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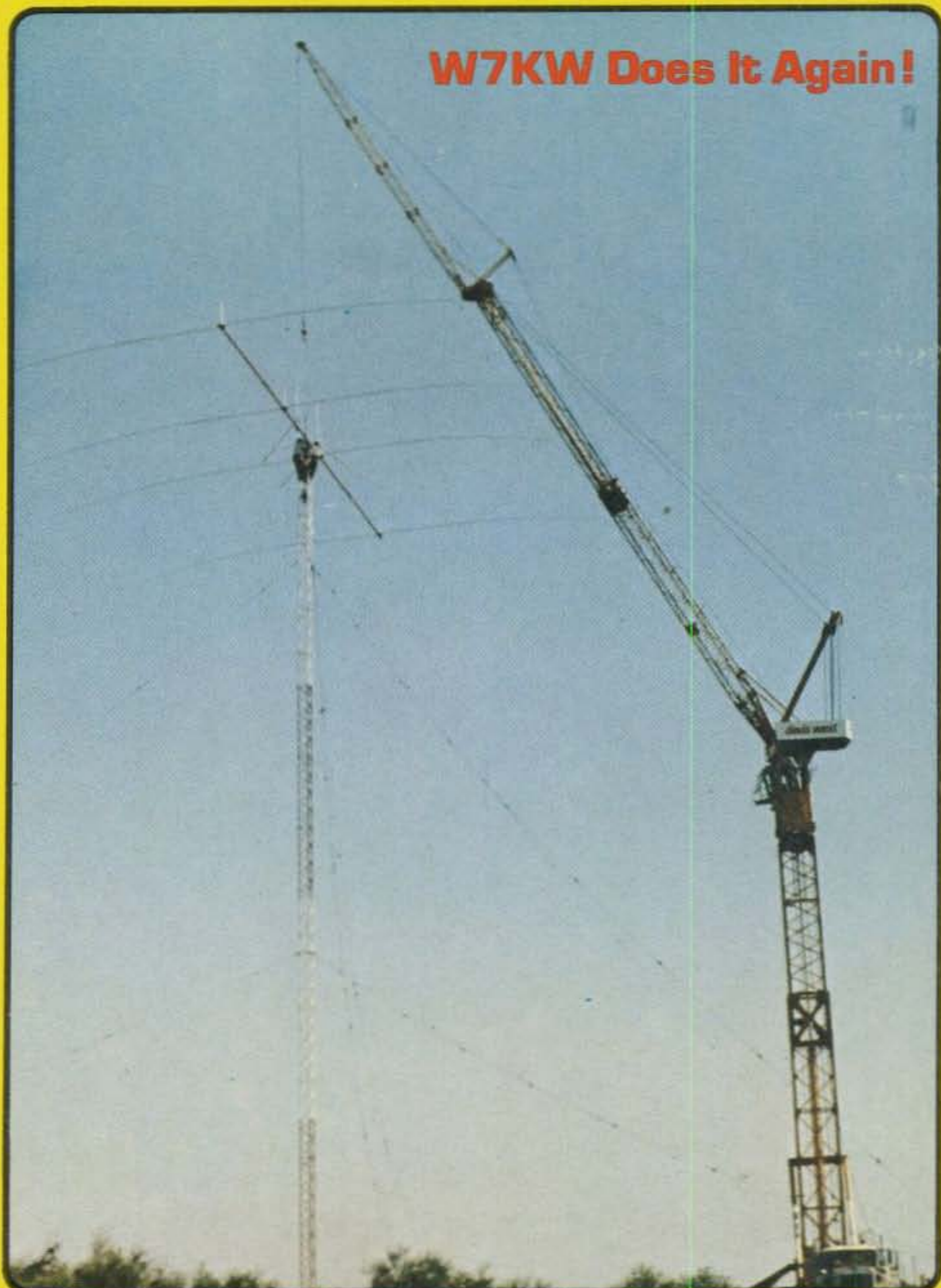
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THE RADIO AMATEUR'S JOURNAL



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Plus IF Passband Tuning/Full Band Coverage, Speech Processing, 235 Watts PEP All Bands and Much More.

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NEW! MFJ INTRODUCES THE GRANDMASTER MEMORY KEYERS

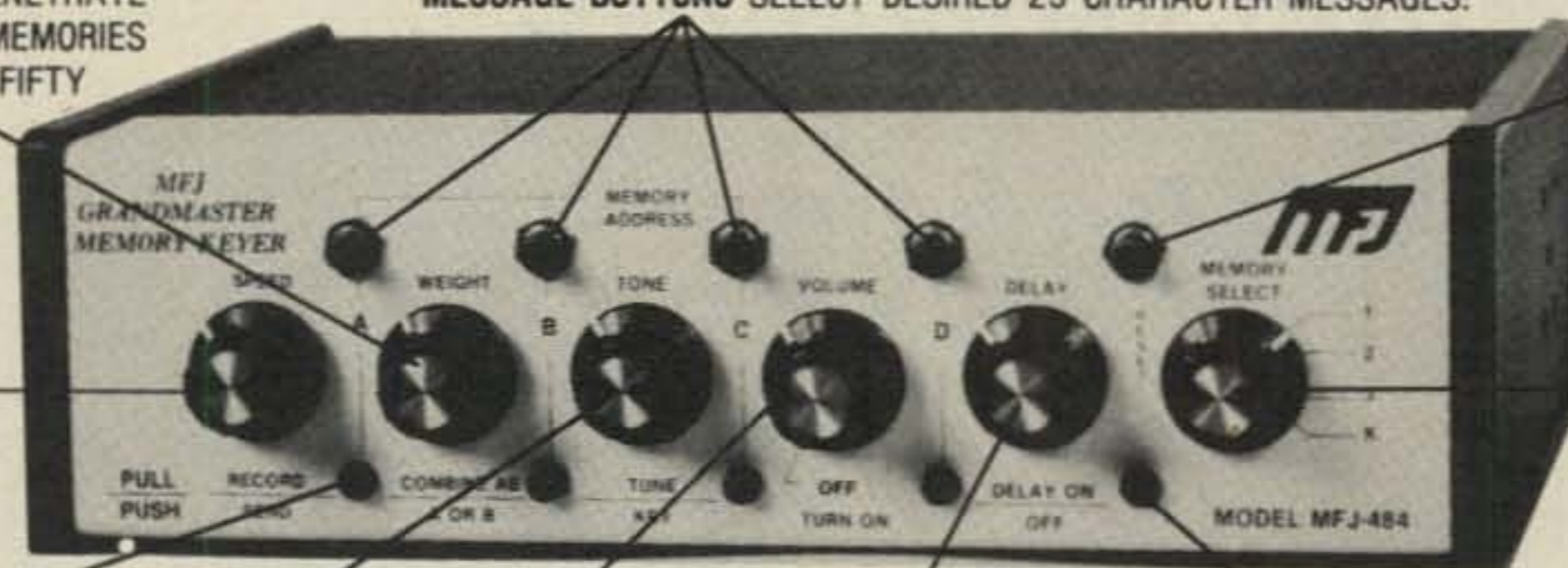
At \$139.95 this MFJ-484 GRANDMASTER memory keyer gives you more features per dollar than any other memory keyer available — and Here's Why . . .

WEIGHT CONTROL TO PENETRATE QRM. PULL TO COMBINE MEMORIES A AND B FOR 1, 2, OR 3 FIFTY CHARACTER MESSAGES.

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LEDs (4) SHOW WHICH MEMORY IS IN USE AND WHEN IT ENDS.

TONE CONTROL. PULL TO TUNE.

VOLUME CONTROL. POWER ON-OFF.

DELAY REPEAT CONTROL (0 TO 2 MINUTES). PULL FOR AUTO REPEAT.

LED INDICATES DELAY REPEAT MODE.

NOW YOU CAN CALL CQ, SEND YOUR QTH, NAME, ETC., ALL AUTOMATICALLY.

And only MFJ offers you the MFJ-484 Grandmaster memory keyer with this much flexibility at this price.

Up to twelve 25 character messages plus a 100, 75, 50, or 25 character message (4096 bits total).

A switch combines 25 character messages for up to three 50 character messages.

To record, pull out the speed control, touch a message button and send. To playback, push in the speed control, select your message and touch the button. That's all there is to it!

You can repeat any message continuously and even leave a pause between repeats (up to 2 minutes). Example: Call CQ. Pause. Listen. If no answer, it repeats CQ again. To answer simply start sending. LED indicates Delay Repeat Mode.

Instantly insert or make changes in any playing message by simply sending. Continue by touching another button.

Memory resets to beginning with button, or by tapping paddle when playing. Touching message button restarts message.

LEDs show which 25 character memory is in use and when it ends.

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PLUS A MFJ DELUXE FULL FEATURE KEYS. Iambic operation with squeeze key. Dot-dash insertion.

Dot-dash memories, self-completing dots and dashes, jamproof spacing, instant start (except when recording).

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control. 8 to 50 WPM.

Weight control lets you adjust dot-dash-space ratio; makes your signal distinctive to penetrate QRM.

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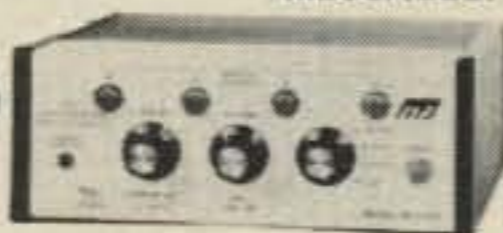
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- Speed, volume, weight, tone controls
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- Repeat, tune functions
- Built-in memory saver

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Similar to MFJ-484 but with 1024 bits of memory, less delay repeat, single memory operating LED. Weight and tone controls adjustable from rear panel. 6x2x6 inches. 110 VAC or 12 to 15 VDC.

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- Repeat function
- Tune function
- Built-in memory saver

\$79⁹⁵



Similar to MFJ-482 but with two 50 character messages, less weight controls. Internal tone control. Volume control is adjustable from rear panel. 5x2x6 inches. 110 VAC or 12 to 15 VDC.

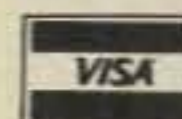
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New OMNI/SERIES B Filters The Crowd

The new OMNI/SERIES B makes today's bands seem less crowded. By offering a new i-f selection that provides up to 16 poles of filtering for superior selectivity. And a new Notch Filter to remove QRM. No other amateur transceiver we know of out-performs it.

NEW I-F RESPONSE SELECTION. OMNI comes equipped with an excellent 8-pole 2.4 kHz crystal ladder i-f filter which is highly satisfactory in normal conditions. But when the going gets rough, the new OMNI/SERIES B, with optional filters installed, provides two additional special purpose i-f responses.

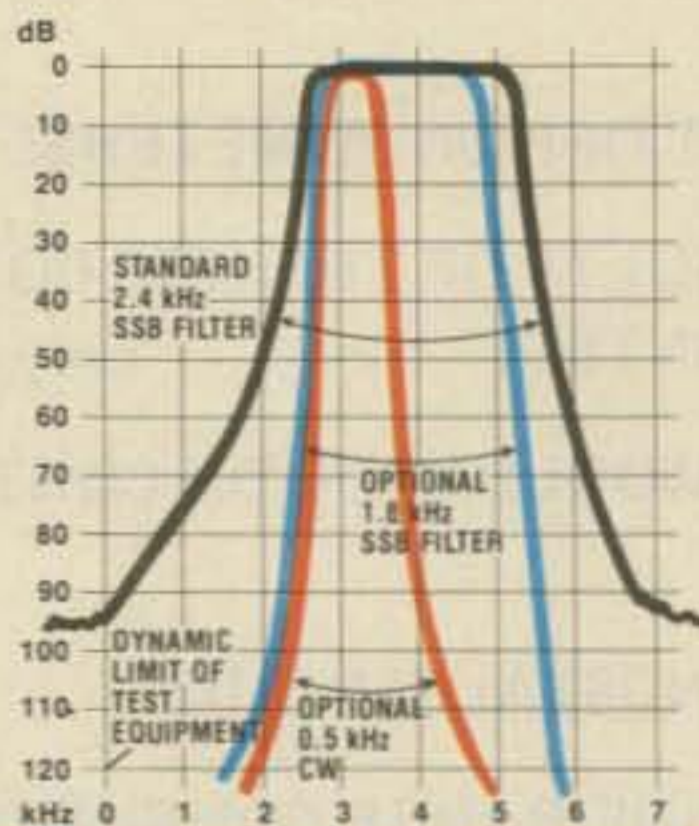
The 1.8 kHz crystal ladder filter transforms an unreadable SSB signal in heavy QRM into one that gets the message through. The 0.5 kHz 8-pole filter provides extremely steep and deep skirts to the CW passband window which effectively blocks out even the very strong adjacent signals.

Both of these filters can be front-panel switched in series with the standard filter to provide up to 16 poles of filtering for near-ultimate selectivity. In addition, the standard CW active audio filters have three bandwidths (450, 300, and 150 Hz) to give even further attenuation to adjacent signals. In effect, OMNI/SERIES B has six selectivity curves—three for SSB and three for CW. That's true state-of-the-art selectivity.

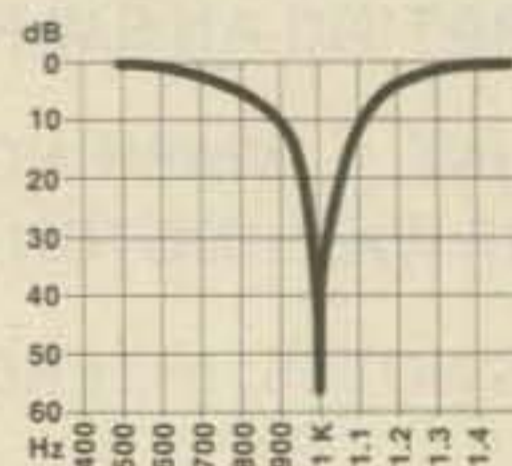
NEW NOTCH FILTER. A variable frequency notch filter in OMNI/SERIES B is placed inside the AGC loop to eliminate interfering carriers and CW signals without affecting received signals. Attenuation is more than 8 "S" units (over 50 db) for any frequency between 0.2 kHz and 3.5 kHz.

OMNI/SERIES B RETAINS ALL THE FEATURES THAT MADE IT FAMOUS.

All solid-state; 160-10 meters plus convertible 10 MHz and AUX band positions; Broadband design for band changing without tuneup, without danger;



OMNI/SERIES B I-F RESPONSES WITH STANDARD AND OPTIONAL FILTERS.



NOTCH FILTER PERFORMANCE ADJUSTED TO 1 kHz POINT.

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EXPORT: 5715 LINCOLN AVE., CHICAGO, ILL. 60646

Choice of readouts —OMNI-A for analog dial or OMNI-D for digital dial; Built-in VOX and PTT facilities; Selectable Break-in, instant or delayed receiver muting; Dual-Range Receiver Offset Tuning, ± 5 kHz or ± 0.5 kHz; Wide Overload Capabilities, dynamic range typically exceeds 90 dB and a PIN diode switched 18 dB attenuator is also included; Phone Patch Interface Jacks; Adjustable ALC; Adjustable Sidetone; Exceptional Sensitivity; 200 Watts input to final with full warranty on final transistors for first year, pro-rata for 5 years; 100% Duty Cycle for RTTY, SSTV or sustained hard usage; 12 VDC Circuitry for mobile use, external supplies for 117/220 VAC operation; Front Panel Microphone and Key Jacks; Built-in 25 kHz Calibrator in analog dial model; Zero-Beat Switch; "S"/SWR Meter; Dual Speakers; Plug-In Circuit Boards; Functional Styling, black textured vinyl over aluminum "clamshell" case, complementary nonreflective warm dark metal front panel; Complete Shielding; Easier-to-use size: 5 $\frac{3}{4}$ "h x 14 $\frac{1}{4}$ "w x 14"d; Full Options: Model 645 Keyer \$85; Model 243 Remote VFO \$139; Model 252MO matching AC power supply \$139; Model 248 Noise Blanker \$49; Model 217 500 Hz 8-pole Crystal Ladder CW Filter \$55; Model 218 1.8 kHz 8-pole Crystal Ladder SSB Filter \$55;

OMNI owners note: Your OMNI can be converted to a SERIES B model at the factory for just \$50 (plus \$5 for packing and shipping). The notch filter replaces your present squelch control and provision is made for the two additional optional filters; a partial panel with new nomenclature is provided. Contact us for details.

Model 545 Series B OMNI-A \$949
Model 546 Series B OMNI-D \$1119

Experience the uncrowded world of OMNI/SERIES B. See your TEN-TEC dealer or write for full details.

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Zero Bias

an editorial

Well, we're about to enter our 34th year of talks and research and hearings to bring about an RFI Bill. Now, I can't fault the present-day Commissioners at the FCC for all the delay, some of them were probably in grade school when this all started, but they still are dragging their heels kicking and screaming in an attempt to thwart positive action. I reported on the start of the 33rd year last October and perhaps there will be better news by next October. I don't mean to rush anyone or have anyone do anything that might be considered rash, but 34 years should approach enough time to make up one's mind as to the validity of the problem. It doesn't take Congress 34 years to vote themselves a raise, they see that need clearly enough. Maybe if we sort of worked towards a time limit of say fifty years, Congress and the FCC could (with three or four extensions) come up with a workable starting point.

Even though this issue is labeled October, it will be in the mail by the first week in September so that news of WARC and WARC itself is several weeks in the coming, there's been enough speculation for me to add anything else. We'll all find out soon enough what the final results are.

CQ WW DX Contest Season

It's CONTEST TIME once again and amateur radio's biggest and best DX contest is ready to start. The anticipation and excitement have been building for months and you can almost feel it in the air as last minute plans are finalized, provisions and equipment packed and stored all set to go on the big day. Groups of amateurs will leave their homes at staggered times, taking various routes to avoid being followed, and thinly disguised report to smaller, less known airports (pretending not to know each other) and head to exotic ports of call in order to set up a winning station. It's going to be a lot of hard work, a lot of sleepless nights

and a maximum effort by all. It's also going to be a lot of fun and when it's all over and the smoke clears, you can certainly sit back, relax, and know darned well it was worth it. Good luck to one and all.

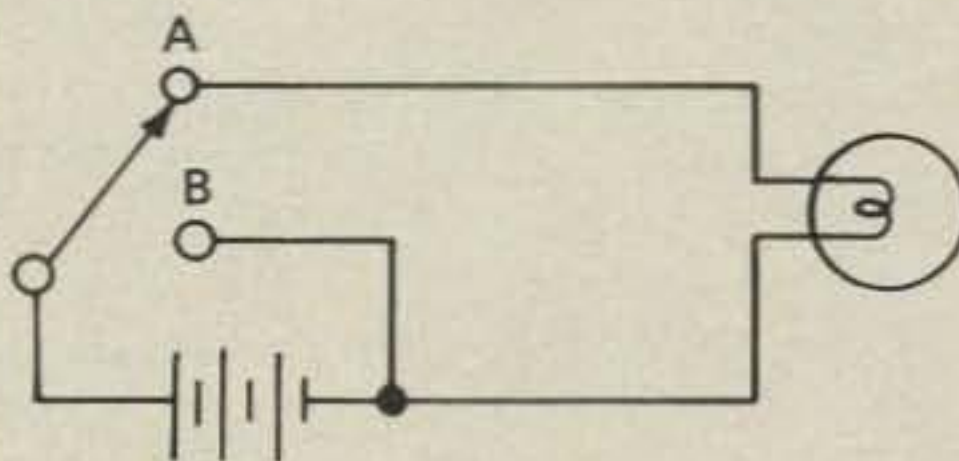
New CQ Features

Many of us have whiled away the time waiting for our food at a luncheonette or diner by working on those placemat puzzles. You can guess the state capitols, find the 37 errors, complete the dots or learn sage remedies to cure warts, dandruff or the vapors. Corny as it may be, it's generally fun and it's hard to resist getting involved with them.

Under our general heading of "Cranium Queries" we're introducing a series of puzzles, quizzes, and error ridden circuits (this time on purpose) to test your ingenuity, patience, and knowledge. The solutions will follow in the next issue (so you can't cheat) and you can find out how well you scored. The only prize is your enjoyment. If you need an example (remember the matchbook cover contests where they give you the first answer?) look below. This one won't be used again.

FIND THE ERROR

A Battery Burnout Device and Indicator Circuit



Solution 1

Keep flipping the switch from A to B and back again. You will not only

kill the battery, but you will know when it is dead when the bulb no longer lights.

5 Band WAZ Award To Be Reorganized

The 5 Band WAZ Award started out with the best of intentions. The concept seemed a natural and it was enthusiastically thought of as amateur radio's Ultimate Achievement Award, and it is. In our zeal and exuberance to go ahead with the new program, we committed a cardinal error. We started it up without being prepared to adequately support it, both in administrative procedures and in actually having award material to distribute. Once the Award was announced, it took off faster than anticipated. It was and is very popular. The problems still exist and refinements are in order and a lot of people are going to be unhappy, but the basic concept will persist and the 5 Band WAZ Award will be and is the most prestigious award in amateur radio.

One problem and perhaps a most significant problem is that of record keeping. The original plateau system would require keeping track of where numerous amateurs are at any given time with respect to total number of Zones. It would mean constant movement of individuals upgrading their way to the top. It would also mean that an individual could amass a total of 150 zones without once qualifying for the regular WAZ Award. This isn't quite right or what we had in mind. Another problem that arose is the design of the certificate itself. Originally, this meant that appropriate space would have to be provided for various seals, ribbons or such to signify at what level the individual was at. By and large, the biggest fact we neglected to notice was that the 5 Band Award is, to use a TV term,

(Continued on page 72)

ANOTHER FIRST FROM DENTRON more power for less.



In January, 1978, our engineers developed a unique linear amplifier. The GLA-1000 was to be the smallest amateur linear to offer 1200 watts SSB PEP input, and 1000 watts CW input, with a built-in power supply, at the lowest possible price, \$379.50 sugg. retail.

How would it perform? Could a unit this small (5 $\frac{3}{8}$ "H x 11"W x 11"D) and economical measure up to high standards set by "professional" amateurs across the country? We decided to let a group of amateurs tell us.

The GLA-1000 was field tested for 1 month by the following amateurs: Robert Allen W8IO, Harold Unger WA2EQN, Robert Schiers N0AN, Jim Turle WA8RCN, Alan Applegate K0BG, Howard Townsend WA5MLT, Mickey LeBoeuf K5ML, Tom Lutman WB8ZWY, Ed Clegg W3LOY and Andy Calandria K5MVP. The group was instructed to "use the prototype under tough operating conditions, not to baby it in any way."

What was the response? Some on the air comments received by W8IO, "Fantastic signal, 12 db over barefoot exciter" (75SSB). "Excellent keying, no change in wave form, 5-9 +30 db in Kentucky" (40CW). From N0AN, "Overall quality excellent and up to the standards. Dentron has come to stand for." From K5ML, "Finally a high quality amplifier that everyone can afford."

Response was unanimously positive. Build a powerful linear with special features like full metering of essential voltages and currents, a back-lit, black-out meter that even includes a relative, power output function. Keep it small and economical so that it is within the reach of all amateurs, and you've got a winner!

In inflationary times like these, it's important to find ways to do more for less.

We did, and we're proud of it.

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It's a digital signal injector. And it thinks for itself.

It may look like a logic probe . . . but our DP-1 Digital Pulser is a lot more unique. This handheld, circuit-powered instrument is actually a miniature pulse generator built to speed digital troubleshooting.

Touch it to a circuit, and DP-1 automatically senses the logic state. So when you push the button, out comes one perfect pulse — preset to the logic family you're working with — of the proper polarity to force the state the other way. Hold the button down for a second and it starts injecting a 100pps pulse train. With all the punch you need — up to 100 mA.

Think what a help that can be when your logic circuit is doing something illogical. (And just in case *you* do something illogical, we've included reverse-polarity and short-circuit protection, as well.)

It's smart to save time with a DP-1. At \$74.95*, it's a smart buy, too.

Smarter tools for testing and design.

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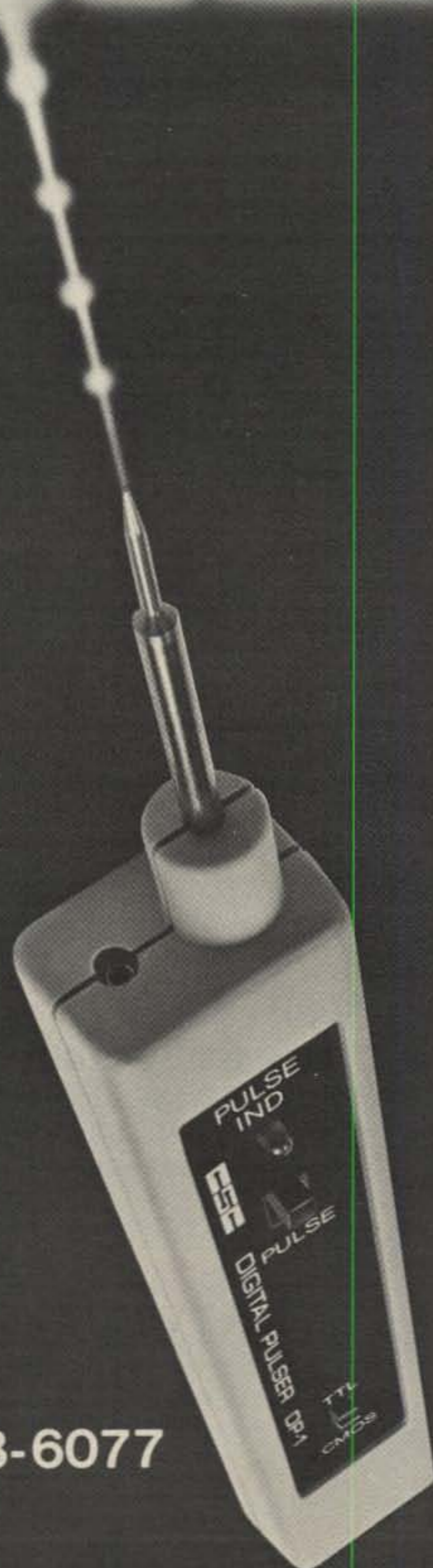
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Europe: CSC UK LTD. Phone Saffron-Walden 0799-21682, TLX 817477
Canada: Len Finkler Ltd., Ontario

Call toll-free for details **1-800-243-6077**

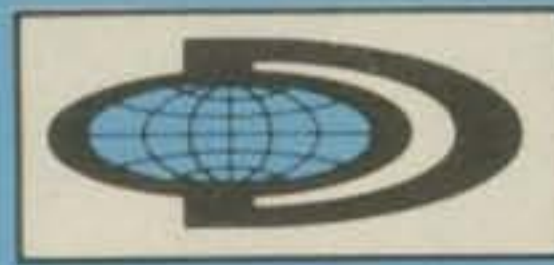
*Suggested U.S. resale. Available at selected local distributors.
Prices, specifications subject to change without notice.

