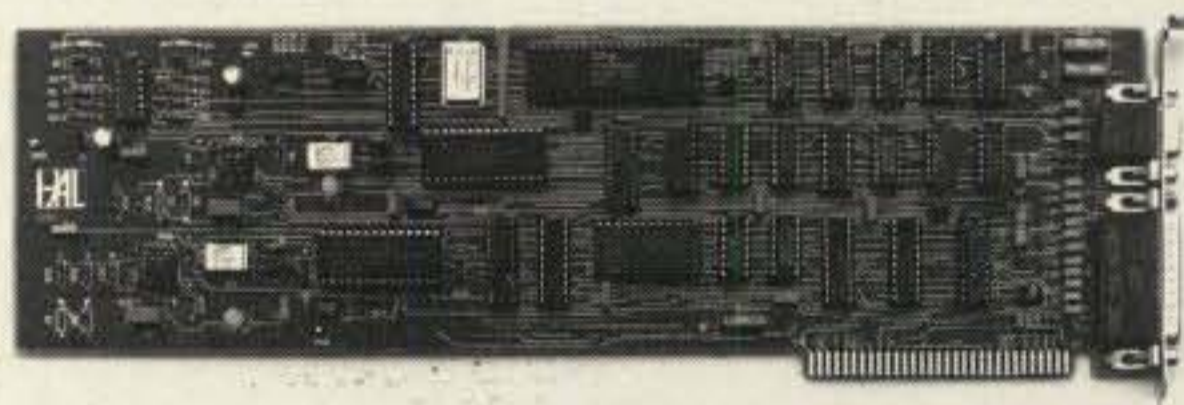
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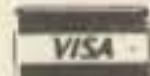
5 XY-137 7.8 dB Ask

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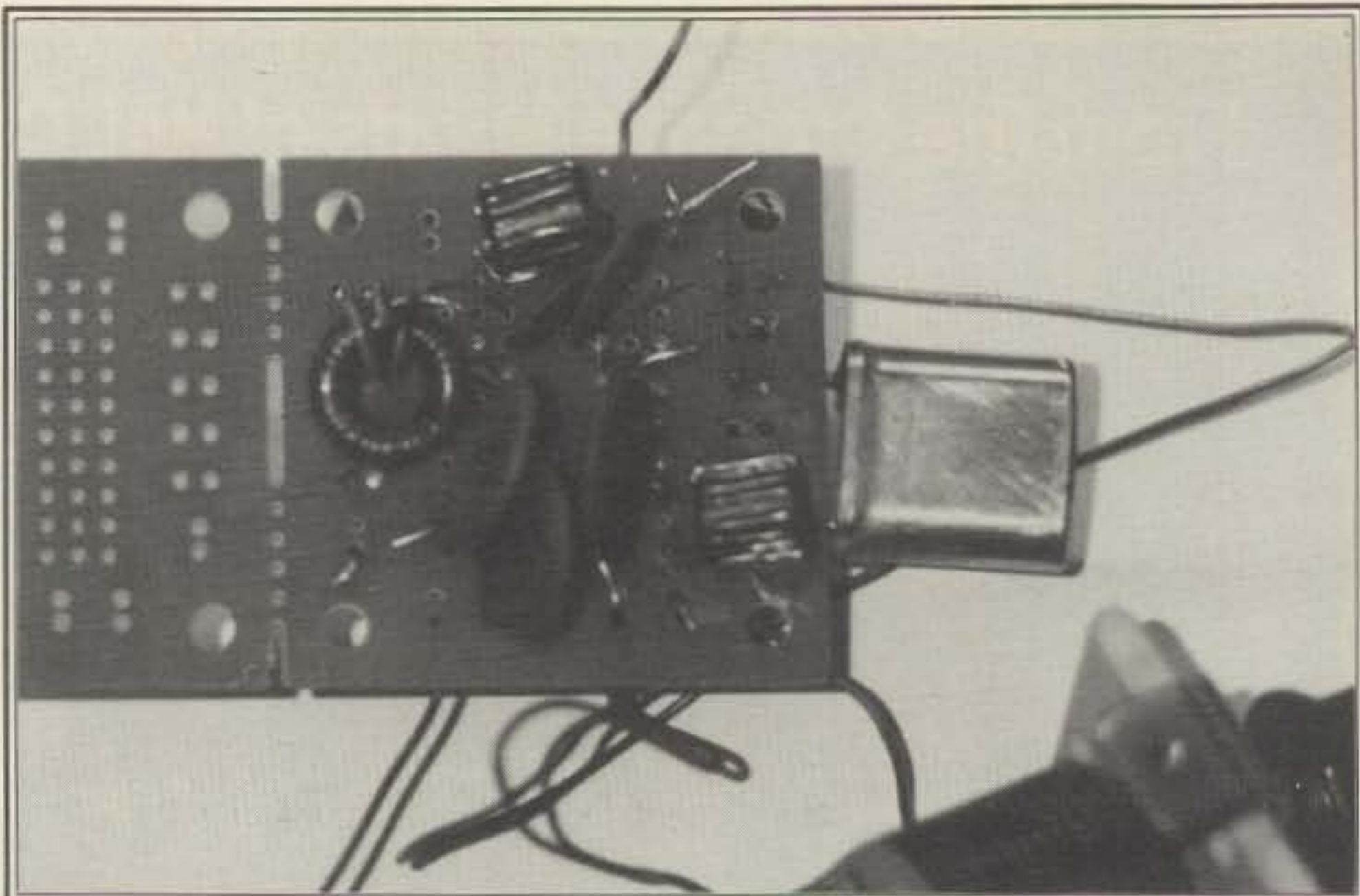
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View of underside. Clockwise from bottom of crystal: RFC1, C1, C4, C5, L1-2, RFC2, and C6-7.

haywiring a circuit is a cinch.

My first version of the TWOFER grew across two boards (they come in twos with holes for easy splitting apart). Then I decided to try to put the whole TWOFER on a single board, and that took a bit of planning. The final wiring configuration is shown in fig. 2. Each pad has five holes, permitting mounting components either foilsides or undersides. Underside components are marked with an asterisk in figs. 1 and 2. For foilsides parts, the wire leads are inserted only far enough to leave some bare wire for soldering to the pads. Actually, there is no need to use the holes, since leads can be soldered directly to the pads. My decision to mount most of the parts on the foilsides was based on the fact that it is easier to keep track of connections that way, since there are so many holes on the board. Circuit ground is established by joining several pads with jumper wires.

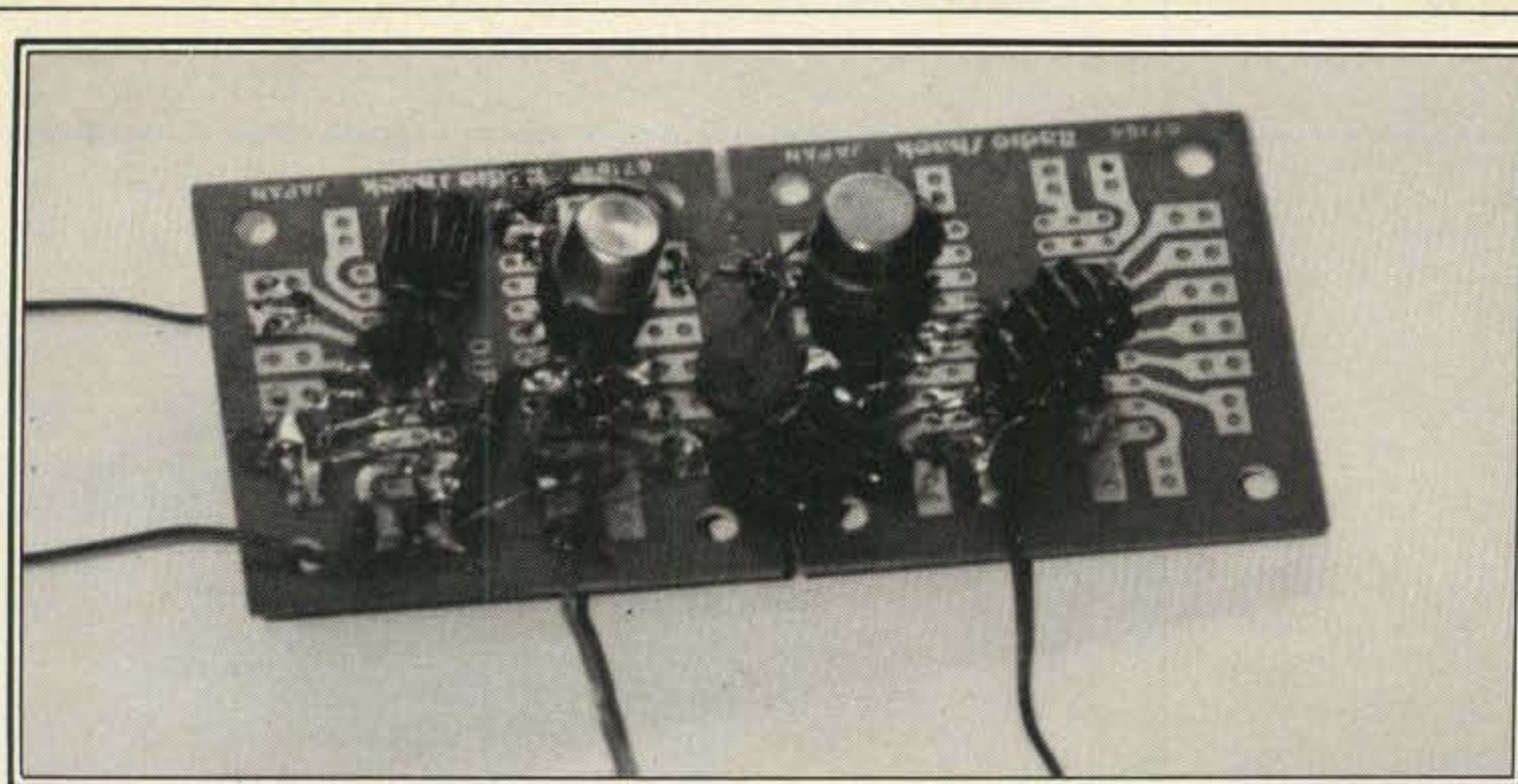
The unit is quite compact, as seen in the photos. Overall cubic size could be decreased considerably by using dipped tantalum or monolithic-chip by-pass capacitors at C1-2-4-5-6-7-8, and dipped tantalums or match-head caps at C3-9-10. I used standard silver micas and 1/2 inch ceramic discs in my units and the layout in fig. 2 so that there would be enough room if you don't want to order subminiature components. A second way of decreasing size (and reducing cost) is to substitute an ARCO 404 4-60 pF subminiature trimmer capacitor for the regular variable seen in the photos. The 404 leads can be bent into a right angle about 1/8 inch from the end to permit direct mounting across the bottom edge of the PC board of fig. 2. In this approach it will be necessary to use a screwdriver to shift frequency. However, this is only a minor inconvenience, since the tuning ratio is very broad and accurate zeroing is possible. Or, you can use a trick that I discovered in 1955 for creating a shaft when none exists. Find a hollow tube that fits onto the adjusting screw, and then epoxy it to the screw. The fit need not be exact, since the epoxy will make up the difference. Ballpoint pens are perfect. For example, the top end of a regular "Papermate" ballpoint fits snugly around the screw. It's a natural for this application. Finally, the

HC7/U crystal is soldered directly to the PC board (see photo), although it could be socket-mounted on the enclosure. I plan to put mine into a Band-Aid box and use a socket.

The TWOFER kit offered by The Small Parts Center includes the above options for miniaturizing the version shown here. Instead of disk ceramics, monolithic chips are provided for the by-pass and coupling capacitors. Hence, these can be mounted on the foilsides of the board with a slight modification of the connections seen in fig. 2. For example, C6 and C7 can both be connected to the pads shown for C7. C1 and C4 are connected as shown, but C1 is moved to the left of Q1. RFC1 can be moved to foilsides in a vertical stance. A mono-chip C8 will create space for foilsides mounting of RFC2. Finally, L1-2 can be mounted in a vertical stance beside Q2.

A few other notes about The Small Parts Center kit will be helpful in ordering. First, specify the band to be used so that the correct values of C9-10 are provided. Second, the kit includes a MPF102, a 2N2222A, and a 2SC799, a 5 watt CB duplicate of the 2N3553 which costs just 55 cents (vs. \$2.15) and provides the same higher output. A crystal socket, RCA phono jack for the antenna, wire for winding the chokes and coils, and the Radio Shack #276-159 PC board are included. Ct is optional. A high-quality Millen 50 pF unit will cost an extra \$4.50, while an ARCO 404 4-60 pF trimmer is \$1.40 extra. All you'll need is a crystal, soldering iron, pliers, and wire-cutters. A 12 volt (or a pair of 6 volt) lantern battery will provide power (almost) indefinitely.

As seen in the photo, the dual-in-line PC boards come in pairs with a series of holes on the boundary for easy snapping apart. I left the extra board attached for the eventual addition of a VFO. To drive the transmitter with a VFO, simply remove the crystal, connect the VFO output across the Q1 gate and ground, and commence operation. An ideal choice for this function is the VFO described in detail in *The Joy of QRP*. Another use for the extra PC board is suggested in KN1H's article in which he describes a simple direct-conversion receiver to go with the transmitter (hence the "two fer



Original version of my TWOFER spread across three columns of pads on the PC board beginning with Q1 at the left. The transistors are mounted in sockets to permit comparing several without the need for resoldering leads. Layout is not critical, and this approach will produce the same results as the compact layout shown in fig. 2.

one" monicker), and it could be mounted on the extra PC board as well. Actually, I may end up doing this instead of a VFO, since the VXO feature permits moving around the band a bit.

One drawback of these simple transmitter designs is that they will operate only on the band for which the crystal, L1-2, L3, and C9-10 have been selected. However, there is a relatively simple way around this which I haven't seen mentioned in the literature for transistor transmitters, although this method was the "bread-n-butter" of multiband operation in vacuum days. Obviously, I'm speaking of using plug-in coils! Note that C9-L3-C10 form a lumped circuit with three terminals (input, output, and ground). It just so happens that transistor sockets also have three terminals. The light goes on . . . Instead of soldering the output filter directly onto the PC board, a garden-variety low-profile PC-mounting transistor socket takes its place. Next, a method for plugging the lumped circuit into the socket has to be devised. You simply can solder C9-L3-C10 together, leaving leads that will fit the socket holes, but this is really clumsy. I cut a small piece of PCB stock large enough to mount the components and gouge two channels in the copper foil, which leaves three isolated pads for mounting the components. Three leads are also soldered to the proper pads and bent to fit the socket. Presto! The same approach can be taken for L1-2, but in this case a 4-pin transistor socket must be used.

There are quite a few possible variations on this approach, limited only by the almost infinite number of sockets available at a flea market! Dual-in-line sockets and plugs are a "natural" combination for this approach, since the components can be soldered directly to the plug terminals, thereby eliminating the need for making a PCB mount. The extra PC board in my unit, for example, could be used to mount a 16- or 20-pin dual-in-line socket. This would permit using standard silver micas for C9-10 and T-50-2 toroids for L1-2 and L3 with some space to spare. By shifting to dipped tantalum capacitors and T-30-2 toroids, an 8-pin DIP socket should be large enough to accommodate L1-2, L3, and C9-10. In either case, it might be possible to mount the remaining parts of the transmitter on the pads and holes around the periphery of the socket on a single board, assuming that dipped tantalum or

mono-chip by-pass capacitors are used. The obvious advantage of the DIP plug-in is that only one is needed to shift both driver and final to another band.

At any rate, the use of this approach converts a single-band simple transmitter to a multiband unit. Change crystals, plug in the appropriate lumped circuits, and try another band! Since this is such a fantastic idea, a veritable child of inventive genius, it surely deserves more publicity than this one-shot offering. Therefore, I invite you all to try your hand at coming up with your unique variation of the plug-in lumped circuit idea. Send in a description of your innovation, specifying the exact (more or less) sockets/plugs you used, the source for these, and a drawing if that will make things clearer. We'll share them all in some future column. After all, if NØARQ hadn't had the brilliant idea of using the Radio Shack DIP PC board and taken the time to send it in, a lot of us would still be dinking around with isolated pads and haywiring!

### The QRP ARCI Homebrew Sprints

Now to the fun of working QRPers with the TWOFER! Two events are scheduled for 1988. On July 10, 1988 from 2000-2400 UTC the Summer Homebrew Sprint can be entered using either homebrew or commercial equipment. However, the Winter Homebrew Sprint on December 11 (2000-2400 UTC) is limited to stations using either a homebrew transmitter, receiver, or transceiver. The exchange for QSOs includes RST, State/Province/Country, and QRP ARCI Member Number or power output if you are not a member. You can join the QRP ARCI by applying to: Bill Harding, K4AHK, 10923 Carters Oak Way, Burke, VA 22015, including \$11 check/MO. This fee includes four issues of the *QRP Quarterly* as well as a membership number. In addition to the two Homebrew Sprints, bonus points are awarded in both Spring and Fall QSO Parties for the use of homebrew gear: +200 for each band with HB transmitter; +300 per band for HB receiver; +500 per band for HB transceiver. See the *QRP Quarterly* or CQ's "Contest Calendar" for full details on scoring and rules.

Well, gang, that's the story on the TWOFER and Homebrew Sprints. The rig is easy to build and guaranteed to work. Why even think about it? Just go for it! 73, Ade, WØRSP

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MRF492	Q 90W	16.00	35.00
SRF2072	Q 65W	12.75	28.50
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MRF208	11.50	2N3866	1.25
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MRF221	11.00	2N4427	1.25
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MRF226	14.50	2N5179	1.00
MRF227	3.00	2N5589	7.25
MRF237	2.70	2N5590	10.00
MRF238	12.50	2N5591	13.50
MRF239	14.00	2N5641	9.50
MRF240	15.00	2N5642	13.75
MRF245	27.50	2N5643	15.00
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MRF264	12.50	2N6081	8.00
MRF317	56.00	2N6082	9.50
MRF406	12.00	2N6083	9.75
MRF433	11.00	2N6084	11.50
MRF450	13.50	2SC730	1.25
MRF453	15.00	2SC1307	3.00
MRF458	20.00	2SC1946,A	15.00
MRF475	3.00	2SC1947	9.75
MRF476	2.75	2SC1969	3.00
MRF477	11.75	2SC2075	3.00
MRF479	10.00	2SC2097	28.00
MRF485	6.00	2SC2166	3.50
MRF485 MP-KEN	18.00	2SC2312	4.95
MRF492A	18.75	2SC2509	9.00
MRF497	14.25	2SC2630	28.00
MRF515	2.50	2SC2640	15.00
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## NEWS OF CERTIFICATE AND AWARD COLLECTING

### **A. Edward Hopper, W2GT 1907-1988**

A. Edward Hopper became a Silent Key on February 25, 1988. Ed was USA-CA Director and editor of this section of *CQ* from 1965 until 1983, and was largely responsible for building the USA-CA Program into the position of prominence it now occupies in the amateur radio community.

Those of us who enjoyed the high privilege of working with Ed will long remember the generous way in which he shared his knowledge. Ed contributed much to the amateur radio community, and he will be sorely missed by his many friends.

**T**he Story of the Month for June is:

### **Boyd Stepler, WA9ROU USA-CA All Counties #547, All SSB, 8-10-87**

"Among the ranks of radio amateurs are the County Hunters. They are a formidable lot if judged alone by their numbers and activity. Add the skills they use and some considerable determination, and they become something special indeed. However, they too find their accomplishments are spawned in soil that others before them have tilled and nurtured. Even their goals have been placed out of reach by others, but are attainable as demonstrated by those who have 'done it.'

"For me, a USA-CA number is a tangible symbol of an extraordinary network of women and men who have made this possible in a delightful way. Singularly, it is a very meaningful and poignant representation of how county hunting impinged upon several of the most demanding years of my life.

"My academic career had taken me into several of the most hallowed institutions of our own country and abroad. My professional experience as a clergyman fitted and conditioned me, I thought, to cope and presume to help others with some of the many problems that often muddy the contemporary scene. For many years it all seemed to work out according to plan. That is, until one day we

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60060

were told by our physician that my wife had parkinson's disease. That woman who was my wife, my best friend, mother of our children, eminent co-worker was so soon in the wrenching grip of an incurable and devastating disease.

"The illness years reach beyond a decade. They were testing the limits of my own strength to care for her. Enter the County Hunters. It was the early autumn of 1984.

"The ominous windchill of October and the almost daily cloud-filled sky added to the inexorability of our own diminishing resources, emotional and physical.

"Alas, with the casual flip of the radio transceiver tuning knob I heard rapid signal reports, the word *mobile* purposefully interjected, and the names of counties. The resonant voice of the net control said with preferential innuendo, 'county line.' Once the county line exchanges had ceased, I blurted out on the frequency, 'Where can I receive information? In one fell-swoop there were instructions where to write, a reminder to send an accompanying SASE—'Large envelope please, and 39 cents postage'—and they were calling the next mobile, all in one breath.

"Well, my 39 cent SASE was on its way in the next mail. It was a week before the now swollen envelope was returned. At that time there were some 400 worldwide who had received the USA-CA All Counties Award. This was a real challenge, I concluded. Moreover, I hopefully said to myself, 'This is the sustained interest I need, that something to take my mind off our troubles.' County hunting did those several things. It did much more!

"With the severe illness came the imperatives. There were those things which needed to be done at specific times, and there were limitations that normal couples didn't need consider. There were also some options open to us. We could travel in our car during some of the daylight hours. I could operate a mobile radio if we kept moving.

"The vehicle we had didn't cooperate very well. The noise level on the S-meter was always a menacing 6 to 9 dB. Pulling off the road and shutting off the engine wasn't for us. I solved the problem by trading cars. That maneuver cost me some respect with some of my county hunter friends—'Trading cars, my word!' I ran a lot of counties in an effort to overcome that handicap. Once in a while some of the old timers will still cast an aspersions. I hope the USA-CA number will change the focus.

"At noontime June 20, 1987 Galen,



*Boyd Stepler, WA9ROU, at home in his  
FB station in Indiana.*

KB5FU, had already been acting for hours as net control on 14.336 when I returned to the car from going to my postal box. It was then I heard Galen's voice on the 735, 'Call Boyd; that's his next to last for the whole ball of wax.' Naturally I came on with alacrity. Ralph, WB4FFV, was the mobile. With the exchange for Audobon county, then came Ralph's query, 'What's his last?' 'Emmet,' Galen replied. At 21:45 that same afternoon Ralph came in strongly with the very last county. It too was in Iowa.

"During my first weeks of county hunting, an old-timer had cautioned (I now think facetiously) that this pursuit easily becomes addictive. I've noted with satisfaction years later that he is still working counties and gives no hint of fighting the addiction. I'm certain he knew then as now that it's not an addiction, it's a love affair.

"For most of us, meeting the requirements for the USA-CA Award is long in coming. Its circuitous path is quite like many of the roads that the county hunter mobiles use to give out countries. There are ups and downs. Schedules don't always work out. Return mobile reply cards sometimes don't return. Propagation doesn't always smile on us. The radio and antenna equipment chooses its eccentric propensities. Yes, on the nets there are pecking orders. They are founded empirically.

"What now? I'll do it again. I'm a County Hunter! There is always a supportive accompaniment with this act. It's music to my ears. The many, many familiar voices are ever increasing in numbers, the crescendos of counties, hearing one's own call, one's own name, the reit-

### USA-CA Special Honor Roll

Jay E. Paulovicks, KD8GL  
All Counties #559, All SSB/Mobiles,  
2-3-88

G. A. "Jerry" Koon, W0NNH  
All Counties #560, All SSB, 2-3-88

Douglas J. Rider, KC7JC  
All Counties #561, All Mobile/SSB, 2-6-88

John K. Withrow, WB6FJU  
All Counties #562, All 20M Mobile,  
2-20-88

Milton E. Bonham, KY0E  
All Counties #563, All 20M SSB/Mobile  
2-24-88

eration of identify—"How sweet it is!"