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CIRCLE 9 ON READER SERVICE CARD



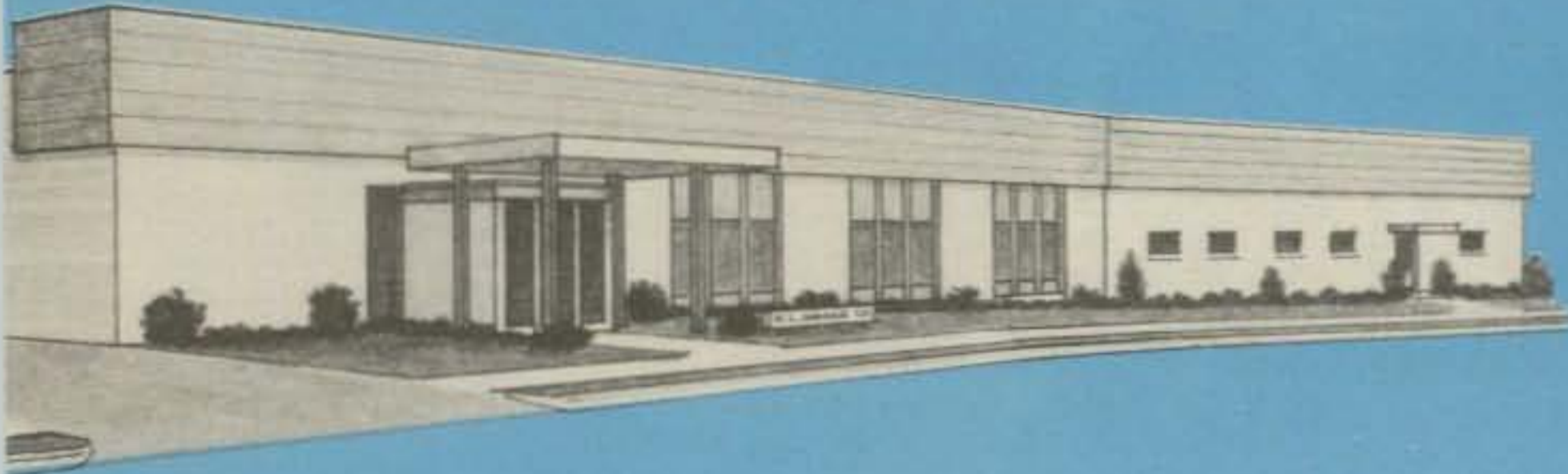
Known throughout the world for quality...



DRAKE

**Equipment
for**

Radio Communications



R. L. DRAKE COMPANY

540 Richard Street, Miamisburg, Ohio 45342

Phone (513) 866-2421 • Telex 288-017

Specifications, availability and prices subject to change without notice or obligation

Drake TVI Filters

High Pass Filters for TV Sets

provide more than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.



Model No. 1603

Drake TV-300-HP

For 300 ohm twin lead. New terminals for easy installation.



Model No. 1610

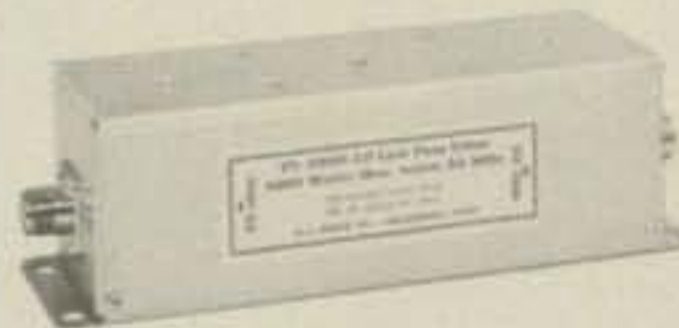
Drake TV-75-HP

For 75 ohm TV coaxial cable; TV type "F" connectors installed.

Low Pass Filters for Transmitters

have four pi sections for sharp cut off above the hf amateur bands and to attenuate transmitter harmonics falling in any TV channel and fm band. 52 ohm. SO-239 connectors built in.

Model No. 1608 **Drake TV-3300-LP**



1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as harmonic interference.

Model No. 1605 **Drake TV-42-LP**



is a four section filter designed with 43.2 MHz cut-off and extremely high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input.

Drake TVI Filters help you keep peace with your neighbors

Model
1514



Drake WH-7 Directional RF Wattmeter

1.8-30 MHz

Drake directional, through line wattmeters, using printed circuits, toroids, and state of the art techniques, permit versatile performance and laboratory accuracy, yet at a lower cost.

Removable coupler provides remote metering, and allows convenient positioning of coaxial cable.

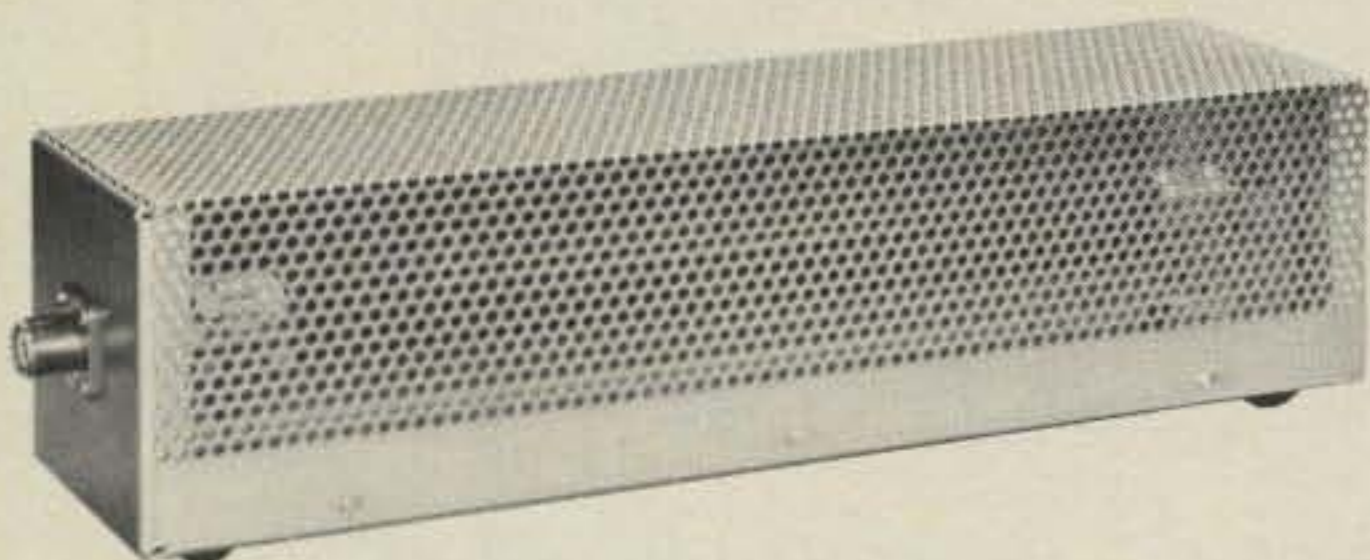
WH-7 wattmeter makes possible quick, accurate adjustments of antenna resonance and impedance match, when placed between transmitter and matching network.

Drake WH-7: Designed for user convenience and high accuracy. This instrument includes three calibrated scales for rf power to satisfy applications from QRP to high power (0-20, 0-200 and 0-2000 watts full scale) A fourth calibrated scale provides direct reading VSWR information, and is switch selected from front panel. The WH-7 is styled to match the 7-line.

Specifications

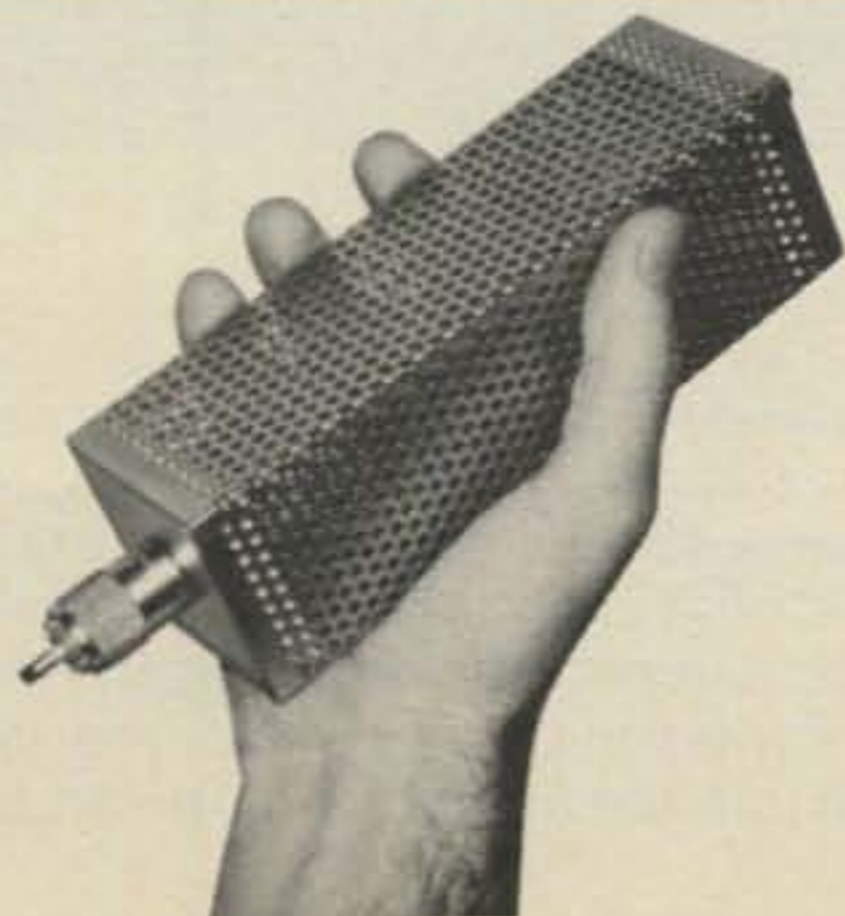
Frequency Coverage	1.8-30 MHz
Line Impedance	50 ohm resistive
Power Capability	2000 W continuous
Jacks, Removable Coupler	Two S0239 input and output connectors
Semiconductors	Two power meter rectifiers
Accuracy	± (5% of reading + 1% of full scale)
VSWR Insertion	Insertion of wattmeter in line changes VSWR no more than 1.05:1
Shipping Weight	3 lbs (1.4 kg)
Dimensions	5.3"H x 6.9"W x 7.5"D (13.5 x 17.5 x 19 cm)

Drake "Dry" Dummy Loads—no oil required



Model 1551 Drake DL-1000

- **1000 watts** for 30 seconds, with derating curve to 5 minutes. Designed to accept Drake FA-7 cooling fan for extended high power operation.
- **VSWR of 1.5:1 max.** 0-30 MHz.
- Provided with SO-239 coax connector, and rubber feet for desk or bench use.
- **Size 14" x 3.6"** (35.6 x 9.1 cm). Wt. 2 lbs (910 g)



Model 1550 Drake DL-300

- **300 watts** for 30 seconds, with derating curve to 5 minutes.
- **Built-in PL-259** coax connector for direct connection to rear of transceiver or transmitter—no jumper coax necessary.
- **VSWR of 1.1:1 max.** 0-30 MHz 1.5 max. 30-160 MHz.
- Ideal as bench test device for amateur or commercial hf and vhf gear.
- **Small size** fits conveniently in any field service tool box. **6.7" x 2.08"** (17.0 x 5.3 cm). Wt. 11 oz (310 g)

*A remarkable
engineering
breakthrough...*

DRAKE TR-7

0-30 MHz

continuous coverage reception—
no gaps—no range crystals required †

160-10 Meters

Amateur Band transmission, including
capability for MARS, Embassy,
Government, and future band expansions*

*The Drake TR-7 System significantly
advances the technology of worldwide
radio communications and unfolds
an entirely new state of the art.*



Models shown
are Drake TR-7/DR-7
with RV-7 and MS-7

Designed and manufactured in U.S.A.

In 1963 Drake led the way by producing the first commercially available amateur transceiver that employed the now widely copied 9 MHz i-f frequency. Even today, many major competitive transceivers are still being introduced using i-f's in this range.

Now, Drake leads the way again by developing the first commercially available amateur transceiver that uses a 48 MHz i-f, through the technique of "Up-Conversion." This system greatly improves image and general coverage performance, and will be copied in the years to come. With Drake, you can join the new state of the art today!

solid state continuous coverage synthesized hf system

Model 1337



The design philosophy behind the new Drake "7 system" has created a most sophisticated system concept, extending from engineering to the visual appearance of the system and each of its parts.

The TR-7 System is the result of one of the most extensive engineering and development programs in the history of the R. L. Drake Company, and provides the user with many innovative design features.

With the excellent design of its front panel and controls, the system is simple and straightforward to operate—makes state of the art performance a pleasure.

Broadband, Solid State Design—100% solid state throughout. All circuits are broadbanded so there is no need for preselection tuning or transmitter adjustments of any kind.

Synthesized/PTO Frequency Control—A Drake exclusive: Special high performance synthesizer, combined with the famous Drake PTO, provides smooth, linear tuning with 1 kHz dial and 100 Hz digital readout. 500 kHz up/down range switching is pushbutton controlled.



out-of-band transmit coverage is available for MARS, Embassy, Government, and future band expansions in the range 1.8 thru 30 MHz.* The Aux-7 Board also provides 0 thru 1.5 MHz receive coverage and crystal-controlled fixed channel operation for Government, Amateur, or semi-commercial applications anywhere in the hf range. The TR-7 w/o DR-7 provides coverage of the Amateur Bands 160 thru 15 meters and the 28.5-29.0 MHz range of 10 meters. The Aux-7 Range Program Board is also useable in the standard TR-7 for extra range coverage as noted.

State of the Art Receiver Design—The Drake TR-7 introduces another industry first for amateur transceivers: "Up-Conversion," in combination with a special high level double balanced mixer for superior strong signal handling, spurious and image response performance. The first i-f of 48.05 MHz places images well outside the receiver passband, and provides for true general coverage operation without i-f gaps.

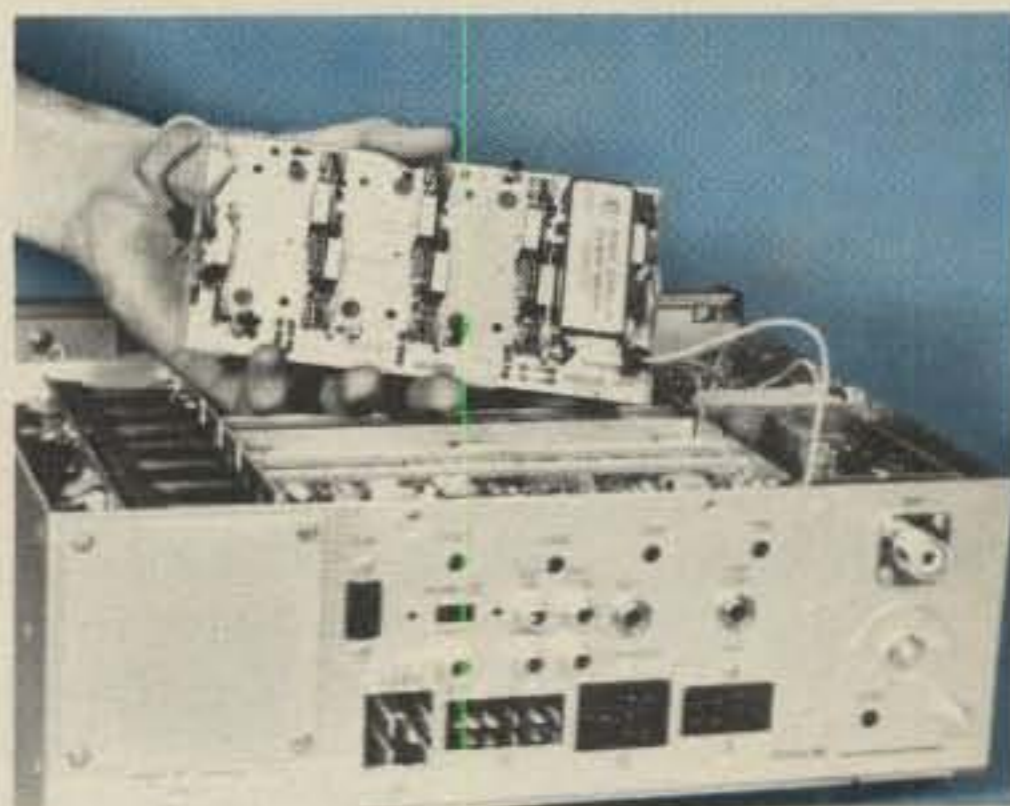
True Passband Tuning—The TR-7 employs the famous Drake Full Passband Tuning instead of the limited range "i-f shift" found in some other units. The Drake System tunes from the top edge of one sideband, through center, to the bottom edge of the other sideband. In fact, the range is even wider to



accommodate RTTY. Full passband tuning greatly improves receiving performance in heavy QRM.

Unique Independent Receive Selectivity—Optional receiving selectivity filters can be installed internally and pushbutton-selected from the front panel. These may be selected independently of transmit mode and provide optimum response for various conditions of ssb, cw, RTTY, and a-m. You may also transmit cw while receiving ssb, or vice versa, or even transmit one sideband while receiving the other. The standard filter is 2.3 kHz for ssb. You may choose from optional 300 Hz, 500 Hz, a special 1.8 kHz for crowded ssb, or 6 kHz filter for a-m. Any three may be installed in addition to the ssb filter.

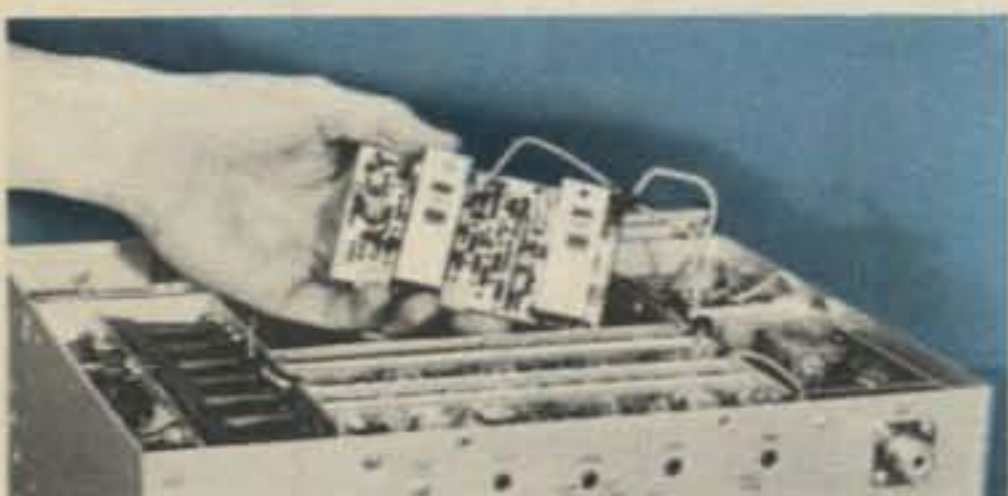
Effective Noise Blanker—This accessory is custom engineered to provide true impulse-type noise blanking performance.



Special High Power Solid State PA—A Drake custom-designed diagonal heat sink provides for an internally mounted power amplifier with nothing mounted outboard subject to physical damage. The unique air ducting effect of this amplifier allows an optional rear-mounted fan to provide continuous duty on SSTV/RTTY. Continuous ssb/cw

(TR-7 features continued on next page)

Continuous, Wide Range Frequency Coverage—The TR-7/DR-7 provides reception from 1.5 thru 30 MHz—continuously, and zero thru 30 MHz continuously with the optional Aux-7 Range Program Board. No gaps or range crystals required. The highly advanced Drake Synthesizer makes this possible, and is an industry first. The TR-7/DR-7 provides transmit coverage for all Amateur Bands 160 thru 10 meters. With the optional Aux-7 Range Program Board, diode-programmable

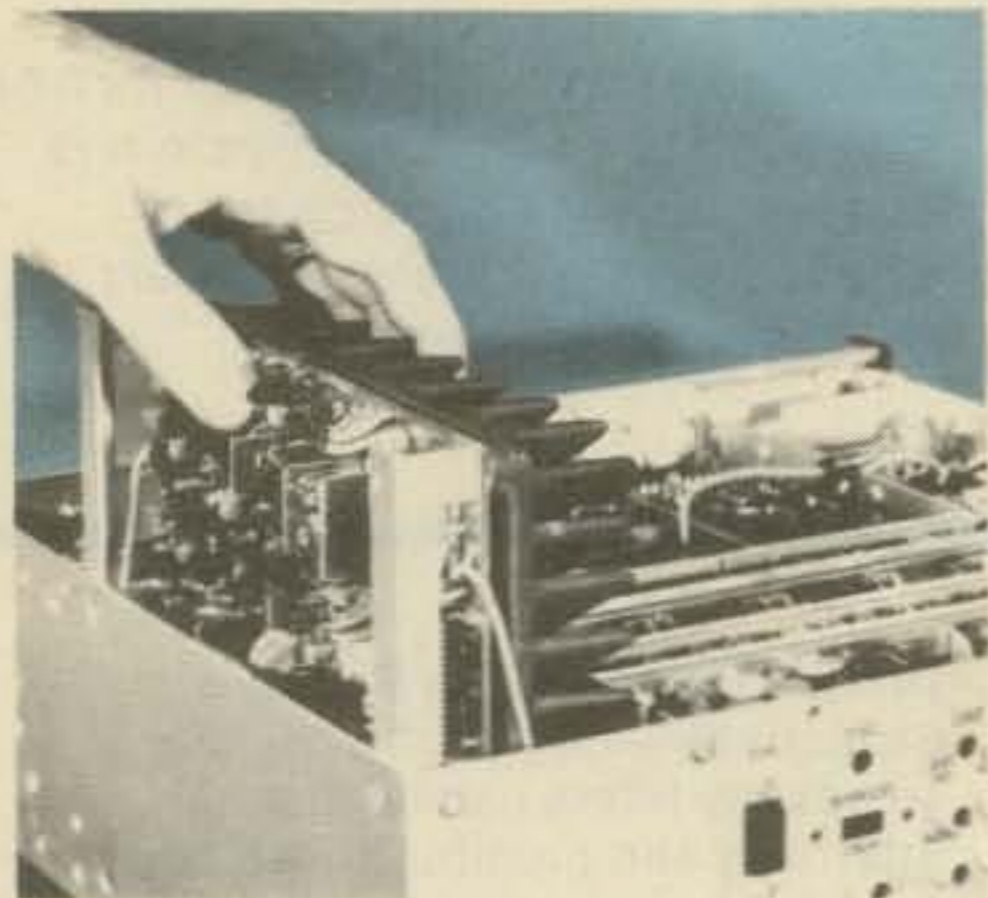


*Note: Out-of-band transmitter coverage for MARS, Government, etc. is available only in ranges authorized by the FCC, Military, or other government agency for a specific service. Proof of license for that service must be submitted to the R. L. Drake Company, including the 500 kHz range to be covered. Upon approval, and

at the discretion of the R. L. Drake Company, a special range IC will be supplied for use with the Aux-7 Range Program Board. Prices quoted from the factory. See operator's manual for details. (Not available for services requiring type acceptance.)

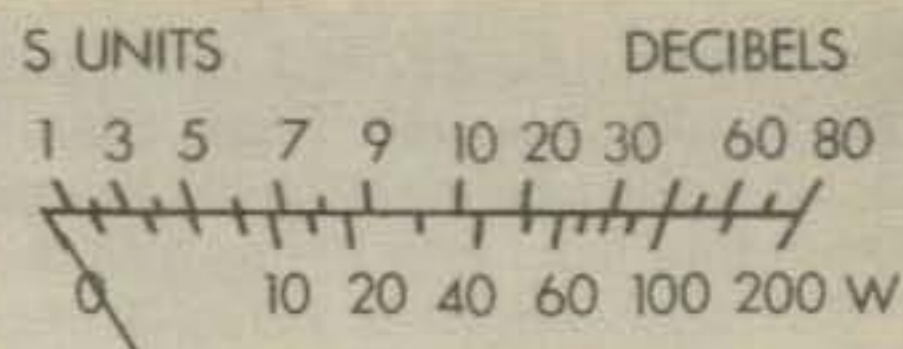
(Continued from preceding page)

DRAKE TR-7 solid state continuous coverage synthesized hf system



operation is available without the fan, due to the excellent heat sink design. The optional Drake PS-7 Ac Supply is rugged, rated for continuous duty, and will easily handle power requirements. The System is rated 250 watts input—in any of its modes. Fully VSWR protected.

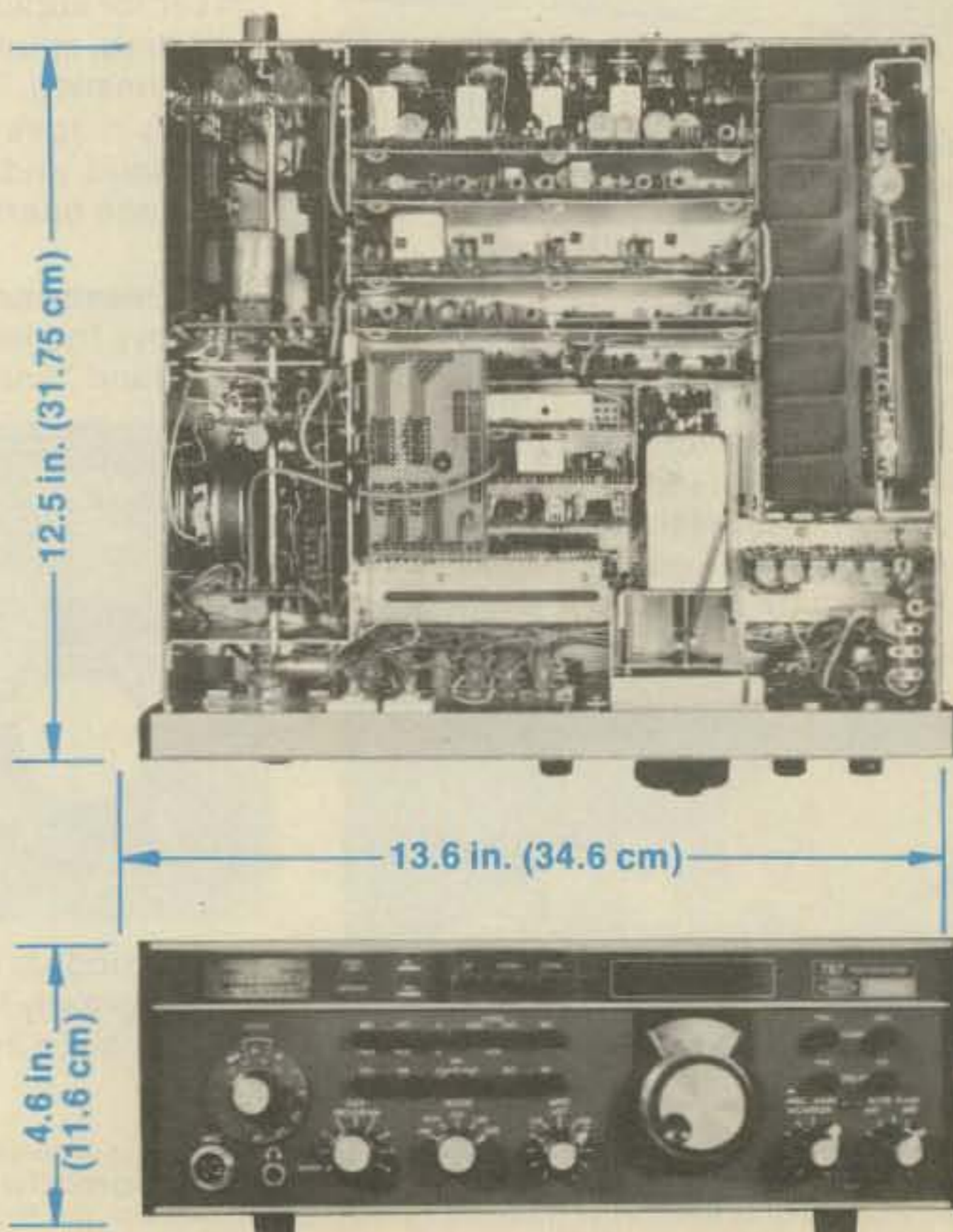
TR-7 Internal Test Facilities—As well as the standard "S" meter function, the TR-7 metering includes a built-in rf Wattmeter/VSWR Bridge. Also, the DR-7 digital counter reads frequencies to 150 MHz for test purposes. Access to the counter is from the rear panel.



Receiver Incremental Tuning (RIT)—Complete RIT Flexibility is provided for both the TR-7 and RV-7 remote VFO for maximum convenience. The RV-7 also includes a special "spot" function for easy zero beating.



- Model 1337 Drake TR-7 Transceiver
- Model 1530 Drake DR-7 General Coverage/
Digital Readout Board
- Model 1336 Drake TR-7/DR-7 General Coverage
Digital R/O Transceiver
- Model 1338 Drake RV-7 Remote VFO
- Model 1502 Drake PS-7 120/240V Ac Supply
includes special wide range voltage and
frequency capability. Operates from
any nominal line voltage (90-132 V/
180-264 V, 50-60 Hz) ideal for overseas
- Model 1536 Drake Aux-7 Range Program Board†
- Model 1531 Drake MS-7 Matching Speaker
- Model 1537 Drake NB-7 Noise Blanker
- Model 1529 Drake FA-7 Fan
- Model 7021 Drake SL-300 Cw Filter, 300 Hz
- Model 7022 Drake SL-500 Cw Filter, 500 Hz
- Model 7023 Drake SL-1800 Ssb/RTTY Filter, 1.8 kHz
- Model 7024 Drake SL-6000 A-m Filter, 6.0 kHz
- Model 1335 Drake MMK-7 Mobile Mounting Kit
- Model 7037 Drake TR-7 Service Kit/Extender Board Set
- Model 385-0004 Drake TR-7 Service/Schematic Book



DRAKE TR-7 SPECIFICATIONS

GENERAL

Frequency Coverage
(with DR-7 Digital R/O Gen. Cov. Board)

Receive
Without Aux-7 ... 1.5 to 30 MHz, continuous, no gaps
With Aux-7† ... Same, plus 0 to 1.5 MHz at reduced performance in this range

Transmit
Without Aux-7 ... 1.8-2.0, 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-30.0 MHz
With Aux-7† ... Above ranges, plus any eight 500 kHz segments from 1.8 to 30 MHz

Frequency Coverage
(without DR-7 Digital R/O Gen. Cov. Board)

Receive/Transmit (Transmit above 1.8 MHz only)
Without Aux-7 ... 1.5-2.0, 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.5-29.0 MHz, plus Receive only on 2.5-3.0 MHz and 5.0-5.5 MHz
With Aux-7† ... Above ranges, plus any eight 500 kHz segments from 0 to 30 MHz, (0 to 1.8 MHz Receive only)

Modes of Operation ... Usb, Lsb, Cw, RTTY, A-m equiv. (A-3H)

Frequency Stability ... Total drift is less than 100 Hz after warm up. Total frequency change is less than 100 Hz over the 11-16 V-dc input supply range

Frequency Readout Accuracy
Analog ... Better than ± 1 kHz when calibrated at the nearest marker point
Digital ... 15 ppm \pm 100 Hz

External Counter Mode
Maximum Input Frequency ... 150 MHz
Input Level Range ... 50 mV to 2 V, rms

Power Supply Requirements ... 11-16 V-dc (13.6 V-dc nominal), 3A receive, 25A transmit

Dimensions
Depth ... 12.5 in. (31.75 cm), excluding knobs and connectors.
Width ... 13.6 in. (34.6 cm)
Height ... 4.6 in. (11.6 cm), excluding feet
Weight ... 17.1 lb. (7.75 kg)

RECEIVER

(1.8-30 MHz, reduced specs 0-1.8 MHz)

Sensitivity
Ssb, Cw ... Less than 0.5 μ V for 10 dB (S+N) \div N
A-m (30% Mod.) ... Less than 2.0 μ V for 10 dB (S+N) \div N

Selectivity ... 2.3 kHz at -6 dB and 4.1 kHz at -60 dB (1.8:1 shape factor)

Ultimate Selectivity ... Greater than 100 dB

Agc ... Less than 4 dB output variation for 100 dB input signal change, referenced to agc threshold

Intermodulation ... Intercept Point, +20 dBm
 Two-tone Dynamic Range, 99 dB
 (at tone spacings of 50 kHz and greater)

I-f Frequency ... First I-f ... 48.05 MHz
 Second I-f ... 5.645 MHz

Image and I-f Rejection ... Greater than 80 dB

Spurious Response ... Greater than 60 dB down

Internally Generated Spurious ... Less than 1 μ V equivalent, except 3 μ V equivalent from 5 to 6 MHz. (Reduced specs on internal osc frequencies)

Audio Output ... 2.0 watts @ less than 10% THD (4 ohm load)

TRANSMITTER

Power Input (Nominal)
Ssb ... 250 watts PEP
Cw ... 250 watts
A-m equiv. ... 80 watts (carrier), plus upper sideband

Load Impedance ... 50 ohms, nominal

Spurious Output ... Greater than 50 dB down

Harmonic Output ... Greater than 45 dB down

Intermodulation Distortion ... 30 dB below PEP (24 dB below one of two tones)

Undesired Sideband Suppression ... Greater than 60 dB @ 1 kHz

Duty Cycle
Ssb, Cw ... 100%
Tune, SSTV, RTTY, A-m w/o 1529 FA-7 Fan: 33%, 5 min. transmit, max.
 with 1529 FA-7 Fan: 100%

Wattmeter Accuracy ... $\pm 5\%$ @ 100 watts (50 ohm load)

Carrier Suppression ... Greater than 50 dB

Microphone Input ... High impedance

VSWR Turndown (Nominal) (Percent rf power turndown)
 @ 1:1 ... 0%
 @ 2:1 ... 10%
 @ 3:1 ... 25%
 @ 4:1 ... 50%
 @ 5:1 and above ... 90%

† Aux-7 must be used with either Model 1546 RRM-7 Range Receive Module, or Model 1547 RTM-7 Range Transceive Module. Use one module per 500 kHz range. Modules plug directly into Aux-7.

R. L. DRAKE COMPANY



540 Richard St., Miamisburg, Ohio 45342
 Phone: (513) 866-2421 • Telex: 288-017



UV-3 uhf-vhf fm



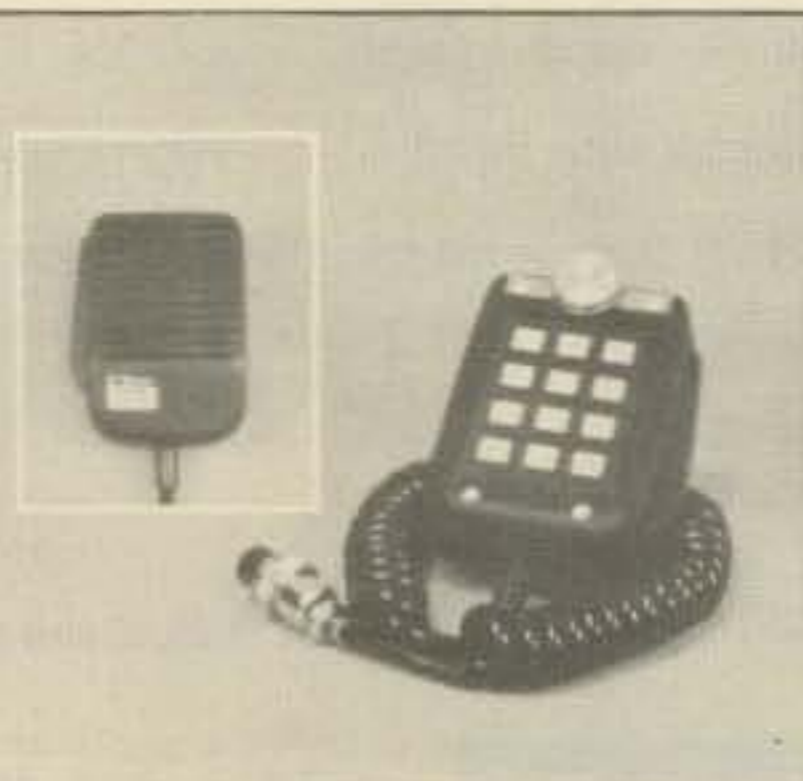
Optional
Drake 1525EM
Encoding Mike

Designed and manufactured in U.S.A.

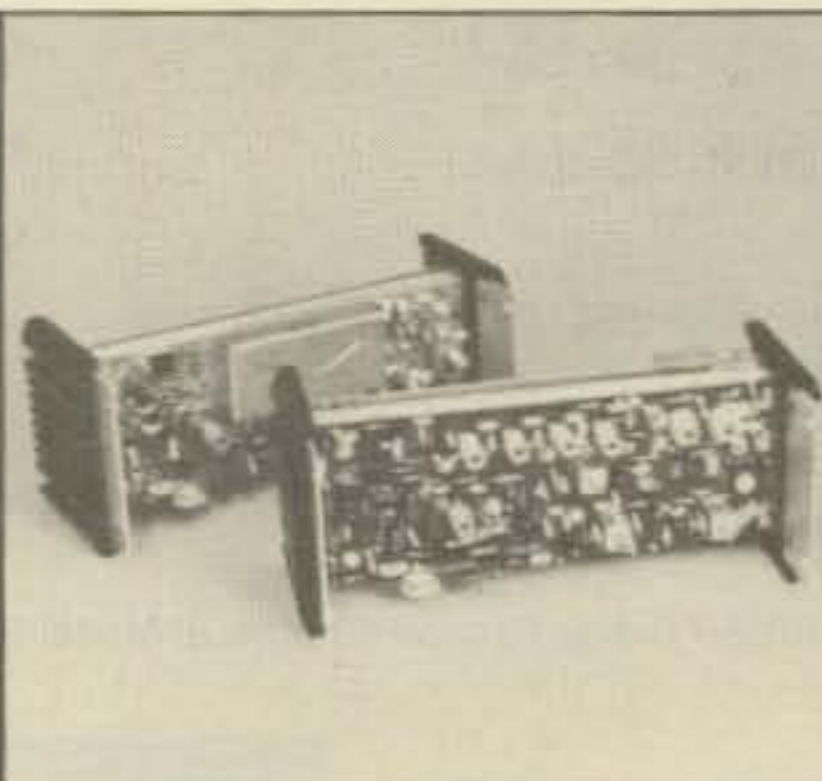
- Fully synthesized on each band, 5 kHz steps, digital read-out.
- Fm coverage on complete 144, 220 and 440 Amateur Bands, depending on model purchased. Completely band-switched from front panel.
- Four extra diode programmable fixed channels, with offsets, available for each band, in addition to the synthesizer.
- Diode programmable non-standard offsets available for each band.
- Separate SO-239 Antenna Connector for each band.
- Outstanding receiver front-end performance. Ideal for use in metropolitan areas where many repeaters are in use.
- Squelch.
- Hi-lo power, with lo-power adjustable.
- Priority scan feature:
 - scan a programmed fixed channel from any synthesizer frequency.
 - scan any synthesizer frequency from a programmed fixed channel.
 - scan a specific programmed fixed channel from another programmed fixed channel.
- Plug-in modular construction.
- Remote operation. Removable control head will operate radio in trunk compartment from driver seat. (remote kit optional)
- No frequency mixing in transmitter. Transmitter frequency derived directly from VCO frequency. Provides extremely low spurious output.
- Companion ac power supply (PS-3).
- Operate mobile or fixed station. (13.8 V supply required)
- Small, compact, rugged construction utilizing aluminum extrusion sides and panel.
- Transmit audio custom tailored for maximum communications "punch."
- Choice of one, two, or three band coverage in a single transceiver. Basic models may be purchased, with factory installed add-on modules added later.



PS-3 Ac Power Supply



1525EM Encoding Microphone



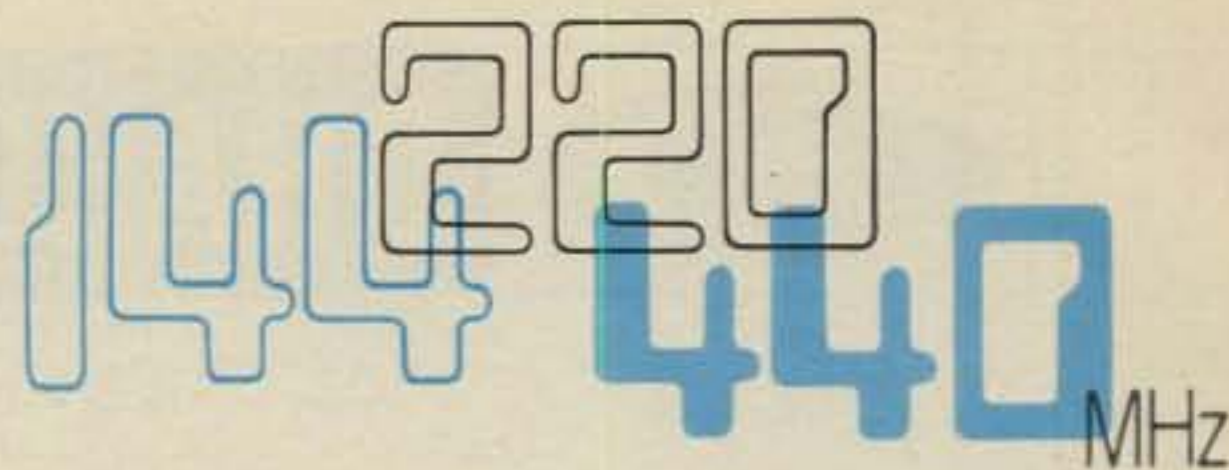
220 and 440 Add-on Modules



UMK-3 Remote Trunk-Mount Kit

3-band system

Fully synthesized on each band



DRAKE UV-3 SPECIFICATIONS

GENERAL

Frequency Coverage:	144	144-148 MHz*
	220	220-225 MHz
	440	440-450 MHz
Mode:	Fm (5 kHz deviation)	
Supply Voltage:	11.5-15.0 V dc negative ground	
Supply Current:	Receive	0.9 A Standby
	Transmit	6 A High Power
		1.3 A Low Power
Dimensions:	Length (single unit)	9" (22.86 cm)
	(two unit)	11.5" (29.2 cm)
	(three unit)	14" (35.56 cm)
	Width	8.1" (20.6 cm)
	Height	3.5" (8.9 cm)
Weight:	(One unit)	7 lbs. (3.17 kg)
	(Two unit)	7.3 lbs. (3.31 kg)
	(Three Unit)	7.6 lbs. (3.45 kg)
Operating Temperature:	0°C to 60°C	

*Band overlap allows tuning of most Mars frequencies

FREQUENCY SYNTHESIZER

Type: Directly programmable, digital phase locked loop, 5 kHz steps

Reference: 5 MHz crystal oscillator

Frequency Accuracy: ±.0005% over a temperature range of 0°C to 60°C with a supply voltage variation of 11.5 to 15 V dc

RECEIVER

Type: Double conversion, 1st i-f @ 10.7 MHz, 2nd i-f @ 455 kHz, 6 pole crystal filter @ 10.7 MHz and 8 pole ceramic filter at 455 kHz

Selectivity: 12 kHz @ -3 dB

Sensitivity:	146-148 MHz	} Typically less than .35µV for 12 dB SINAD
	222-225 MHz	
	442-447 MHz	
	144-148 MHz	} 5 µV (max.) for 12 dB SINAD
	220-225 MHz	
	440-450 MHz	

Adjacent Channel Rejection:	144	greater than 80 dB min. @ ± 30 kHz
	220, 440	greater than 70 dB min. @ ± 30 kHz
	144, 220, 440 ..	greater than 60 dB min. @ ± 15 kHz

Intermodulation Attenuation:	144	80 dB (referenced to 12 dB SINAD)
(EIA RS-204-A)	220	75 dB (referenced to 12 dB SINAD)
	440	65 dB (referenced to 12 dB SINAD)

Image Rejection:	144	80 dB
	220	60 dB
	440	50 dB

I-f Rejection: Greater than 95 dB

Audio Output: 2.5 watts @ less than 10% THD, 2 watts @ less than 5% THD

Squelch Sensitivity: Less than 0.2 µV

Meter: Indicates relative signal level

TRANSMITTER

Power Output (13.8 V dc):	High Power:	144	25 watts nom. (144-148 MHz)
		220	10 watts min. (220-225 MHz)
		440	10 watts min. (440-450 MHz)
	Low Power:	Approx. 10% of high power (adjustable)	

Harmonic and Out of Band Spurious:	144, 220	-60 dB (min.) referenced to carrier
	440	-40 dB (min.) referenced to carrier

Spurious in Band: -75 dB (min.) referenced to carrier

Modulation: Direct fm, pre-set to ±5 kHz deviation

Hum and Noise: Greater than 40 dB below maximum deviation

Model 1346 Drake UV-3 (144-220-440)

Model 1344 Drake UV-3 (144-440)

Model 1340 Drake UV-3 (144)

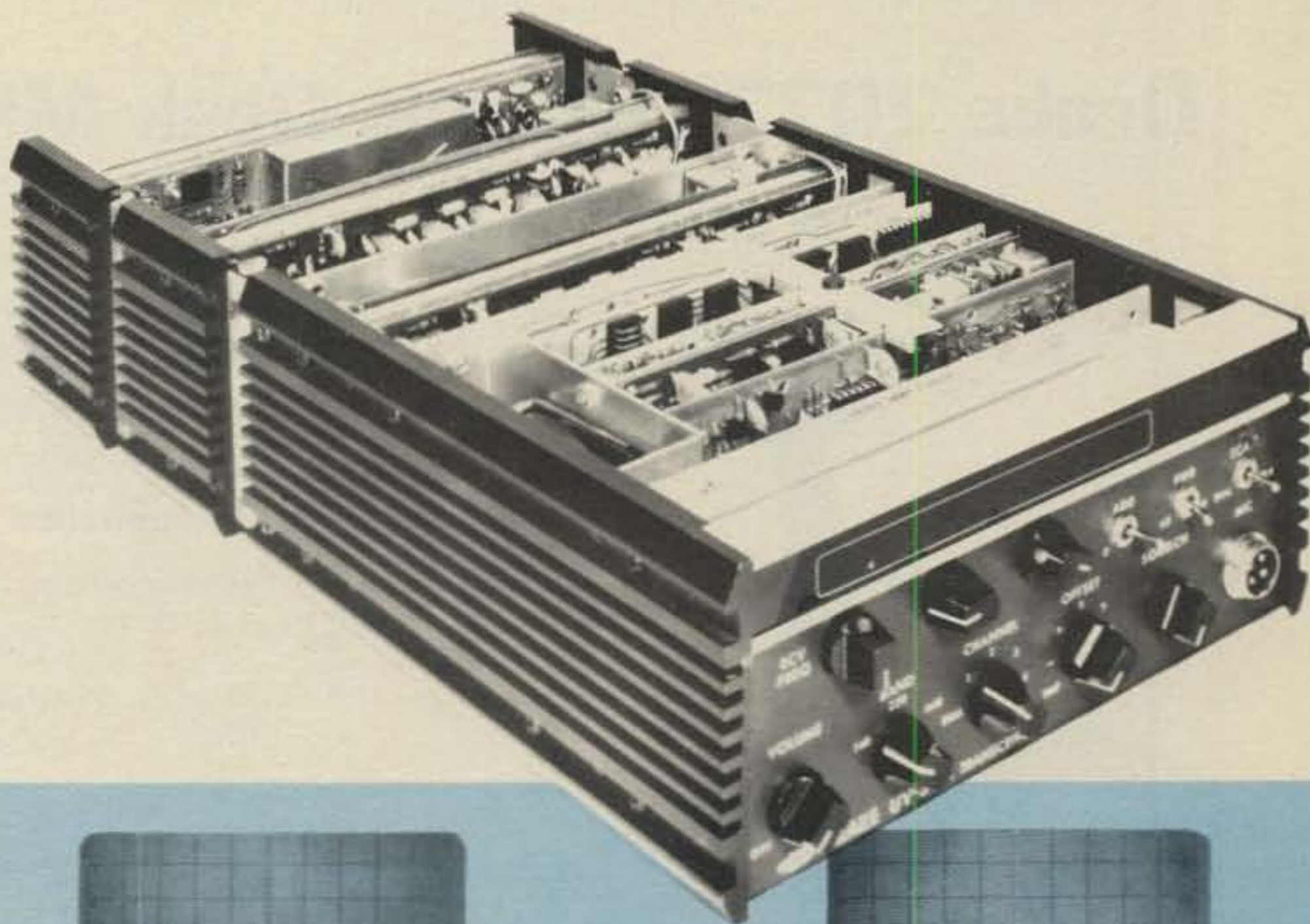
(Models above include factory installed modules for bands as listed, standard dynamic mike, and mobile mounting bracket.)

Add-on modules expand band coverage of models which may have been purchased in a single band or two band configuration. Prices include factory installation which is necessary to meet FCC receiver certification requirements.