"Thanks to the mobiles, net controls, county hunters everywhere, and sponsors for bringing a lilt into our lives again and again.—73, Boyd."

### Awards Issued

Jay Paulovicks, KD8GL, made a clean sweep of it by claiming USA-CA All Counties #559, USA-CA 3000 #589, USA-CA 2500 #663, USA-CA 2000 #732, USA-CA 1500 #820, USA-CA 1000 #1002, and USA-CA 500 #2225, All SSB Mobiles, dated 2-3-88.

### USA-CA Honor Roll

3000		1000	
KD8GL	589	KD8GL	1002
W0NNH	590	W0NNH	1003
KC7JC	591	DL3SZ	1004
WB6FJU	592	W0SZC	1005
KY0E	593	DK1QH	1006
		WB6FJU	1007
		KY0E	1008
		KA1CRP	1009
2500		500	
KD8GL	663	KD8GL	2225
W0NNH	664	W0NNH	2226
NT7R	665	W9TP	2227
WB6FJU	666	DL3SZ	2228
KY0E	667	JABKSD	2229
		8P6OV	2230
2000		DK1QH	2231
KD8GL	732	HG19HB	2232
W0NNH	733	WB6FJU	2233
WB6FJU	734	W5LLU	2234
KY0E	735	KY0E	2235
KA8VVE	736	VK5AGX	2236
1500			
KD8GL	820		
W0NNH	821		
WB6FJU	822		
KY0E	823		
W0SZC	824		

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to CQ is \$4.00. For non-subscribers, it is \$10.00. Initial application must be submitted in the USA-CA record book which may be obtained from CQ Publishing Company, 76 North Broadway, Hicksville, NY 11801, U.S.A. for \$1.25. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985. A complete copy of the rules may be obtained by sending a SASE to the USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, U.S.A. DX stations must include extra postage for air mail reply.

G.A. "Jerry" Koons, W0NNH, also did it all in one big jump by claiming USA-CA All Counties #560, USA-CA 3000 #590, USA-CA 2500 #664, USA-CA 2000 #733, USA-CA 1500 #821, USA-CA 1000 #1003, and USA-CA 500 #2226, All SSB, dated 2-3-88.

Douglas "Doug" Rider, KC7JC, got his last confirmation and completed his good record, receiving USA-CA All Counties #561, and USA-CA 3000 #591, All Mobile All SSB, dated 2-6-88.

John K. Withrow, WB6FJU, went all the way in one step, claiming USA-CA All Counties #562, USA-CA 3000 #592, USA-CA 2500 #666, USA-CA 2000 #734, USA-CA 1500 #822, USA-CA 1000 #1007, and USA-CA 500 #2233, All 20M Mobile, dated 2-20-88.

Milton E. Bonham, KY0E, also did it all in one giant leap, receiving USA-CA All Counties #563, USA-CA 3000 #593, USA-CA 2500 #667, USA-CA 2000 #735, USA-CA 1500 #823, USA-CA 1000 #1008, and USA-CA 500 #2235, All 20M SSB Mobile, dated 2-24-88.

O. Brian Schreen, NT7R, added another gold seal to his certificate by qualifying for USA-CA 2500 #665, Mixed, dated 2-6-88.

Howard Guenther, KA8VVE, updated his good record by claiming USA-CA 2000 #736, Mixed, dated 2-24-88.

Clarence A. Graham, Jr., W0SZC, received USA-CA 1500 #824, All SSB, dated 2-24-88 and USA-CA 1000 #1005, All SSB, dated 2-10-88.

Adolph Vogel, DL3SZ, filed his good application for USA-CA 1000 #1004, and USA-CA 500 #2228, All CW, dated 2-8-88.

Horst Werning, DK1QH, received USA-CA 1000 #1006, and USA-CA 500 #2231, All 2 x SSB, dated 2-18-88.

David Landry, KA1CRP, added an endorsement to his certificate by claiming USA-CA 1000 #1009, Mixed, dated 2-26-88.

USA-CA 500 certificates went to:

Jay E. Paulovicks, KD8GL, USA-CA 500 #2225, 2-3-88, All SSB/Mobile.

G.A. "Jerry" Koon, W0NNH, USA-CA 500 #2226, 2-3-88, All SSB.

Rev. J. Philomon Anderson, W9TP, USA-CA 500 #2227, 2-4-88, Mixed.

Adolph Vogel, DL3SZ, USA-CA 500 #2228, 2-8-88, All CW.

Masashi Takeuchi, JA8KSD, USA-CA 500 #2229, 2-9-88, All CW.

Frederick O'M. Inness, 8P6OV, USA-CA 500 #2230, 2-9-88, All 2 x SSB.

Horst Werning, DK1QH, USA-CA 500 #2231, 2-18-88, All 2 x SSB.

Memorial Station of First Hungarian Wireless Radio, HG19HB, USA-CA 500 #2232, 2-18-88, Mixed.

John K. Withrow, WB6FJU, USA-CA 500 #2233, 2-20-88, All 20M Mobile.

John P. Stewart, W5LLU, USA-CA 500 #2234, 2-20-88, All SSB.

Milton E. Bonham, KY0E, USA-CA 500 #2235, 2-24-88, All 20M SSB Mobile.

Vic Noble, VK5AGX, USA-CA 500 #2236, 2-29-88, All 2 x CW.

### Awards Available

**Radio Society of Great Britain Awards.** (Ed. note: Last month we presented several RSGB awards and promised more for this month. General rules and conditions applicable to RSGB HF awards were cited last month.)

Cards should be enclosed, when applying for RSGB awards, in accordance with the requirements of the award being claimed. Nonmembers of the RSGB should enclose 3.00 pounds, 12 IRCs, or \$4.00 U.S. for each certificate or class of certificate applied for. Members should enclose 1.50 pounds, 6 IRCs, or \$2.00 U.S. for each certificate or class of certificate applied for. Please ensure that each claim is accompanied by the name, call (if applicable), and full address of the applicant. Claims (except for IOTA) should be sent to the RSGB HF Awards Manager, S. Emlyn-Jones, GW4BKG, P.O. Box 20, Bridgend, Mid Glamorgan CF35, United Kingdom.



IARU Region 1 Award offered by the Radio Society of Great Britain.

**IARU Region 1 Award.** This award, available in three classes, may be claimed by any licensed radio amateur eligible under the general rules who can produce evidence of having effected two-way communication with amateur radio stations located in the requisite number of countries whose national societies are members of the Region 1 Division of the International Amateur Radio Union (IARU). The three classes are for contacts as follows:

Class 1—All member countries on the current list.

Class 2—45 member countries.

Class 3—30 member countries.

Members of IARU Region 1 are Algeria, Andorra, Austria, Bahrain, Belgium, Botswana, Bulgaria, Cyprus, Czechoslovakia, Denmark, Djibouti, Faeroes, Finland, France, Gabon, Gambia, German Democratic Republic, German Federal Republic, Ghana, Gibraltar, Greece, Hungary, Iceland, Ireland, Israel, Italy, Ivory Coast, Jordan, Kenya, Kuwait, Lebanon,

Lesotho, Liberia, Luxembourg, Malta, Mauritius, Monaco, Morocco, Netherlands, Nigeria, Norway, Oman, Poland, Portugal, Romania, San Marino, Senegal, Sierra Leone, South Africa, Spain, Sweden, Switzerland, United Kingdom, USSR, Yugoslavia, Zambia, and Zimbabwe.

A special version of this award is available, in the same three classes, for confirmed contacts on the 28 MHz band since 1 July 1983.

**Worked All Continents (WAC).** This award, issued by IARU headquarters, may be obtained by any licensed radio amateur in the UK, Channel Islands, or Isle of Man who is a member of the RSGB and can produce evidence of having effected two-way communication with amateur radio stations located in each of the six continents—North America, South America, Europe, Africa, Asia, and Oceania.

Applicants should send QSL cards to

the RSGB HF Awards Manager, who will certify the claim to the IARU headquarters society (ARRL) for issuance of the award. They should also enclose a self-addressed, stamped envelope for return of the cards, and proof of RSGB membership.

All contacts must be made from the same location, defined as an area not exceeding 25 miles (40 km) in diameter. Various endorsements, including "all 1.8 MHz," are available. In addition, both a 5- and 6-Band WAC may be claimed, but the confirmed contacts in each case must have taken place since 1 January 1952.

**Islands On The Air (IOTA).** The IOTA award was created by Geoff Watts, a leading British shortwave listener, in the mid-1960s. In March 1985 it was at his request taken over by the RSGB. By that date it had already become well established and highly regarded among amateurs worldwide.

In all, the IOTA award program con-

sists of 15 separate awards. They may be claimed by any licensed radio amateur eligible under the general rules who can produce evidence of having effected two-way communication, since 1 December 1964, with the requisite number of amateur radio stations located on islands both worldwide and regional. Many of the islands are DXCC countries in their own right; others are not, but by meeting particular eligibility criteria they also count for credit. One of the great merits of IOTA is that it is an evolving program with new islands being added to the list when they are activated for the first time.

The following awards are available: IOTA Africa (IOTA-AF), IOTA Arctic Islands (IOTA-AI), IOTA Antarctica (IOTA-AN), IOTA Asia (IOTA-AS), IOTA British Isles (IOTA-BI), IOTA Europe (IOTA-EU), IOTA North America (IOTA-NA), IOTA Oceania (IOTA-OC), IOTA South America (IOTA-SA), IOTA West Indies (IOTA-WI), IOTA World Diploma (IOTA-WW), IOTA Century Club Award (IOTA-CC-100), IOTA Century Club Award (IOTA-CC-200), IOTA Century Club Award (IOTA-CC-300), and IOTA Century Club Award (IOTA-CC-400).

A feature of the IOTA program is the quarterly Honor Roll appearing in the RSGB's *DX News Sheet*, which encourages continual updating of claim.

The 14-page Directory of Islands lists all islands which count for IOTA and gives full information of the awards. Requests for Directories and IOTA award claims, which in all cases must be accompanied by QSL cards, should be addressed to the IOTA Awards Manager, Roger Balister, G3KMA, La Quinta, Mimbridge, Chobham, Surrey GU24 8AR, England (not the HF Awards Manager).

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CIRCLE 132 ON READER SERVICE CARD



WPEACE Award available from Antonio Nunes, CT1CIR.

**Worked Portugal, Espana, All Continents, Equator Award (WPEACE).** The "PEACE Award" is available to licensed amateurs throughout the world for confirmed contacts with, or having heard from, stations under the following requirements:

1. Five stations from Portugal and three different country stations with the letter P in the prefix.

2. Five stations from Spain and three different country stations with the letter E (EA not valid) in the prefix.

3. One station in each continent (Europe, Africa, Asia, North America, South America, and Oceania).

4. Three stations from different countries crossed by the equator.

5. Stations other than those in Europe need contact only two stations in Portugal and two stations in Spain.

6. Portuguese and Spanish amateurs need 10 contacts with Portugal and the same number of contacts with Spain.

7. All SSB contacts on HF amateur bands after January 1974 are valid. Send log extracts (GCR) with award fee of \$3.00 U.S. or 7 IRCs, to the Award Manager: Antonio Nunes (CT1CIR), P.O. Box 227, 2403 Leiria, Portugal.



Easter Island Award sponsored by the Radio Club of Easter Island.

**Easter Island Award.** The Easter Island Award, sponsored by the Amateur Radio Club of Easter Island, is in commemoration of the 100th anniversary of the annexation of Easter Island as Chilean territory. It is available to all licensed radio amateurs and SWL stations under the following rules.

1. Make one contact with CE0ZIP, the Easter Island club station, plus contacts with two other stations of Easter Island; or

2. Make contacts with four amateur stations of Easter Island.

3. Contacts after January 1, 1987, on any band in any mode, are valid.

4. The cost of the award is US \$5.00, or 10 IRCs.

5. Send application, fee, and copy of the log or list of stations worked to Award Manager, Radio Club Easter Island, P.O. Box 1, Easter Island, Chile. QSL cards are not required.

6. This award is available permanently.

**Notes**

Have your summer holidays begun well? I hope so.

73, Dorothy, WB9RCY

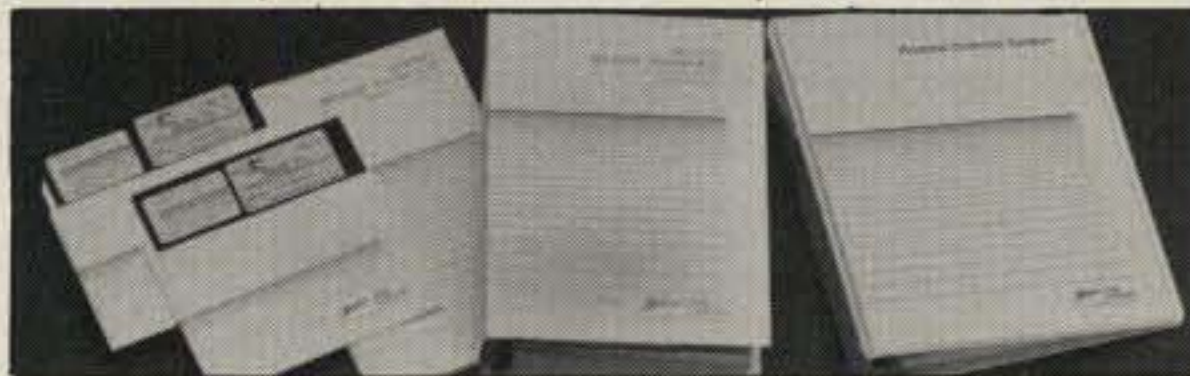
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Phone \_\_\_\_\_  
Sign Here \_\_\_\_\_

Please send all reader inquiries directly.

# Contest Calendar

a monthly feature by  
FRANK ANZALONE, W1WY

## NEWS/VIEWS OF ON-THE-AIR COMPETITION

The guest editorial by Randy Thompson, "Technology or Sport," in the April issue has created quite a response. Here is an opposing viewpoint by Charles Fulp, K3WW, of the Frankford Radio Club. The Contest Committee's analysis will be given at a later date after we receive more input on this topic.

### Technological Sport

by Charles Fulp, K3MM

Many traditional sports have gone "high-tech" with new equipment and training techniques and so forth. Amateur radio by its very nature is a technological activity and cannot expect to avoid technological advances. Going to the moon was a high-tech endeavor with little direct purpose beyond being king of the hill; however, the technological advances made in the effort continue to benefit mankind. Pioneers will require extraordinary skills to develop hardware and software; however, as in the past others can ultimately benefit from the improved equipment which will result.

I have serious reservations about attempting to limit advances in the state of the art. The advances in antennas, transceivers, and peripheral equipment have in fact raised the ante for top-level participants; however, they have apparently made contests more appealing or available to thousands who participate with little concern for who may be "king of the hill."

Technology has made contesting more fun for many newcomers and old timers. It gives us an opportunity to do something different each year. Many of us would never want to give up and go back to the "good old days." Not all of the technological improvements are that expensive for the creative radio amateur. Many of us are in professions completely unrelated to electronics, but we have pushed ourselves into fields that amaze even us. We cannot afford to sit back and let the world pass us by.

I disagree with the philosophy that a contest should "ultimately be the test of an operator's skills, experience, and stamina against all others." This may be a worthwhile objective, but what "skills" are we testing? The range of skills and abilities needed to produce a top score is endless. One person's most important factor may be low on another's list. I don't believe any specific skills can be fairly tested by on-the-air contests; however, total contest skills can be demonstrated over a series of contests.

I also disagree with the idea that a great operator cannot overcome the limitations of an inferior station. Obviously, with operators of reasonably high operating abilities and similar locations, a vastly inferior station would have little chance; however, in the recent ARRL DX contest P40GD overcame stations with considerably greater hardware and fairly similar locations. The station will rarely be the sole determinant of winner and loser.

14 Sherwood Road, Stamford, CT 06905

### Calendar of Events

• May 28	ARCI QRP CW Sprint
• <b>May 28-29</b>	<b>CQ WW WPX CW Contest</b>
• May 28-29	UBA SWL CW Trophy
• June 4	YLRL Novice/Tech. Day
• June 4-5	RSGB Field Day
• June 4-6	ANARTS RTTY Contest
June 11-12	So. American CW Contest
June 11-13	ARRL VHF QSO Party
June 18-19	All Asian Phone Contest
June 18-19	SMIRK (6M.) Party
June 18-19	RCV Valencia Contest
June 18-19	NINE Land QSO Party
June 25-26	ARRL Field Day
July 1	Canada Day Contest
July 2-3	Colorado 6 Meter Net
July 2-3	Venezuelan Phone Contest
July 9-10	IARU HF World Champ.
July 10	ARCI QRP CW Sprint
<b>July 16-17</b>	<b>CQ WW WPX VHF Contest</b>
July 16-17	AGCW-DL QRP CW Contest
July 30-31	Florida QSO Party
July 30-31	Venezuelan CW Contest
Aug. 6	YLRL YL/OM SSB Sprint
Aug. 6-7	ARRL UHF Contest
Aug. 14	ARCI QRP SSB Sprint
Aug. 27-28	All Asian CW Contest
Sept. 7-9	YLRL "Howdy" Days
<b>Sept. 24-25</b>	<b>CQ WW DX RTTY Contest</b>
Sept. 25-26	Classic Homebrew Exchange
Oct. 8-9	Pennsylvania QSO Party
<b>Oct. 29-30</b>	<b>CQ WW DX Phone Contest</b>
<b>Nov. 26-27</b>	<b>CQ WW DX CW Contest</b>

\* Covered last month.

The sole determinant in many cases is geographic location. Operating skills and superior technology and hardware will never overcome geographic and propagation variables. If W2GD had access to the world's best station and it were located in Finland, he would not have set a new world record in the past contest. In most years a station outside the Northeast cannot expect to win the U.S.A. single-op trophies in DX contests; on the other hand, the Northeast can be shut out in Sweepstakes.

There is no way to make competition over a wide geographic area equitable. We must all realize that we are really competing with ourselves and our neighbors, and that national and world titles demonstrate a combination of skill and dedication to contests in which the top scorers have suitable geographic locations to make the best scores. They are not necessarily the best all-around operators, if there is such a thing.

Complicated exchanges and rules do nothing to demonstrate superior skills. They do limit the amount of competition by discouraging casual operators from participating. By only having serious participants in the contest you eliminate a variety of tactics for the more competitive stations. Quick exchanges with extensive participation allow operators to demonstrate a wide variety of skills. Complex exchanges and rules demonstrate the ability to operate in a very tight format and reward a

small number of regular participants who know the complex exchanges and operating patterns by rote.

I feel it is the wide variety of variables that make contests interesting, and that over-zealous rulemaking, not technological advances, is the greatest threat to contesting fun. The quest to prove that there is a best overall operator by any definition will never be successful. Even under laboratory test conditions, I cannot imagine which skill or group of skills would prove who is the ultimate tester. The vast array of contests gives many of us a chance to find a hill we can be king of. Over all I hope to see contesting continue to be on the leading edge of improvement for all amateur radio operating.

The sponsors of the Florida QSO Party have had a change of heart and have rescheduled it for a later date, July 30-31. Full details will be given next month.

I sometimes wonder if some of you contest and party managers read this column. Sending your announcements to CQ at 76 N. Broadway, Hicksville, NY 11801 is okay, but sending them to my home address which appears at the beginning of this column is to your advantage, especially when you try to make the deadline. This month it's June 15th for the September issue and July 15th for the October issue.

73 for this time, Frank, W1WY

### RSGB National Field Day

1500 to 1500Z Sat.-Sun., June 4-5

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

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

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

### ARRL VHF Contest

1800-0300Z Sat.-Mon., June 11-13

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

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



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

### South American CW Contest

1500Z Sat. to 1500Z Sun., June 11-12

Sponsored by *Electronica Popular* magazine of Brazil, and supervised by the Grupo Argentino de CW of Buenos Aires, this is an annual affair the second weekend of June.

It's still a CW contest only, but the format and scoring have been changed. Now you can work stations in other continents as well as South Americans. Use all 6 bands, 1.8 through 28 MHz.

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

**Exchange:** RST plus a QSO number starting with 001.

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

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

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

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

Use a separate log sheet for each band and a summary sheet showing the scoring and other essential information. Include an SAE and one IRC for a copy of results.

Logs must be received no later than August 31st and go to: WWSA Contest Committee, P.O. Box 18003, 20772 Rio de Janeiro, RJ, Brasil.

### All Asian DX Contest

Phone: June 18-19 C.W.: Aug. 27-28  
0000Z Sat. to 2400Z Sun.

This is the 29th year of this activity sponsored by the JARL. The exchange is between Asian countries and the rest of the world.

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

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

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

**Scoring:** 3 points for contacts on 160; 2 points for contacts on 80; 1 point on all other bands. (KA contacts do not count.)

### 1987 European Phone Contest North American Results

All Band U.S.A.		High Bands 14, 21, 28 MHz U.S.A.	
KM1H	809,952	W2FCR	72,592
N6AR	199,348	AB8K	67,496
K4YKZ	81,300	W3ARK	17,292
K1CLN	72,141	K5MK	15,708
K3IPK	61,560	K6SVL	8,650
N2VW	25,833	K4FPF	6,762
KA1DWY	18,450	K3TX	5,040
WA2UDT	18,147	N4JF	4,576
WK4F	9,576	W2GKZ	4,256
W1LQQ	6,696	KE7KF	1,824
N4UH	6,426	KA1DSQ	1,056
N3BNA	420	K6NA	84
<b>Antigua</b>		<b>Canada</b>	
DF1EQ/V2A	111,740	VO1QU	152,640
<b>Canada</b>		<b>Costa Rica</b>	
VE8RCS	137,020	T12LTA	185,472
VE1CBF	26,362		
VO1AW	14,418		
<b>Dom. Rep.</b>		<i>Certificate winners</i>	
HI8LC	36,252	<i>are in boldface. There</i>	
<b>Nicaragua</b>		<i>were no multi-op en-</i>	
YN3EO	12,218	<i>tries.</i>	

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

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

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

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

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

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

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

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

**Asian Country List:** A4; A5; A6; A7; A9;

AP; BV; BY; CR9; EP; HL/HM; HS; HZ/7Z; JA-JR; JD1; JT; JY; OD; S2, TA; UA/UK/UV/UW9-0; UD6; UK6C, D, K; UF6/UK6F, O, Q, V; UG/UK6G; UH8/UK8H; UI8/UK8A, G, I, L, O, T, Z; UJ8/UK8J, R; UL7/UK7; UM8/UK8M, N; VS6; VS9M/8Q; VU; VU (Andaman & Nicobar); VU (Laccadive); XU; XV/3W; XW; XZ; YA; YI; YK; ZC4/5B4; IS (Spratly); 4S; 4W; 4X/4Z; 70 (S. Yemen); 70 (Kamaran); 8Z4; 9K; 9M2; 9N; 9V; (Abu Ail).

### SMIRK (6 Meter) QSO Party

0000Z Sat. to 2400Z Sun., June 18-19

This is the 13th annual QSO party sponsored by the Six Meter International Radio Klub (SMIRK). The party is open to all, members and non-members, but it seems to be geared for membership participation.

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

**Exchange:** SMIRK number and grid square.

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

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

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

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

Send your entries no later than July 6th to: Lisa Lowell, KA0NNO, P.O. Box 547, Hugo, CO 80821.