220 Add-on Module

440 Add-on Module

144 Add-on Module



Model 1504 Drake PS-3 AC Power Supply

Model 1525 Drake 1525EM Encoding Mike (see next page)

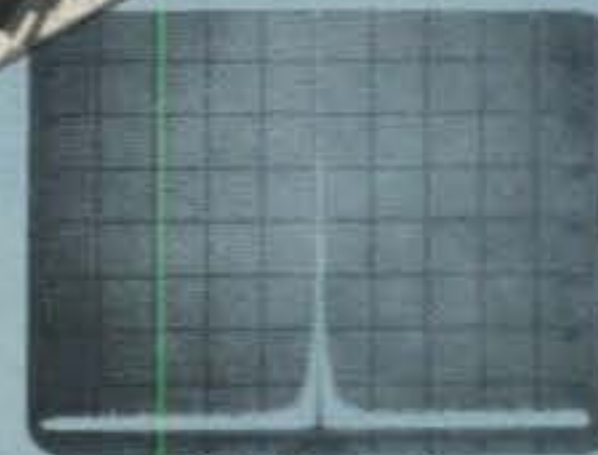
Model 1330 Drake UMK-3 Remote Trunk-Mount Kit

Model 385-0002 Drake UV-3 Service/Schematic Book



100 MHz/Division

UV-3 Frequency Spectrum
146.520 MHz
25 Watts



500 kHz/Division



DRAKE®

MICROPHONES

Drake 1525EM Push Button Encoding Mike

- Microphone and auto-patch encoder in single convenient package with coil cord and connector. Fully wired and ready for use.
- High accuracy IC tone generator, no frequency adjustments.
- High reliability Digitran® keyboard.
- Power for tone encoder obtained from transceiver through microphone cable. No battery required. Low current drain.
- Low output impedance allows use with almost all transceivers.
- Four pin microphone plug: directly connects to Drake UV-3 without any modification in transceiver. Compatible with all previous Drake and other 2 meter units with minor modifications.
- Tone level adjustable

Model
1525



Drake 7077 Dynamic Desk Microphone



- **Audio and level characteristics** custom designed to match the transmit audio requirements of the Drake TR-7.
- **Features both VOX and PTT** operation without modification.
- **High Impedance**
- Includes coil cord and plug wired for direct installation to the Drake TR-7.
- Style and color provide a beautiful match to the Drake 7-Line.
- Size 4.3"W x 5.8"D x 9.3"H (10.9 x 14.7 x 23.6 cm). Wt. 1 lb. 7 oz (650 g).

R. L. DRAKE COMPANY



DRAKE®

540 Richard St., Miamisburg, Ohio 45342
Phone: (513) 866-2421 • Telex: 288-017

Drake L-7 Continuous Duty 160-10* Meters 2kW Linear Amplifier

Model
1528



Temperature controlled design for "key-down" operation over a wide frequency range. Newly engineered for coverage of any new or expanded hf amateur bands within FCC amplifier rules. Also features wide frequency coverage for MARS, and other services authorized for this type of amplifier.

2 kW PEP, 1 kW cw, RTTY, SSTV operation—all modes, full rated input, continuous duty cycle.

160-10* meter amateur band coverage, plus expanded ranges for any future hf band expansions or additions within FCC rules. These ranges also include increased coverage for MARS, embassy, government, or other such services.

The Drake L-7 utilizes a pair of Eimac 3-500 Z triodes for rugged use, and lower replacement cost compared to equivalent ceramic types. Tubes are included.

Accurate built-in rf wattmeter, with forward/reverse readings, is switch selected. Calibrated 300/3000 watt scales.

Temperature controlled two speed fan is a high volume low noise type and offers optimum cooling.

Adjustable exciter agc feedback circuitry permits drive power to be automatically controlled at proper levels to prevent peak clipping and cw overdrive. Front panel control.

By-pass switching is included for straight through, low power operation without having to turn off amplifier.

Bandpass tuned input circuitry for low distortion and 50 ohm input impedance.

Amplifier is comprised of two units—rf deck for desk top and separate power supply.

Operates from 120/240 V ac, 50/60 Hz primary line voltage.

DRAKE L-7 SPECIFICATIONS

Frequency Coverage*: Ham bands 160 through 15 meters. Non-amateur frequencies between 6.5 and 21.5 MHz may be covered with some modification of the input circuit.

Plate Power Input: 2000 Watts PEP on SSB and 1000 Watts DC on CW, AM, RTTY, and SSTV.

Drive Power Requirements: 100 Watts PEP on SSB and 75 Watts on CW, AM, RTTY, and SSTV.

Input Impedance: 50 Ohms. (Bandpass tuned input)

Output Impedance: Adjustable pi-network matches 50 Ohm line with SWR not to exceed 2:1.

Intermodulation Distortion Products: In excess of -33 dB.

Wattmeter Accuracy: 300 Watts forward and reflected, \pm (5% of reading + 3 Watts). 3000 Watts forward, \pm (5% of reading + 30 Watts).

Power Requirements: 240 Volts 50-60 Hertz 15 Amperes, or 120 Volts 50-60 Hertz 30 Amperes.

Tube Complement: Two of 3-500Z or 8802/3-500Z or 8163 or 3-400Z.

Dimensions: Amplifier 13.69"W x 6.75"H x 14.25"D (34.8 x 17.1 x 36.2 cm). Power Supply 6.75"W x 7.88"H x 11"D (17 x 20 x 28 cm).

Weight: Amplifier 27 lbs (12.25 kg), Power Supply 42.5 lbs (19.3 kg).

*Export model includes coverage of the 10-meter Ham Band.

Drake R-7 Synthesized, General Coverage Receiver

Model
1240



Full general coverage reception, 0-30 MHz, with no gaps or range crystals required.

Continuous tuning all the way from vlf thru hf. Superb state-of-the-art performance on a-m, ssb, RTTY, and cw—and it transceives with the Drake TR-7.

100% solid state broadband design, fully synthesized with a permeability tuned oscillator (PTO) for smooth, continuous tuning.

Covers the complete range 0 to 30 MHz with no gaps in frequency coverage. Both digital and analog frequency readout.

Special front-end circuitry employing a high level double balanced mixer and 48 MHz "up-converted" 1st i-f for superior general coverage, image rejection and strong signal handling performance.

Complete front-end bandpass filters are included that operate from hf thru vlf. External vlf preselectors are not required.

10 dB pushbutton-controlled broadband preamp can be activated on all ranges above 1.5 MHz. Low noise design.

Various optional selectivity filters for cw, RTTY and a-m are switch-selected from the front panel. Ssb filter standard.

Special new low distortion "synchro-phase" a-m detector provides superior international shortwave broadcast reception. This new technique permits 3 kHz a-m sideband response with the use of a 4 kHz filter for better interference rejection.

Tunable i-f notch filter effectively reduces heterodyne interference from nearby stations.

The famous Drake full electronic passband tuning system is employed, permitting the passband position

to be adjusted for any selectivity filter. This is a great aid in interference rejection.

Three agc time constants plus "Off" are switch-selected from the front panel.

Complete transceive/separate functions when used with the Drake TR-7 transceiver are included, along with separate R-7 R.I.T. control.

Special multi-function antenna selector/50 ohm splitter is switch-selected from the front panel, and provides simultaneous dual receive with the TR-7. This makes possible the reception of two different frequencies at the same time. Main and alternate antennas and vhf/uhf converters may also be selected with this switching network.

The digital readout of the R-7 may be used as a 150 MHz counter, and is switched from the front panel. Access thru rear panel connector.

The built-in power supply operates from 100, 120, 200, 240 V-ac, 50/60 Hz, or nominal 13.8 V-dc.

The R-7 includes a built-in speaker, or an external Drake MS-7 speaker may be used.

Built-in 25 kHz calibrator for calibration of analog dial.

Low level audio output for tape recorder.

Up to eight crystal controlled fixed channels can be selected. (With Drake Aux-7 installed.)

Optional Drake NB-7A Noise Blanker available. Provides true impulse type noise blanking performance.



R. L. DRAKE COMPANY

Optional accessories available

Model 1531 Drake MS-7 Speaker
 Model 7021 Drake SL-300 Cw Filter, 300 Hz
 Model 7022 Drake SL-500 Cw Filter, 500 Hz
 Model 7023 Drake SL-1800 Ssb/RTTY Filter, 1800 Hz
 Model 7024 Drake SL-6000 A-m Filter, 6.0 kHz
 Model 7026 Drake SL-4000 A-m Filter, 4.0 kHz
 Model 1532 Drake NB-7A Noise Blanker
 Model 1536 Drake Aux-7 Range Program/Fixed-Frequency Board

DRAKE R-7 SPECIFICATIONS

Frequency Coverage, continuous tuning (With Drake DR-7 Digital R/O, General Coverage Board)

0 to 30 MHz continuous (With or without Aux-7 board) (No gaps in frequency coverage)

Frequency Coverage, continuous tuning (Without DR-7 Board installed)

0.01 to 0.5 MHz	Without Aux-7 Board	5.0 to 5.5 MHz
0.5 to 1.0 MHz		7.0 to 7.5 MHz
1.0 to 1.5 MHz		14.0 to 14.5 MHz
1.5 to 2.0 MHz		21.0 to 21.5 MHz
2.5 to 3.0 MHz		28.5 to 29.0 MHz
3.5 to 4.0 MHz		

Plus any eight additional 500 kHz segments between 0 and 30 MHz when programmed into Aux-7 Board.

Crystal Controlled Fixed Frequencies: Up to eight crystal-controlled fixed frequencies within the 0-30 MHz range with Aux-7 Accessory Board. Proper 500 kHz range for desired fixed frequency is also programmed into Aux-7.

Frequency Stability: Less than 100 Hz drift after temperature stabilization including $\pm 10\%$ line voltage variation.

Digital Readout Accuracy: (DR-7 installed) 15 PPM \pm 100 Hz

Analog Dial Accuracy: Better than ± 1 kHz when calibrated to nearest calibrator marker.

Modes of Operation: Ssb, cw, RTTY, SSTV, a-m.

Sensitivity (ssb): 1.8-30 MHz Less than $.20\mu\text{V}$ for 10dB S+N/N with preamp on (typically $.15\mu\text{V}$) (Noise floor typically -134 dBm) Less than $.50\mu\text{V}$ for 10 dB S+N/N without preamp (typically $.30\mu\text{V}$) (Noise floor typically -128 dBm). .01-1.5 MHz Less than $1.0\mu\text{V}$ for 10 dB S+N/N

Sensitivity (a-m): 1.8-30 MHz Less than $1.2\mu\text{V}$ for 10dB S+N/N @ 30% modulation, preamp on. Less than $2.0\mu\text{V}$ for 10 dB S+N/N @ 30% modulation, preamp off. .01-1.5 MHz Less than $4.0\mu\text{V}$ for 10 dB S+N/N @ 30% modulation.

Selectivity (2.3 kHz filter supplied): 2.3 kHz at -6 dB, 4.2 kHz at -60 dB (1.8:1) shape factor. Optional 300 Hz, 500 Hz, 1800 Hz and 4 kHz filters are available as follows:

Ultimate Selectivity: Greater than 100 dB

Accessory Crystal Filters

SL-300 cw filter: 300 Hz @ 6 dB, 700 Hz @ 60 dB
 SL-500 cw, RTTY Filter: 500 Hz @ 6 dB, 1100 Hz @ 60 dB
 SL-1800 ssb/RTTY Filter: 1800 Hz @ 6 dB, 3600 Hz @ 60 dB
 SL-4000 a-m Filter: 4 kHz @ 6 dB, 8 kHz @ 60 dB
 SL-6000 a-m Filter: 6 kHz @ 6 dB, 12 kHz @ 60 dB

Strong Signal Handling

Two-tone dynamic range: 99 dB* 1.8-30 MHz
 Third order intercept point: +20 dBm preamp off
 Two-tone dynamic range: 95 dB* 1.8-30 MHz
 Third order intercept point: +10 dBm preamp on
 Blocking: >145 dB above noise floor

**(At tone spacings of 50 kHz and greater)*

I-f and Image Rejection: Greater than 80 dB (48.05 MHz 1st i-f) (5.645 MHz 2nd i-f) (50 kHz 3rd i-f)

Agc Performance: Less than 4 dB audio output variation for 100 dB input signal change above agc threshold. Agc threshold is typical $.8\mu\text{V}$ with preamp off and $.25\mu\text{V}$ with preamp on.

Attack time: 1 millisecond. Three selectable release times: Slow—2 seconds; Med—400 m sec; Fast—75 m sec. Also, "Off" position is provided.

Antenna Input Impedance: Nominal 50 ohms

Audio Output: 2.5 watts with less than 10% T.H.D. into nominal 4 ohm load.

Power Requirements: 100/120/200/240 V-ac $\pm 10\%$, 50/60 Hz, 60 watts or 11.0 to 16.0 V-dc (13.8 V-dc nominal), 3 amps

External Counter Mode (DR-7 installed): Readout: to 100 Hz. Accuracy: 15 PPM \pm 100 Hz. Maximum input frequency: 150 MHz. Input level range: 50 mV to 2 V rms.

Dimensions/Weight:

Depth— 13.0 in (33.0 cm) excluding knobs and connectors.
 Width— 13.6 in (34.6 cm)
 Height— 4.6 in (11.6 cm) excluding feet
 Weight— 18.4 lbs (8.34 kg)

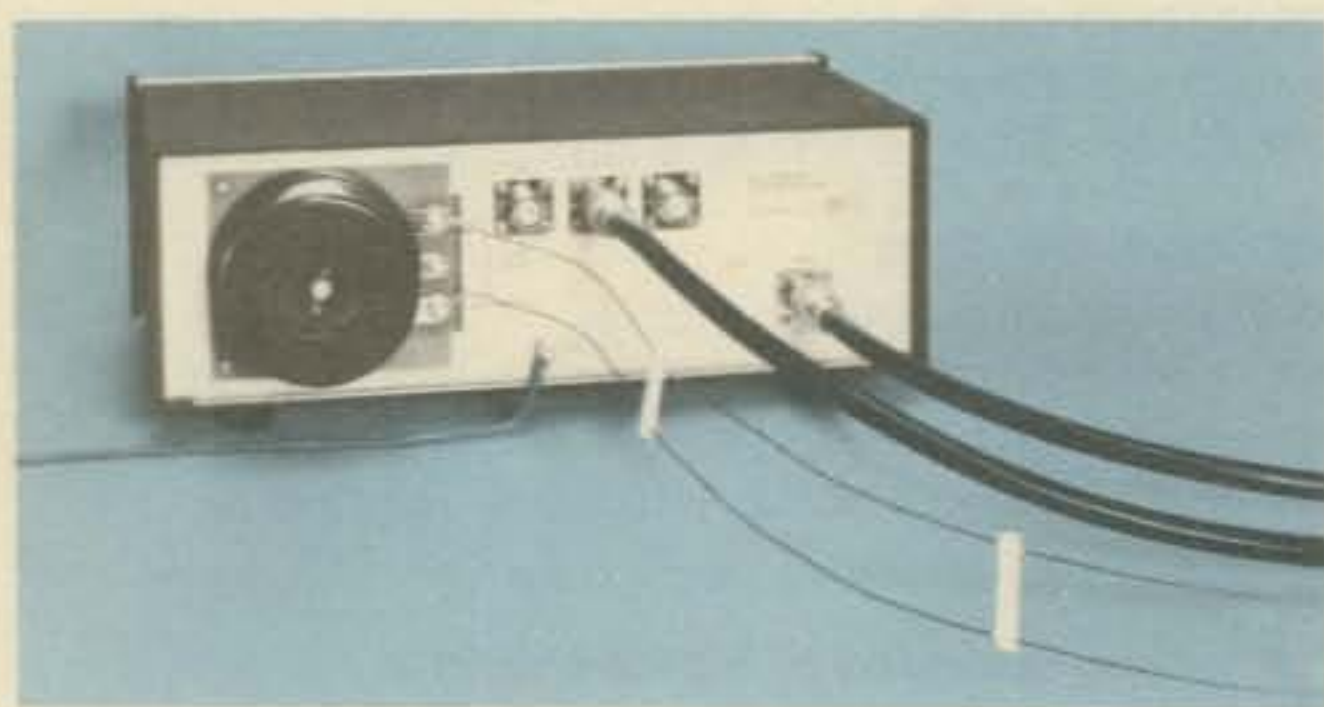
**DRAKE****MATCHING NETWORKS**

Precision instruments providing
rf radiation control and measurement
for your communication system



Drake MN-2700
2kW
Matching
Network

Model 1539



Drake B-1000 Balun Model 1510 installed on Matching Network.



Drake MN-7 Matching Network
 Model 1538

Same features and specifications as the Drake MN-2700, but rated at 250 watts continuous. Same width and height, but only 8.5" (21.6 cm) in depth, and weighs 10 lbs. (4.55 kg). Meter reads 0-300 watts forward power or VSWR.

The Drake MN-2700 manages rf radiation in the areas of impedance match to the antenna, rf power measurement, VSWR measurement, reduction of harmonic radiation, and antenna selection.

DRAKE MN-2700 FEATURES

160 thru 10 Meters Frequency Coverage—With out-of-band coverage for MARS, future band expansions and other applications.

Antenna Choice—Matches antennas fed with coax, balanced line, or random wire. (For balanced line use optional Drake B-1000 Balun, which mounts on rear panel of MN-2700.)

Antenna By-pass Switching—Unique design allows unit to be switch-by-passed regardless of which antenna is in use, whether coax or wire type. No need to manually disconnect feedlines. Switch also selects various antennas.

Extra Harmonic Reduction to help fight TVI—Drake Matching Networks employ special "pi-network" low-pass filter type circuitry for maximum harmonic rejection. This feature alone makes the MN-2700 a worthwhile investment; it is a Drake exclusive.

Built-in Metering—Accurate rf wattmeter/VSWR bridge is pushbutton controlled from front panel.

Power Capability—2000 watts PEP, 1000 watts average. Continuous Duty.

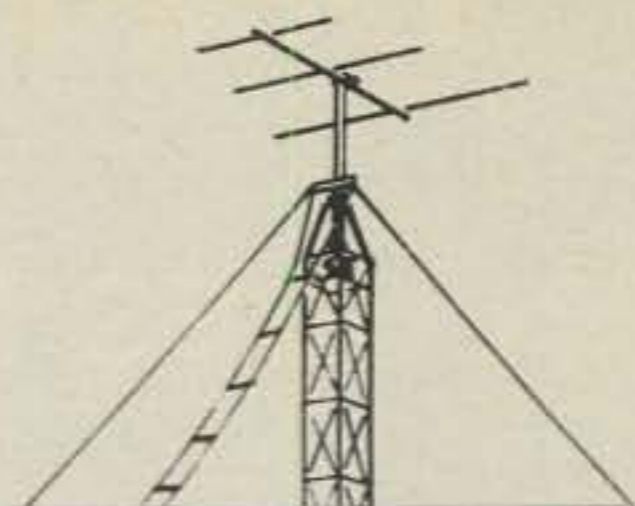
Dimensions—13.09"W x 4.53"H x 13"D including connectors (33.26 x 11.5 x 33 cm); **Weight** 11 lbs. (5 kg).

DRAKE MN-2700 SPECIFICATIONS

• **Frequency Coverage:** 1.8 to 30 MHz. Band Switch marked for 160, 80, 40, 20, 15, and 10 meter amateur bands; however, frequency coverage between amateur bands is possible by using the nearest band positions with a small reduction in matching capability. • **Input Impedance:** 50 ohms (resistive). • **Load Impedance:** 50 ohm coaxial with VSWR of 5:1 or less at any phase angle (3:1 on 10 meters). 75 ohm coaxial at a lower VSWR can be used. • **Balanced Feedlines:** With the Drake B-1000 accessory balun, which mounts on rear panel, tunes feed point impedances of 40 to 1000 ohms, or 5:1 VSWR referenced to 200 ohms (3:1 on 10 meters). • **Long-Wire Antennas** Feed point impedances up to 5:1 VSWR referenced to 50 ohms. Also, 5:1 refer-

enced to 200 ohms with the Drake B-1000 accessory balun (3:1 on 10 meters). • **Meter:** Reads VSWR or forward power, 0-200 watts or 0-2000 watts. • **Wattmeter Accuracy:** ±5% of reading ±1% of full scale. • **Insertion Loss:** 0.5 dB or less on each band after tuning. • **Front Panel Controls:** Provide for the adjustment of resistive and reactive tuning, antenna switching, band switching, VSWR calibration, and selection of watts or VSWR functions of the meter. • **Rear Panel Connectors:** The rear panel has four type SO-239 connectors (one for input and 3 for outputs), three screw terminal connections (for long-wire and open-wire feeder systems), and a ground post.

really a "secret weapon"
for 160 meter enthusiasts!



The Drake MN-2700 and MN-7 Matching Networks have a truly unique antenna feed switching design

Both matching networks will completely change the mode of a balanced-line fed 135 foot doublet to a special configuration that provides very effective 160 meter performance. And best of all, it's done with the simple flip of a switch on the front panel.

Consider a typical all-band antenna set-up—a 135 foot doublet, center-fed with 60 to 70 feet of balanced line at a height of 45 to 60 feet. The Drake MN-2700/B-1000 or MN-7/B-1000 will match this as a true balanced system on 80 thru 10 meters. (Fig. 1)

But what about 160 meters? Many amateurs recommend tying the feeders together and using the antenna as a vertical with a "top-hat." In fact, we suggest this ourselves in our manual.

However, the use of this, or any vertical, assumes you have a good ground or radial system for efficient operation. If you do not

have enough room or do not wish to install such a radial system, performance may suffer. And if you do have radials, you still have to change the feeder connections each time you operate 160 meters.

On the other hand, when you use the MN-2700/B1000 or MN-7/B-1000 simply leave the feeders in the balanced connection as you would for 80 thru 10, and move the special antenna selector switch to Position No. 4. This automatically converts half of the antenna and feedline to an inverted "L", fed through a 4:1 impedance transformer, with the other half operating as a counterpoise. (Fig. 2)

This system offers the convenience of "stay in your chair" operation, while providing an effective means of operating 160 meters with a relatively small antenna.

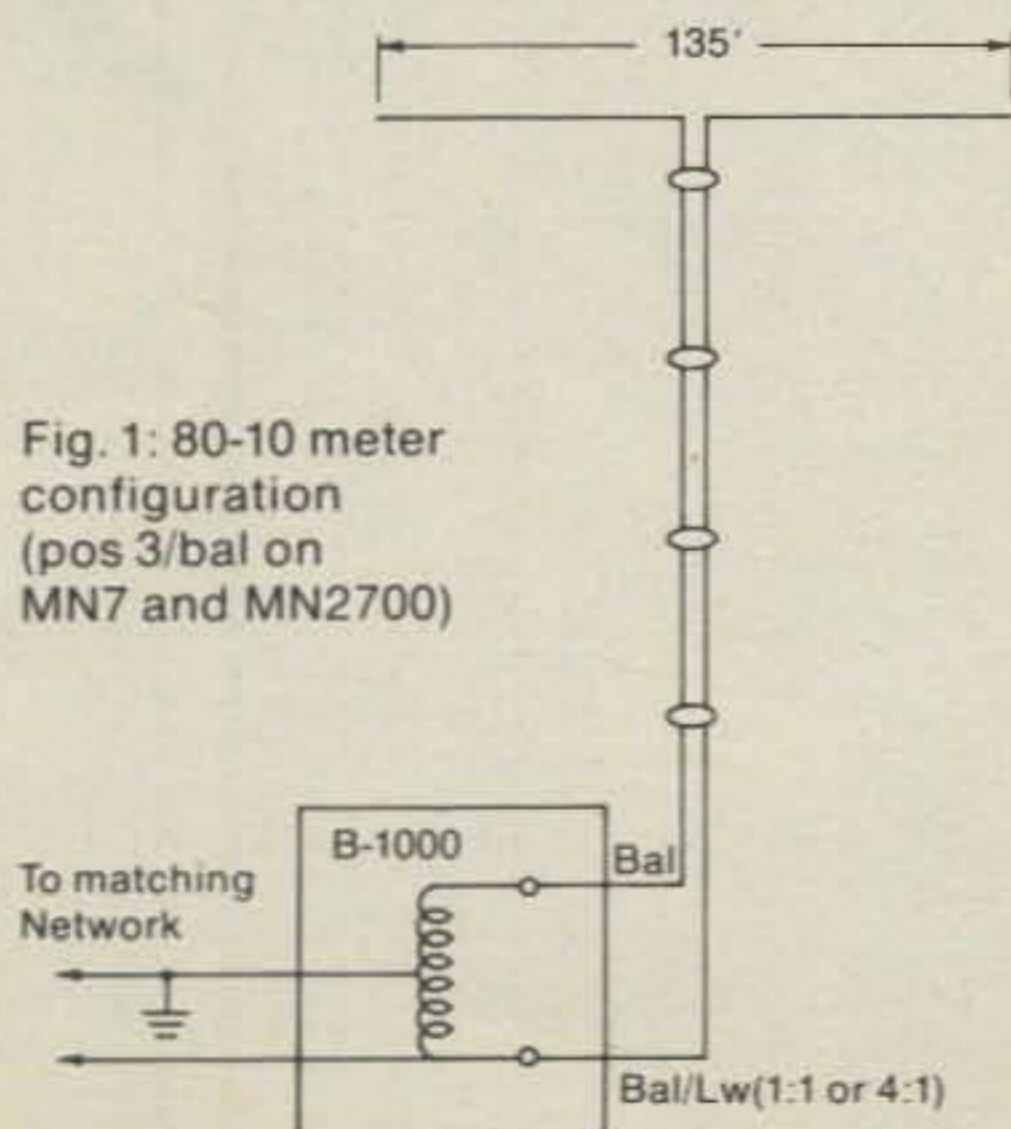


Fig. 1: 80-10 meter configuration (pos 3/bal on MN7 and MN2700)

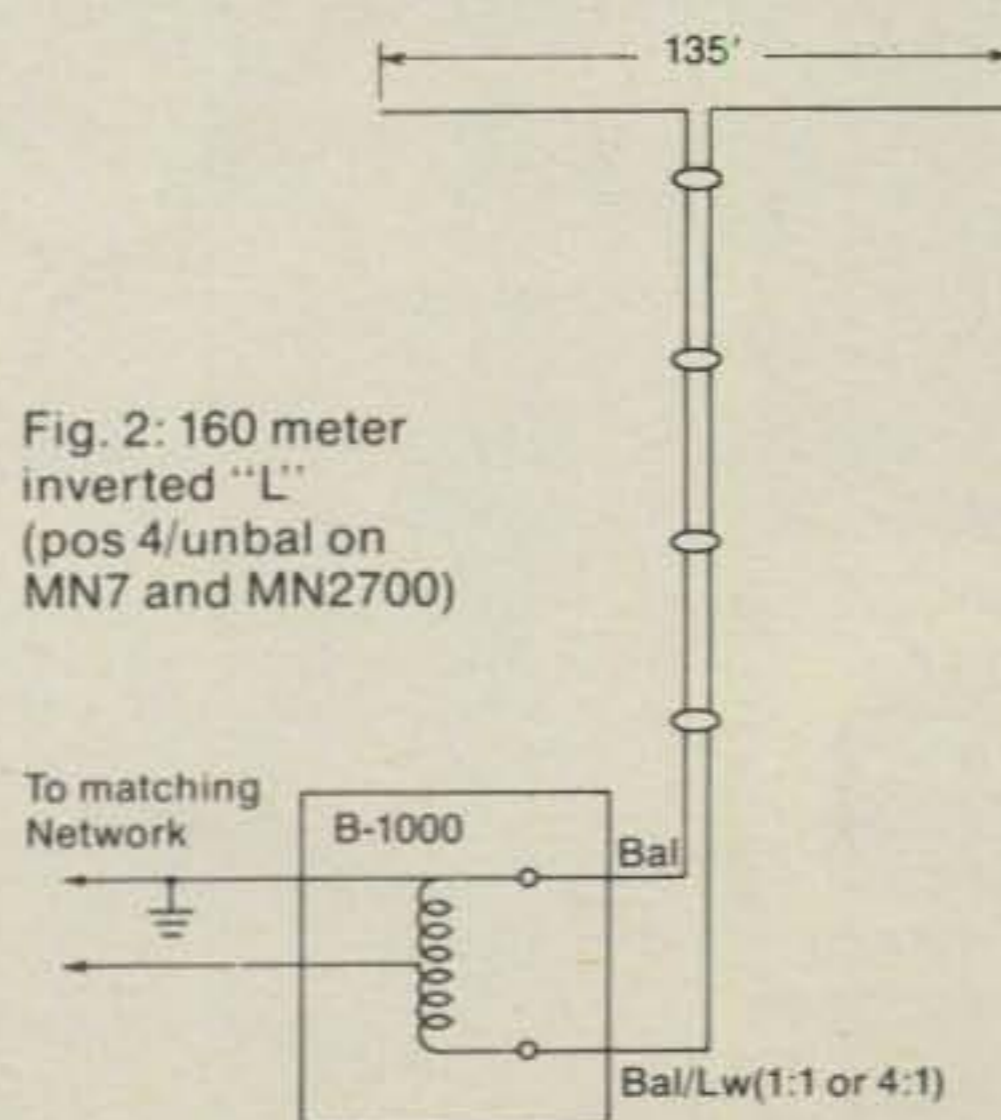
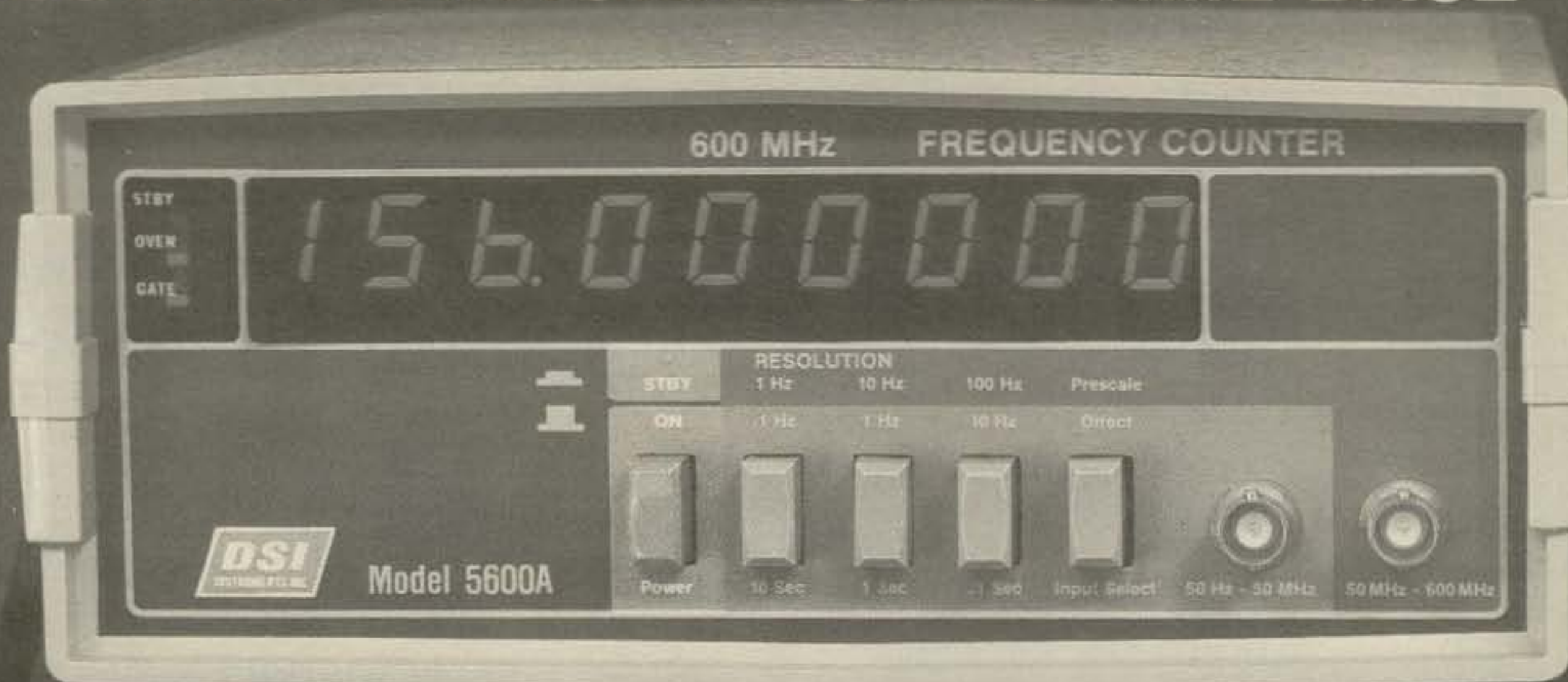


Fig. 2: 160 meter inverted "L" (pos 4/unbal on MN7 and MN2700)

DSI HAS DONE IT AGAIN

QUIK-KIT II®

INCLUDES PROPORTIONAL OVEN TIME BASE



- DC-BATT-AC (W-AC9)
- 85% Factory Assembled
- 100% Factory Tested
- .2 PPM 10° to 40° C Accuracy
- 2 Digits .5 Inch LED's
- 0.1 HZ Resolution
- Auto Zero Blanking

\$149.95

MODEL 5600A KIT

WHY BUY A 5600A: Because 95% of the assembly is completed by DSI and you are only one hour away from solving all those difficult bench problems from setting the frequency of a audio signal to within 1/10 of a HZ, to checking the frequency of a 488 MHz mobile radio. Whether you are servicing a VTR, trouble shooting a PLL circuit, the 5600A is the right counter with accuracy that will meet any FCC land mobile, broadcast, or telecommunications requirements. On the bench or in the field the 5600A will do the job you need. The 5600A includes a self contained battery holder providing instant portability or we offer a 10 hour rechargeable battery pack option. Other options include a audio multiplier which allows you to resolve a 1/1000 of a HZ signal and finally a 25db preamplifier with an adjustable attenuator making the 5600A perfect for communications, TV servicing, industrial testing or meeting your QSO on the correct frequency every time.

FACTS ARE FACTS: With the introduction of the 5600A, The sun has set on the competition. This may sound like a bold statement on the part of DSI BUT FACTS ARE FACTS. No counter manufacturer except DSI offers a Full Range 50 HZ to 600 MHz counter with — 9 Digits — 0.1 Hz resolution — .2 PPM 10° to 40° C proportional oven — RF pre-amp — 600 MHz prescaler — three selectable gate times — oven ready, standby and gate time indicator lights as standard features — For only \$149.95 kit and \$179.95 factory wired. In fact the competition doesn't even come close unless you consider \$200.00 to \$800.00 close. With DSI having the best price to quality features ratio in the industry, no wonder we've become one of the world's largest manufacturers of high quality frequency counter instrumentation.

FOR INFORMATION — DEALER LOCATION — ORDERS — OEM
CALL 800-854-2049 CALIFORNIA RESIDENTS CALL 800-542-6253

Model	Price	Frequency Range	Accuracy Over Temperature	Sensitivity			Number of Residuals	Size of Residuals	Power Requirements	Size H x W x D
				@ 100Hz-25MHz	@ 50-250MHz	@ 250-450MHz				
5600A-K	\$149.95	50Hz-600MHz	Proportional Oven	10MV	10MV	50MV	9	.5 Inch	*115 VAC or 8.2-14.5 VDC	3 1/4" x 9 1/2" x 9"
5600A-W	\$179.95		2 PPM 10° - 40° C							
3550	99.95	50Hz-550MHz	TCXO	25MV	25MV	75MV	8	.5 Inch	*115 VAC or 8.2-14.5 VDC	2 3/4" x 8" x 5"
500RH	\$149.95	50Hz-550MHz	TCXO	25MV	20MV	75MV	8	.4 Inch	*115 VAC or 8.2-14.5 VDC or NICAD PAK.	1" x 3 1/2" x 5 1/2"

5600A wired factory, backed in 1 year limited warranty. 5600A kit 90 day limited warranty. Prices and/or specifications subject to change without notice or obligation.

*With AC-9 Adaptor

\$99.95



MODEL 3550K

3550 OWNERS
You can add the 35P.2 .22 PPM 10° to 40° C proportional oven to your existing 3550



DSI INSTRUMENTS, INC.

7924 Rensson Road
San Diego, California 92111
CIRCLE 10 ON READER SERVICE CARD

TERMS: MC - VISA - AE - Discover - M.O. - C.O.D. in U.S. Funds. Please add 10% to a maximum of \$10.00 for shipping, handling and insurance. Orders outside of USA & Canada, please add \$20.00 addition to cover air shipment. California residents add 6% Sales Tax.

T101 Ant. \$3.95
AC-9 AC Adaptor 7.95
35P.2 29.95
Factory Installed 49.95

5600A Kit \$149.95
5600A Wired 179.95
AC-9 AC Adaptor 7.95
T600 BNC Ant. 7.95

BUILT-IN OPTIONS

BA56 Rechargeable
10 Hr. Bat. Pack 24.95
AM56 Audio Multiplier
.001Hz Resolution 34.95
PA56 25dB Preamplifier
with Attenuator 59.95

ATTENTION:

TO: All Amateurs
FROM: Wilson Systems, Inc.

Inflation . . . gas shortages . . . etc., all leading to higher prices each week, and cutting into the amount that we have to spend on our hobby. And face it, our hobby is what keeps us sane in this runaway inflation period, our escape from the hustle and hectic grind of working to make a living. We know — we see the same price increases at the grocery store, the same increases in the gas prices. Wilson Systems, Inc., is going to do something to help ease the purchase of your new tower and antenna.

As you may know, in January of 1979, Regency Electronics, Inc., purchased Wilson Electronics Corp. What you may not know is that in August, 1979, Jim Wilson purchased back the antennas and towers. There is now a new name to look for — WILSON SYSTEMS, INC. — With the new name and new company comes new ideas, methods, products and prices. Yes, prices. But not what you might expect. Wilson Systems is LOWERING the prices to where you will find it hard to believe. Check them out in the following pages of this issue. You will be surprised and pleased at what you will find.

What are we doing that will enable us to lower the prices? Well, we are Hams, too. We like to pay the lowest price possible and will spend much time assuring ourselves this is accomplished. We feel the same higher demands on our money for the house, food, and bills. And as this demand increases, the amount of money left for our hobby decreases. So when money is spent, we want the best quality for the best price.

There are a number of ways to bring the cost of a product down. By using a cheaper grade of material, buying raw materials in larger quantities to obtain a better discount, by cutting the profit ratio, and by eliminating the middle man. Wilson Systems will not lower the quality of the product. In fact, we have improved the strength and quality of almost every antenna in the line. The newly designed monobanders will stay up under heavy icing conditions when others are falling apart. Wilson Systems is currently purchasing at the lowest price possible from the aluminum companies, so these methods of cost reduction are eliminated. The third method mentioned is one that we have decided to consider as a part of the overall cost reduction plan, yet leaving room for research and development expense, so we may bring you the products you want and at a price you will like.

The last method mentioned is always a risky one. The dealers do not want their profits cut back just as you do not want your pay check cut. If you cut the dealers' profits back, some of them will just push the product that will tend to give them the most profit, rather than the one that will be the best performing for you. A rather drastic form of this method is the one that Wilson Systems will be choosing. You will not be able to find the Amateur products of Wilson Systems in stock at the dealers, nor will they probably recommend them. (After all, as long as they're not handling them and making a profit, why should they promote or even recommend them?) No, you will only be able to enjoy the most product for the least money by dealing with Wilson Systems factory direct. We will be offering you the amateur antennas and towers at prices that are below, in most cases, what the dealers pay for the products of other companies. And to make it even easier, we have a toll-free number for you to place your order. Now isn't this what you've been looking for? The best product for the least money!

Just remember these four points:

1. Highest Quality
2. Lowest Price
3. Toll-Free Order Number

The fourth point? Remember the name . . . WILSON SYSTEMS, INC.

Yours Truly,
Jim Wilson
Wilson Systems, Inc.

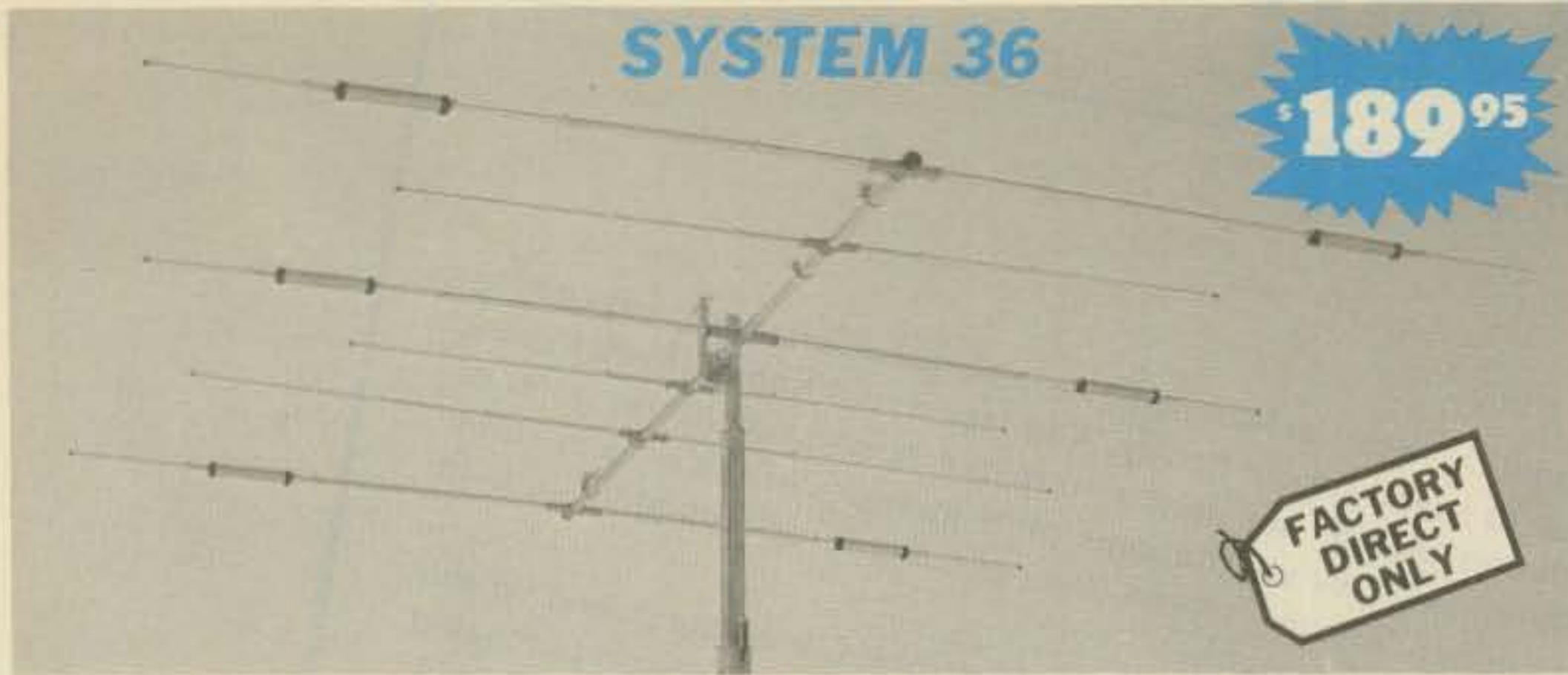
**W S I WILSON
SYSTEMS, INC.**

4286 S. Polaris Ave., Las Vegas, Nevada 89103
(702) 739-7401 — Toll-Free Order Number 800-634-6898
October, 1979 • CQ • 25

CIRCLE 54 ON READER SERVICE CARD

No 23-24

WILSON SYSTEMS INC. MULTI-BAND ANTENNAS



SYSTEM 36

\$189⁹⁵

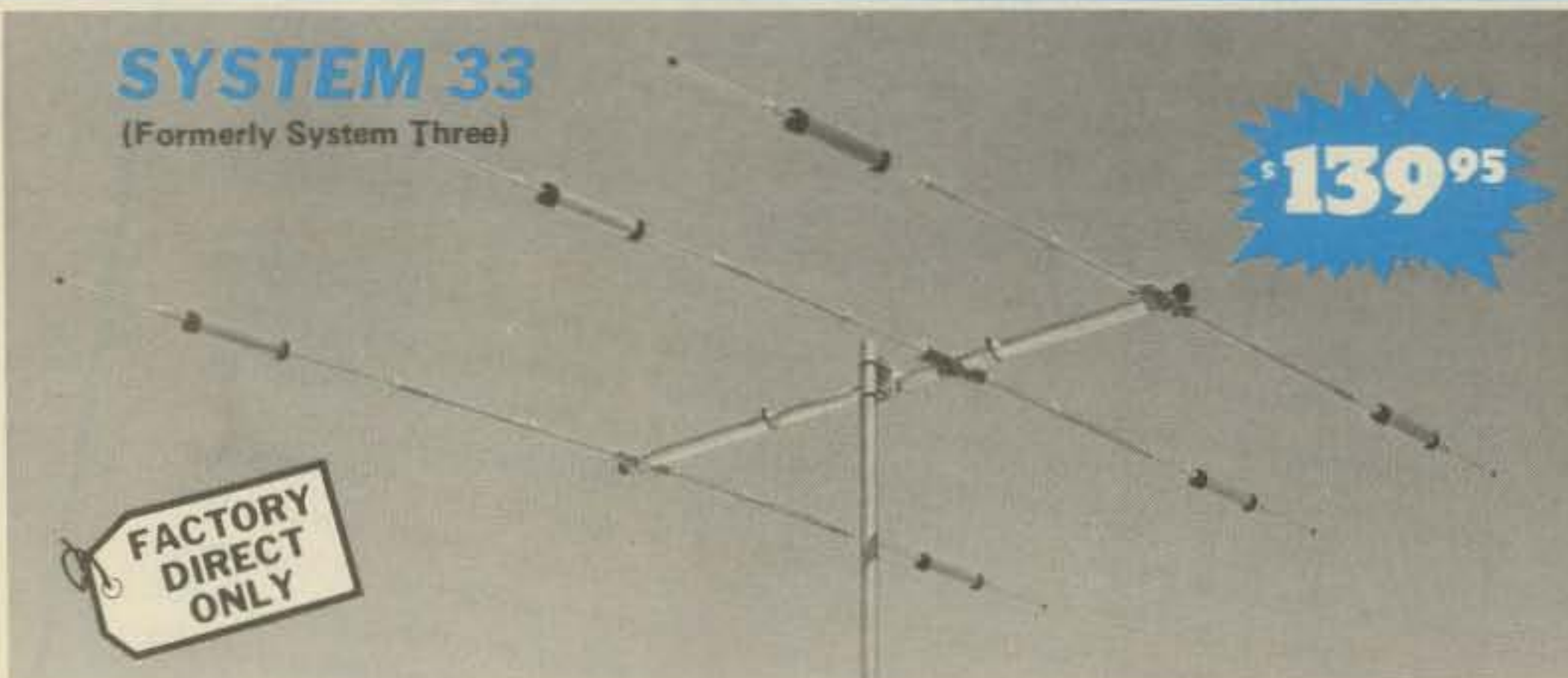
FACTORY DIRECT ONLY

A trap loaded antenna that performs like a monobander! That's the characteristic of this six element three band beam. Through the use of wide spacing and interlacing of elements, the following is possible: three active elements on 20, three active elements on 15, and four active elements on 10 meters. No need to run separate coax feed lines for each band, as the

bandswitching is automatically made via the High-Q Wilson traps. Designed to handle the maximum legal power, the traps are capped at each end to provide a weather-proof seal against rain and dust. The special High-Q traps are the strongest available in the industry today.

SPECIFICATIONS

Band MHz 14-21-28	Boom (O.D. x Length) . . 2" x 24'2 1/2"	Wind loading @ 80 mph . . 215 lbs.
Maximum power input . Legal limit	No. of elements 6	Maximum wind survival . . 100 mph
Gain (dBd) Up to 9 dB	Longest element 28'2 1/2"	Feed method Coaxial Balun (supplied)
VSWR @ resonance . . . 1.3:1	Turning radius 18'6"	Assembled weight (approx.) 53 lbs.
Impedance 50 Ω	Maximum mast diameter . 2"	Shipping weight (approx.) 62 lbs.
F/B ratio 20 dB or better	Surface area 8.6 sq. ft.	



SYSTEM 33

(Formerly System Three)

\$139⁹⁵

FACTORY DIRECT ONLY

Capable of handling the Legal Limit, the "SYSTEM 33" is the finest compact tri-bander available to the amateur.

Designed and produced by one of the world's largest antenna manufacturers, the traditional quality of workmanship and materials excels with the "SYSTEM 33".

New boom-to-element mount consists of two 1/8" thick formed aluminum plates that will provide more clamping and holding strength to prevent element misalignment.

Superior clamping power is obtained with the use of a rugged 1/4" thick aluminum plate for boom to mast mounting.

The use of large diameter High-Q Traps in the "SYSTEM 33" makes it a high performing tri-bander and at a very economical price.

A complete step-by-step illustrated instruction manual guides you to easy assembly and the lightweight antenna makes installation of the "SYSTEM 33" quick and simple.

SPECIFICATIONS

Band MHz 14-21-28	Boom (O.D. x length) . . 2" x 14'4"	Wind loading at 80 mph 114 lbs.
Maximum power input . Legal limit	No. elements 3	Assembled weight (approx.) . 37 lbs.
Gain (dbd) Up to 8 dB	Longest element 27'4"	Shipping weight (approx.) . . 42 lbs.
VSWR at resonance . . . 1.3:1	Turning radius 15'9"	Direct 52 ohm feed—no balun required
Impedance 50 ohms	Maximum mast diameter . 2" O.D.	maximum wind survival 100 mph
F/B ratio 20 dB or better	Surface area 5.7 sq. ft.	

\$44⁹⁵
WV-1A

4 BAND TRAP VERTICAL (10 - 40 METERS)

No bandswitching necessary with this vertical. An excellent low cost DX antenna with an electrical quarter wavelength on each band and low angle radiation. Advanced design provides low SWR and exceptionally flat response across the full width of each band.

Featured is the Wilson large diameter High-Q traps which will maintain resonant points with varying temperatures and humidity.

Easily assembled, the WV-1A is supplied with a hot dipped galvanized base mount bracket to attach to vent pipe or to a mast driven in the ground.

Note:

Radials are required for peak operation. (See GR-1 below).

SPECIFICATIONS:

- Self supporting—no guys required.
- Input Impedance: 50 Ω
- Powerhandling capability: Legal Limit
- Two High-Q Traps with large diameter coils
- Low Angle Radiation
- Omnidirectional performance
- Taper Swaged Aluminum Tubing
- Automatic Bandswitching
- Mast Bracket furnished
- SWR: 1.1:1 or less on all Bands

GR-1

\$9⁹⁵

The GR-1 is the complete ground radial kit for the WV-1A. It consists of: 150' of 7/14 stranded copper wire and heavy duty egg insulators, instructions. The GR-1 will increase the efficiency of the GR-1 by providing the correct counterpoise.

Prices and specifications subject to change without notice.

W S I WILSON SYSTEMS, INC.