### RCV Valencia Contest

1600Z Sat. to 2200Z Sun., June 18-19

This activity organized by the Valencia branch of the Radio Club Venezolano is a yearly celebration of the "Carabobo Battle" of independence of Venezuela which took place on June 24, 1821. Participation in this contest was confined to Bolivarian countries but has now been expanded to include Latin America and Caribbean Islands. (No mention was made, however, of the rest of North America or overseas DX countries.)

**Bands:** 20, 40, and 80 meters SSB.

**Categories:** Single operator, both single and all band.

**Exchange:** RS and QSO number starting with 001.

**Points:** Two points for contacts on 40 and 80, 4 points on 20 meters. Own country, zero points but counts as a multiplier.

**Multiplier:** One for each country plus each YV call area worked (9) counted once only.

**Final Score:** Total QSO points times the sum of the multiplier.

**Awards:** Medals to winners in each category and each band for Central America, South America, Caribbean area, and Bolivarian countries. There is a wide assortment of trophies for YV stations (minimum of 30 QSOs).

*(As I have already indicated, participation seems to be confined to Latin America only. No mention was made of awards in other areas. The sample of their very colorful certificate would have been an appropriate award for stateside and DX participation.—ed.)*

Check your log for dupes, etc. Non-YV stations are requested to include 10 IRCs to cover mailing costs of any possible awards.

Mailing deadline for logs is August 30th to: Radio Club Venezolano, P.O. Box 510, ZP 2001 Valencia, Venezuela.

### NINE Land CW Contest

1700Z Sat. to 1700Z Sun., June 18-19

This is the 6th annual contest organized by the Joliet ARS in which there is no limit to whom you can work; however, contact with NINE Land stations (Ill., Ind., and Wisc.) have double QSO point value. Only one contact per band with the same station permitted.

**Classes:** Single and multi-operator, one transmitter.

**Exchange:** Consecutive QSO numbers beginning with 001, and state, VE province, or DX country.

**Scoring:** Contacts with NINE Land stations count 2 points; with all other stations 1 point.

**Multiplier:** Number of states, VE provinces, and DX countries worked (counted once only). There is a bonus multiplier of 1 for each 20 NINE Land stations worked.

**Final Score:** Total QSO points from all bands times the number of states, provinces, DX countries, and bonus points worked.

**Frequencies:** 1805 and 60 kHz up from lower edge of 10 through 80 meters (no 30 meters). Novice: 25 kHz up from low edge of their bands.

**Awards:** Certificates to high scorers in each class in each state, VE province, and DX country. Plaques to high scorer in NINE Land and outside NINE Land.

Dupe sheets are required for entries with over 200 contacts, and a summary sheet showing the scoring, etc. Include a large SASE for a copy of the results.

Mailing deadline is July 20th to: John Fixari, NM9X, Rt. #1 140 H3, Lockport, IL 60441.

### ARRL Field Day

1800-2100Z Sat.-Sun., June 25-26

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

Entries are separated into many classes. Rules and requirements are

quite extensive and will be found in the May issue of QST. It is advisable that you read them thoroughly.

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

### Canada Day Contest

0000 to 2400Z Friday, July 1

Sponsored by the Canadian Amateur Radio Federation, this contest is open to all amateurs. Everyone works everyone on both sides of the border. Rules have been restructured to quote, "make for a better contest."

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

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

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

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

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

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

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

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

### Colorado 6 Meter Net Activity

1400Z Sat. to 0300Z Sun., July 2-3

All stations interested in making contacts on 50 MHz are invited to join this activity.

**Exchange:** Call, name, grid square, and S.I.N. number if any.

**Scoring:** Contacts with S.I.N. members count 3 points, with non-members 2 points. Multiply QSO points by number of states worked.

**Awards:** Certificates to first- and second-place winners. All entries will receive results of the scoring. A large SASE would be appreciated.

Mailing deadline is July 31st to: Richard C. Johnk, N0AKI, 8529 Fenton St., Arvada, CO 80003.



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RFC 2-17, 2W in = 170 out  
RFC 2-117, 10W in = 170 out  
RFC 2-317, 30W in = 170 out  
RFC 2-417, 45W in = 170 out

#### 220 MHz Amps

RFC 3-22, 2W in = 20 out  
RFC 3-211, 2W in = 110 out  
RFC 3-112, 10W in = 120 out  
RFC 3-312, 30W in = 120 out

#### 440 MHz Amps

RFC 4-32, 3W in = 20 out  
RFC 4-310, 3W in = 100 out  
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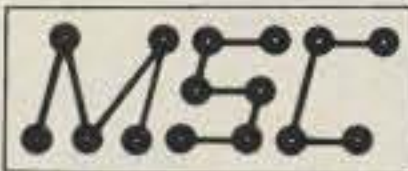
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## CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

### Introduction to PACKET—Part II

Last month, I mentioned the questions most asked by beginning packeteers. In this installment, we will move directly to the commands and their meanings. There will be some variation in the command structures of different TNC models, but the meaning will surface the same.

As recommended, we should try to make our first step into packet from the 2 meter (VHF) band. This will help us to cope with situations which arise one by one. HF tends to confront the newcomer with too many problems. These can be eliminated by first learning the procedures on the VHF bands. You need to become familiar with terms associated with data communications, and how each definition describes our equipment.

Look at fig. 1; this will define the equipment and its function, or role in the packet system. First our terminal, dumb or intelligent, is defined as **Data Terminal Equipment (DTE)**. The inter-connection to the modem/TNC is the RS-232 buss or cable.

The TNC is the **Data Communications Equipment (DCE)**. In the case of packet, the TNC/DCE is composed of two elements (see fig. 2). This is where the **Packet Assembler/Disassembler (PAD)** came into play. The RS-232 cable is the link for ASCII data to converse between the DTE and DCE. The terminal and RS-232 cable does not care whether a telephone modem or TNC is at other end. The only requirement is for the ASCII information to get to and from the DCE and that it be properly acknowledged. This is where the action begins.

The chain of events taking place in this DTE to DCE loop is more than we can conceive at the moment. To bring the data stream into perspective, we should look at the loop as if it were several cars meeting at each end of a one lane bridge. There must be a way to develop a "method to this madness."

Let's pretend we have a "traffic cop" placed at each end of this bridge. They have a communications link with each other.

#### Enter Hardware Hand-Shaking

The cars represent the data, the bridge is the RS-232 buss, and the Policemen

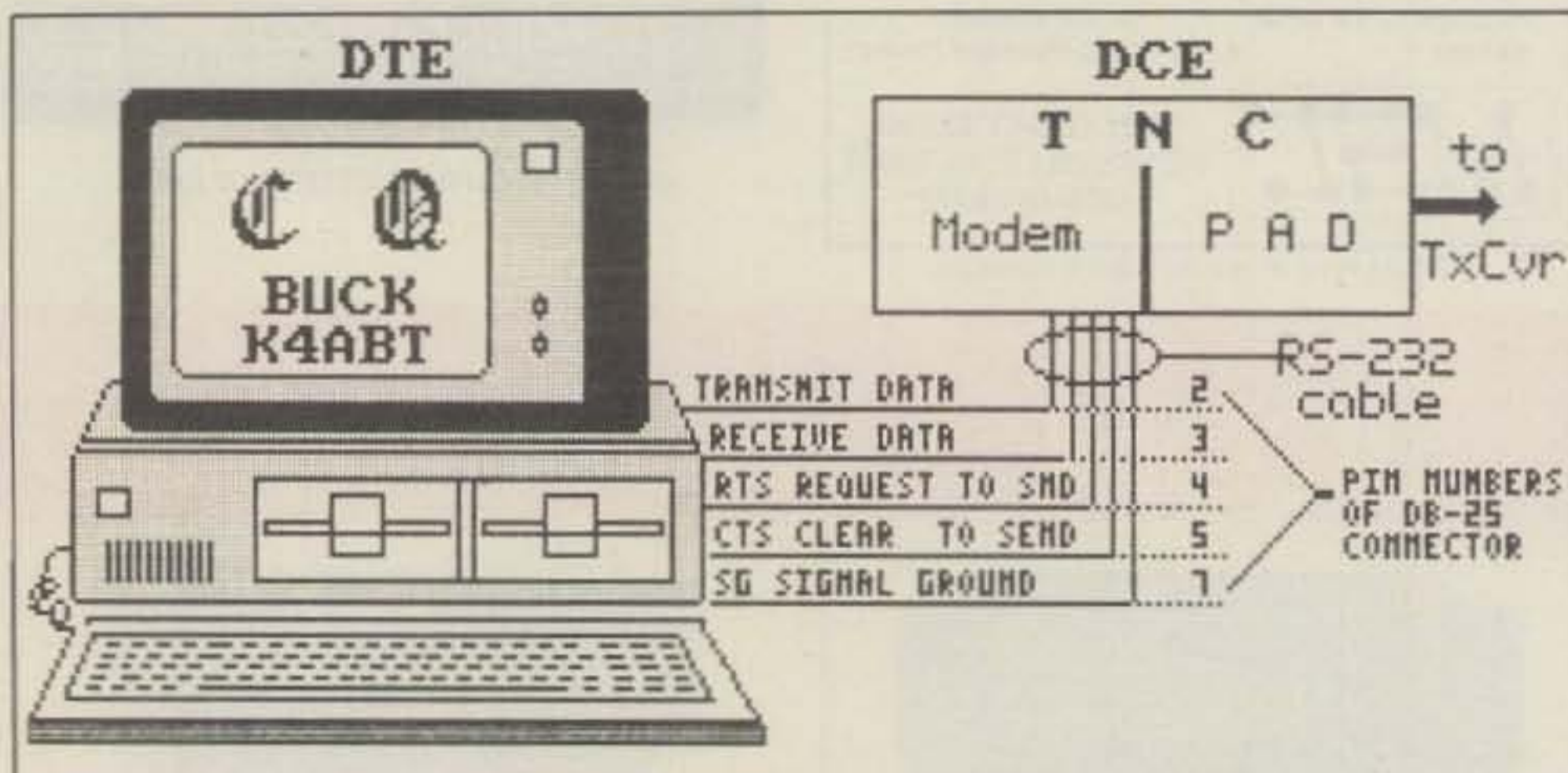


Fig. 1—Terminal (DTE) to (DCE) connections via RS-232.

are the **RTS** and **CTS** pins. Oh, yes, we need to define the hardware hand-shaking process. Most, if not all, TNCs can use hardware hand-shaking. This requires a five wire cable from the DTE to DCE. The standard PC or clone to modem/TNC, RS-232 pin numbers and descriptions are defined in Table 1.

The car on the left end of the bridge (DTE) needs to go first because this is the DTE "connect" packet or data stream. The left end cop (pin 4) "requests," or asks the cop on the right end if it is OK to send a car across.

The cop (pin 5) on the right end of the bridge then signals to the cars on his side to wait, and he then gives a **clear to send** the car across. This request and clear process continues on and on, until there are no longer any requests from either end. Likewise, we are assured of an orderly passage of data information to and from the DTE and DCE.

With hardware hand-shaking and using the "PACFILE" terminal program, I configure my **terminal (DTE) to TNC (DCE)** data communications to those of Table 2.

Duplex depends on the setting of my **ECHO** command. I usually set **ECHO, OFF**. If *double letters* appear on the screen while inputting data, set **ECHO OFF**.

By now you are ready to connect your DTE and DCE to the radio. I have put together a number of drawings which describe the complete interfacing for different systems. The radio connection may be the right connection for your radio while the DTE to DCE may be found in another drawing. By comparing these draw-

PIN # (DTE)	Description	PIN # (DCE)
2	TXD Transmit data	2
3	RXD Receive data	3
4	RTS Request to send	4
5	CTS Clear to send	5
7	SG Signal Ground	7

RS-232 pin numbers when connecting a modem to a pc.

Baud rate	4800
Parity	NONE
Stop Bits	1
Data Bits	8

"Standard" communications configuration for serial port and TNC.

ings, you will find the exact combination for your packet station. Each month I will add more drawings to the list, you will want to collect them all. This month, see figs. 3, 4, and 5. We will discuss *software hand-shaking* in a future issue.

Now that we have tied it all together, let's look at how the commands interact with the various levels of packeting. When we have the terminal talking to the TNC, the first thing we should do is enter our call sign with the **MYCALL** command. If we are using hardware handshaking,

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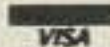
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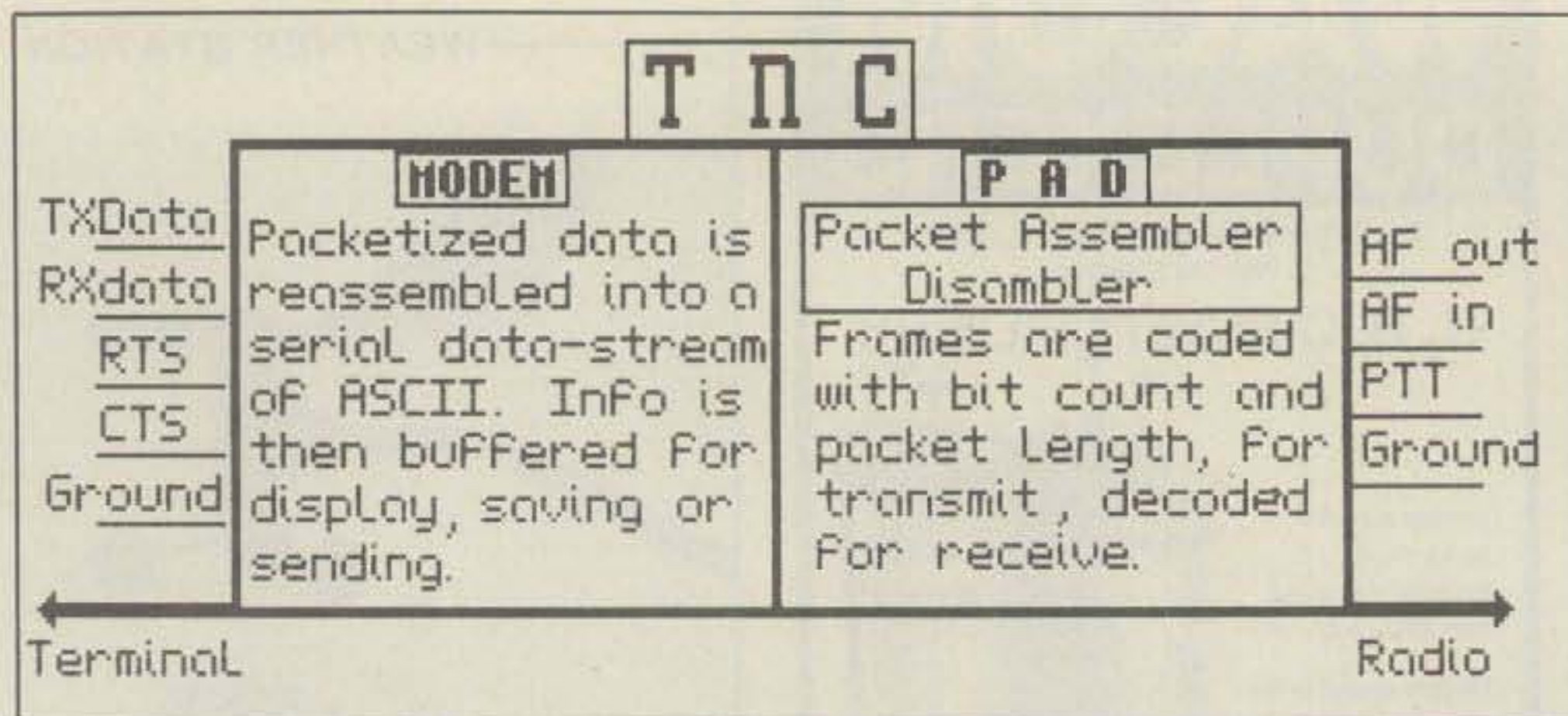


Fig. 2- The TNC is composed of a modem and a PAD.

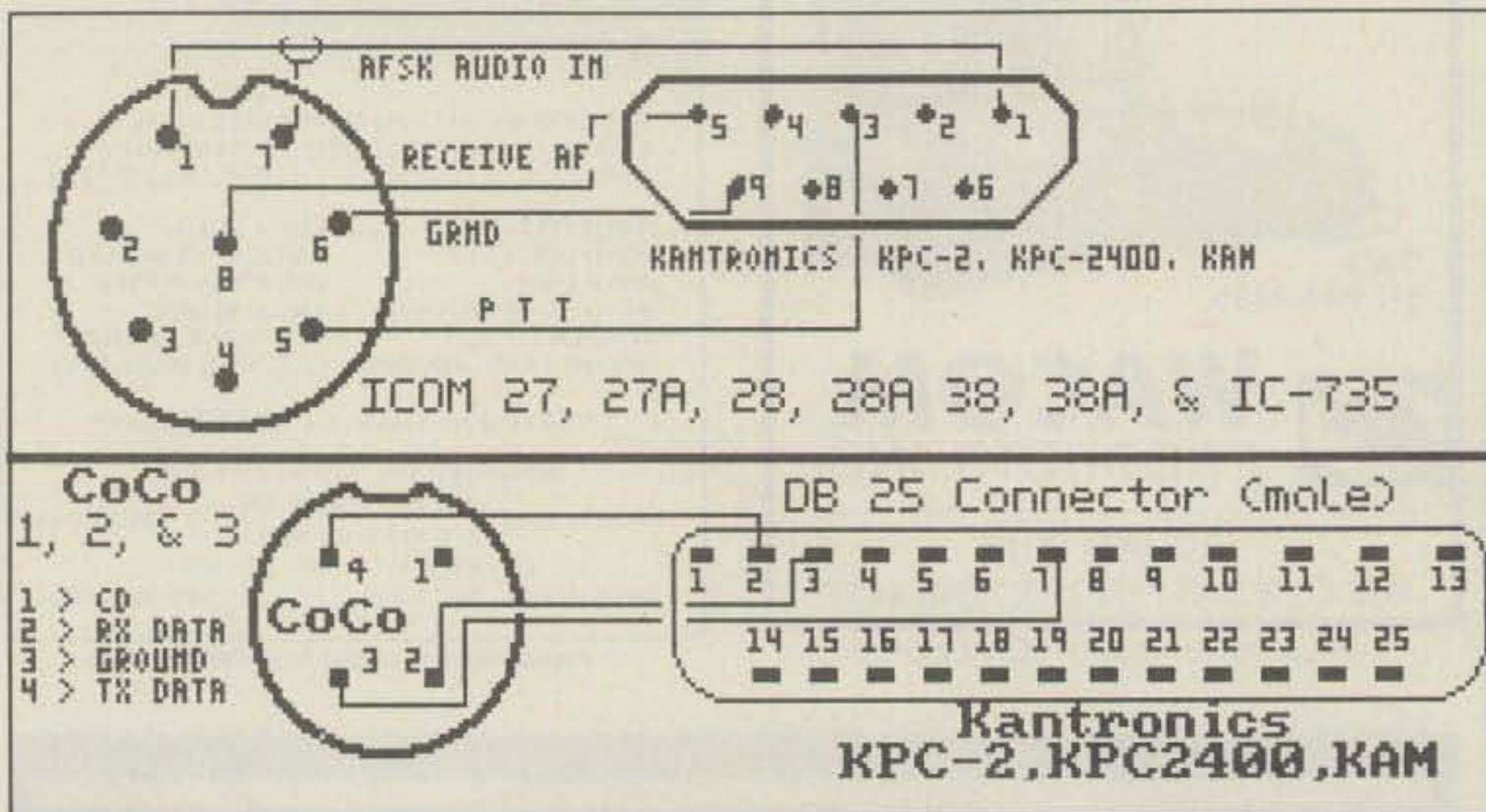


Fig. 3- Connections for the Radio Shack CoCo series computers and the Kantronics TNCs.

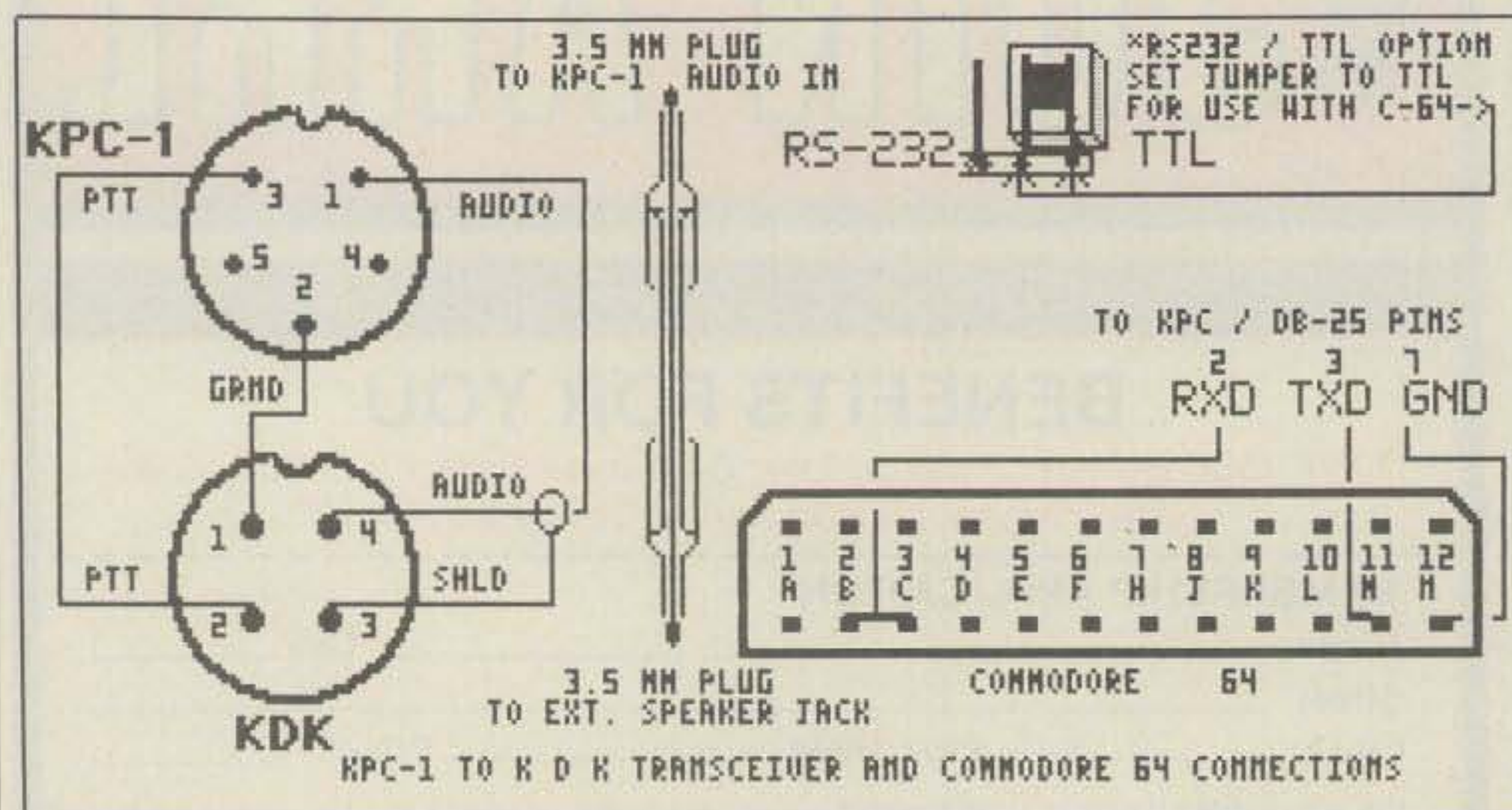


Fig. 4- Connections for the KDK transceiver and Commodore 64 when used with the KPC-1.

we set the "flow" commands to off. The one exception is the **FLOW ON**, while we turn **XFlow**, **TxFLOW**, and **TRFlow**, **OFF**. This will allow the RTS and CTS (pins 4 and 5) to function as the *hardware* flow control mechanism.

One typical manufacturing oversight is the default setting of the **TXDelay** command. The **TXDelay** is that period of time between the transmitter PTT activation and actual packet intelligence being sent from the TNC to the transceiver. Most

TNC vendors set this parameter far too short.

First of all, we may find the transceiver we use is a PLL (phase locked loop) with a 100 millisecond lock-up time. The transmitter may take another 100 milliseconds to come to full power output. If a linear amplifier is in line, this requires another 60 milliseconds. If it is Bi-Lateral (has built-in RF pre-amp) then an additional 40 milliseconds is required.

Here we stop and look at the default settings and find them set to 15. Each increment of one (1) represents 10 milliseconds. Already we find we are in trouble. We total our requirements and find a need in excess of 300 milliseconds, however our default is only 150 milliseconds.

At once, we see we must change the **TXDelay** to at least 35 ( $35 \times 10 = 350$  ms) or 350 milliseconds. Through many trials and tests, I have found setting **TXDelay** to 50, is the safe way to go. Otherwise you may find yourself "retried out" unable to account for the reason why. Try to find the *happy medium* and leave it there. Setting the **TXDelay** too long can add to the number of collisions on the frequency. If everyone on the same frequency added extra or unnecessary **TXDelay**, you would soon see the reason I advise using only what you need, and no more.

Unless you are setting up a digipeater on a mountaintop, leave the **DWait** command as is, enough said. I will cover these second level time settings in a future issue. Depending on how much of the packet QSOs you wish to monitor, will determine whether or not you wish to turn the **MONITOR** command on or leave it off. I recommend setting the **MCON** command to **OFF**. This will assure that you receive only the packets directed to your station after making a *connect*.

For the first time user, the **MONITOR** command **ON**, can be used to your advantage by watching the paths and packet procedures which are being used by other packet stations.

There are three "states" of packet operations, with regards to actual on the air use. They are, the **command** or **CMD** state, the **converse** state, and the **transparent** state. As it implies, the command state is where all commands are issued, *ie*; connect, disconnect, or changes to any of the TNC "personality" parameters. The **CONMODE** should be set, if not, defaulted to **CONVERSE**.

If you find yourself in the transparent state and unable to return to the converse state, there are three ways to get yourself out. First try holding the **control** key down while pressing the **C** key, three times. Do not press **enter**. The second way to get out of transparent is by receiving a **disconnect** from a connected station. The third way is the easy way. Turn the TNC off and back on. *Works for me, every time.*

For your first contact on packet, I sug-

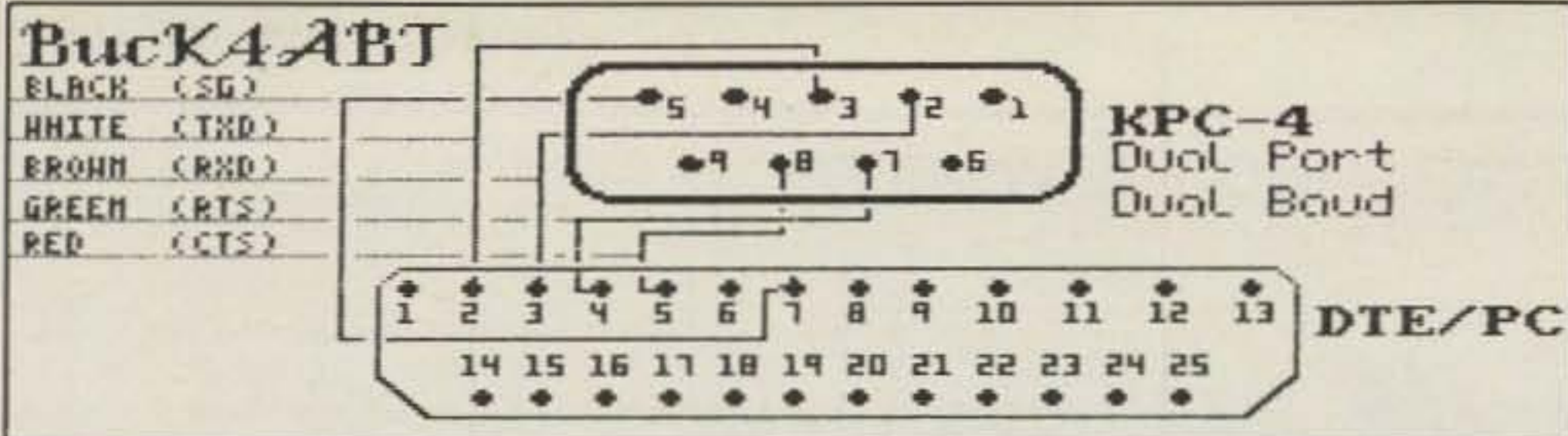


Fig. 5—Connections for the Kantronics KPC-4 and a compatible PC.

gest using the *direct* method. That is, connect directly to a station without using a digipeater. For example, if we were close enough to communicate direct, you would issue a connect request from the command state in this manner: **CMD:C K4ABT <enter>**. If the connect request is properly executed, and if I am on the air, you would see this screen message appear almost immediately: "CMD: \*\*\* CONNECTED TO K4ABT." From here we would enter into a packet dialogue. Well, that is, we would as soon as you got over the sudden *rush* of joy and excitement with your first packet connection. I really enjoy being the first *connect* station for some of the newcomers. Even the old-time amateurs who experience packet for the first time, seem to always relate it to their first contact via CW. The reason I like to be the first "connect" is the long

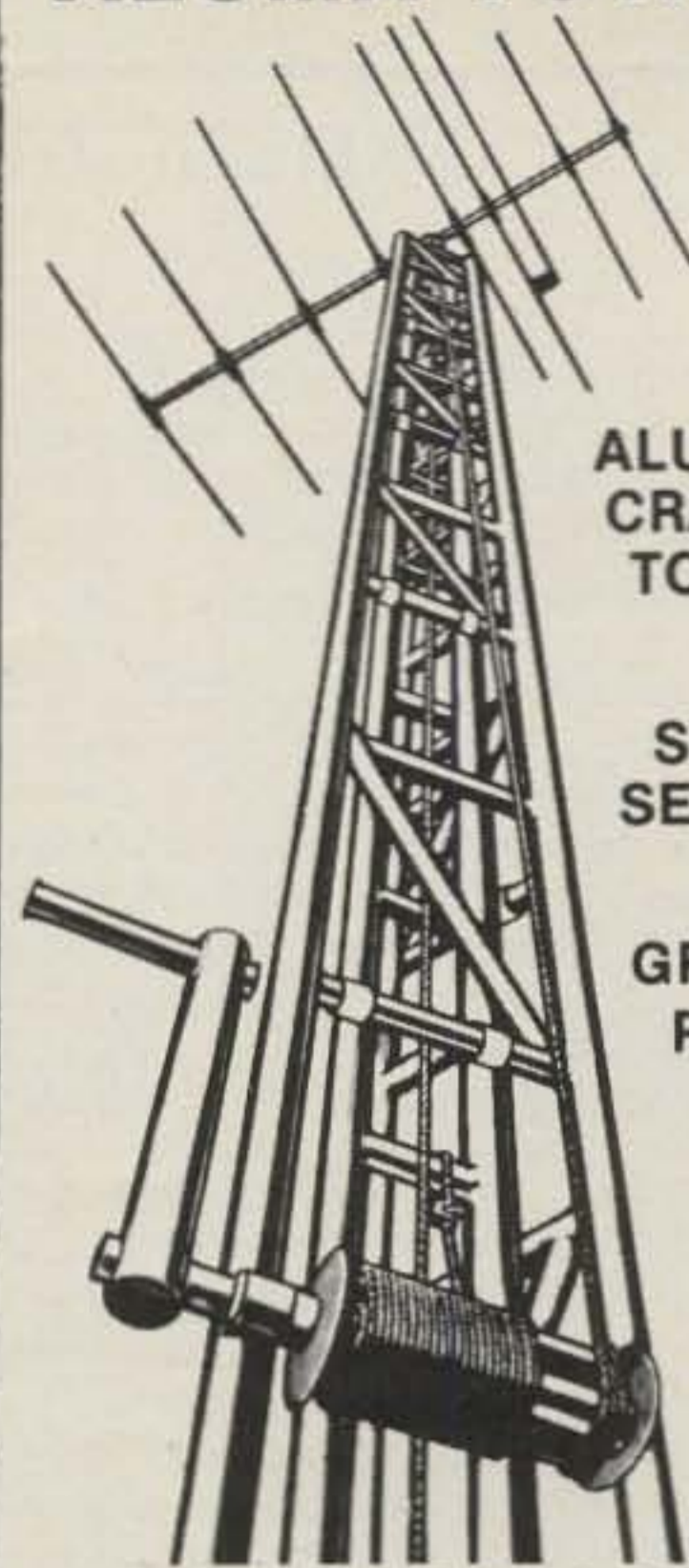
pause which occurs just after they see the "CMD: \*\*\* Connected to K4ABT."

I set patiently waiting as the new station makes the first entry, with this first connect. I know the "warm and fuzzy" that is being experienced at the other end of this link. I want that new packeteer to savor every bud of flavor from this moment. To that new packeteer at the other end of the link, this is *high-tech, ecstasy*.

Packet is so much fun, it becomes one of those nice things in life which you want to keep for yourself. Instead you find yourself trying to recruit more of your friends into this new wave of communications. You become involved in other ways to participate, like digitized voice, or digitized pictures. More on that in the next installment of *the Packet Users Notebook*.

Good packeting, de Buck4ABT

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## NEWS OF COMMUNICATION AROUND THE WORLD

*Though the latitude's rather uncertain,  
And the longitude's rather flex,  
Still the people I miss, who know not the lists,  
Of the wonderful world of DX...*

It being summertime and the solstice near, you will find most DXers heavily concentrating on enjoying the benefits of Cycle 22. But even with the good days of DXing, there will always be some who wish to become a bit more involved. We still recall what the Old Timer told us years back: "There is more to DXing than just working DX stations. Sometimes you might stop and think of what DXing might be like if there were none working at the multitude of little tasks which make your DX operations so enjoyable." We must admit that at that stage of our experience all we could think about was working more DXCC countries. There was little else that was important.

"Of course you are right," we had immediately replied, "but just what do you mean?" Even back then we had learned not to do anything but agree when hearing those oracular statements delivered by the Old Timer. We were then fairly new to DXing and ready to believe anything about DX when it was delivered with an air of wisdom, solemnity, or even obscurity. We believed back then because we thought that we would eventually understand everything about which the Old Timer spoke. We are still working on some of his more obscure statements. At times we suspect we are not alone.

Still, there are times when just to put a question to the Old Timer is not enough. Often he has propounded on his belief that DXers are a bit above the common cut as a group, always able to think for themselves and definitely able to understand and converse in the most obtuse fashion. There are instances when rather than just answering your query, he pushes you to do your own thinking. When we asked back then what some of these other things might be, he had brusquely replied. "Just stop and think a moment," he said. "Certainly you can think of a number of things that some DX individuals do which help others in DXing. Perhaps these are things that might not really be DXing in themselves but are activities that relate to DXing and will always be needed by others."

Back in those years we had barely emerged from the early stages of DXing, finally realizing that there might be more to catching needed countries than just tuning aimlessly up and down the bands. From experience we had learned about the twilight paths, the likelihood of finding DX more at the lower end of the bands than anywhere else, and even about the multitude of information gained from a subscription to a DX bulletin. We recited our list to the Old Timer, and he nodded his head at each one we mentioned. He was still listening when we ran out of ideas, and we finally had to ask, "Did we miss something?" The Old Timer nodded. We had.

77 Coleman Drive, San Rafael, CA 94901



*There are a number of DXers in the DX Hall of Fame who have brought years of DX excitement to the Deserving. Among them are Franz Langner, DJ9ZB, Baldur Drobnica, DJ6SI, Martti Laine, OH2BH, the Colvins, W6KG and W6QL, and Jim Smith, P29NS. A roster of the DX activity by any one of them is astounding. They seem to be tireless, non-stop DXers. And DXers benefit . . . always. Here is Bruce, VK9AD/G3MSR, visiting the Norfolk Island Smiths, Kirsti, VK9NL, and Jim, VK9NS. The Smiths have brought a lot of DX up on the bands and still do so.*

"How about QSL Managers?" he asked, and we acknowledged that we had missed that one. Later we came to realize that we had missed more than one. But back then we had talked about QSL Managers, and the more we listened to the Old Timer, the more our appreciation of their efforts grew. We still have the good feeling and admiration for their volunteer work.

In these latter days we still find some coming forth to volunteer for duty as a QSL Manager. They are always offered a quick welcome, for they are among those who offer their own efforts to make DXing more pleasurable for others. Sometimes they volunteer without knowing much about what they volunteer for. At times they are scarcely acquainted with the duties, procedures, or even the obligations. But this is always part of the learning process. DXers are never as knowledgeable at 50 countries as they are at 250. Some assistance with the learning process expands their knowledge. Eventually they and a lot of other DXers benefit from it.

In recent weeks a letter came from Ragnar Otterstad, OZ8RO, who has also been signing LA5HE at times. He wrote about QSL Managers. The morning after the letter arrived we hailed the Old Timer as he made his daily downhill run to the village. We just had to show him Rag's letter.

"Remember years back when we talked about QSL Managers?" we asked, and the Old Timer nodded. "Remember it well," he said. "I talked and you listened, remember?"

How could we forget when he put it that way? The Old Timer read OZ8RO's letter and a guidance list that Rag had prepared for potential QSL Managers. He kept nodding his head, and we got the feeling that things were headed in the right direction.

"Rag puts it as clearly as anyone ever might do," the Old Timer said. "But an additional advantage is that he puts it forth from the perspective of a DX station. Always keep in mind that a DX station might see things a bit differently than you might, but even with different viewpoints both of you can be right and logical in your thinking. You may just be looking from different angles. But there should be no problem with what Ragnar writes. He makes some good points."

That was just what we had been thinking. QSLs are always important to DXers. A DXer clinging to the heights of the Honor Roll usually knows all the angles in getting them. Others sometimes have a bit to learn, but learn they definitely will. Understanding all the QSLing processes will bring benefits along the path to the 300-country sticker. So stand back! We are running Ragnar's letter, this his commandments for QSL Managers. He writes:

"We are some old-timer DXers who feel that it is about time to set the records straight regarding the 'business' of being a QSL Manager for a DX station. The following set of 'golden rules' has been put together in an effort to put newcomers on the right track from the beginning and, with some luck, bring some of the existing managers back on track. We hope that the subject will get some needed publicity—in the best interests of true DXing."—73, Ragnar Otterstad, Vejdammen 5, DK-2840 Holte, Denmark.

And Ragnar lists out what he labels "LA5HE's Commandments for QSL Managers."

"1. By accepting to act as a DX station's QSL Manager, you are assuming the responsibility of ensuring that everybody who wants and merits a card gets it, one way or another.

"2. All cards received must be checked against the log entries in the log information you receive from the DX station. Then, the QSL card should immediately be made out and returned, either directly or via the bureaus.

"3. One of the services of a national society is to provide a QSL Bureau for its members. A QSL Manager should be sure to maintain a membership in his national society which, hopefully, is an IARU member. All this to ensure proper receipt of QSL cards coming in via the bureaus.

"4. Always make sure that your national society or district QSL bureau is aware of the fact that you are handling QSLs for a DX station, often for a station in a difficult part of the world to work. This will help ensure smooth cooperation from those parties concerned with handling QSL cards in your country.

"5. If your national QSL Bureau is not automatically accepting QSLs from or on behalf of overseas DX stations, consider taking the necessary steps to adopt such a policy. Consider what your country's national society policy is on incoming QSLs before accepting the responsibility for acting as a DX station's QSL Manager. One will find this very important and especially so when it is realized that the bulk of the DX world's QSL cards are handled by the national bureaus.

"6. For more prompt handling of QSL cards, many eager DXers are prepared to pay post-



## The WPX Program

### Mixed

1329 IT9TQH 1332 EA5EYP  
 1330 JS1HEM 1333 11WRE  
 1331 RB5MP

### SSB

1948 AK0G 1951 OZ1DYI  
 1949 IT9TQH 1952 EA5EYP  
 1950 N4PNI

### CW

2497 DJ2PJ 2501 GM3TRI  
 2498 OZ5UR 2502 RB5MP  
 2499 KY3V 2503 JH3CXL  
 2500 IT9TQH

## Endorsements

Mixed: 450 IT9TQH, JS1HEM, K3UA, 11WRE. 500 K4MEF, IT9TQH, K3UA, 11WRE. 550 IT9TQH, K4MEF, K3UA, 11WRE. 600 IT9TQH, K3UA, 11WRE. 650 IT9TQH, K3UA. 700 W5EW, IT9TQH, K3UA. 750 IT9TQH, G4OBK, K3UA, W9IAL. 800 IT9TQH, YU3BQ, G4OBK, K3UA. 850 IT9TQH, YU3BQ, K3UA, OE1-0140. 900 IT9TQH, YU3BQ, K3UA. 950 IT9TQH, YU3BQ, K3UA. 1000 IT9TQH, YU3BQ, K3UA. 1050 IT9TQH, YU3BQ, K3UA. 1100 IT9TQH, K3UA. 1150 IT9TQH, K3UA, YU2QS. 1200 IT9TQH, YU2QS. 1250 YU2QS. 1300 YU2QS. 1350 YU2IS. 1400 YU2QS. 1450 YU2QS. 1500 YU2QS.

S.S.B.: 350 AK0G, IT9TQH, W0GOQ. 400 AK0G, KA0ZFX, IT9TQH, W0GOQ. 450 AK0G, IT9TQH, G0DXS, W0GOQ. 500 AK0G, IT9TQH, W0GOQ. 550 AK0G, IT9TQH, W0GOQ. 600 AK0G, IT9TQH, W0GOQ. 650 AK0G, IT9TQH, EA3AAY, W0GOQ. 700 AK0G, IT9TQH, EA3AAY. 750 IT9TQH, I3ZSX, I2IAU. 800 IT9TQH, I2IAU, KS3F. 850 IT9TQH, EA5ABD. 900 IT9TQH. 950 I2EOW, I2TZK, IT9TQH. 1000 I2TZK. 1050 I2TZK, I1EEW, HI8LC. 1100 HI8LC. 1150 HI8LC. 1200 HI8LC. 1250 HI8LC. 1500 W3ARK. 1600 NJ0C.

CW: 350 DJ2PJ, IT9TQH, GM3TRI, JH3CXL. 400 DJ2PJ, IT9TQH, GM3TRI, JH3CXL. 450 DJ2PJ, IT9TQH, GM3TRI, JH3CXL. 500 DJ2PJ, IT9TQH, GM3TRI, JH3CXL. 550 DJ2PJ, IT9TQH, IK3GER, GM3TRI, JH3CXL. 600 DJ2PJ, IT9TQH, WA2EYA, JH3CXL. 650 DJ2PJ, IT9TQH, JH3CXL. 700 DJ2PJ, IT9TQH, JH3CXL. 750 DJ2PJ, IT9TQH, JH3CXL. 800 DJ2PJ, IT9TQH, JH3CXL. 850 DJ2PJ, JH3CXL. 900 DJ2PJ, LA8CE, JH3CXL. 950 DJ2PJ, LA8CE, JH3CXL. 1000 DJ2PJ, LA8CE, JH3CXL. 1050 W10PJ, LA8CE, I1EEW, JH3CXL. 1100 W9PWM, JH3CXL. 1150 JH3CXL. 1200 JH3CXL. 1250 JH3CXL. 1300 JH3CXL. 1350 IT9VDO, PA0SNG. 1400 PA0SNG.

10 Meters: G4CPJ, IT9TQH, JH3CXL, EA4KK  
 15 Meters: IT9TQH, JH3CXL, N2CIC,  
 20 Meters: KA0ZFX, IT9TQH, JH3CXL  
 40 Meters: AC3T, IT9TQH, EA4KK  
 80 Meters: IT9TQH  
 160 Meters: IT9TQH, K3UA, K0SI

Asia: IT9TQH  
 Africa: IT9TQH, K3UA, K4RDU  
 No. America: IT9TQH, K3UA, JH3CXL, K8KUH  
 So. America: IT9TQH, CT4UW, K3UA, KL7AF  
 Europe: SP1MHV, IT9TQH, K3UA, OZ1DYI, JH3CXL  
 Oceania: IT9TQH, JH3CXL

**Award of Excellence Plaque Holders:** W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YLW4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2\*\*, AB90, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K0JN

**Award of Excellence Plaque Holders with 160 Meter Endorsement:** W4VQ, K6JG, W4CRW, N4MM, SM0AJU, KF2O, K5UR, OK1MP, N5TV, W8CNL, W1JR, W6OUL, W4BQY, W5UR, N4NO, W8RSW, N4KE, I2UIY, W8ILC, W1BWS, NN4Q, G4GUE, LU3YLW4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM, VE7IG, K9BG, AB90, FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, W3ARK, HI8LC, KA5W, UR2\*\*, VE3XN, K6XP, LA7JO

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.



*A month or so back the Colvins wound up their latest DX effort and headed home after action from Nepal, Sri Lanka, and a few other countries. Zimbabwe was the scene for their W6QL/ZZ operation a bit back, and here Lloyd clutches the authority to operate while Iris smiles in anticipation. These two are a remarkable DX duo, having operated in enough countries to get you a couple of DXCC certificates. They are DX!*

age . . . plus, for the service of a direct QSL card return by air or surface mail. If you are prepared to offer this service, make sure that such information is passed on by the DX station. It should also be published in the various DX bulletins and in the amateur magazines around the world. If self-addressed stamped envelopes (SASEs) are required, it should always be made known and understood. It is also a good idea to note how many International Reply Coupons (IRCs) will be required, especially for airmail service. One IRC should always cover surface postage. More will be needed for airmail return of the QSL card. If self-addressed envelopes are required, make it known at all times.

"7. For direct return of QSLs, never demand more than needed to cover your actual costs. QSL Managers are volunteers and are presumed to do the work out of dedication to DX-ing or for personal pleasure. You should be prepared to accept small losses at times. These to some extent will be compensated for by some DXers sending you postage in excess of what is required. However, being a QSL Manager is definitely a non-profit operation.

"8. Always remember that being a DX station's QSL Manager is a responsibility, not an ego trip."

A couple of days after the Old Timer had stopped by the QTH, he again showed in mid-morning. He had something more to say on the QSLing subject.

"Sometimes in discussing DX matters with others at the local radio club," he started in, "it is evident that non-DXers tend to consider QSLing a relatively simple matter, something straightforward and uncomplicated. When one of them ventures into the DX activity, he quickly changes his mind." We could see that the Old Timer had been thinking about Ragnar's letter and his eight commandments for QSL Managers. We waited for more from the Old Timer.

"Generally a new DXer's need for QSL information is relatively simple," the Old Timer continued, "and many will find that just marking their magazines at the QSL information with a paper page-mark will often suffice. A new DXer needs about everything. A lot of the routes that he needs for his country counters will be in the magazines. As the country totals mount, their

research must become more complex; then the disappointments over the inability to corner a QSL start to be known." We were listening to the Old Timer. We had been down that path and still remember that even if you have only 50 or 75 countries confirmed, your anxiety is hardly any less than if you have 300.

"One also learns that there are countries where it might not be the best idea to indicate that your letter is going to an amateur radio station. No callsign, no reference to amateur radio at all. Just the address. And this comes because unfortunately some who handle the mails consider the mails as a fringe benefit of their employment, with likely pieces to be studied further for possible currency, IRCs, or other valuable enclosures." The Old Timer leaned closer to hold our attention. "You know of some of those, don't you?" he asked, and we remembered some—a South American country for one where some would take their mail to the airport looking for a pilot on a state-side run to carry thier mail and deposit it in the States. You may have heard of such instances.