4286 S. Polaris Avenue
Las Vegas, Nevada 89103
(702) 739-7401
Factory Direct Toll Free 1-800-634-6898

New, Improved Wilson Towers



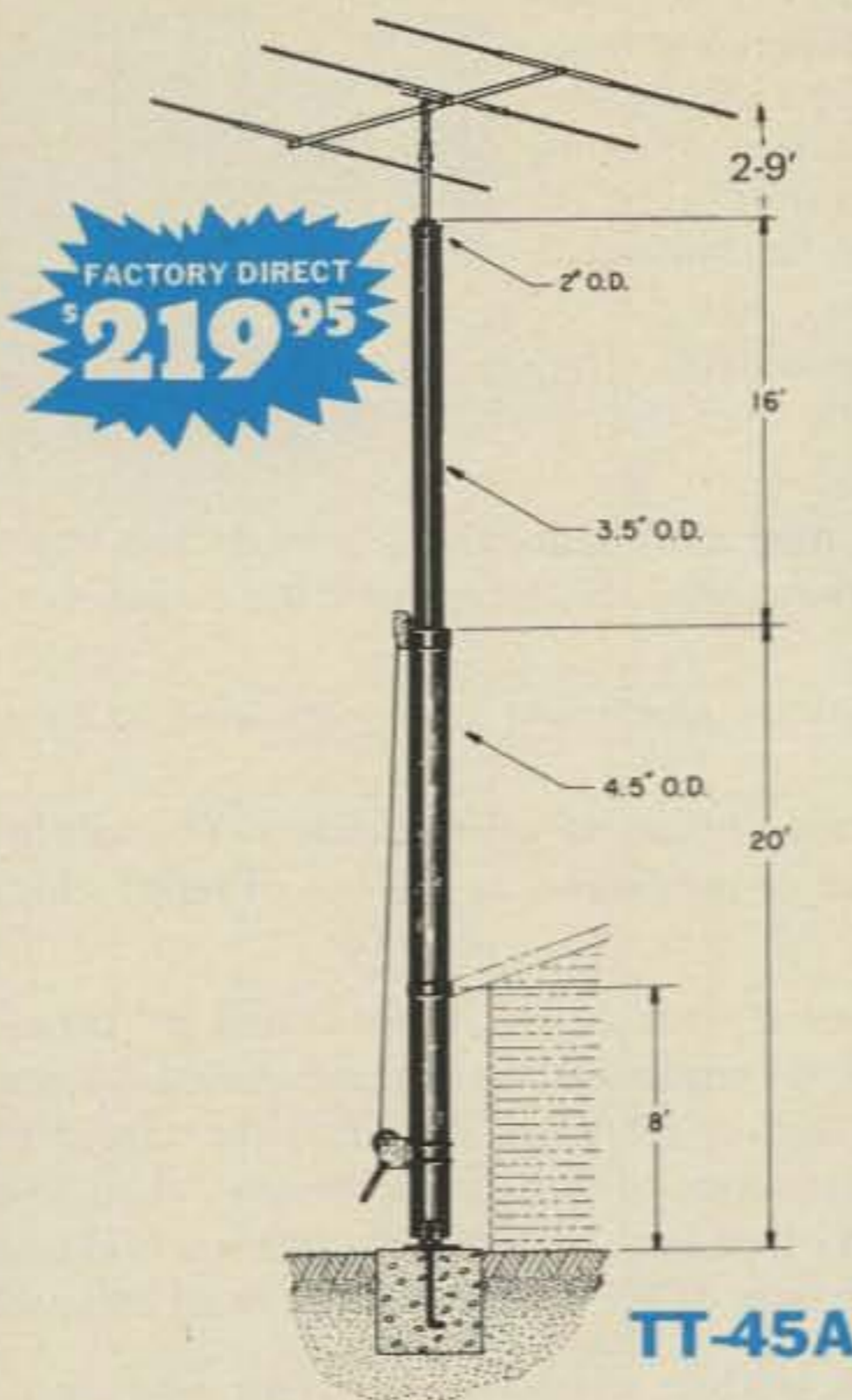
Hinged Base Plate - Concrete Pad, Heavy Duty Winch



Mounting the House Bracket



The Hinged Base Plate allows tower to be tilted over for access to antenna and rotor from the ground.



FEATURES:

- Maximum Height 45' (will handle 10 sq. ft. at 38') @ 50 mph
- 800 lb. winch
- Totally freestanding with proper base
- Total Weight, 189 lbs.

The TT-45A is a freestanding tower, ideal for installations where guys cannot be used. If the tower is not being supported against the house, the proper base fixture accessory must be selected.

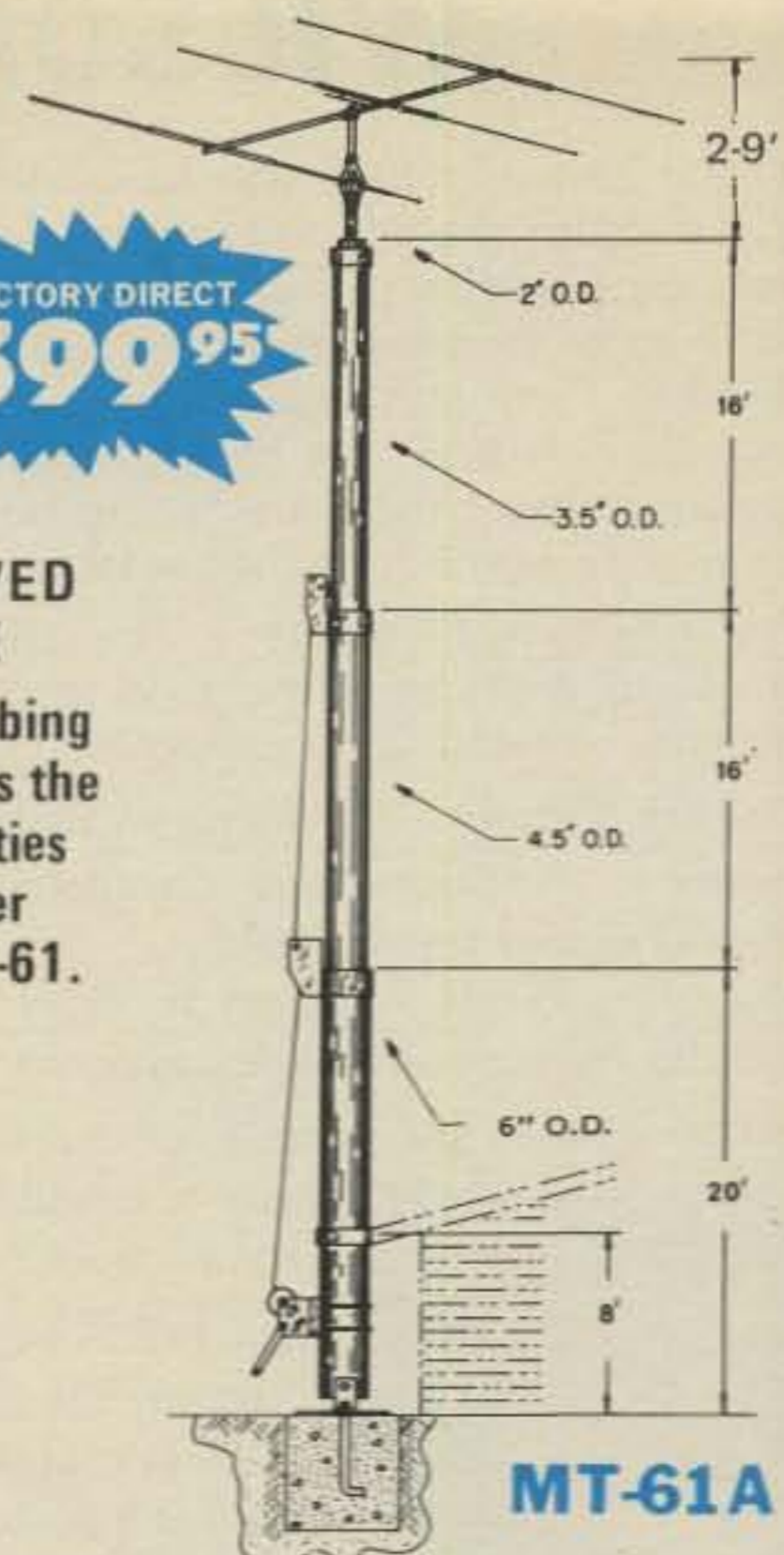
GENERAL FEATURES

All towers use high strength heavy galvanized steel tubing that conforms to ASTM specifications for years of maintenance-free service. The large diameters provide unexcelled strength. All welding is performed with state-of-the-art equipment. Top sections are 2" O.D. for proper antenna/rotor mounting. A 10' push-up mast is included in the top section of each tower. Hinge-over base plates are standard with each tower. The high loads of today's antennas make Wilson crank-ups a logical choice.

FACTORY DIRECT
\$399.95

NEW IMPROVED FEATURE

Heavier wall tubing greatly increases the stress capabilities over the older TT-45 and MT-61.



FEATURES:

- Is freestanding with use of proper base
 - Maximum Height is 61' (will handle 10 sq. ft. at 53') @ 50 mph
 - 1200 lb. brake winch
 - 4200 lb. raising cable
 - Total Weight, 350 lbs.
- Recommended base accessory: RB-61A, FB-61A.

The MT-61A is our largest and tallest freestanding tower. By using the RB-61A rotating base fixture the MT-61A is ideally suited for the SY33 or SY-36. If you plan to mount the tower to your house, caution should be taken to make certain the eave is properly reinforced to handle the tower. If not, one of the base accessory fixtures should be used.

TILT-OVER BASES FOR TOWERS

FIXED BASE

The FB Series was designed to provide an economical method of moving the tower away from the house. It will support the tower in a completely free-standing vertical position, while also having the capabilities of tilting the tower over to provide an easy access to the antenna. The rotor mounts at the top of the tower in the conventional manner, and will not rotate the complete tower.

FB-45A ... \$ 79.95

FB-61A ... 109.95

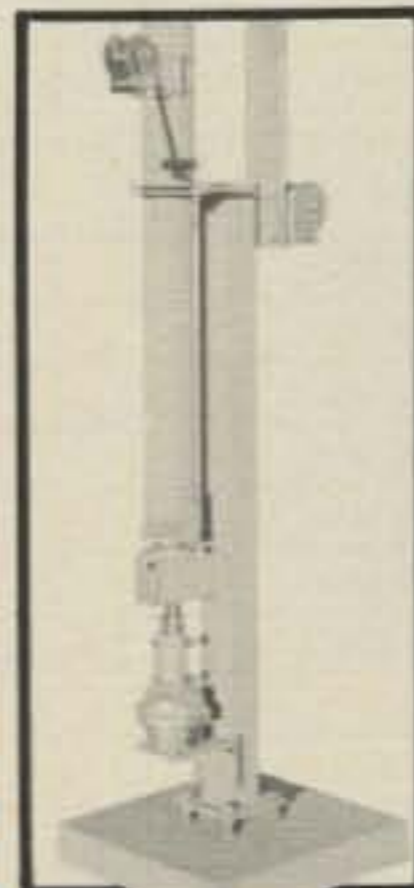


ROTATING BASE

The RB Series was designed for the Amateur who wants the added convenience of being able to work on the rotor from the ground position. This series of bases will give that ease plus rotate the complete tower and antenna system by the use of a heavy duty thrust bearing at the base of the tower mounting position, while still being able to tilt the tower over when desiring to make changes on the antenna system.

RB-45A ... \$119.95

RB-61A ... 179.95



Tilting the tower over is a one-man task with the Wilson bases.

(Shown above is the RB-61A.)

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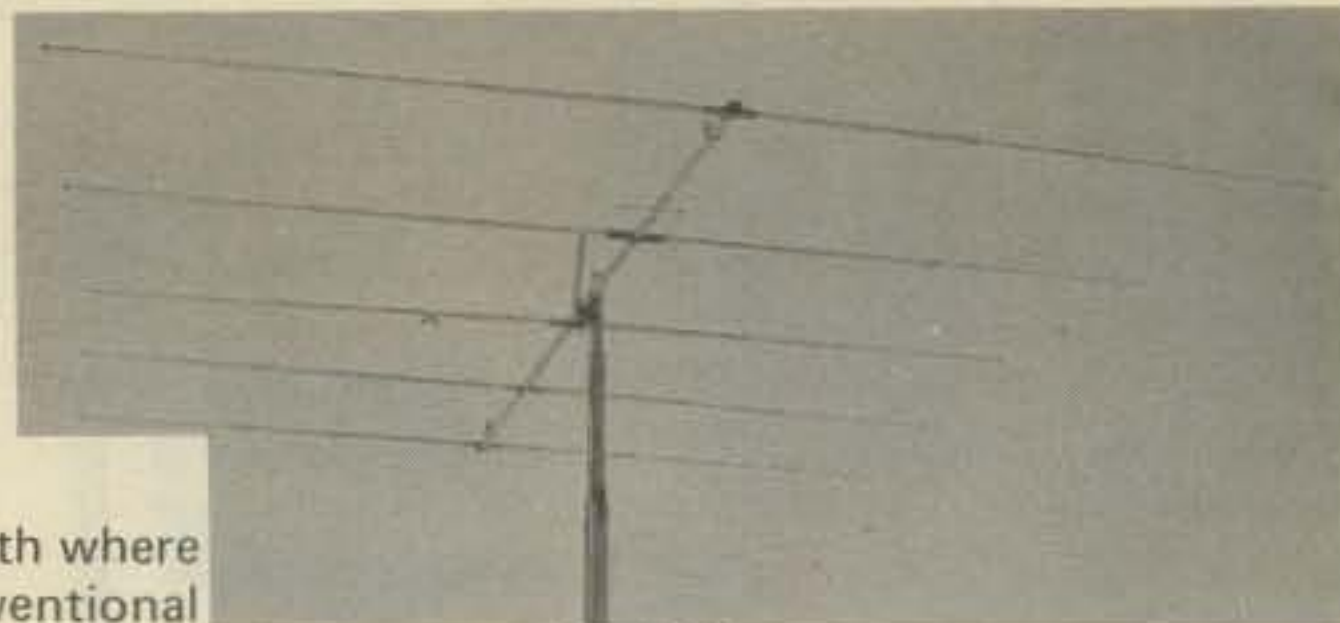
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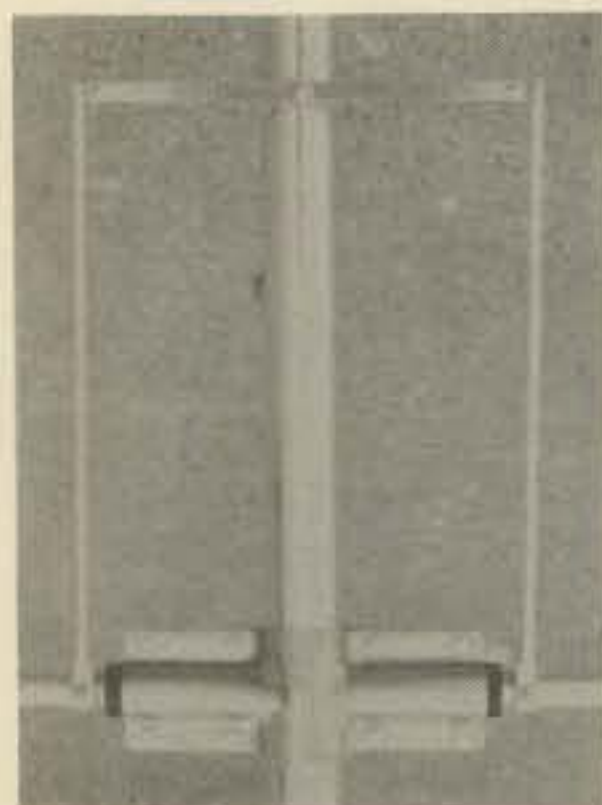
WILSON MONO-BAND BEAMS

At last, the antennas that you have been waiting for are here! The top quality, optimum spaced, and newest designed monobanders. The Wilson Systems' new Monoband beams are the latest in modern design and incorporate the latest in design principles utilizing some of the strongest materials available. Through the select use of the current production of aluminum and the new boom to element plates, the Wilson Systems' antennas will stay up when others are falling down due to heavy ice loading or strong winds. Note the following features:



M-520A

- Taper Swaged Elements** – The taper swaged elements provide strength where it counts and lowers the wind loading more efficiently than the conventional method of telescoping elements of different sizes.
- Mounting Plates – Element to Boom** – The new formed aluminum plates provide the strongest method of mounting the elements to the boom that is available in the entire market today. No longer will the elements tilt out of line if a bird should land on one end of the element.
- Mounting Plates – Boom to Mast** – Rugged 1/4" thick aluminum plates are used in combination with sturdy U-bolts and saddles for superior clamping power.
- Holes** – There are no holes drilled in the elements of the Wilson HF Monobanders. The careful attention given to the design has made it possible to eliminate this requirement, as the use of holes adds an unnecessary weak point to the antenna boom.



Wilson's Beta match offers maximum power transfer.

With the Wilson Beta-match method, it is a "set it and forget it" process. You can now assemble the antenna on the ground, and using the guidelines from the detailed instruction manual, adjust the tuning of the Beta-match so that it will remain set when raised to the top of the tower. The Wilson Beta-match offers the ability to adjust the terminating impedance that is far superior to the other matching methods including the Gamma match and other Beta-matches. As this method of matching requires a balanced line, it will be necessary to use a 1:1 balun, or RF choke, for the most efficient use of the HF Monobanders.

The Wilson Monobanders are the perfect answer to the Ham who wants to stack antennas for maximum utilization of space and gain. They offer the most economical method to have more antenna for less money with better gain and maximum strength. Order yours today and see why the serious DXers are running up that impressive score in contests and number of countries worked.

SPECIFICATIONS

Model	Band Mtrs	Gain dBd	F/B Ratio	Bandwidth @ Resonance 2:1 VSWR Limits	VSWR @ Resonance	Impedance	Matching	Elements	Longest Element	Boom O.D.	Boom Length	Turning Radius	Surface Area (Sq. Ft.)	Windload @ 80 mph (Lbs.)	Maximum Mast	Assembled Weight (Lbs.)
M520A	20	11.5	25 dB	500 KHz	1.1:1	50 Ω	Beta	5	36'6"	2"	34'2½"	25'1"	8.9	227	2"	68
M420A	20	10.0	25 dB	500 KHz	1.1:1	50 Ω	Beta	4	36'6"	2"	26'0"	22'6"	7.6	189	2"	50
M515A	15	12.0	25 dB	400 KHz	1.1:1	50 Ω	Beta	5	25'3"	2"	26'0"	17'6"	4.2	107	2"	41
M415A	15	10.0	25 dB	400 KHz	1.1:1	50 Ω	Beta	4	24'2½"	2"	17'0"	14'11"	2.1	54	2"	25
M510A	10	12.0	25 dB	1.5 MHz	1.1:1	50 Ω	Beta	5	18'6"	2"	26'0"	16'0"	2.8	72	2"	36
M410A	10	10.0	25 dB	1.5 MHz	1.1:1	50 Ω	Beta	4	18'3"	2"	12'11"	11'3"	1.4	36	2"	20

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WILSON SYSTEMS ANTENNAS

WILSON SYSTEMS TOWERS

Qty.	Model	Description	Shipping	Price	Qty.	Model	Description	Shipping	Price
	SY33	3 Ele. Tribander for 10, 15, 20 Mtrs.	UPS	\$139.95		TT-45A	Freestanding 45' Tubular Tower	TRUCK	\$219.95
	SY36	6 Ele. Tribander for 10, 15, 20 Mtrs.	UPS	189.95		RB-45A	Rotating Base for TT-45A w/tilt over feature	TRUCK	119.95
	WV-1A	Trap Vertical for 10, 15, 20, 40 Mtrs.	UPS	44.95		FB-45A	Fixed Base for TT-45A w/tilt over feature	TRUCK	79.95
	GR-1	Ground Radials for WV-1A	UPS	9.95		MT-61A	Freestanding 61' Tubular Tower	TRUCK	399.95
	M-520A	5 Elements on 20 Mtrs.	TRUCK	199.95		RB-61A	Rotating Base for MT-61A w/tilt over feature	TRUCK	179.95
	M-420A	4 Elements on 20 Mtrs.	UPS	139.95		FB-61A	Fixed Base for MT-61A w/tilt over feature	TRUCK	109.95
	M-515A	5 Elements on 15 Mtrs.	UPS	119.95		STB-50	Thrust Bearing	UPS	18.95
	M-415A	4 Elements on 15 Mtrs.	UPS	79.95	Nevada Residents Add Sales Tax				
	M-510A	5 Elements on 10 Mtrs.	UPS	84.95	Ship C.O.D. <input type="checkbox"/> Check enclosed <input type="checkbox"/> Charge to Visa <input type="checkbox"/> M/C <input type="checkbox"/>				
	M-410A	4 Elements on 10 Mtrs.	UPS	64.95	Card # _____ Expires _____				
	WM-62A	Mobile Antenna: 5/8 λ on 2, ¼ λ on 6	UPS	19.95	Bank # _____ Signature _____				
	ACCESSORIES								
	HD-73	Alliance Heavy Duty Rotor	UPS	109.95	<i>Please Print</i>				
	RC-8C	8/C Rotor Cable	UPS	.12/ft.	Name _____ Phone _____				
	RG-8U	RG-8U Foam-Ultra Flexible Coaxial Cable. 38 strand center conductor, 11 gauge	UPS	.21/ft.	Street _____				
					City _____ State _____ Zip _____				

Note: On Coaxial and Rotor Cable, minimum order is 100 ft. and in 50' multiples.
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*Shown with accessory touch tone pad

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By now most of you have heard the same words of praise on the air that we (gratefully) receive over and over. The quality that is built into the S-1 has been attested to by the outstanding performance and dependability of the thousands of units in daily use. The high level of innovative engineering that brought forth the Amateur world's first hand held synthesized radio also designed into this compact beauty exciting performance and features at a very affordable price. A price that also includes a ni-cad battery pack, charger, and a telescoping whip antenna. The optional touchtone pad shown in the illustration adds greatly to its convenience. In addition we offer superior quality 30 and 80 watt solid state matching power amplifiers that give the S-1 the flexibility of operating as a portable, mobile, or base station rig.

Remember...the Tempo S-1 is the original and proven 800 channel synthesized hand held transceiver. Don't be fooled by substitutes.

SPECIFICATIONS

Frequency Coverage: 144 to 148 MHz
 Channel Spacing: Receive every 5 kHz, transmit Simplex or ±600 kHz
 Power Requirements: 9.6 VDC
 Current Drain: 17 ma-standby, 500 ma-transmit
 Batteries: 8 cell ni-cad pack included
 Antenna Impedance: 50 ohms
 Dimensions: 40 mm x 62 mm x 165 mm (1.6" x 2.5" x 6.5")
 RF Output: Better than 1.5 watts
 Sensitivity: Better than .5 microvolts

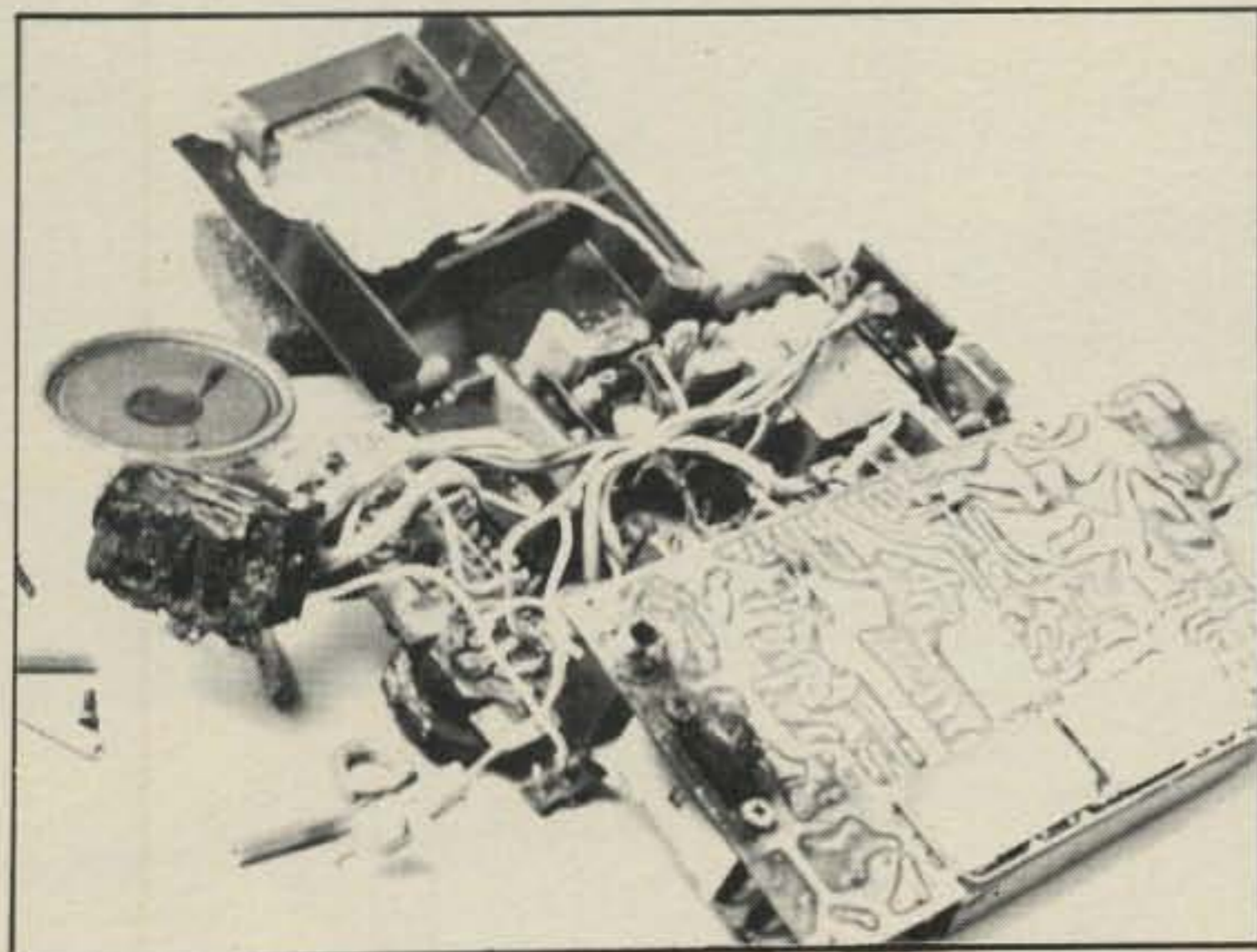
Price... \$349.00
 With touch tone pad... \$399.00

SUPPLIED ACCESSORIES

Telescoping whip antenna, ni-cad battery pack, charger.