## The WAZ Program

### 10 Meter Phone

317 NS7Z

### 15 Meter Phone

253 NS7Z

### 20 Meter Phone

650	IN3DEL	654	W4UW
651	KB9LN	655	N6IV/KL7
652	N7GMT	656	I2RKI
653	N6CGB		

### 10 Meter CW

59 EA7OH

### 15 Meter CW

125 EA7OH 126 JA2IU

### 20 Meter CW

283	JA2JNA	286	NQ7M
284	OZ4RS	287	AK5Q
285	EA7OH	288	OZ1FAO

### 40 Meter CW

73 N7RT

### All Band WAZ

#### SSB

3176	W9ZTL	3182	DL9NC
3177	K8REG	3183	I5KKW
3178	KD9EB	3184	N6IV/KL7
3179	N9RD	3185	I1WRE
3180	K0ARR	3186	OZ9FJ
3181	N6CGB		

#### Phone/CW

6257	A16V	6267	AK5Q (CW)
6258	JA7IL	6268	UA6JWW
6259	EA3GF	6269	W7ALZ
6260	JA2HWE	6270	IK4DCT
6261	DL4GBA	6271	N4SF
6262	HB9DDM	6272	OE9SLH
6263	JA0UMV	6273	K8NN
6264	N9RD	6274	ZS6P
6265	W5EC	6275	G4MVA
6266	AK5Q	6276	OH9SC

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Leo Haljzman, 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

As of March 1, 1988 171 stations have attained the 200 zone level.

### New recipients of the 5 Band Worked All Zones:

G4BWP	JATIL
SM0BZH	SP5AA
UA9JWW	ZSSBK

### The top 9 contenders for 5 Band WAZ are:

- |                |               |
|----------------|---------------|
| 1. N4WW, 199   | 6. W2YY, 198  |
| 2. K6YRA, 199  | 7. W7UR, 198  |
| 3. W8UVZ, 199  | 8. K9GX, 198  |
| 4. K4CEB, 199  | 9. EA5AD, 198 |
| 5. SP6JCY, 199 |               |

452 Stations have attained the 150 Zone level, as of March 1, 1988.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Leo Huijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application.

Strange as it may seem, such by-passing of the local mail systems is a technical violation of the international treaty on the mails, but it is doubtful if you will ever be able to find anything or anyone having problems from the by-passing.

Looking at the other side of things, we recalled talking with an official from the Pakistani Postal Service and being amazed when he told of the mail service in the back area of the country. Mail carriers traveling on foot would carry and pick up mail in the mountainous regions, being gone for a week at a time and handling money orders, registered mail, and stamp sales out of their pack. When we questioned the safety of the foot carrier in the remote areas the Pakistani had been surprised.

"The mail carrier is the only contact many have with the outside world," he told us. "No one back in those mountains would dare touch the mail carrier. Anyone who touched the carrier would have the populace to deal with." And it did make sense. Often when amateurs have problems in getting their QSL to an overseas address, the problems are most likely to show in urban areas. But then again, it can happen almost anywhere.

"What about the QSL Managers List?" we asked. "And when would you say that a DXer might consider using that source?" We got a laugh at that question. "You are asking self-answering questions," the Old Timer told us. "You can use that publication almost any time, but it really is a need that nothing else fills for the top-of-the-heap DXers, those on the Honor Roll or close to it. And while they know all the answers, the routes and the inside tracks to almost any DX around, they cannot afford to miss anything at all. Maybe those with the lower totals, say 100 to 225, will manage without the QSL Managers List, but when you start getting up around the 250 mark, you need everything. But you know that already, don't you?"

We did, but we also knew that DX needs an unending attention to the gathering of information, the sharpening of your DX knowledge, and a willingness to listen to anyone who might



What does an RTTY team do when they work 400 stations in a CQ WW Contest? They stop to savor the moment and preserve it for posterity. From the left are JH8KJW, JH8PNE, JA1UT, and JG1RVN. They operated BV0RY and worked 400 countries. (KZ2P photo)

help even just a bit. "Just asking questions," we commented, and the Old Timer shook his head.

"When did you ever do otherwise?" he asked, and we had to admit the point. But one also learns that old DXers have within their memories a lot of good information. One can learn much by asking questions and even just listening. And you can always tell an Old Timer; they need suspenders to hold up their pants. One of these days we are going to ask the Old Timer why young DXers—young in years, that is—can hold up their pants with just a belt, but the Old Timers cannot do it without suspenders. Someone tried to tell us once that it was because their chest has migrated down towards where their hips used to be. We are not yet convinced, but possibly if you take a look you can come up with an explanation.

### June 6, Normandy Beaches

Every year Morio Andre, F5AM, at St. Lo in the Carentan Peninsula heads a group operating from the Normandy Beaches to mark the 1944 landings. Last year they signed TO6JUN. This year it will be a different call. Look for them from about June 1-6. All bands, but mostly 20.

### Scandinavia DX Meeting

If you are headed for northern Europe this month of June, you might want to detour to Geilo, outside of Oslo and on the highway to Bergen. This is a meeting to celebrate the 10th anniversary of the LA-DX Group, an open convention for all DXers who can make it.

The June 4-5 weekend is the date. The locale is the Geilo Hotel og Turistsenter, Geilo being in the mountains in south central Norway. You can reach Geilo either by train or car.

Who will be found in Geilo that weekend? ON4UN will be there to talk about low-band DXing. Maybe even OH1RY will talk about trying to work Europe on the low bands from the Pacific.

Martti will be present to recall his experiences in Western Sahara and the S0RASD operation. Possibly Martti will even speculate on some future efforts. You might even find Frank Clement, W6KPC, there to talk about his 20 meter landmark tower and his 80 meter antennas. The convention is trying to lure Frank to Europe to explain why his signal is so loud. It's the mhos at the San Joaquin Valley QTH of

W6KPC that account for the signal. Others say that the 200 foot tower helps a bit.

The 3Y2GV/3Y1EE Peter I Island story will be told. LA5NM and LA4LN will tell of some arctic DXing. There will be more, and more information can be obtained from Bjorn-Henning Bergheim, LA4DCA, in Oslo. The phone number is 42.2.617385. Einar, LA1EE, is among the well-known DXers involved in this effort.

### Saba—PJ0M

The 6M DX Society will be on Saba operating from July 7-14 signing PJ0M. They will be active on all bands, 80-6 meters, SSB and CW and with a good bit of attention given to testing the 6 meter multi-hop paths to the UK and Europe as well as to the Americas.

From the 6M DX Society Mario Karcich, WB2CZB, Jim Holt, N3AHI, and John Laing, W1EXC, will be the operators. The gear will include an FT757, two TS680s with amplifiers, and wire antennas for the HF bands. For the 6 meter efforts they will have 3-element and 5-element beams. Mario, WB2CZB, is a member of QRP International and will be looking for QRP contacts. QSLs will be handled by K2MUB, and SASE or SAE/IRC is requested. You might even hear the group a day or two before the scheduled dates.

### Western Sahara

This one was accepted as a DXCC counter by an unanimous vote of the Awards Committee. Then with this decided, there was a discussion as to whether it should count as a totally new country or a reactivation of the former EA9-Spanish Sahara. This country was deleted in May 1969 when Spain relinquished its claim to the territory as a Spanish colony.

The matter had to be resolved with the DX Advisory Committee. In March the decision on the matter came out. Western Sahara will be considered as the reactivation of Spanish Sahara. Cards for S0RASD will be accepted for credit starting June 1st. Thus, if you had in other years worked EA9-Spanish Sahara and received a QSL, you will be treading water, more or less, as your total worked will not have been affected if you did work S0RASD. If you have your S0RASD QSL, the door is open.

Spanish Sahara was not exactly a common DX country heard on the bands some 20 years back. It was worked, but not easily. Actually, since S0RASD had been active on 20 most days starting around 1900Z, the country is a lot more available than it was a couple of decades back.

### Revillagigedo

Alejandro Lecon Lopez, XE1L, in the Mexico City area was holding on to some transportation a month or two back and was looking for some operators for a planned May or June operation from XF4. There was hope that OH2BH would join the effort to cut down the need of the European DXers for this one. The plans included operating from 160 to 10 meters and with SSB, CW, RTTY, and SSTV. If the plans solidified, you should be hearing them about this time.

### Howland Island

Jim Smith was on his way as this was being written. The whole idea was to rendezvous at Tarawa and head out for Howland, about a three-day trip. If everything fell into place, you

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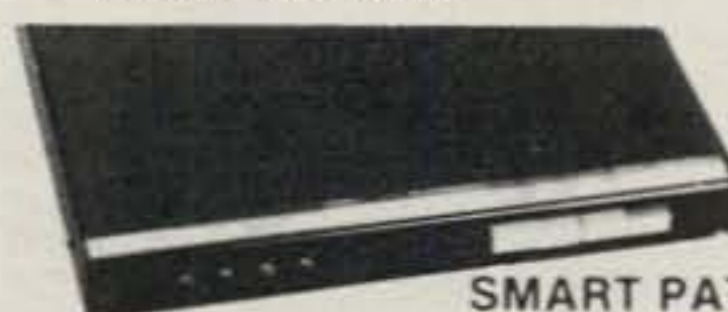
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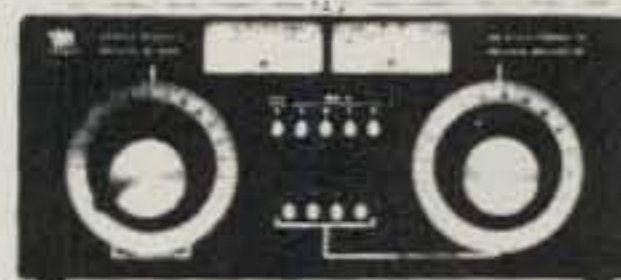


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3303	YU2AA	2002	I8YRK	1515	N6JM	1227	WB8ZRL	993	SP5AA
3252	F9RM	1945	W9NUF	1501	KL7AF	1188	K7CU	958	W0JIE
2953	K2VV	1915	YT7DX	1470	K8LJG	1159	A18S	904	YU7DR
2875	W2NC	1859	PY1APS	1458	W8UMR	1156	N8BJQ	892	K9BQL
2694	K6JG	1802	W0SFU	1436	I1POR	1156	N2CIC	886	G4SDJ
2606	VE3XN	1799	CT1LN	1415	G4FAM	1153	N2AIF	883	I2EAY
2539	YU2TW	1779	IN3ANE	1414	SM0AJU	1150	YU1GR	877	I2CZO
2502	K6XP	1776	PY4OD	1405	DK5AD	1147	JA6GWU	872	W2XQ
2462	W4BOY	1764	K9BG	1374	W6OUL	1112	I1EEW	839	I5ZTC
2416	W9DWQ	1722	YU7SF	1366	K2POF	1102	VE5FX	835	G4OBK
2401	N4NO	1701	I2UIY	1352	YU2CQ	1080	WD9HC	791	YT7WW
2325	N4MM	1676	KF2O	1350	AC2J	1074	VK9NS	750	F1HWB
2270	N6JV	1675	N5TV	1345	YU7AJD	1067	I1WXY	747	KD8IW
2128	N6CW	1659	HA0DU	1340	KA5W	1066	NE6I	726	K18B
2123	I2PJA	1631	N6AW	1309	YU2TY	1052	PY2DBU	726	W9IAL
2104	N9AF	1593	I2MQP	1304	AB9O	1044	I0AOF	720	YUIPJ
2077	YU1AB	1578	SM3EVR	1279	SM6CST	1016	W9IL	719	K63V
2065	WA8YTM	1555	K8LJG	1278	3A2LF	1007	A16Z	714	K6UXO
2056	PA0SNG	1553	SM6DHU	1269	K2OLG	1007	KS0Z	695	W5ASP
2047	N2AC	1549	IT9QDS	1246	YU1SZ	1000	K13L	665	KC7EM
2026	EA2IA	1541	W5PWG	1235	W4UW	1000	WV9S	637	F6HJM
2020	SM7TV								

### SSB

3174	F9RM	1717	I8YZP	1303	KC8YM	1054	I1EEW	781	KB0C
2837	I0ZV	1681	WF4V	1258	W2NC	1050	F6BVB	769	KC2FC
2509	K2VV	1656	I4CSP	1257	KK0L	1047	EA3AQC	766	I0PSB
2442	ZL3NS	1655	CT1LN	1249	EABAKN	1032	PY4VX	755	IT9ONV
2400	K6JG	1587	WA8YTM	1239	CT4UW	1029	KA5W	750	F1HWB
2334	K2POA	1583	NJ0C	1236	W4UW	1020	I8WYD	726	NE6I
2281	CT1UA	1538	ZP5JCY	1207	I1POR	1010	K8LJG	710	N2AIF
2268	K6XP	1533	W1NG	1200	KL7AF	993	AG2K	698	I2KKL
2238	I0AMU	1532	WA4QMO	1186	PY4OD	992	I2EOW	694	A16Z
2120	I2PJA	1516	W3ARK	1178	SM6DHU	972	WA2FKF	691	W5ILR
2097	N4MM	1507	W9NUF	1167	K5RPC	962	W3GXX	675	IK2DUU
2053	I2PHN	1466	EA2IA	1150	CT1BY	900	I2TZK	665	AB1U
2048	W0YDB	1457	CT1FL	1144	I5ZJK	863	G4SDJ	657	KE6KT
2005	I3ZKD	1450	G4CPJ	1131	N6FX	857	CT1AHU	648	N6CGB
2000	WD8MGO	1406	KF2O	1129	N2AC	848	K3IXD	631	YV1CP
1923	VE1YX	1397	I2UIY	1110	EA4KK	842	KK5P	622	SM6CST
1883	CT4NH	1387	XE1OX	1106	AB9O	828	W6OUL	618	CT1DIZ
1870	W4BOY	1350	N5TV	1097	SM0AJU	807	K8ZZU	611	HR1FC
1844	OZ5EV	1350	G4CHP	1087	IK5ACO	800	I3ZSX	605	VK9NS
1825	N4NO	1343	AC2J	1060	CX9CO	792	YB3CEV	600	KB4HU
1802	PA0SNG	1305	I8KCI	1055	N2CIC	790	K9BQL	600	NM5Y
1750	W9DWQ								

### CW

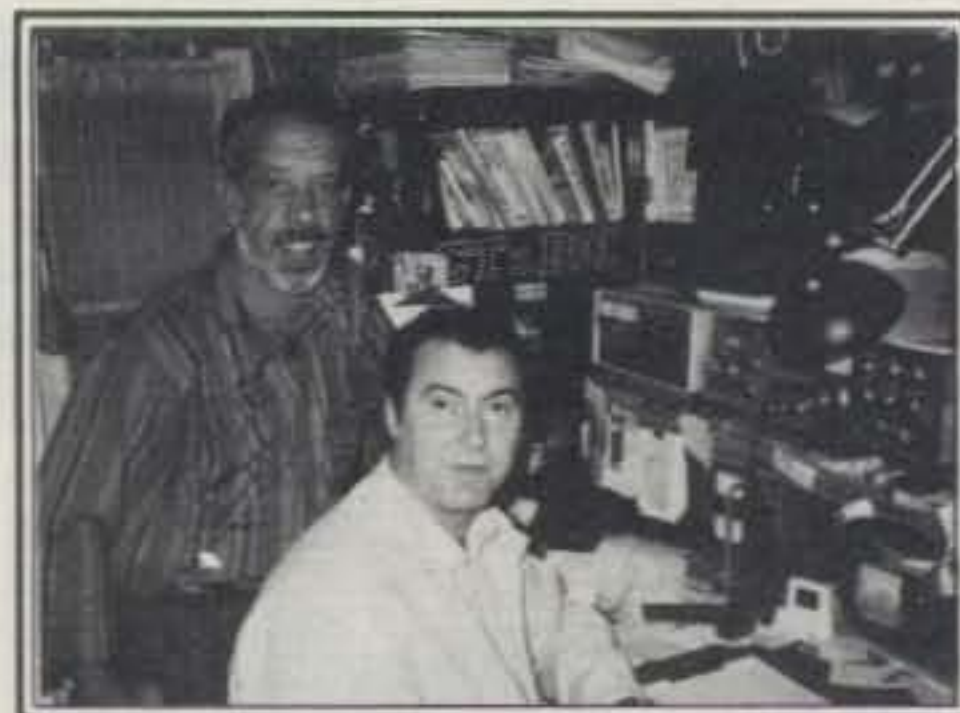
2621	W2NC	1779	OZ5EV	1309	IT9VDQ	1010	KN7K	800	I8YRK
2415	K2VV	1740	YU7SF	1292	W1NG	1005	T14SU	777	EA5QR
2271	WA2HZR	1672	YU7BCD	1224	N6FX	1004	VE1ACK	753	I2EAY
2247	N6JV	1659	LZ1XL	1160	K2POF	1001	AK2H	743	NE6I
2134	ON4OX	1614	EA2IA	1151	SM6CST	990	YU2CQ	743	G3VDQ
2092	N4NO	1595	N4MM	1138	I2UIY	984	DJ1YH	715	W2XQ
2029	W3ARK	1554	VO1AW	1131	KF2O	975	KA5W	709	W0JIE
2019	K6JG	1519	PY4OD	1125	SM6DHU	969	G4FAM	708	OZ5UR
2014	W9DWQ	1500	W9NUF	1117	I7PXV	967	SM5DAC	707	WB8ZRL
2004	VE7CNE	1488	I1YRL	1101	KL7AF	948	LA9XG	705	OE1KJW
1973	N6CW	1414	N4YB	1082	K8LJG	940	W6OUL	702	G4SSH
1927	K6XP	1394	WA8YTM	1077	W1WAI	915	AB1U	622	LZ2VP
1926	W4BOY	1350	N5TV	1038	SM0AJU	871	A16Z	605	K7DBV
1906	G2GM	1344	KA7T	1026	F6HKD	849	CT1LN	602	VK9NS
1801	N2AC	1309	I2DMK	1011	AK9Z	813	VE4AEX		

probably worked the crew a couple of weeks or so back. The plan was to sign the AH1 prefix.

The logistics of a major DX effort are always of interest to most DXers, and this one took a lot of organizing. Early in March the crew dwindled down to six operators, these being Jim Smith, VK9NS, and his wife Kirsti, VK9NL; Cliff, NO1Z; Ron, N9CLS; Jean-Louise, TR8JLD; and Hal McBirney, KV4AM. Another seven operators had been listed as possibles, but they had to withdraw for a number of reasons.

Up to the time of departure at Tarawa, the

costs had passed the \$30,000 mark. Some 80 donations had been received from individual DXers, DX clubs, or other groups such as DX foundations. Jim was speculating that Baker/Howland KH1 might not be the rarest of DX, but that a bit of wall-to-wall pileups could be expected. There had been a U.S. weatherman set to accompany the trip. He dropped out and this eliminated some funding. The charter of the vessel is a heavy expense, and this might affect the time ashore and the number of days on the air, the hope being that there would be



On the left is Avelino Pereira, CT3BM, and Justino Ramiro Santos, CT1UA, tries out the operating position. Miro was on a visit to Funchal Island in the Madeira group and was visiting the local big gun. CT1UA wishes more special-event/special-callsign stations would be liberal with QSL information. He is the CQ Awards check-point back home in Portugal.

at least seven days of operating.

Jim, in his last-minute notes, could be right about Howland not being the rarest, though a good many do need it. Twenty years back there was a U.S. installation in the group and a number of KB6s, these being on Canton Island in the Central Phoenix group. The 1969 Callbook lists 12 KB6 stations on Canton, this including 8 Conditional Class licenses. Ten years later in 1979 there were four KB6 stations listed. One of the unusual aspects of this part of the Phoenix group was that it was claimed by both the British and the U.S. With each country gripping the administrative gavel, the islands around Canton, as well as Canton, were jointly administered. Thus, you could work VR1 on Canton, KB6 on Canton, sometimes it being the same station but two DXCC counters. British Phoenix became part of Central Kiribati, and Canton now signs T31. Up north were, and still are, Baker and Howland Islands. The U.S. held an exclusive claim to those islands, and they did not become part of the Kiribatis back in the early 1980s. Thus, you know why Jim Smith was headed out that way. Canton may now be T31, but Howland is still KB6 and not too many KB6s have been heard in recent years.

Though VK9NS may not be buried by the demand at this time, you can expect that Howland and Baker will increase in the standings in the needed countries list in the years ahead. And as noted, such an effort is a bit expensive. If you worked the AH1 operation, keep in mind what it took to put it on the air.

## Western Sahara, The New DXCC Country

Most DXers who work S0RASD have an understanding that conditions within the Western Sahara nation are not currently placid, with some hostilities going on as they have for over a decade. A few months back the Canadian DX Association's *Long Skip* reprinted an article on the area, this entitled "The Divided Desert" and taken from the *Geographical Magazine*. As the information in the article does give a better understanding of the political situation there, parts of it are excerpted here.

The struggle in this former Spanish colony has been going on since 1975, when Spain relinquished the area. When the Spanish troops left, 350,000 Moroccans who had gathered

## CQ DX Awards Program

### SSB

1593	KABMVJ	1596	I1BRB
1594	EA3FUM	1597	KA9TNZ
1595	EA3EXW	1598	PA0XPO

### CW

720	SM6CTQ	721	W1JQ
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### SSB Endorsements

310	N6AW/315	275	K4LR/295
310	W6DN/312	275	WA2FKF/295
310	W6SN/309	275	WA6DTG/288
300	VE7DX/308	275	PA0XPO/287
300	W4UNP/307	250	N6CGB/254
300	W6NLG/305	250	KA9TNZ/252
300	K8ZZU/305	150	AC3T/150
275	K8NWD/296	28 MHz	PA0XPO
3.5/7 MHz	PA0XPO	28 MHz	WA9RCQ
3.5/7 MHz	I5EFO		

### CW Endorsements

300	SM6CTQ/306	275	W1WAI/283
275	IT9QDS/290	275	W6DN/276

Total number of active countries is 319. 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.

across the border swept into the northern part of the area. King Hassan of Morocco claimed the area on the basis of an oath of fealty by the Sahrawi tribal leaders before the Spanish occupation. This claim was rejected in 1975 by the International Court of Justice, and within months the Red Cross reported that 40,000 Sahrawis had fled across the border to Algeria, there to be sustained by relief agencies and the government in Algiers.

The Polisario Front Independence Movement, which had been formed in 1973 to oppose the Spanish authorities, in 1975 moved to oppose Morocco, some of the fighting penetrating well into southern Morocco. Sixty-seven countries have recognized the Sahrawi Arab Democratic Republic as the government in Western Sahara. It has observer status at the UN and at other international groups, but most of the formal recognition has come from Latin America and Africa, Yugoslavia being the only European country to extend recognition.

In the early 1980s Morocco moved to protect its claim in the northern part of the former Spanish colony by building a 1500 mile wall from the mountains in southern Morocco down to the area of Villa Cisneros on the Atlantic Coast, this at a bay named Bahia de Rio de Oro. This wall encloses about three-quarters of the former colony and is patrolled and maintained by a large army garrison backed by helicopter gunships and fighter planes. Another wall was completed in recent years along the Mauritania border.

According to the *Geographical Magazine* article, behind the protective wall Morocco has turned the area into an African boom town. Laayoun is noted as having been transformed from a shanty town of 25K to a hygienic city of more than 100K with plazas and modern high-

ways fanning out to modern housing areas. Morocco is said to have invested over a billion dollars in upgrading the living standards in the area.

Even the Sahrawi tribespeople in the area note how the area has changed. They are benefitting economically and are entitled to free housing in the new projects. Food costs have been halved, as have fuel costs. Some of the Sahrawi have joined the entrepreneurial movements in the fields of transport, construction, egg farms, building materials, and soft-drink franchises. There has been the discovery of over a billion-ton deposit of phosphates south of Laayoun. Morocco cites this as a further basis for annexation of the area and has invested heavily in developmental work on these deposits. A new deep water port has been developed at Laayoun Beach with facilities to handle ten million tons of phosphate a year plus dry cargo and fish processed from the rich, off-shore fishing grounds.

Even Club Mediterranee is there managing two luxury hotels, and the long, white deserted beach areas are being developed for winter tourism.

While Morocco apparently is moving in to stay, the article notes that the Polisario Front does seem to be losing some support. Though recognized by a third of the voting members of the UN and half the states in the Organization for African Unity, some signs of fading enthusiasm among the supporters have been reported.

Some efforts to settle the dispute have been ongoing. The UN has proposed a UN-monitored referendum among the Sahrawi, free from military or administrative restraints. The Polisario wants all the Moroccans out of the country as a prerequisite to any polling. Morocco has offered limited autonomy to the Polisarios; this has been rejected. The refugees in Algeria have grown to 165K, though some Sahrawi in the Moroccan areas have bought houses or started up businesses. Beyond the cities, little has changed from the former lifestyles. Though some have improved living conditions in the Moroccan administered area, there is still noted the fear that things might change again. But there is also the belief that should a referendum be held many of the Sahrawis would not vote for independence. It is thought that the loss of Morocco's largesse and the installation of another regime, with possible retribution towards collaborators, would be a significant factor in such a referendum.

With the passing of the years the interests of Morocco have become intertwined with those of the Sahrawi, and this further solidifies the occupation. Though efforts to settle the dispute continue, little progress has been made in recent years.

What does this mean? For now, S0 Sahrawi Arab Democratic Republic is a good DXCC counter. Work it and it adds to your total. But the political situation in the former Spanish Colony is definitely unsettled. The dispute is unsettled, but Morocco has moved in on three-quarters of the area, has developed the better part, and apparently intends to stay. If you have yet to work this new one, it might be a good move to work them now and worry later. Things might change there, but once the counter is on your DXCC total it stays.

### Curacao

Bob Mitchell, N5RM, will be signing his call /PJ2 from May 24-31st, but it will be PJ0R dur-



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### A Few Wind-Up DX Notes

There is a background report that the Swedish operator who was expected from Bouvet is not a DXer, though he has an amateur license. He had been in the Antarctic for eight months. He had a large number of schedules set with friends back in SM-land, but only one or so were ever kept.

Down in South Florida the DX Association elected a new group of bright-eyed leaders, these being Tom Mannix, WA4VLD, president; Tom Lewis, N4TL, vice-president; Harry Lersner, N2AWM, secretary; and Cleve Irby, NW4O, treasurer.

The Western Washington DX Club is talking up the possibility of amateur radio contesting being included in the Olympics. This might be a world-gathering, all participants using the same gear at the same location. If it sounds a bit farout, remember the interest in "fox hunting" in some countries.

K7SS may be pushing the matter a bit further. There might even be something at the Goodwill Games in 1990. You might keep in mind that the Western Washington DX Club is

still pushing for a joint Soviet-U.S. amateur DX-pedition to the Diomedes. These are islands in the Bering Strait, the International Dateline running through the group.

The Kingman/Palmyra effort was set for early May. If it slipped any in the starting dates, they might still be found. The expected callsign was K9AJ/KH5. J52US should be heard from Guinea-Bissau for the next year or so. This one works from 160 up, being heard from 2200Z up to 0800Z and sometimes even beyond. Frequencies are 14021, 7010, 3798, 1840, 21270 kHz. The *Totem Tabloid* notes that China is reported as ending broadcast operations in the 7.0-7.1 MHz segment, but you might still catch Albania there. The mode? Broadcast, of course.

The CQ WW DX CW Test comes the last weekend of May (May 28-29). This marks the end of the great season for DX contesting, but you can still catch the All Asian Phone June 18/19 and the CQ WW WPX VHF Contest July 18-19. Each is getting a bit closer to the great days of DXing which will start this year the last weekend in October with the CQ WW Phone DX Test. Be prepared!

Back a month or so the Colvins tried for Bangladesh but could not get the licenses, so they put on an operation from Sri Lanka. By this

time they will have returned home to attend again the International DX Meeting and the Dayton Hamvention. SM0AGD is now with SAS, the Scandinavian airline. In May Erik should be heard from S9 Sao Tome.

Back a bit George Goldstone, W8AP, visited with Victor Rivera, ZK1CG, in the Cook Islands and operated as ZK1XH. This was last November. George was hardly home before QSLs for ZK1XH by another operator were showing. Seems that there are only 26 ZK1 calls with the X suffix for visiting operators and they are turned over fast—very fast. If you work a ZL1X call, QSL right now. Next week might be too late.

New officers of the Southeastern DX Club based in Atlanta are Ken Byers, K4TEA, president; Dave Curran, WD4RCO, vice-president; Neil Foster, KC4MJ, treasurer; and Dave Thompson, K4JRB, the "Activities Pusher." Doing everything else to keep the club jumping is Sandra Jorgenson, KL7JAR, who handles the secretary's job and publishes the club bulletin.

TP2CE, the amateur station at Strasbourg for the Council of Europe, is still pushing for country status. F6FQK manages the station and continues to work for recognition.

Remember: we write three months in advance. If you have big plans for the WW DX four months hence, July is the deadline for the October issue. Write early and often.

73, Cass, WA6AUD

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### QSL Information

Back a bit we talked about QSL Managers. We had hardly finished when Mike Thomas, NA5U, was waving his hand and shouting, "I volunteer!" Mike wants to handle some QSL chores for a DX station. Write to him at 5717 Puerto Vallarta, No. Richland Hills, Texas 76118.

Mario Raul Andraca, LU8DPM, Box 45, 7150 Ayachucho, Buenos Aires is the QSL Manager for AY2E, AY8DPM, CE8ABF, CE3AD, CE3FIP, CE5SG, CE6EDZ, CE6EJZ, CE8EMM, CE6GCU, CE1FGT, CE5BTS, CE6GEO, CE7DOM, CE1YI, CE4GTA, CE3HZN, CE2HBY, CE4FXV, CE8GXE, CE3JTV, CE8ILB, CE3HPE, CE3FTV, CE6BDN, CE3BST, CE6MBQ, CE2DSA, C30LCK, CX3TU, CX2DC, LU1UAI, LU1UFR, LU8FEU, LU6DB, LU2E, ZP5JCY, ZP5JCZ, ZP5LOY, ZP5LHY, and ZP0JCY.

All of the following was compiled with a lot of listening by W9LNZ through the lonely nights.

A15AA to DJ6SI	TE21 to TI2JJP
A15AB to DL8CM	T31TP to WC0W or WB0DLT
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J56AS to IT9AZS	V32TP to WB0DLT or WC0W
K9AJ/KH5 to WA2MOE	VK3ETT/VK9L to 4X4TT
N2PC/KX6 to K2CL	VP2ML to K1RH
KX6HE to K2CL	VP2MET to W1SD
N4GNR/6Y5 to N4GNR	XE1L to WA3HUP
NY6M/AH8 to NY6M	XE1C to WB6JMS
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P43SF to 1988 CB only	YS9LG to DJ4ZB
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RF8FWW to UF6FFF	3X8A to I8YGZ
TL8HW to KJ4GK	5T5EV to DL3KCE
TP2CE (SSB) to F6FQK	8P6RV to G3LNS
TP2CE (CW) to F6EYS	9Q5UN to OH3GZ
TI2JJP to F6FNU	
CE8ID1 to P.O.B. 1508, Punta Arenas, Chile	
N01Z/KH1 to Heard Island DX Assn., Box 90, Norfolk Island via Australia	
J73LJ to Box 245, Roseau, Dominica, West Indies	
S42LK to Box 1, Hamburg, 5015 Ciseki, South Africa	
SV5TS to Box 251, CP 85100D, Rhodes, Greece	
TJ1AP to Centre de Promotion Sociale, Box 50, Mbalmayo, Camerouuns	
YE4SUN to Box 96, Jakarta, 10002, Indonesia	



# Washington Readout

a monthly feature by  
FREDERICK O. MAIA, W5YI

REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

## FCC Proposes Reorganizing Amateur Radio Service Regs

In a public meeting on March 24 the FCC Commissioners unanimously voted to issue a Notice of Proposed Rulemaking (NPRM) to streamline and clarify §Part 97 of its regulations governing the Amateur Radio Service. The Commission said the new rules were necessary "Because technological advances and operational changes have made the current Amateur Radio Service rules difficult to apply to modern amateur radio communications."

Special Services Division Chief Robert McNamara described the NPRM as an attempt to integrate present policy into the rules: "A lot of material originates from staff experiences, letters, questions, controversy, and established policy that becomes generally known—but not everybody knows—and it's not specifically stated in the rules."

For the most part, FCC staff do not consider the proposed changes to be substantive in nature, but rather they are to cut down on the "red tape" to the maximum extent possible. The proceeding (Docket PR 88-139) is entitled "Reorganization and Deregulation of Part 97 of the Rules Governing the Amateur Radio Service." John B. Johnston, W3BE, Chief of the FCC's Personal Radio Branch, said that the deregulation was "more in terms of dropping out obsolete and repetitious rules" rather than in new regulations.

It was Johnston who rewrote the rules. He told us that it took him about a year to do it. Basically, what he did was take §Part 97 and put it on a word processor. A new reorganized outline for the table of contents was developed, and then existing paragraphs were moved into new headings. "We found a lot of duplications and started eliminating them. A lot of words were saved because you don't have to reintroduce the subject later in the rules," he said.

"Then we started a good, thorough coordination process. Other people had suggestions they wanted. Ralph Haller, N4RH (Chief, Private Radio Bureau) is a ham, and he had a lot of personal involvement in it, as did Ray Kowalski (ex-Chief, Special Services Division) before he left.

We are still "cleaning it up" due to last-minute changes.

### Presentation To The Commissioners

Personal Radio Branch attorney John Borkowski delivered the formal presentation to Commissioners Dennis Patrick (chairman), James Quello, and Patricia Dennis. His remarks to the Commissioners:

"The item before you for consideration is a Notice of Proposed Rulemaking to reorganize and deregulate the rules governing Part 97, the Amateur Radio Services. The Amateur Radio Services consist of the Amateur Service, the Amateur Satellite Service, and the Radio Amateur Civil Emergency Service, known as RACES. The Amateur Service and Amateur Satellite Service are recognized internationally; RACES is unique to the United States.

"This item proposes to reduce the total body of Amateur Service rules by almost 40 percent by deleting those rules which are unnecessary, obsolete, or redundant. Just as important, this proposal would reorganize Part 97 to account for the tremendous advances in technology, and concomitant changes in operating practices, that are taking place in the Amateur Services.

"The current rules have not undergone a major reorganization since 1951. They have evolved one at a time, in response to the introduction of new technologies. They are based upon telegraphy and AM telephony operating practices. The proposed reorganized rules before you would more readily accommodate current and future technologies and operations. They will promote a regulatory environment that fosters maximum operator flexibility, and innovative technological uses and experimentation."

"In addition to these structural changes to the rules, the document before you does propose certain limited substantive changes. They are in the areas of permissible emission types, and codification of certain policies not currently specified in the rules.

"When the Commission's rules were revised to incorporate the system of emission designators adopted by the Final Acts of the 1979 World Administrative Radio Conference, almost 1,300 possible

designators replaced the previous system of 14 designators used in Part 97. Because amateur radio is not a highly structured service, we recommend that this complex system of identifiers be replaced with nine terms that are already familiar to amateur operators. This will eliminate uncertainty, and promote flexibility and experimentation, by clarifying the wide range of emission types that are available.

"Additionally, the document before you would clarify the extent to which amateur stations may provide valuable and needed radio communications in support of community activities, without danger of violating the prohibition against business communications. Except where specifically noted, the new rules are intended to be consistent with the Commission's current rules and policies in the Amateur Services. We believe that this clarification and simplification of the Amateur Service rules will eliminate confusion and encourage compliance. We have included cross-reference tables from the current rules to the proposed rules and vice-versa, to assist the public in understanding and commenting on the new structure."

### Reaction of the Commissioners

Commissioner Quello thought the new rules were "... very well written." He added that the rules needed revision, and Commissioner Dennis agreed. "I especially like that we are making explicit what has been heretofore implicit in operating practices. I think it's important to let people know specifically what the rules of the game are. . . . It recognizes that we're no longer in the vacuum tube age. . . ."

FCC Chairman Dennis Patrick commented that he "looked forward to a dialogue with the Amateur Service as we move along to the final stages of this proceeding. We've had a lot of dialogue lately. . . ." At this point there was laughter in the Commission chamber. . . probably referring to the large number of Congressional inquiries and letters pouring in from amateurs on the 220 MHz issue. The FCC has proposed to reallocate the top 2 MHz of the 220-225 MHz band to narrow-band Land Mobile business interests. That finalization of that matter should be coming up very soon.

National Volunteer Examiner Coordinator,  
P.O. Box 565101, Dallas, TX 75356

## Insight Into The New Proposed Part 97

Borkowski, McNamara, Johnston, and Private Radio Bureau Deputy Chief Beverly Baker later elaborated on some of the details of the proposed rules. They emphasized that the document (which in draft form numbers some 87 single-spaced typewritten pages) has not yet been finalized for public release. The new rules will include statements of official policy on:

1. The exemption of so-called "swap nets" from the business communications prohibition. Basically the new rules will say that private individuals selling their personally owned equipment on the amateur airwaves in a network format will be permitted.

2. How amateur stations may be operated in emergencies . . . during disasters and in cases involving safety of life and protection of property, or when the station is in distress. (Johnston:) "These rules are in there now, but they are not obvious . . . they are back in the appendix with the International rules. These points have been moved up to the main body of Part 97."

3. How an amateur station may be used in support of public gatherings.

4. The four-pronged test that must be met for amateur stations to transmit news information.

5. *Frequency sharing.* For the first time, the FCC proposes to state explicitly that amateur operators must share their frequencies by choosing the best available frequency, so as not to cause interference.

6. Clarification that *station records* are within the scope of an amateur station inspection.

7. Appending of *self-assigned IDs* to the FCC-assigned amateur call sign. Any identifiers may be appended, provided they don't conflict with current FCC-authorized identifiers or prefixes of other nations. Contest and packet stations often use such IDs after their regular call sign.

8. Clarification of rules on FCC imposition of *quiet hours* on an amateur station.

9. Removal of rule prohibiting an amateur from damaging another amateur's equipment. The FCC believes amateurs should rely on local authorities in such situations.

10. Removal of rules instructing *aliens* on how to apply for a license. Rules duplicate instructions on application FCC Form 610.

11. Removal of *space operation* notification rules. Space operations will be directed to comply with International Telecommunication Union (ITU) regulations, from which amateur rules were derived.

12. New rules will allow amateur ATV stations to identify television transmissions in color as well as in monochrome.

13. Deletion of rules requiring retention and disposition of amateur examination papers in the volunteer examination systems. (Johnston:) "This is actually in recognition of 'paperless' examinations that can be administered at a computer keyboard."

## New Proposed Emission Designators

The NPRM also proposes to simplify the system of *emission designators* to be used in amateur radio. Johnston said, "What we tried to do was to get a 'handle' on all of these ITU emission designators. We used to have just 14 emission designators in the §Part 97 rules.

"When they implemented the changes that were agreed to at WARC '79, we had to switch over to a system for all of our rules using over a thousand different ITU-recognized emission designators. That had the undesirable side effect of eliminating certain types of privileges that amateurs used to have. One of the most glaring concerned A1, Morse code. There are many different designators for CW . . . such as telegraphy received by ear, CW received by machine, . . . and so forth. You have all of these different designators covering various types of keyed telegraphy. It was never our intention of outlawing any of them. Unfortunately, the new designators had that effect, since each is very specific.

"What we did was come up with nine



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general emission terms that are already familiar to amateur operators and categorized all of the 1,300 ITU designators under those nine terms." They are:

**CW**—single-channel amplitude-shift-keyed telegraphy in International Morse code for aural or automatic reception;

**MCW**—single-channel modulated tone telegraphy emissions in International Morse code for aural or automatic reception;

**Phone**—telephony/voice emissions;

**Image**—single-channel emissions for television and facsimile, etc.;

**RTTY**—single-channel emissions for narrow-band direct printing;

**Data**—digital data including packet;

**Pulse**—pulse emissions;

**SS**—spread spectrum emissions; and

**Test**—emissions containing no modulation or information used for on-air transmitter adjustment, two-tone amplifier linearity testing, antenna measurement, direction finding, ranging, etc.

"Amateurs have been having difficulty learning all of the new emissions. Now with just these nine terms, it should be easier," Johnston added.

Comments on Docket PR 88-139 will be due on or before August 31, 1988, with replies due on/before October 31, 1988. At press time the document was not yet available.

## From The Mailbag

**"Due to a heart attack and lack of oxygen to the brain, I cannot copy Morse code. Can allowances be made for myself and other people like me? I can send some code. Isn't that enough?"**

We constantly get inquiries from readers suggesting that a waiver of the telegraphy requirements should be granted to those who, for one reason or another, cannot copy Morse code. While the FCC does permit volunteer examiners (and VECs) to take handicaps *into consideration* when administering amateur radio operator examinations, the Commission does not entertain requests for waivers of its telegraphy requirements in the Amateur Radio Service. Actually, this is the way the handicapped want it. When the Commission was considering the telegraphy question a few years ago, handicapped amateurs agreed that they should not be treated differently.

While all amateur radio operator applicants must be proficient in the International Morse code, VEs are given wide latitude in administering telegraphy tests to the handicapped. The hearing impaired can be examined by blinking lights or vibrating surfaces. Blind applicants can dictate the telegraphy text back to the VE team or merely answer seven questions out of ten. Braille typewriters are permitted. If the applicant can understand the code at a specific transmission speed, he is passed. It is the responsibility of those handicapped to provide any

needed special equipment and a letter from their doctor concerning the nature of their disability.

To answer your question, allowances can be made, but you have to demonstrate that you can *receive* the International Morse code *by ear*—§Part 97.21(a) and 97.26(g). Although also required by the rules, most examiners do not require amateur radio operator examinees to hand-send Morse code, since it is FCC experience that if you can receive code, you can also send it as fast. The reverse is not true, however. Nearly every amateur can send code faster than he/she can receive it.

The day will probably come when the telegraphy will be relaxed in the Amateur Radio Service—at least in the VHF and higher frequency ranges. For now, you must be proficient in the International Morse code to be a ham radio operator.

**"There are only two amateurs qualified to be volunteer examiners in our area. Can we use someone else to be the third VE? Is it legal for a VE to examine his girl friend?"** Another "waiver" question. Sorry, but the answer is no

again. Exceptions cannot be made to the rules requiring Technician and higher amateur radio operator test sessions be conducted by three accredited VEs. Some VEC programs allow Advanced class VEs to administer the Technician examination Element 3A, but it still takes three accredited VEs. An accredited VE is one who has been accepted as qualified by the test session coordinator (VEC). Two General class volunteer examiners, who need not be accredited by a VEC, may conduct Novice-level examinations.

§Part 31.a(ii) requires that administering volunteer examiners not be related to the amateur radio operator candidates. A "girl friend" is not related so technically the VE could participate in the examination. While the "letter of the law" has been met, however, the spirit has not. VEs are precluded from examining relatives so as not to present the appearance that the applicant may have been "assisted." Examining a close friend also might be construed the same way by others. I wouldn't do it.

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## THE SCIENCE OF PREDICTING RADIO CONDITIONS

The new solar cycle continues to increase at a slow but steady pace. The monthly median sunspot number for February 1988 was 40, as reported by the Royal Observatory of Belgium. This results in a smoothed sunspot number of 35 centered on August 1987, an increase of 4 points from the previous month's level. A smoothed sunspot number in the low to mid 70s is forecast for this month.

The 10.7 cm median solar flux level for February was 105, based upon observations made at the Algonquin Radio Observatory in Ottawa, Canada.

### June Propagation

Typical summertime ionospheric propagation conditions are expected on the HF bands during June. With the sun at its highest point in the northern sky, solar absorption is expected to be at a near seasonal peak in the northern hemisphere. This should mean considerably weaker signals during daytime DX openings. On the other hand, much improved conditions are expected during the early evening hours and through the period of darkness. This is a normal summertime condition—better DX conditions during the period of darkness than during the daylight hours. However, there should also be ample opportunity for some good DX openings during the daylight hours as well.

Thunderstorm activity peaks during the summer months, and this is expected to result in considerably higher static levels on the HF bands during June.

With a moderate level of solar activity expected this summer, DX conditions should be considerably better than they have been for the past several summer seasons.

Despite a seasonal decrease in DX propagation on 10 meters, some fairly good openings should be possible during June to southern and tropical areas. Expect the band to peak for DX openings during the late afternoon hours.

The best daytime DX band during June should be 15 meters. Worldwide openings should be possible, but conditions will be best towards southern and tropical areas. Expect the band to peak for DX signals during the late afternoon and early evening hours. Due to the increase in solar activity, DX should be possible on this band well into the evening hours.

11307 Clara Street, Silver Spring, MD 20902

### LAST MINUTE FORECAST

Day-to-Day Conditions Expected for June 1988

Propagation Index . . . . .	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 2, 14-15, 29	A	A	B	C
High Normal: 1, 6, 13, 16-17, 26, 28	A	B	C	C-D
Low Normal: 3-5, 7, 10-12, 18, 20-23, 25, 27, 30	B	C	D	D-E
Below Normal: 8, 19, 24	C	C-D	D-E	E
Disturbed: 9	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.  
 B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.  
 C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.  
 D—Poor opening, with weak signals varying between S0 and S3, and with considerable fading and noise.  
 E—No opening expected.  
 3 dB per S-Unit.

### HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be good (B) on June 1st, excellent (A) on the 2nd, good-to-fair (B-C) on the 3rd to the 5th, good (B) on the 6th, etc.

While DX openings to one area of the world or another are forecast almost around the clock on 20 meters, optimum conditions are expected during the early evening hours, with good conditions throughout the entire period of darkness. During June and the summer months, expect 20 meters to be the best DX band during the nighttime hours. This also results from the increase in solar activity, and while it may take some getting used to, the signals will be there on 20 meters from sundown to sunrise, from all areas of the world, and often with exceptionally strong signal levels!

With fewer hours of darkness and a sharp seasonal increase expected in the level of static, DX conditions on 40 meters are not expected to be as good during June as they were earlier this year. Nevertheless, the band should open to many parts of the world from shortly before sunset and remain open to just after sunrise, often with exceptionally strong signals. This should be a good DX backup band to 20 meters during most of the period of darkness.

The shorter hours of darkness and sea-

sonally high static levels are expected to adversely affect DX propagation on both the 80 and 160 meters bands during June and the summer months. DX openings to some areas of the world are forecast for 80 meters during the hours of darkness, but signals will often be weak and noisy. Not much DX is expected on 160 meters until the fall, but an occasional opening may be possible during the hours of darkness.

Plenty of good short-skip openings are expected on the HF bands during the month. For distances less than 250 miles, try 80 meters during the day and 160 meters at night. For openings between 250 and 750 miles, 40 meters should be best during the day and 80 meters at night. Twenty meters should be optimum for openings during the day between 750 and 1300 miles, with 40 meters best from sundown to midnight and 80 meters from midnight to sunrise. Between distances of 1300 and 2300 miles use 20 meters during the day and 40 meters at night. Frequent short-skip openings, resulting from sporadic-E propagation, are also expected on 10 and 15 meters over distances between approximately 600 and 1300 miles. Fifteen meters should open over longer distances, up to 2300 miles, during the afternoon hours.