OPTIONAL ACCESSORIES

Touch tone pad (not installed): \$39 •
 Tone burst generator: \$29.95
 • CTCSS sub-audible tone control: \$29.95 • Rubber flex antenna: \$8 •
 Leather holster: \$16 • Cigarette lighter plug mobile charging unit: \$6 •
 Matching 30 watt output 13.8 VDC power amplifier (S30): \$89 •
 Matching 80 watt output power amplifier (S80): \$149



This S-1 was in a motorhome that was totally destroyed by fire. When the owner probed around in the ashes he found his S-1, burned almost beyond recognition. BUT STILL OPERATING. Since then we cleaned it up, replaced the case and controls, tuned it, and now it's back on the air...as good as new.

The Tempo line also features a fine line of extremely compact UHF and VHF pocket receivers. They're low priced, dependable, and available with CTCSS and 2-tone decoders. The Tempo FMT-2 & FMT-42 (UHF) provide excellent mobile communication and features a remote control head for hide-away mounting.

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self tracking speeds from 1-175 wpm on a separate plug-in circuit board (Available June, 1979)
- All in a convenient, small cabinet (14.1" x 9.25" x 4.35")

Price: \$449.00

Optional Morse Receive Board: \$149.00

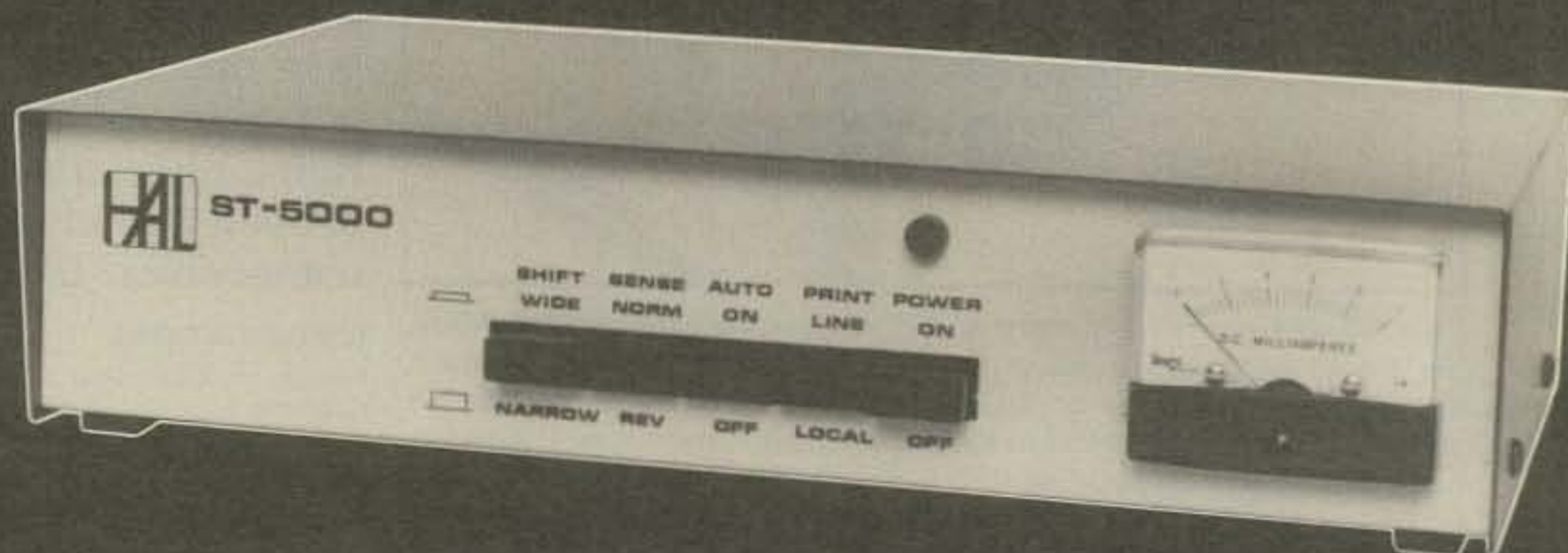
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If you're looking for an RTTY demodulator with great performance on both the HF and VHF bands, take a look at the ST-5000 from HAL. The use of active filters with no phase-lock loop or 'single-tone' short-cuts ensure the kind of performance you expect. Full features in an attractive and conveniently small package make this demodulator a value that's hard to beat!

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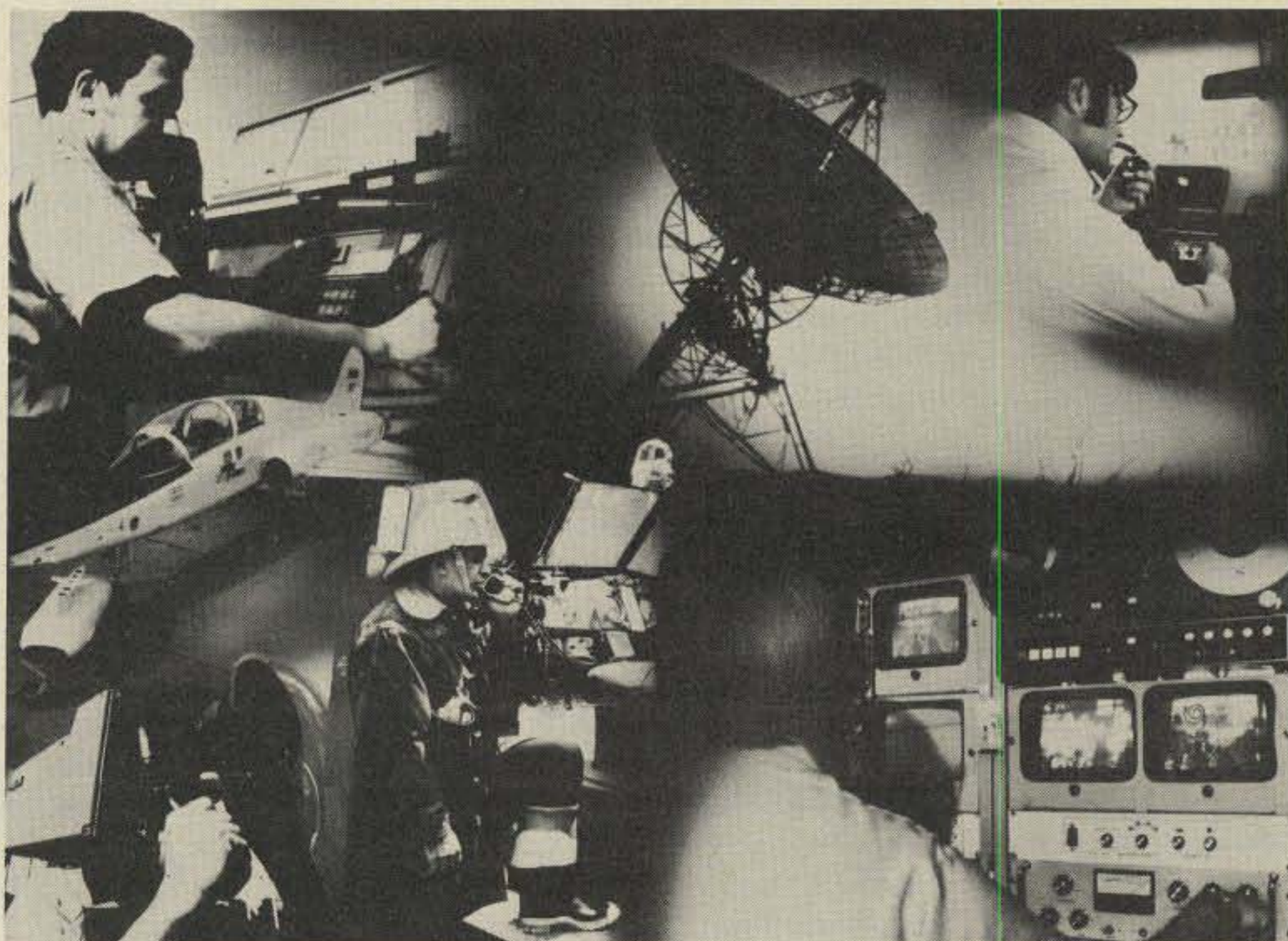
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Announcing

● **Norfolk, VA** — The Fourth Annual Tidewater Hamfest-Computer Show-Flea Market will be held at the Norfolk Cultural and Convention Center SCOPE on October 20 and 21, 1979. 60,000 sq. ft. of airconditioned exhibit and Flea Market tailgating space will be available. Doors will open at 9:00 a.m. ARRL meetings, DX, Traffic forums, plus a CW contest are scheduled. FCC Exams are planned for amateur upgrading on Saturday 9-12 a.m. A special feature will be a dinner cruise and banquet on the Spirit of Norfolk Cruiseship Saturday night. Advance registration-\$2.50 (SASE), \$3.50 at the door. Flea Market tailgate spaces-\$3 a day. Cruise and banquet-\$16 per person, \$30 a couple. For tickets and more info, write: TRC, P.O. Box 7101, Portsmouth, VA 23707.

● **Cedar Rapids, IA** — The 1979 ARRL Midwest Division Convention and CVARC Hamfest will be held on October 19, 20, and 21, at the all new Five Seasons Center. Their guest and Saturday evening banquet speaker is Senator Barry Goldwater, K7UGA. Grand Prize is a complete HF station, Deluxe HF Transceiver, Tri-Band Beam, Rotor, and 60' of tower. The all indoor Flea Market will open with exhibits from 8 a.m. to 5 p.m. and again from 8 a.m. to 2 p.m. on Sunday. Two hotels are attached to the center with ample parking. Flea Market tables are \$5 each for both days on the first come basis payable in advance. Manufacturers and retailers should write for booth info or call 319-364-0855. Tickets are \$4 in advance or \$5 at the door. No reservations will be taken after October 1, 1979. Talk-in frequencies are 146.16/76, 146.52, and 223.34/94. For general information and reservation material, write: CVARC, Box 994, Cedar Rapids, Iowa 52406.

● **Sioux Falls, SD** — The '79 ARRL Dakota Division Convention will be held on October 5, 6, and 7, at the Sioux Falls Airport Ramada Inn. Talk-in on 146.16/76. This event will include technical and operating forums, ARRL

forum, large exhibit area, and culminating banquet. Advanced registration prize-DenTron GLA-1000 amplifier, will be awarded. Grand prize will be a Kenwood TS-820S. Registration: \$15.00 (\$16.00 after September 1). For further information and convention rate hotel accommodations, write: Sioux Falls Amateur Radio Club, Box 91, Sioux Falls, SD 57101.

● **Rome, GA** — The Northwest Georgia Amateur Radio Club would like to invite all to attend their Annual Rome Hamfest on October 7, 1979, at the Coosa Valley Fairgrounds. Gates will open at 9:00 a.m. Talk-in on 146.34/94 and 146.085/685. For further info, write: WB4AEG, Box 274, Adairsville, GA 30103.

● **Chattanooga, TN** — Hamfest Chattanooga will be held on October 27 and 28, 1979, at the Chattanooga State Technical Community College. Events will include FCC exams, prizes, contests, exhibits, forums, and ladies' programs. Indoor dealer area is \$15.00 per table and outdoor paved flea market area is \$2.00 per space each day. Talk-in on 19/79 and 3980. Pre-registration with prize tickets and info is available for \$1 by writing to: Hamfest, P.O. Box 95, Chattanooga, TN 37401.

● **Syracuse, NY** — The Radio Amateurs of Greater Syracuse (New York) will host their 15th Annual Hamfest at the New York State Fairgrounds, Arts and Home Center, on Saturday, October 13, 1979. Time: 9:00 a.m. to 6:00 p.m. There will be exhibitor booths, indoor and outdoor flea market, awards, films, and ladies' programs. Tickets before October 1st are available at a reduced rate. Talk-in on 90/30 and 31/91. For tickets and more info, write: R.A.G.S., P.O. Box 88, Liverpool, NY 13088.

● **Rock Hills, SC** — The York County Amateur Radio Society will hold its Annual Hamfest on Sunday, October 7, 1979, from 0800-until, at Joslin Park. Registration is \$275 ea. or 2/\$5.00 in advance or \$3.00 at the gate. Main prize will be a Yaesu 901DM. A barbecue

dinner will be available in the park. Talk-in on 146.43/147.03 and 146.52 direct. For more info, write: P.O. Box 4141 CRS, Rock Hill, SC 29730.

● **Plymouth, IN** — The Plymouth Indiana "Swap & Shop" will be held at the National Guard Armory on October 21, 1979. Admission will be \$2 at the door. \$3 per 6 ft. table advance reservation allows setup between 6:30 and 8:00 a.m. Cash main door prize and hourly drawings. Advance tickets are \$1.50 from Marshall County Amateur Radio Club members. For table/space/and ticket requests, write to: MCARC, P.O. Box 151, Plymouth, IN 46563 or Paul DeVos, 109 Maple Ave., North Liberty, IN 46554.

● **West Ghent, NY** — The Northeastern States 160 Meter Amateur Radio Association's Annual Election and Banquet will be held on Sunday, October 14, 1979, at Kozel's Restaurant on Rt. 9H. A Flea Market in the rear parking lot will be held at 1:00 p.m. All hams and XYLs are welcome. For reservations and details, contact: WA5IOD, Sec/Treasurer, William Derby, 14 Plain St., Medfield, MA 02052.

● **Moultrie, GA** — Members of the Colquitt County Ham Radio Society will be operating club station WD4 KOW from the site of the second Annual Sunbelt Agricultural Exposition on October 9, 10, and 11, 1979. The hours of operation will be 0900 to 1600 EDST each day. Operations will be mostly on 40 and 20 meters around 7.250 and 14.300 MHz with some operations in the other HF bands. The members will also be listening for visiting hams on the local repeater 146.19/79. Visiting hams are invited to visit the amateur booth at the Expo and operate the amateur station. This year special QSL cards are being printed for this event and will be available for those making a contact and desiring one. For more info, contact: Colquitt County Ham Radio Society, P.O. Box 813, Moultrie, GA 31768.

● **IMPORTANT NOTE:** When applying for certificates and plaques (WAZ, CQ DX, WPX, and USA-CA), please make all checks payable to the appropriate Award Manager. For WAZ, make out check or money order payable to—Leo Haijsman, W4KA, 1044 Southeast 43rd St., Cape Coral, FL 33904. For CQ DX—Billy Williams, N4UF, 911 Rio St., Johns Drive, Jacksonville, FL 32211. For CQ DX—Bob Huntington, K6XP, 5014 Mindora Drive, Torrance, CA 90505 and for USA-CA—A. Edward Hopper, W2GT, P.O. Box 73, Rochelle Park, NJ 07662. □

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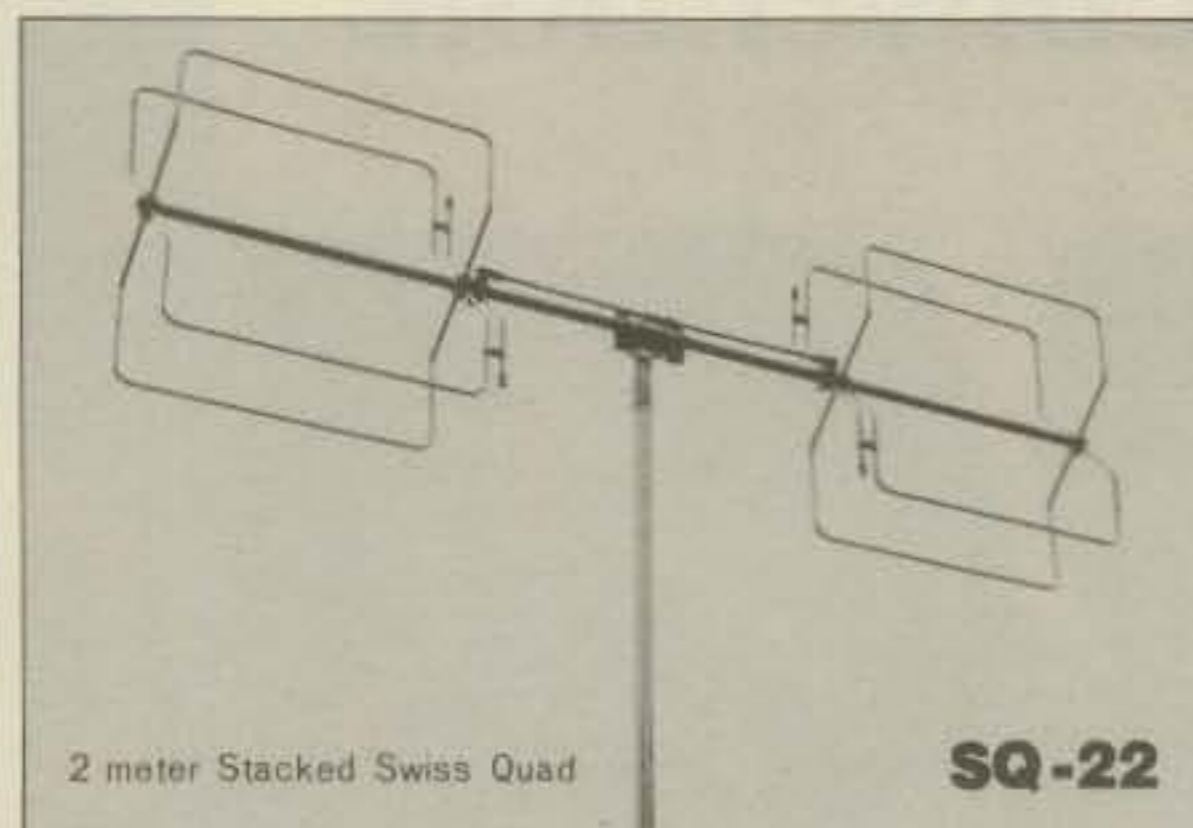
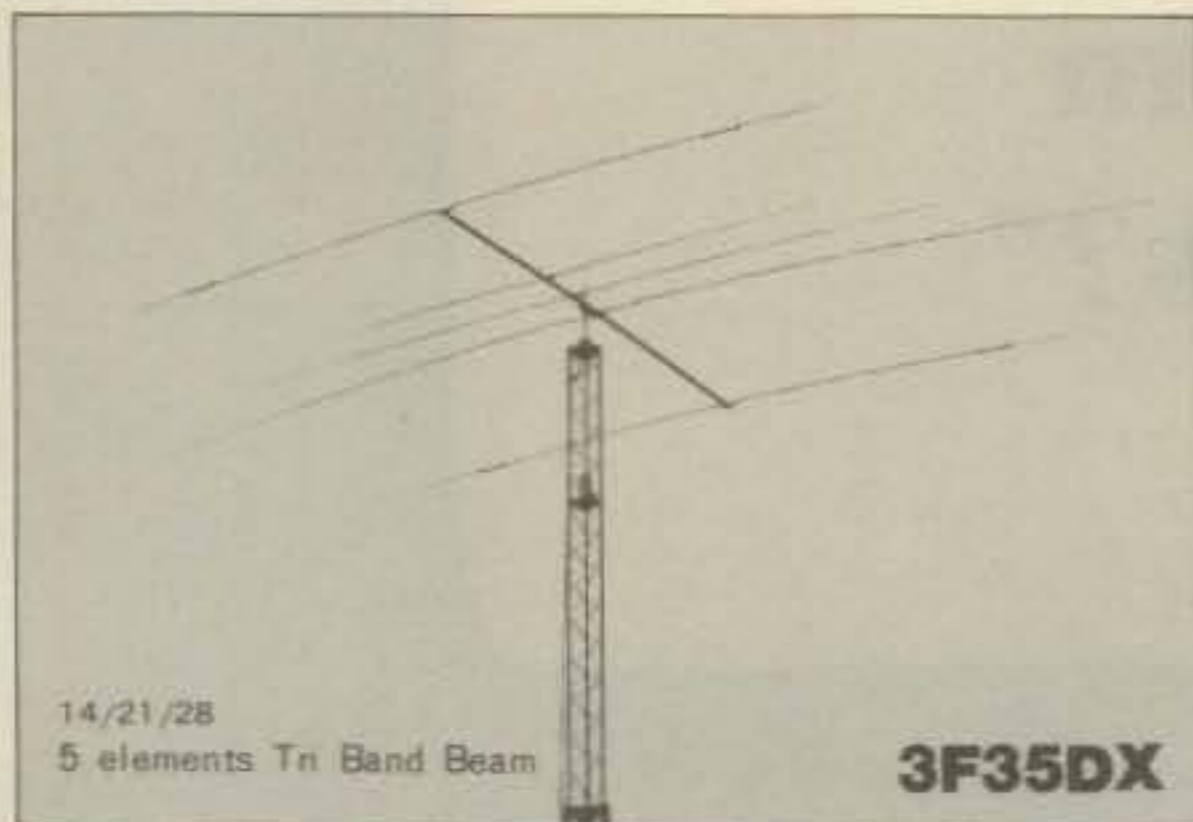
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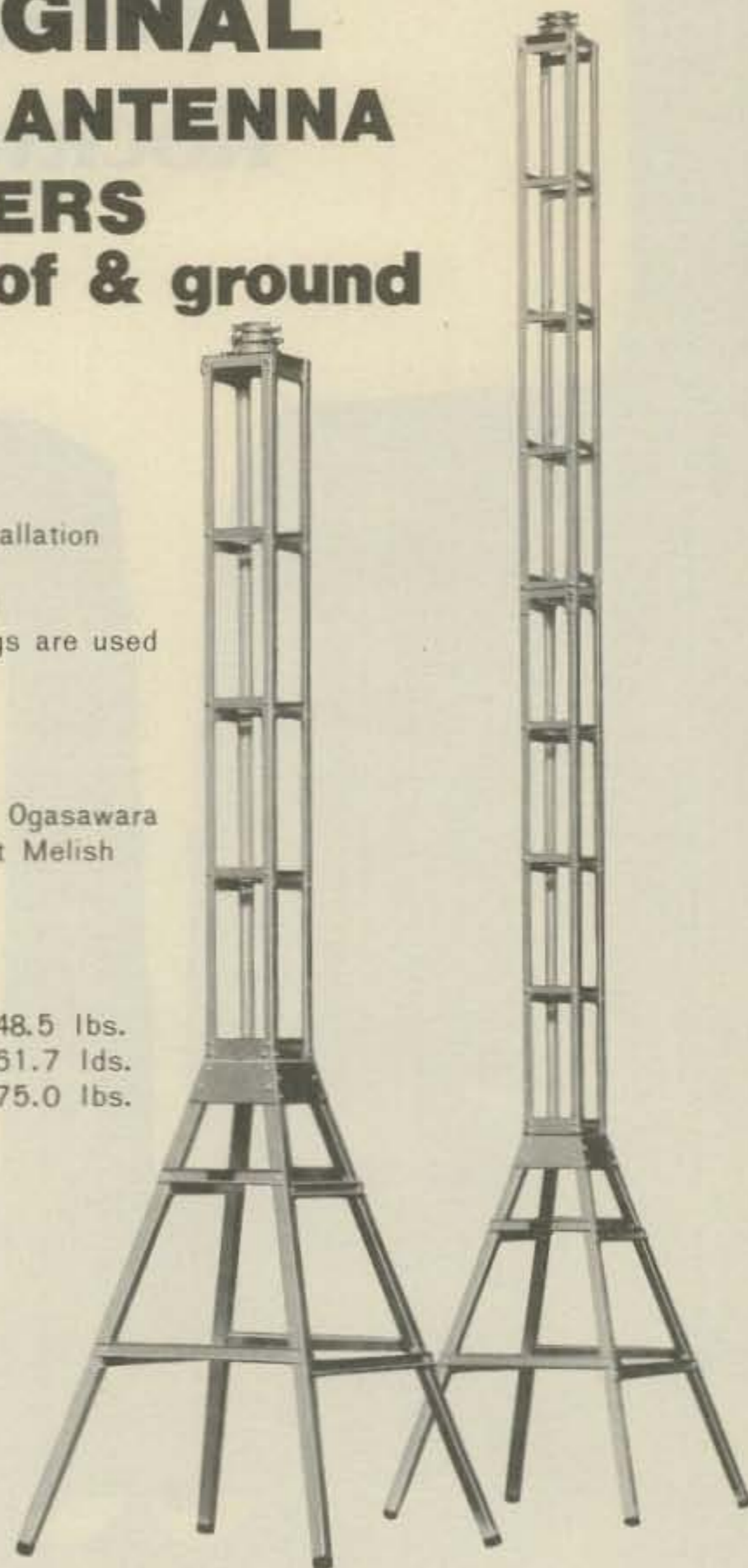
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FEATURES

Advantages such as solid state circuitry, rugged Lexan® case, removable rear panel (enabling easy access to battery compartment) and compact mini-size enhance the Mark Series portable radio's versatility. In addition, Wilson carries a full line of accessories to satisfy almost any of your requirements.

SPECIFICATIONS

The Mark radios offer: • 144-148 MHz range • 6 Channel operation • Individual trimmers on TX and RX xtals • Rugged Lexan® outer case • Current drain: RX; 15 mA, TX; Mark II: 500 mA, Mark IV: 900 mA • A power saving Hi/Lo Switch • 12 KHz ceramic filter and 10.7 monolithic filter included • 10.7 MHz and 455 KHz IF • Spurious and harmonics, more than 50 dB below quieting • Uses special rechargeable Ni-Cad battery pack • LED battery condition indicator • Rubber duck and one pair Xtals 52/52 included • Weight: 19 oz. including batteries • Size: 6" x 1.770" x 2.440".