This month's CQ Propagation Charts contain DX predictions for the period of June 15 through August 15, 1988. Short-Skip Charts for June for openings between 50 and 2300 miles and from Hawaii and Alaska appeared in last month's column.

### VHF Ionospheric Openings

Sporadic-E propagation increases considerably during June and the summer months, and this is expected to result in fairly frequent 6 meter short-skip openings over a range of 1000 to 1400 miles. During periods of widespread and intense sporadic-E ionization, two-hop 6 meter openings may occasionally be possible up to distances of approximately 2500 miles.

An occasional sporadic-E opening on 2 meters can occur, particularly when ionization is very intense, over distances between approximately 1200 and 1400 miles.

While sporadic-E propagation can occur at any time, and hence its name, it is most likely to take place between 10 a.m. and 2 p.m. and again between 6 and 10 p.m., local daylight time.

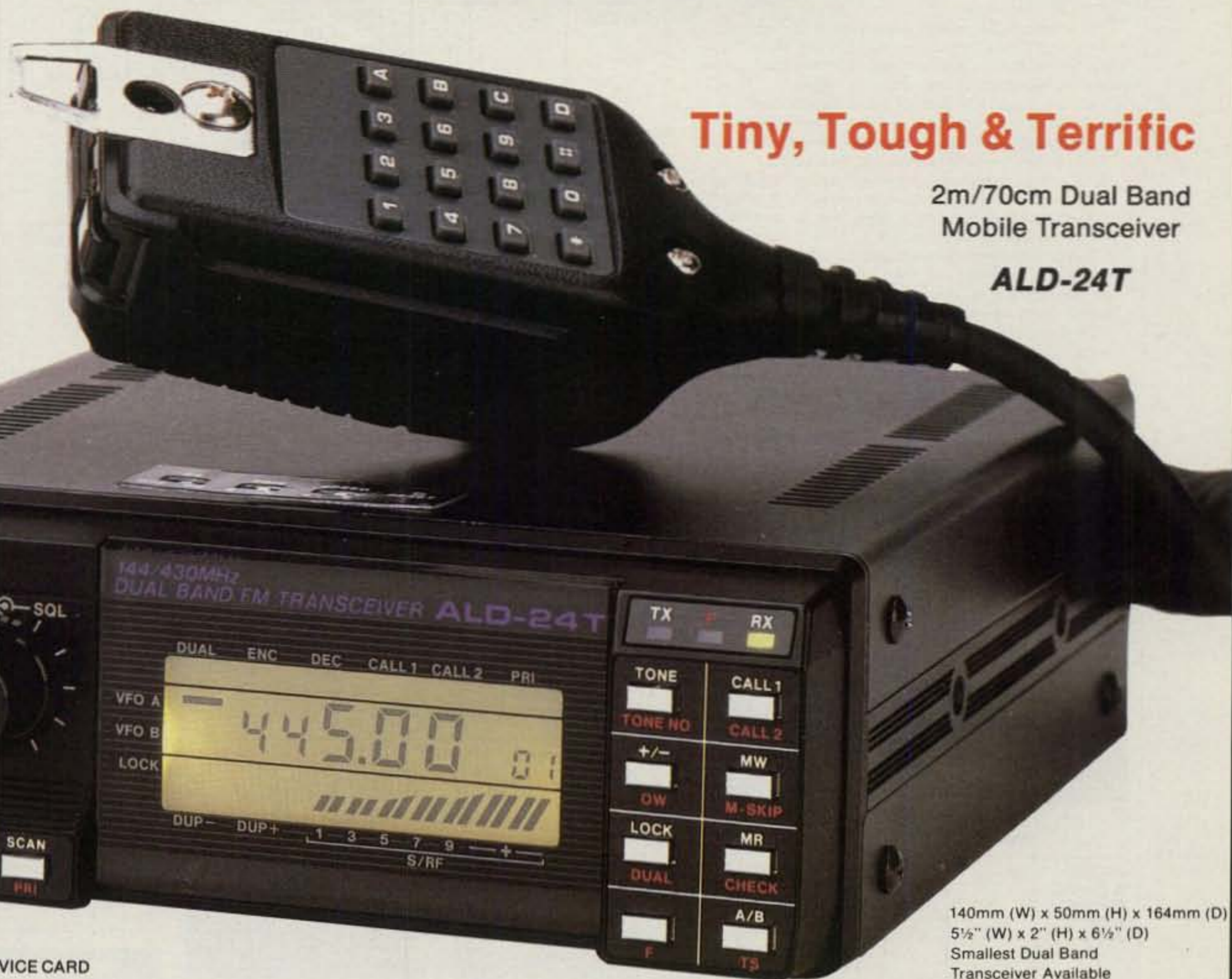
Meteors from the *Herculids* and *Scor-*



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**HOW TO USE THE DX PROPAGATION CHARTS**

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An \* indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate daylight time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

**June 15-August 15, 1988  
Time Zone: EDT (24-Hour Time)  
EASTERN USA TO:**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	Nil	11-16 (1) 16-18 (2) 18-19 (1)	06-09 (2) 09-13 (1) 13-15 (2) 15-17 (3) 17-22 (4) 22-00 (3) 00-03 (2) 03-06 (1)	20-22 (1) 22-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 22-00 (1)* 00-01 (2)* 01-02 (1)*
Northern Europe & European USSR	Nil	14-18 (1)	09-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-23 (3) 23-02 (2) 02-07 (1) 07-09 (2)	21-22 (1) 22-00 (2) 00-02 (1) 21-00 (1)*
Eastern Mediterranean & Middle East	Nil	11-16 (1) 16-18 (2) 18-19 (1)	12-14 (1) 14-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	20-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	16-18 (1)	10-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-22 (1)	03-07 (1) 07-09 (2) 09-15 (1) 15-16 (2) 16-17 (3) 17-23 (4) 23-01 (3) 01-03 (2)	20-22 (1) 22-00 (2) 00-02 (1) 22-00 (1)*
Eastern & Central Africa	16-17 (1)	11-14 (1) 14-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-21 (4) 21-23 (3) 23-02 (2) 02-06 (1)	21-00 (1)
Southern Africa	10-13 (1)	09-11 (1) 11-12 (2) 12-13 (3)	00-01 (1) 01-05 (2) 05-07 (1)	21-22 (1) 22-00 (2) 00-02 (1)

		13-14 (2) 14-15 (1)	15-16 (1) 16-18 (2) 18-19 (1)	23-01 (1)*
Central & South Asia	Nil	10-12 (1) 19-22 (1)	17-20 (1) 20-23 (2) 23-03 (1) 06-09 (1)	19-21 (1)
Southeast Asia	Nil	10-12 (1) 19-21 (1)	19-21 (2) 21-23 (1) 23-01 (2) 01-02 (1) 06-07 (1) 07-09 (2) 09-11 (1)	Nil
Far East	Nil	10-12 (1) 17-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-12 (1) 19-20 (1) 20-23 (2) 23-00 (1)	Nil
South Pacific & New Zealand	18-21 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	18-21 (1) 21-23 (2) 23-01 (3) 01-03 (4) 03-04 (3) 04-07 (2) 07-09 (3) 09-10 (2) 10-12 (1)	01-03 (1) 03-06 (2) 06-08 (1) 04-06 (1)*
Australasia	18-20 (1)	10-12 (1) 18-19 (1) 19-20 (2) 20-21 (3) 21-22 (2) 22-23 (1)	23-01 (1) 01-02 (2) 02-04 (3) 04-05 (2) 05-07 (1) 07-09 (2) 09-10 (1) 16-18 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	08-09 (1) 09-11 (2) 11-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	07-10 (4) 10-16 (3) 16-00 (4) 00-03 (3) 03-06 (2) 06-07 (3)	19-21 (1) 21-23 (2) 23-03 (3) 03-05 (2) 05-06 (1) 22-23 (1)* 23-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	12-14 (1) 14-16 (2) 16-18 (3) 18-19 (1)	08-09 (1) 09-11 (2) 11-15 (1) 15-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-23 (2)	11-16 (1) 16-17 (2) 17-18 (3) 18-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-11 (2)	20-21 (1) 21-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 22-03 (1)*
McMurdo Sound, Antarctica	Nil	16-20 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	02-05 (1)

**Time Zones: CDT & MDT (24-Hour Time)  
CENTRAL USA TO:**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	Nil	15-18 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-22 (3) 22-00 (2) 00-02 (1)	20-23 (1) 23-01 (2) 01-02 (1) 22-00 (1)*
Northern & Central Europe & European USSR	Nil	13-17 (1)	05-06 (1) 06-09 (2) 09-15 15-18 (2) 18-21 (3) 21-00 (2) 00-01	20-00 (1)
Eastern Mediterranean & Middle East	Nil	15-18 (1)	13-16 (1) 16-18 (2) 18-22 (3) 22-00 (2) 00-01 (1) 07-09 (1)	21-23 (1)
Western Africa	16-18 (1)	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	14-15 (1) 15-16 (2) 16-18 (3) 18-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	20-00 (1) 22-00 (1)*
Eastern & Central Africa	16-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	15-17 (1) 17-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	20-23 (1)

Southern Africa	10-12 (1)	09-10 (1) 10-12 (2) 12-13 (1)	22-00 (1) 00-03 (2) 03-07 (1) 13-15 (1) 15-17 (2) 17-19 (1)	21-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Central & South Asia	Nil	10-12 (1) 18-21 (1)	17-19 (1) 19-22 (2) 22-03 (1) 05-07 (1) 07-09 (2) 09-10 (1)	Nil
Southeast Asia	Nil	10-12 (1) 19-22 (1)	04-07 (1) 07-09 (2) 09-10 (1) 22-23 (1) 23-01 (2) 01-02 (1)	03-05 (1)
Far East	Nil	10-15 (1) 18-20 (1) 20-22 (2) 22-23 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-05 (1)	04-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
South Pacific & New Zealand	18-20 (1)	13-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	17-19 (1) 19-23 (2) 23-01 (4) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-13 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-08 (1) 01-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	17-20 (1)	14-15 (1) 15-17 (2) 17-19 (1) 19-20 (2) 20-21 (3) 21-22 (2) 22-23 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-07 (2) 07-09 (4) 09-11 (2) 11-12 (1)	01-03 (1) 03-07 (2) 07-08 (1) 03-06 (1)*
Caribbean, Central America & Northern Countries of South America	10-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-09 (1) 09-10 (2) 10-11 (3) 11-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	02-05 (2) 05-07 (3) 07-10 (4) 10-11 (3) 11-13 (2) 13-16 (3) 16-22 (4) 22-02 (3)	19-20 (1) 20-23 (4) 23-00 (3) 00-03 (2) 03-05 (3) 05-06 (1) 20-21 (1)* 21-23 (2)* 23-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-14 (1) 14-16 (2) 16-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	14-16 (1) 16-17 (2) 17-18 (3) 18-23 (4) 23-02 (3) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-22 (2) 22-02 (3) 02-03 (2) 03-05 (1) 20-03 (1)*
McMurdo Sound, Antarctica	Nil	15-16 (1) 16-19 (2) 19-21 (1)	17-19 (1) 19-23 (2) 23-01 (3) 01-03 (2) 03-05 (1) 07-09 (1)	03-06 (1)

**Time Zone: PDT (24-Hour Time)  
WESTERN USA TO:**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	Nil	09-11 (1) 15-17 (1)	05-06 (1) 06-08 (2) 08-15 (1) 15-21 (3) 21-23 (2) 23-03 (1)	20-23 (1)
Central & Northern Europe & European USSR	Nil	14-16 (1)	00-06 (1) 06-08 (2) 08-10 (1) 13-16 (1) 16-20 (2) 20-22 (3) 22-00 (2)	20-22 (1)
Eastern Mediterranean & Middle East	Nil	13-15 (1)	14-16 (1) 16-20 (2) 20-22 (3) 22-23 (2) 23-00 (1) 06-08 (1)	20-21 (1)
Western & Central Africa	14-16 (1)	07-09 (1) 11-13 (1) 13-17 (2) 17-18 (1)	14-16 (1) 16-18 (2) 18-20 (3) 20-21 (4) 21-23 (3) 23-03 (2) 03-04 (1) 07-09	20-22 (1)
Eastern Africa	Nil	13-16 (1)	16-19 (1) 19-22 (2) 22-00 (1)	Nil

Southern Africa	09-11 (1) 10-12 (2) 12-13 (1)	09-10 (1) 10-12 (1) 12-13 (1)	15-17 (1) 22-23 (1) 23-01 (2) 01-03 (1) 06-08 (1)	20-23 (1)
Central & South Asia	Nil	10-12 (1) 19-21 (1)	05-07 (1) 07-09 (2) 09-11 (1) 16-19 (1) 21-23 (1) 23-01 (2) 01-02 (1)	05-07 (1) 19-20 (1)
Southeast Asia	Nil	10-12 (1) 19-21 (1)	23-01 (1) 01-03 (2) 03-06 (3) 06-07 (2) 07-10 (1) 16-19 (1)	02-06 (1)
Far East	Nil	13-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-20 (1)	19-21 (1) 21-23 (2) 23-02 (3) 02-04 (4) 04-07 (2) 07-09 (3) 09-11 (2) 11-13 (1)	01-02 (1) 02-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 03-05 (1)*
South Pacific & New Zealand	13-15 (1) 15-18 (2) 18-20 (1)	10-12 (1) 12-15 (2) 15-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	17-19 (1) 19-21 (2) 21-02 (4) 02-06 (2) 06-08 (4) 08-10 (3) 10-11 (2) 11-12 (1)	22-23 (1) 23-01 (2) 01-06 (3) 06-07 (2) 07-08 (1) 23-02 (1)* 02-05 (2)* 05-06 (1)*
Australasia	15-17 (1) 17-20 (2) 20-21 (1)	13-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	20-22 (1) 22-23 (2) 23-00 (3) 00-03 (4) 03-05 (3) 05-06 (2) 06-08 (3) 08-09 (2) 09-13 (1) 13-15 (2) 15-17 (1)	22-00 (1) 00-01 (2) 01-05 (3) 05-06 (2) 06-08 (1) 01-04 (1)*
Caribbean, Central America & Northern Countries of South America	09-11 (1) 11-13 (2) 13-15 (1) 15-17 (2) 17-18 (1)	09-11 (1) 11-14 (2) 14-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	18-01 (4) 01-03 (3) 03-05 (2) 05-08 (3) 08-11 (2) 11-14 (1) 14-16 (2) 16-18 (3)	19-21 (1) 21-23 (3) 23-04 (2) 04-05 (1) 20-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	13-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	08-11 (1) 11-16 (2) 16-17 (3) 17-19 (4) 19-20 (2) 20-21 (1)	14-16 (1) 16-18 (2) 18-19 (3) 19-23 (4) 23-01 (3) 01-02 (2) 02-05 (1) 05-07 (2) 07-10 (1)	20-21 (1) 21-00 (2) 00-02 (1) 02-03 (3) 03-04 (2) 04-05 (1) 02-04 (1)*
McMurdo Sound, Antarctica	Nil	17-21 (1)	16-18 (1) 18-19 (2) 19-24 (3) 24-03 (2) 03-07 (1)	00-06 (1)

\* Indicates best time for eighty meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2), or higher.

piids showers are likely to enter the earth's atmosphere during the first half of June. Although classified as minor showers, some meteor-type propagation should be possible on the VHF bands between June 3 and 5, when both showers are expected to peak in intensity.

Little auroral activity is expected during June but some may be possible when HF conditions are Below Normal or Disturbed. Check the Last Minute Forecast at the beginning of this column for those days during June that are expected to be in these categories. These are the days on which auroral and perhaps other types of unusual short-skip ionospheric propagation are most likely to occur on the VHF bands.

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UG-21D/9913	N Male for RG-8 with 9913 Pin	3.95
UG-21B/9913	N Male for RG-8 with 9913 Pin	4.75
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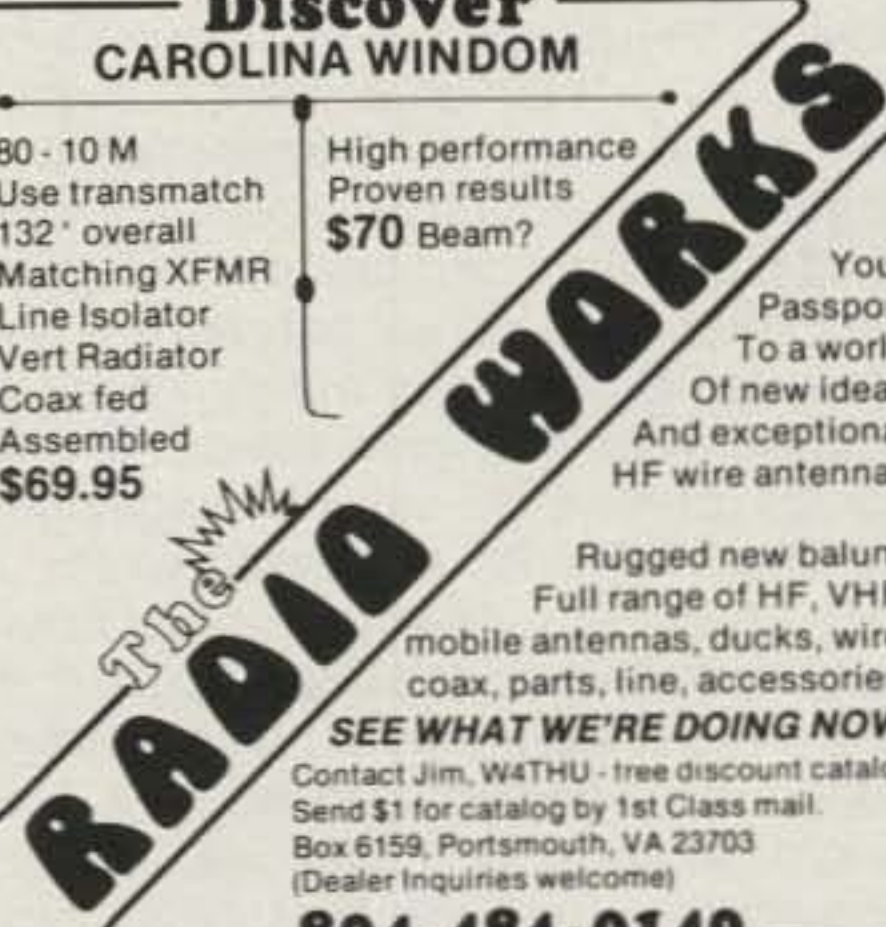
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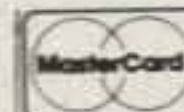
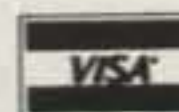
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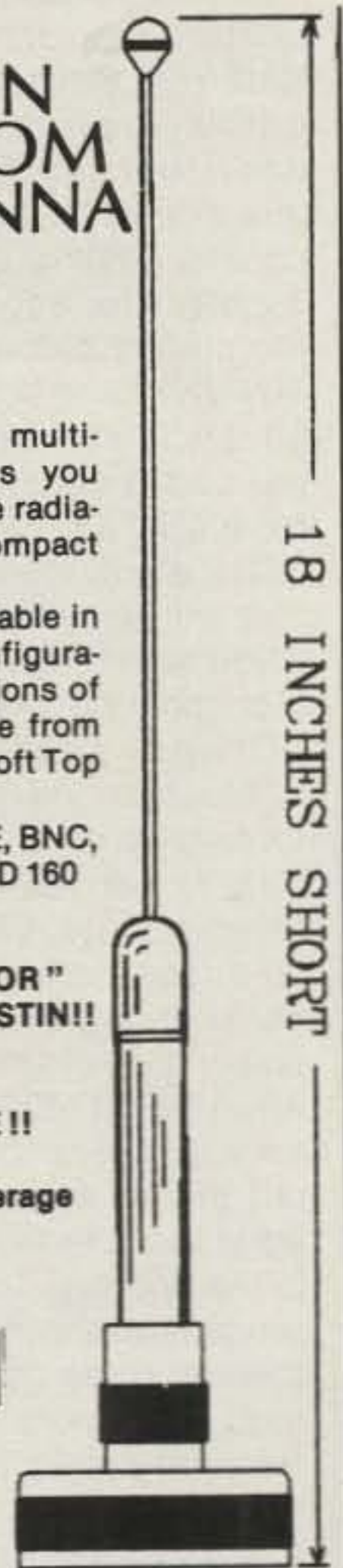
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## PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

**"S**pring has sprung, the grass has riz—I wonder where the E-skip is?" How fondly I recall this sage rhyme from the days of my misspent youth.

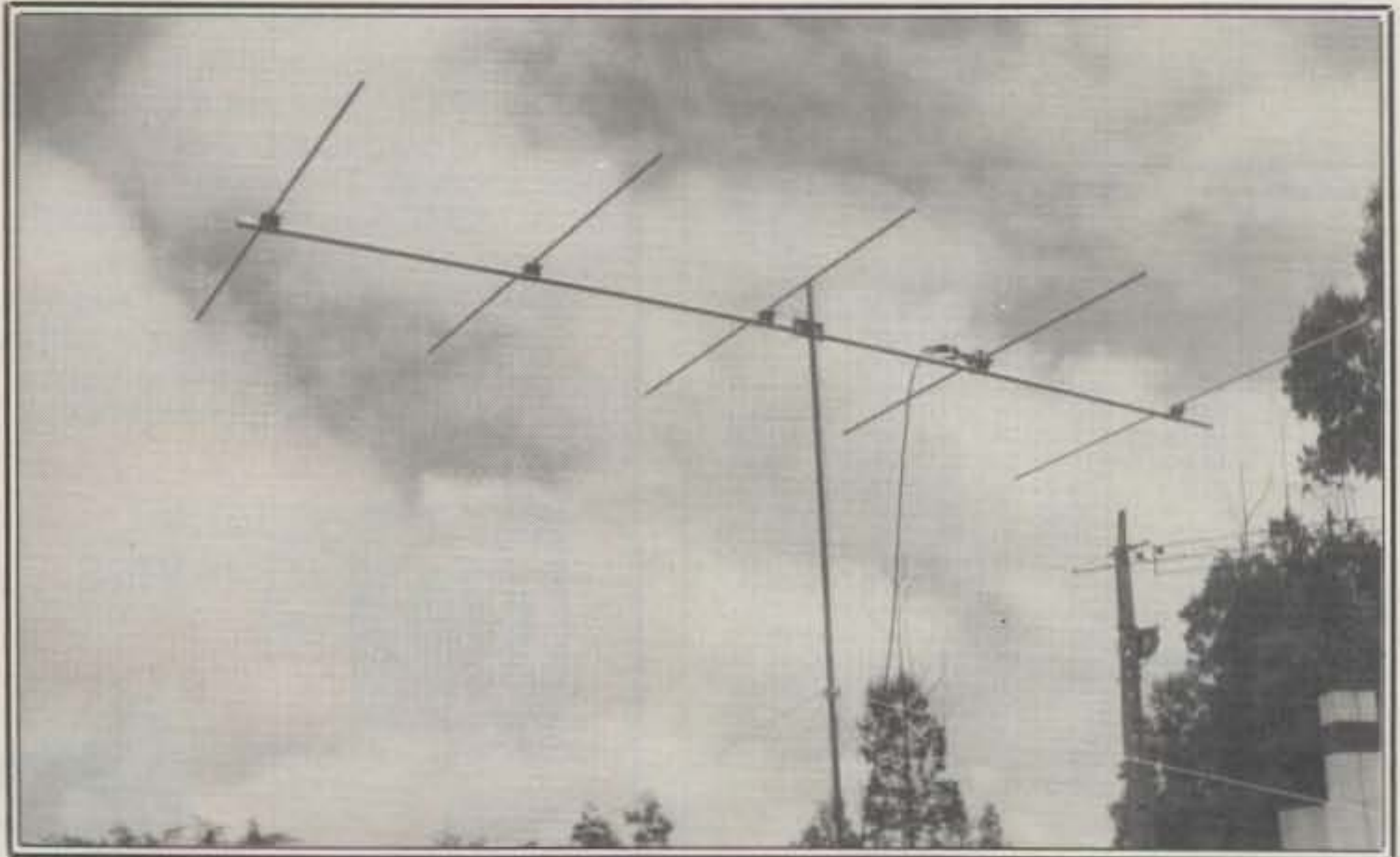
If you, like me, became licensed at an early age and spent all your free time squeezing another one-tenth dB from a 2 meter Yagi when we should have been out fishing, you might recall the same popular couplet. I never did learn anything about fishing.

June's a great time for antenna work. Don't forget to get it all finished up by the VHF QSO Party on the 11th-12th this month; if we're lucky, we may have a repeat performance of the incredible week-end-long E-skip many of us enjoyed last year, when dozens of us completed "double VUCC" (i.e., broke 200 grids) on 6 meters in a 33-hour period. The same week-end last year contained the first recorded E-skip QSO on 135 cm, so anything can happen in June!

This June the well-traveled W1XX contest crew will return to the site from which they made their all-time North American high score record in the 1987 VHF WPX Contest: the United Nations building in New York City (photos of their operation last July are in the VHF Contest results in this issue). Signing the call 4U1UN, the group operates from a fairly common grid square (FN30), but represents a "new country" for anyone who hasn't worked the station before. According to W1XX, 4U1UN will be active on 50 through 2304 MHz with competitive power and antennas on all bands, and will for the first time have a 70 cm EME station, belonging to NC11, along for the weekend operation. This will allow those so equipped to work FN30 and a new country on 432 MHz. Moonbounce skeds may be made via NC11 at his callbook address.

Also for the June contest, a group formed by core operators at WB2WIK/4 (FM27) last year is returning to Chincoteague Island, VA this time equipped for 50 through at least 2304 MHz and possibly extending through 10 GHz, depending on our level of ambition. We made a small effort from FM27 last year, with just four operators, one tower, and one generator, but thanks to splendid conditions managed to make the fifteenth highest score in the country. This time our group is extended to about eight operators, three towers, three generators, bigger antennas, and more equipment. Operating from the same site as last year, we intend

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Five-element homebrew Yagi used by CT3BX and CT3DK on their expedition to Madeira Island. This is a beautiful construction job. (Tnx photo KA3B)

to sign KC2PX/4 and will be the only station in FM27 above 144 MHz. As of this writing, operators will include KC2PX, KT2B, K2OWR, WB2IEY, WB2OTK, and WB2WIK for certain, plus N2EA, N6NB, K2TXB, and WA2YTM as "hopefuls." Skeds may be made via KC2PX at his callbook address.

Now is also a good time to plan for the VHF WPX Contest next month. If you look elsewhere in this issue, you'll see the writeup on the results of last year's VHF and that should whet your appetite. We award beautiful engraved trophies (wall plaques) to the high scorers in eight different categories of competition in the three major geographic areas worldwide, and parchment certificates to high scorers within various subcategories, not to mention all the notoriety that goes with having your call (and maybe a photograph) printed in a national magazine!

The VHF WPX is scheduled for July 16-17 and is a 48-hour contest open to any and all who wish to participate. Based on past experience, I'd say it pays to operate the beginning of the WPX (Friday night for most U.S. stations), as we've traditionally had the best conditions at that time. Of course, this could change. Whenever and wherever you get on, please send in a log. You never know... and you could be a winner!

For this year's VHF WPX some of our SCORE members will be spreading out in small portable operations. Stalwart back-

packer KT2B intends to operate from one or more rare grids in upstate NY. July is a splendid time to be outdoors communing with nature—you know, thunderstorms, mosquitoes, and so forth. It's a blast. For further information on the CQ Worldwide VHF WPX Contest, or for free log/entry forms, write to SCORE, P.O. Box 1325, Eatontown, NJ 07724 or to CQ.

VE1XH wrote to tell of his group's (the Maximum Usable Frequency Contest Group, VE1MUF) plans to activate some rare grids in Canada's Maritime provinces this summer. On June 11-12, the MUF group intends to operate from Deer Island, FN64. Then on Field Day weekend (June 25-26) they hope to operate from FN66 at Doaktown. For the VHF WPX they intend to be on from Miscou Island, FN77, and possibly also FN78. These are really rare grids, for you VUCC chasers. And any VE1 in the WPX will be rare as well. The MUF group's current project is to install a 6 meter beacon on 50.082 signing VE1MUF from FN65NX. They already have a beacon on 28.282, which might be of some help in predicting openings to VE1.

VE1XH runs a Yaesu FT757 with a 10 W 6 meter transverter and a 5-element beam at 50 feet and tries to listen to the band daily from his QTH in New Brunswick province. Gregory says he'd like to pick up an FT690 portable multimode transceiver and activate FN66, close to his home, when conditions are right.

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Here is Jorge, CX8BE, who is one of Uruguay's most active 6 meter operators. (Tx photo KA3B)

Thanks for your efforts, Greg! I only wish you were running a kilowatt and stacked Yagis so we could hear you more often!

Those of us who operate 6 meters may have an opportunity to work the Marshall Islands before long. KX6DS (who is K4TO when home in the States) has a TS940S, TS440S, a 45 foot pole, and a strong interest in getting on 6. Dave and I have been corresponding for a few months now, and I've given him some suggestions regarding equipment and anticipated activity levels. As of this writing, KX6DS was not equipped for 50 MHz but was considering making the investment. I've offered the use of some equipment if Dave will promise to use it! Anyone who might have more modern, lightweight gear to offer Dave in exchange for activating Kwajalein is encouraged to write to him at P.O. Box 1179, APO San Francisco, CA 96555.

New equipment? It's coming out so fast I haven't time to use it. I promised a report on the new Yaesu multimode, multiband FT736R for this issue, but I've been delayed by a combination of poor photography (my fault) and a heavy travel schedule; the review should be in the July issue for sure. My comment thus far, having used the rig from early February through late March: "It's the cat's meow" (no offense, Morris!). The FT736R is a very impressive radio that becomes more useful by the day. Most recently, I've been using the rig along with a new Tokyo Hy-Power HL-250U solid state (250 W output!) amplifier for 70 cm and this power-packed combination has been great fun. I find little I cannot work with the 250 watts output, although the 3CX800A7 amp remains a faithful standby companion. The HL-250U is the first 70 cm amplifier of this power level to be offered in the U.S., and I believe it will be a

big seller once people discover how well it works. Its internal GaAsFET preamp is excellent, and really spruces up the FT736R; plus, the THL amp has a front panel output meter, calibrated in "watts," that is actually quite accurate, and a built-in two-speed cooling fan. What a package!

N5LRD wrote to inquire about the NE8V "PEP Board" for Bird model 43 wattmeters offered for sale by Larry Chapman of Hillsboro, OH. Rod, I hadn't heard of this accessory until you made me aware of it, so I cannot comment on how well it works. Without a copy of the circuit, I can't even comment on its ingenuity; however, the writeup by NE8V which describes the modified Bird as a "standard RMS or PEP type" misses the target.

First, the standard Bird model 43 is by no means an RMS wattmeter. It is a travelling wave coupler in which a simple half-wave diode detector is arranged so as to monitor relative incident or reflected power over a narrow frequency spectrum. A true RMS meter measures power without respect to waveform; the simplest example of such an instrument is an absorption wattmeter which dissipates 100% of the power applied and measures thermal rise in the load. More complex instruments are capable of measuring true RMS power which may or may not be related to average, or CW, power, without absorbing all that is applied; however, such instruments cost a great deal of money and are generally beyond the grasp of amateurs.

"PEP" measurement is a controversial issue. I suspect that the accessory described by NE8V in his literature is really a peak sample-and-hold detector modification. This type of circuit samples the highest voltage (or current) present in a



series of successive pulses and uses a long (decay) time-constant amplifier to drive the output indicator, much in the same way a "slow AGC" circuit functions in an SSB receiver. This may loosely be considered a measurement of peak envelope power, but is more meaningfully described as a measurement of the highest single peak achieved in a sampling period. Using this method of "measurement," the indicated PEP might be ten times the "average" reading recorded by a similar non-peak indicating instrument. Will the signal received by a listener be 10 dB stronger than one which indicates one-tenth the transmitted "PEP" power on the same instrument? Possibly not.

We don't receive voice communications in instantaneous bursts of energy, but by a continuous flow of smoothly modulated energy. Single peaks don't contain meaningful data, so why measure their amplitude? Sure, it's important to avoid envelope "clipping," which can cause severe distortion (not to mention annoying "splatter" to stations using adjacent frequencies), but I know of no meter which will assure its user of a clean transmitted signal. The (ho-hum) oscilloscope is the only reasonably-priced instrument which allows you to monitor the undistorted peak envelope power your transmitter will achieve. This measurement, then, is PEP consistent with good engineering practice, something the FCC requires we maintain.

Besides, a good 'scope allows one to monitor the fullness of his transmitted signal, as well as the peak of each envelope. What good is a 1500 watt PEP signal that maintains only 50 watts average power? This discussion is a bit off the "VHF" track, but applies to anyone who transmits a signal at any frequency, so I think it relevant. Thanks for the inquiry, Rod. It made good food for thought.

Speaking of repeater controllers (weren't we?), RF Concepts is introducing their new 8-RC Controller which they claim "represents a different approach to repeater control. The RFC 8-RC was designed with emphasis placed on being a very flexible and powerful workhorse instead of providing fancy bells and whistles. The result," says their product release, "is a control system that can be expanded to handle all the requirements of large, multiple-site, interconnected systems as well as the simple repeater." The RFC 8-RC suggested list price is \$395—cheap for its features.

Other new RF Concepts products released March this year include two new 70 cm power amplifiers, models RFC 4-310 and 4-110. Each is rated for 100 watts output, with drive (input) levels of 30 W and 10 W, respectively. Each amplifier features a built-in GaAsFET preamp with 15 dB gain and 1.75 dB noise figure (claimed). Suggested list prices are \$324 and \$349 for the 4-310 and 4-110. For

further information on the 440 MHz amplifiers or the new repeater controller, contact RF Concepts, 2000 Humboldt St., Reno, NV 89509 (telephone 702-827-0133).

If you're really interested in reading about VHF, you might consider subscribing to KA0HPK's "VHF/UHF and Above Information Exchange," a monthly publication featuring articles, adverts, and tid-

bits of interest to VHFers. This is a pretty classy publication for a "homebrew" effort, and is worth the \$15.00 (bulk rate; \$19.50 for first class—probably increased by now) Rusty charges. For more information or a subscription, write to Harold W. Landes Jr., KA0HPK, P.O. Box 270, W. Terre Haute, IN 47885.

That's it for this month. Good VHFing!  
73, Steve, WB2WIK

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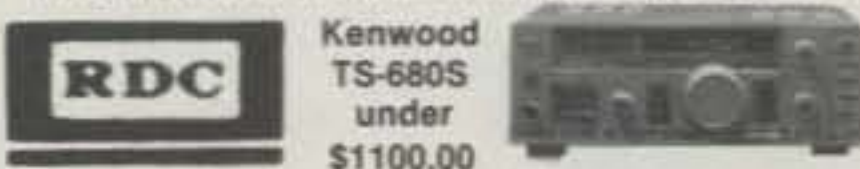
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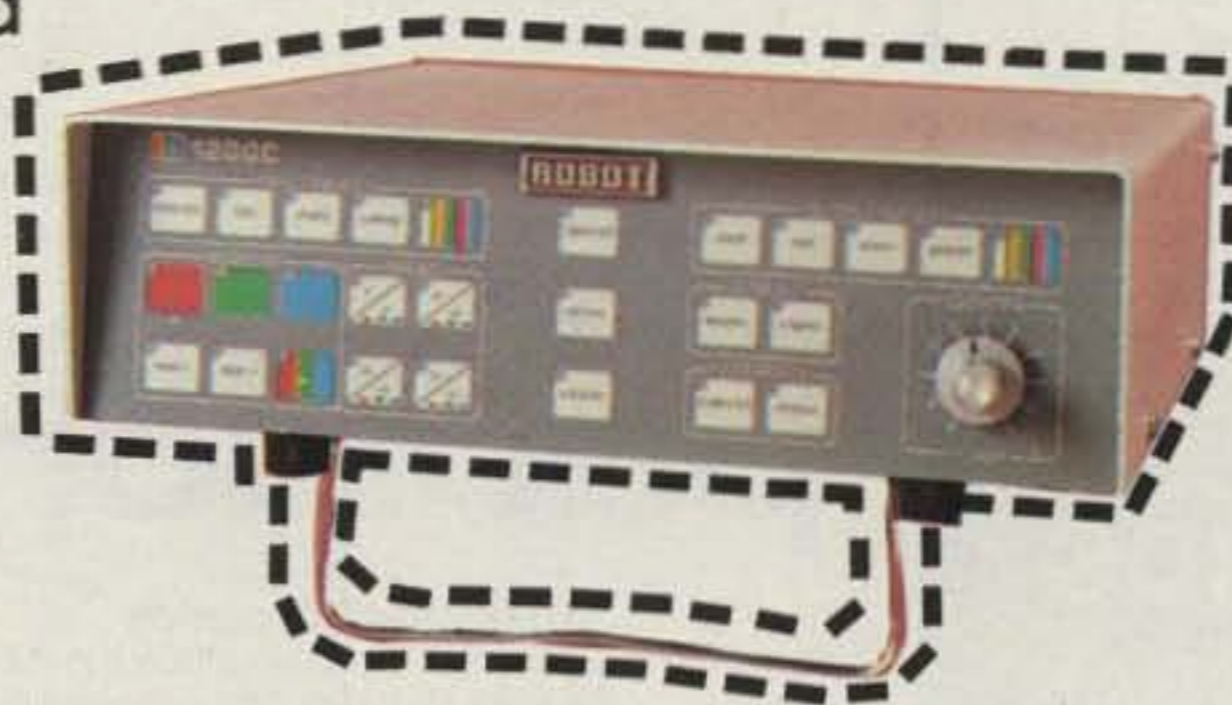
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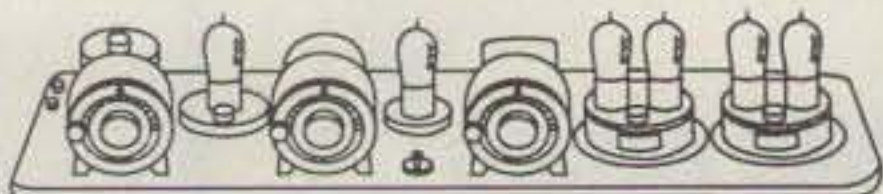
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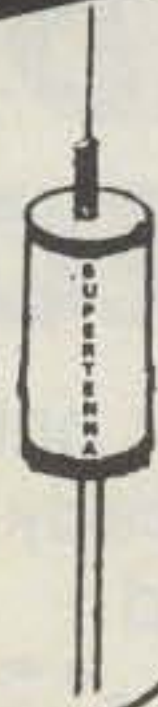
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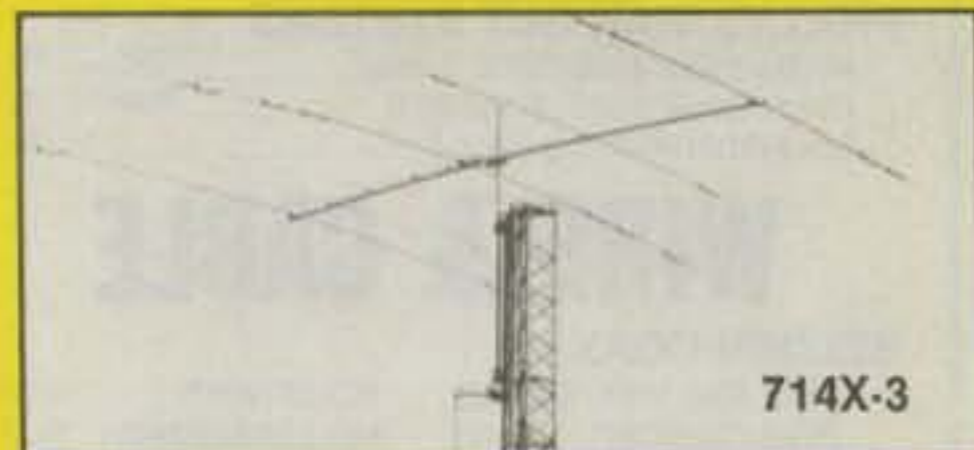
RC5-1	10 sq. ft.	\$251
RC5-3	10 sq. ft. preset	\$328
RC5A-2	25 sq. ft.	\$399
RC5A-3	25 sq. ft. preset	\$459
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(All rotators are UPS shippable)

See Lew McCoy's Review In August 1987 Issue Of CQ.



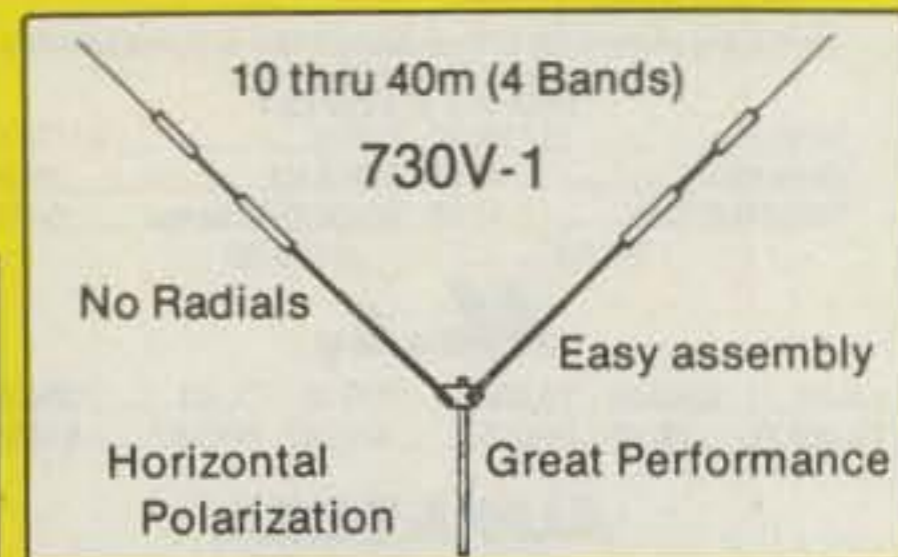
Creative Design Co., LTD.



714 Series Tribanders  
15-20-40 Meters

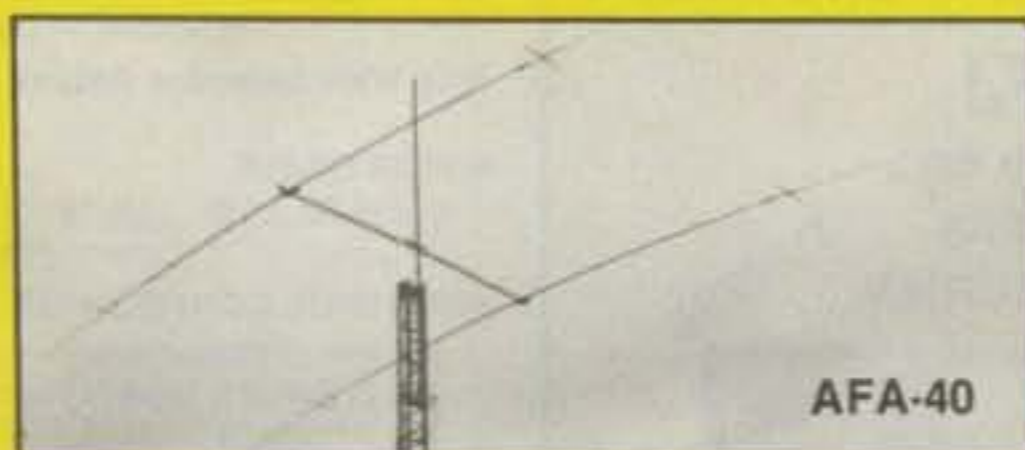
Model	Elements 40-20-15	Boom Length	Longest Element	Turning Radius	Wgt. Lbs.	Power PEP	Price
714T	2/4/4	28'6"	43'	25'3"	71	2 kw	\$574.
714X	3/4/4	32'5"	44'	26'2"	75	2 kw	\$762.
714T-3	2/4/4	28'6"	43'	25'3"	75	3 kw	\$707.
714X-3	3/4/4	32'5"	44'	26'2"	80	3 kw	\$928.

(Prices include balun)



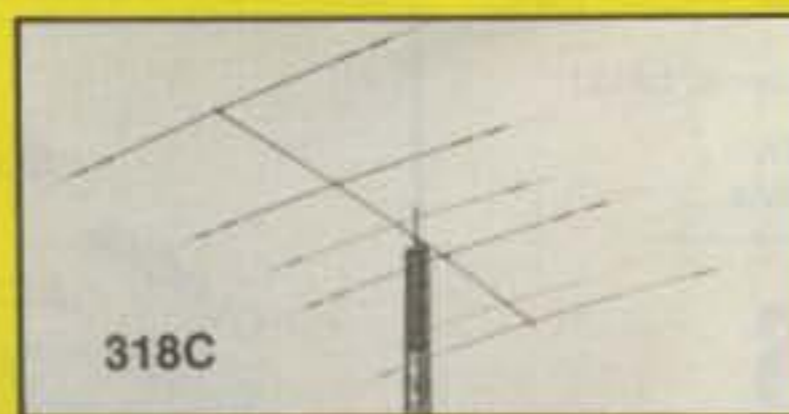
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2 Element Phased Arrays



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AFA-40	7	16'8"	47'10"	25'7"	42	3 kw	\$388.
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318B	3/4/4	20'11"	31'1"	18'4"	49	2 kw	\$434.
318C	5/5/5	29'10"	31'1"	21'	58	2 kw	\$643.

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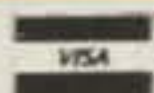
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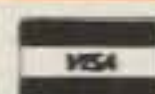


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CIRCLE 42 ON READER SERVICE CARD



# HIGH PERFORMANCE

ICOM has a commitment to high performance 220MHz gear. That's why we're the only manufacturer who can offer you a full line of 220MHz equipment...whether it's a mobile, handheld, base station transceiver, or fiber optic multi-bander.

**Handhelds.** Choose the full-featured five-watt **IC-03AT** with 10 full function memories capable of storing odd offsets and subaudible tones, scanning and

DTMF direct keyboard entry. Or select the **IC-3AT** easy-to-operate handheld featuring thumbwheel switch frequency selection.

**Mobiles.** ICOM offers the **IC-38A**, which sports a large LCD readout, 21 memories, scanning, and memory lock-out. The slim-line **IC-37A** features an LED readout, nine memories capable of storing offset and subaudible tones and both memory and band scan.

**Base Station.** The **IC-375A** is a 220MHz all mode operator's dream...25 watts output, an internal power supply, 99 memories, scanning, and all subaudible tones built-in.

**Multi-Bander.** The newest addition to ICOM's 220MHz family...the **IC-900** fiber optic controlled six-band mobile, which has a 220MHz optional band unit.

Quality. High Performance. That's ICOM 220MHz.

CIRCLE 57 ON READER SERVICE CARD



IC-3AT Handheld



IC-03AT Handheld

NEW! IC-375A Transceiver



IC-37A Mobile



IC-38A Mobile

## ICOM 220MHz

**ICOM**  
First in Communication

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All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 220MHz