OPTIONS

Options available, include Touch Tone Pad, CTCSS, Leather Case, Chargers for Desk Top, Travel or Automobile, Speaker Mike and large capacity, small size batteries.

For more details and/or the name of your nearest dealer, contact: Consumer Products Division, Wilson Electronics Incorporated, 4288 So. Polaris Ave., P. O. Box 19000, Las Vegas, Nevada 89119. Phone 702/739-1931.

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Our Readers Say

Addendum

Editor, CQ:

The passing of Wil Scherer is indeed a keen loss to his many friends and to the amateur fraternity in general.

I learned of Wils passing from your *CQ* editorial (April, 1979) in which you paid due tribute to this man whose many contributions did much to bring amateur radio to the high technical level it presently enjoys.

Your excellent, eulogistic editorial did however contain an error. You mentioned several "firsts" by Wil including the introduction to amateur radio of the grid-dip oscillator. This latter statement is incorrect as Wil would be the first to admit.

To the best of my knowledge, my own article in the March 1947 issue of *CQ* titled, "About grid-dip oscillators" was the initial introduction of this useful instrument to amateur radio circles.

It is interesting to note, however, that Wil had an article titled, "The dipper" which appeared two months later in *CQ* for May 1947. In re-reading this article, it is clear that Wil must have spent considerable time on the subject because he mentions that he had been responsible for several (?) commercial versions of the instrument. One illustration in his article looks strikingly similar to the subsequently well-known Millen grid-dip meter. Be this as it may, Scherer states in the same article, and I quote, "The first post-war reference (to the GDO) in amateur literature appeared in the March (1947) *CQ*". This statement should clearly establish the priority of my own humble contribution.

Some further background on GDO's. As chief engineer for Techrad Corp., in the late thirties, I had occasion to work with the radio communications design group of the U.S. Forestry Service. These innovative people were using a home-built version of a GDO in their Portland, OR lab. I very much regret that I cannot recall individual names at this late date. However, I feel certain that this letter will bring forth other comments on the background of GDO.

Who knows? Perhaps the Forest Service engineers mentioned are in amateur radio and will tell us where they got the idea.

These references to the distant past show clearly that *CQ* Magazine had the foresight to encourage (then)-feature writers to disclose details of equipment that were not generally known to amateur radio.

In this regard, tribute should be paid to the late Larry LeKashman, who, as editor, brought to *CQ* such individuals as Frank C. Jones, Woody Smith, Bill Orr, Herb Becker, myself and others, most of whom had been editors and/or feature writers for the original Magazine *RADIO*. Many of your present readers may not be aware of the hierarchy of which *CQ* is a part.

The chain started with the original *RADIO* magazine founded in 1917 and continued its linkage with a series of *RADIO*'s extending through the depressed 30's. *CQ* is the end link in the chain and is responsible for many other "firsts".

In conclusion, I would like to state clearly that, even if Wil Scherer's article on GDO were not the first to appear in print, surely he was the one who picked up the ball and ran with it and should receive due credit for his early contributions leading to the modern versions of this most useful device.

Clayton F. "Bud" Bane, W6WB
Falls Church, VA

The Price of Complacency

Editor, CQ:

Your information on the "woodpecker" (Dateline . . . Washington D.C., July, 1979), was enlightening and to the point. It concerns me that amateurs have become complacent in thinking that nothing can be done about (OTH) Radar. The 15 meter novice band receives its share of this unnecessary interference.

What concerns me even more is the Department of State and the FCC, since they require amateurs to provide 350,000 signed reports of this abuse.

If the Russians, or any country for that matter, were beaming microwaves toward us, with their possible harmful effects, would both agencies wait for people to become ill, or first require each citizen to file a complaint?

I do not mind writing letters or making phone calls but I do hate to be the only one to complain. If you think for a moment what the Soviet Union could gain by disrupting the amateur bands, we all might rise up, including the State Department and the FCC. We do, in our own way, provide communication to the outside world. By the use of amateur radio, many international events and disasters are known in time for the United States to assist. If we lose segments of our amateur bands to this obvious and blatant interference, then we are mere puppets in the hands of a country which stands totally opposite to what this country was founded upon. Too bad George Washington, Ben Franklin, and Thomas Jefferson were not hams—we would certainly have been heard then!

Jack D. Fleming, KA4JMV
Tuscaloosa, AL

A Raised Fist

Editor, CQ:

Re WA3WBI's article "The Keyer is the Key" (July, 1979, pg. 58): While I agree that a strong case is made for investigating the advantages of the electronic keyer, I believe that "the use of an electronic keyer from the start of one's career in radio", as suggested by Mr. Kaufman, might deprive new amateurs of one aspect of amateur radio that I have found to be personally rewarding—the pride of skillfully and correctly operating a straight key. This accomplishment, admittedly necessitating practice, patience and a certain love for this aspect of radio, carries with it a very special thrill all its own.

I think that the excitement of recognizing an individual's "fist" is comparable to recognizing a friend's voice across the country. I have met many skilled operators who enjoy the different aspects of both electronic and hand keyers. To suggest that a new amateur skip the use of a hand key entirely is to deprive him or her of what might be a truly valued experience.

Bella Romain, WA2CZU
West Hempstead, NY



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The August 1977 cover of CQ featured a photo showing the raising of an antenna farm with the help of a hot air balloon. This is a sequel to that event.

Liftoff On 80 Meters!

BY BILL GUIMONT*, W7KW



After five years of battling in the courts over the legality of the five 180-foot towers at W7KW, I came to an agreement with Maricopa County that if I would reduce the towers' heights to approximately 100 feet,

*23533 North 77th Ave., Peoria AZ 85345

they would issue permits.

To reduce five towers to 100 feet, raise and lower all the yagis on them, and finally reconnect them seemed like an endless task. With the use of a 208-foot hydraulic crane the job seemed feasible, but prohibitive in cost. My neighbor, Andy Bonnet, was a manager of one of the largest crane companies in Pheonix and we pro-

cured the 208-footer (the only one in Arizona!) for the cost of labor only (we have some *good* neighbors). But, of course, with Saturday/Sunday overtime and double-time, this still amounted to a small fortune. As you will note in photo 1, a basket was used to haul up the fellows and preserve their strength for more important tasks in the long day to

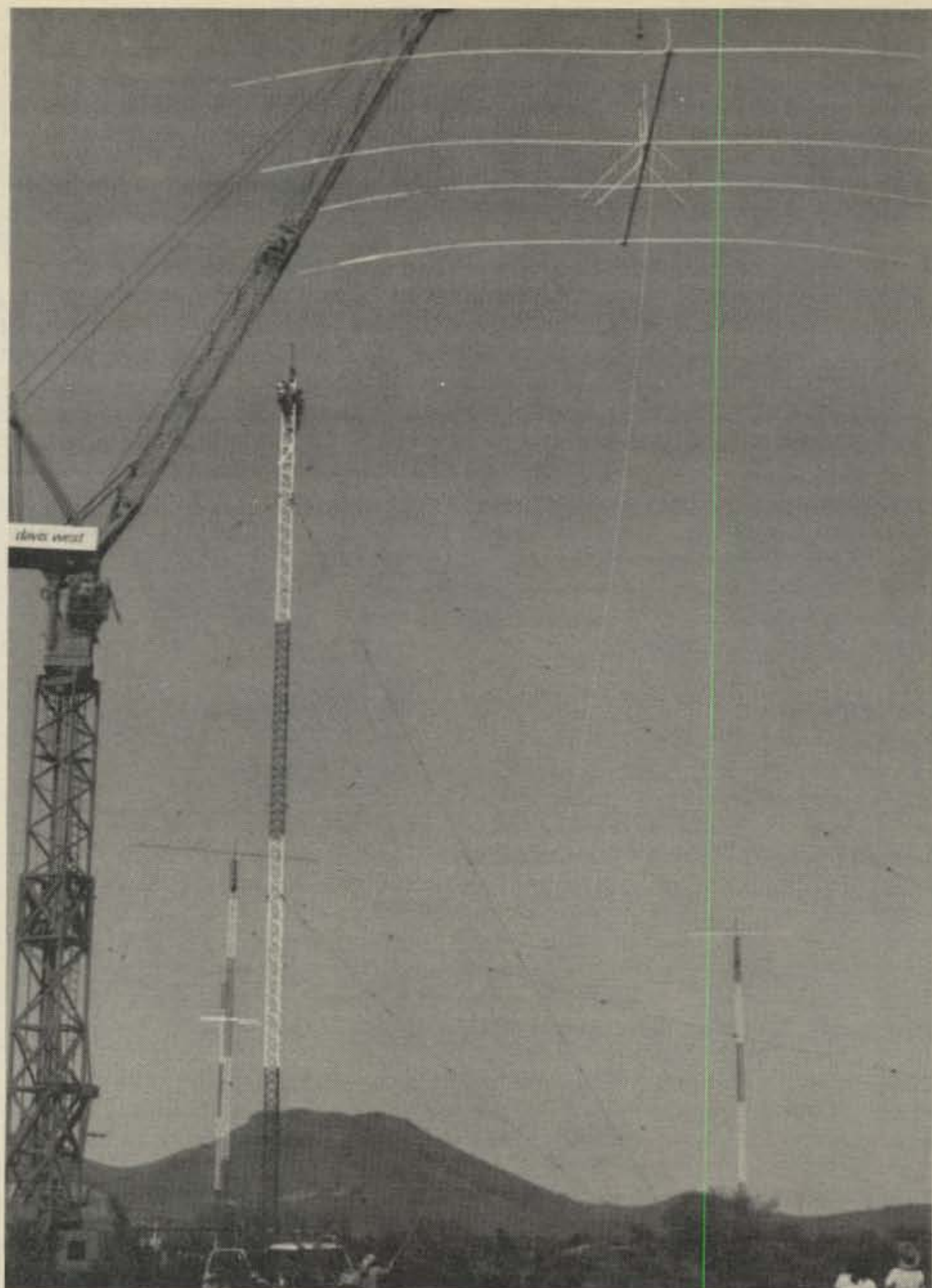


Photo 1 - The 208-foot crane's basket was used to transport the workers to the top of the tower.

follow. What a way to climb a tower! You should try it. After the balloon event, the big 75-meter, four-element KLM yagi was still on the ground and this seemed a logical time to complete that task as well.

Bright and early on Saturday, the crane arrived and a group of ham friends (N7RP, AA7A, K7JVR, W7IUV, W6LH, KA7CAI, WB7ECS and WB7ETR) were on the scene to help. Looking at photo 2, the antennas (10-, 15- and 20-meter 6-element KLM's) and the 40-meter 4-element antennas were let down with the top 10-foot section of the tower, together with the rotating mechanism, etc. Next, the 6-foot heavy section, which was designed to distribute the torque into all three legs, was let down separately, to be put back up when tower sections were removed to their proper heights. The next swipe was to let down the 55 feet or so of tower, which brought the tower down to the agreed upon height. Then, the heavy 6-foot section was put up and, finally, the yagi, complete with final 10-foot section of tower rigged for rotating, was replaced and the cables were reconnected. This was accomplished on all four antennas and towers.

Last, and of course, most climactic, was the huge 75-meter monster! It really hurt to take this particular tower from 180 feet down to 126 feet, but it was the lesser of two evils; the alternative being continuing the expensive legal battle with the county. I placed a sling on the boom and also fastened it to the horizontal guy (boom) wires to maintain horizontal



An overall view of the operation which exhibits its magnitude.

stability (see photo 3). I had the crane lift it slightly to check its center of balance. Then I moved the sling six inches and it handled like a baby carriage - you would have thought it was for 10 meters. Oh yes, the dimensions of this antenna include an element length of 90 feet and it is adjusted to frequency with a shorting bar on the linear loading. The boom was 80 feet long and guyed with a double tripod of 120-degree guy posts. By using two tripods, I removed much of the stress on the center of the boom which already was highly stressed with the mounting plate. It also provided a better angle to the boom. These guys were quarter-inch stainless guy cable. By using the 120-degree guying, I prevented kiting of the boom in strong winds and provided equal support should the boom be in order than

a horizontal position. KLM managed this whole package in less than 350 pounds total weight. An interesting method of utilizing the linear loading is evident in photo 3. Notice the shorter vertical masts above each element. These masts serve to anchor the linear loading 600-ohm line of copper weld in such a fashion that they also serve as guys for the elements, thereby reducing element droop. A shorting bar is used near the vertical mast to tune the elements to frequency. This is a nifty solution to a sticky problem. The droop is only about three feet and this is beyond the twenty-foot mark.

This antenna was a KLM prototype used to establish dimensions. KLM used this facility because it was quite simple to hang the antenna in a sling between two towers and winch it up

and down for dimensional changes and, by the use of a sweep generator and scope, see the bandwidth, changes in curves resulting from changes in dimension, and the s.w.r. Without such a monitor the complex changes in curve patterns vs changes in dimensions would have rendered these adjustments impossible. The two center elements are driven, log-periodic style, with a reflector and director and provide a bandwidth of about 150 kHz. Without the two driven log-periodic elements the bandwidth would be less than 20 kHz. K6MYC of KLM has one in operation and is ex-

periencing a 25 dB front-to-back ratio and a forward gain of about 7.5 to 8 dB - not bad for a rotatable device. The mechanical stability is very good. The night before this article was written we had a wind storm of over 60 m.p.h. that caused damage throughout the city. The beam held up nicely. It has behaved quite nicely in about three such wind storms to date.

The next saga will probably be a five tower (alas, 120-foot) array for 80 and 160. The bases have been installed and, hopefully, this array will go in about four months. It will be similar in approach to the W1CF four-tower ar-

ray but differs in that there will be four towers in a square and one in the center. It will be fed with Wilkenson power dividers and in a combination end-fire/broadside pattern. By use of vacuum relays, it will be rotatable and should provide a gain of about 7.5 dB on 75/80. Perhaps, next August, we can display this array in CQ. It should be interesting.

Oh yes, we have KLM's on 2 through 75 and, no, I have no stock in KLM. See you in 75! □

(Cover photo by W7IUV).

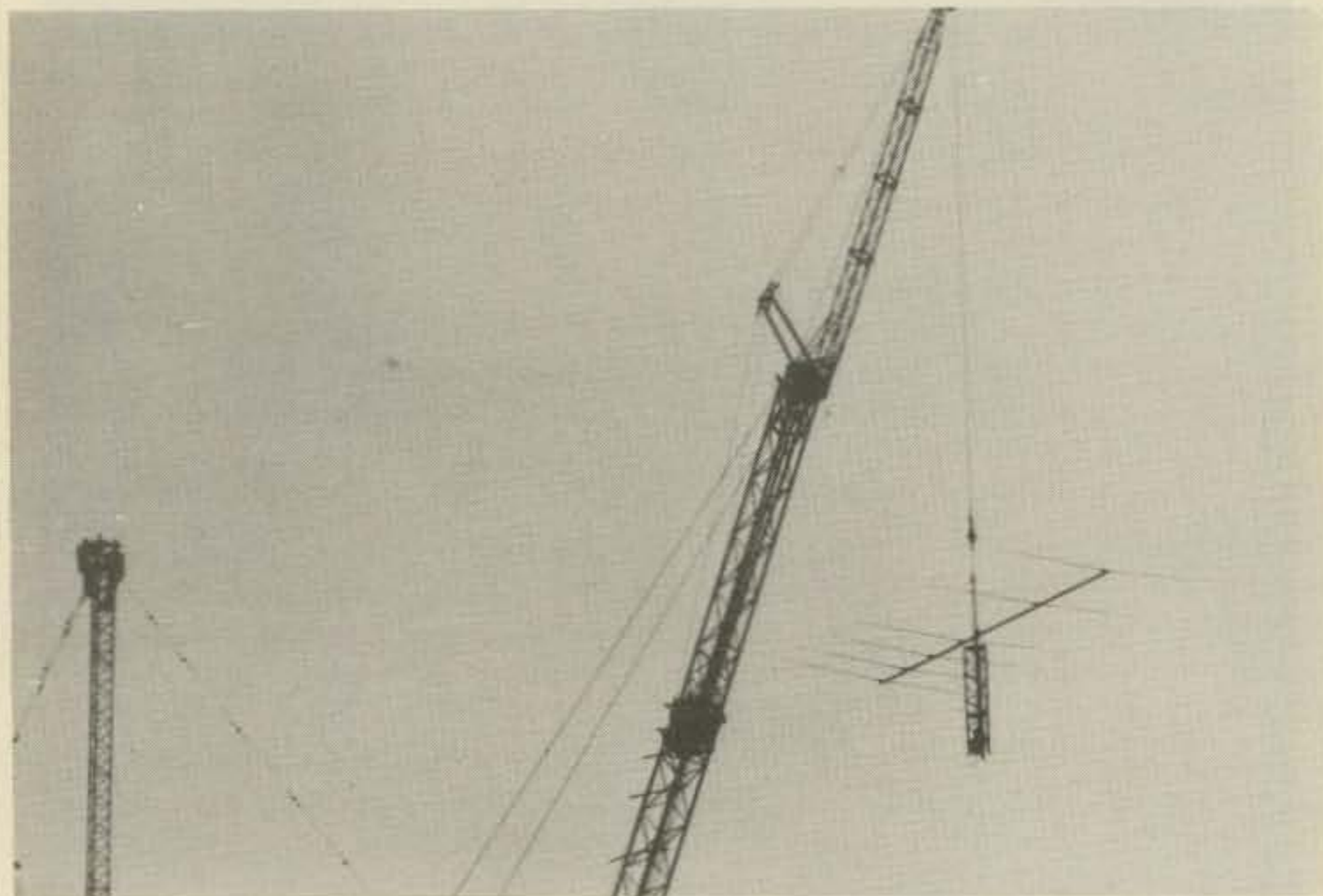
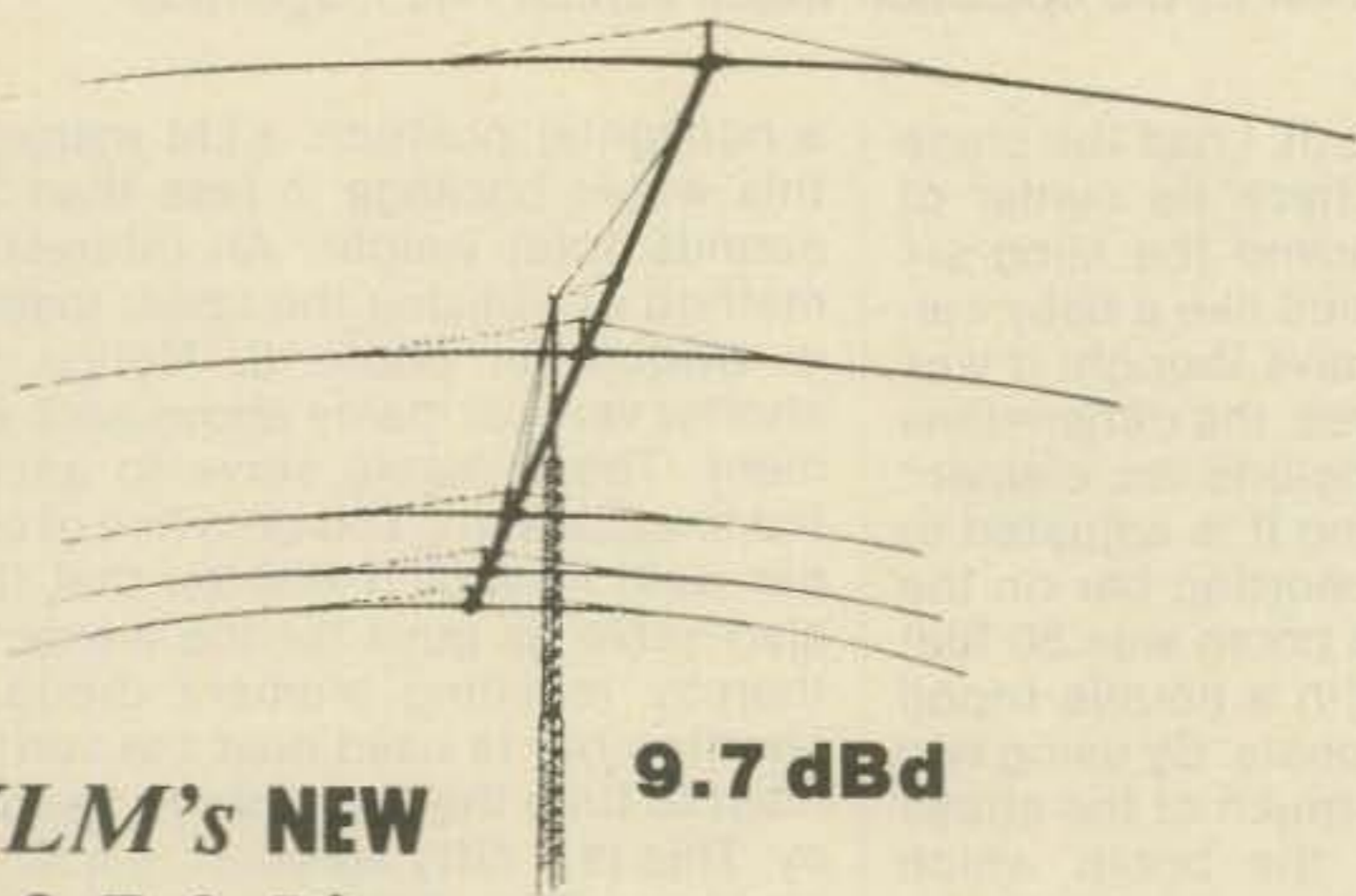


Photo 2 - Each of the five yagis was let down with the top 10-foot section of tower, together with the rotating mechanism.



Photo 3 - A sling was placed on the boom and fastened to the horizontal guy lines to maintain stability.

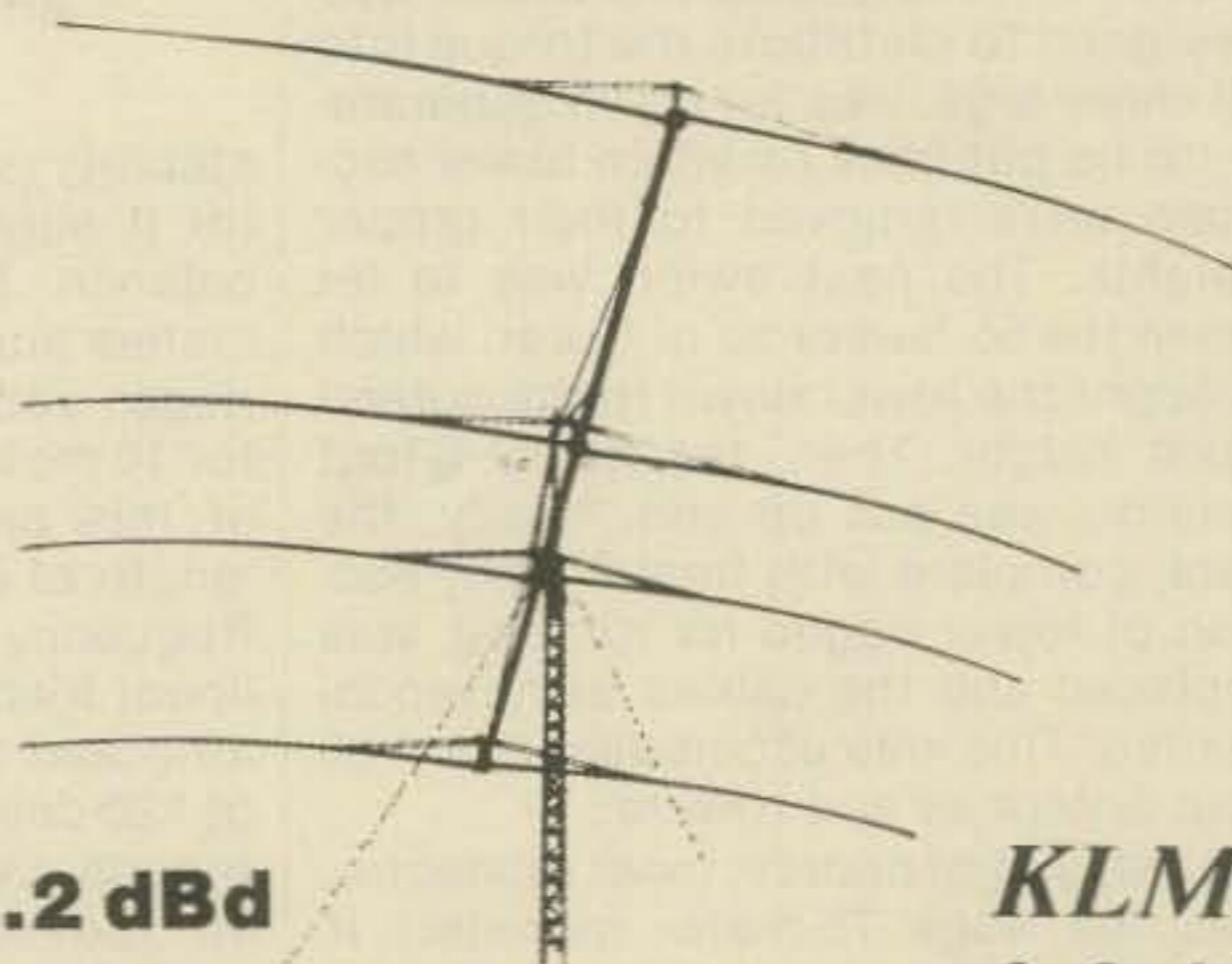
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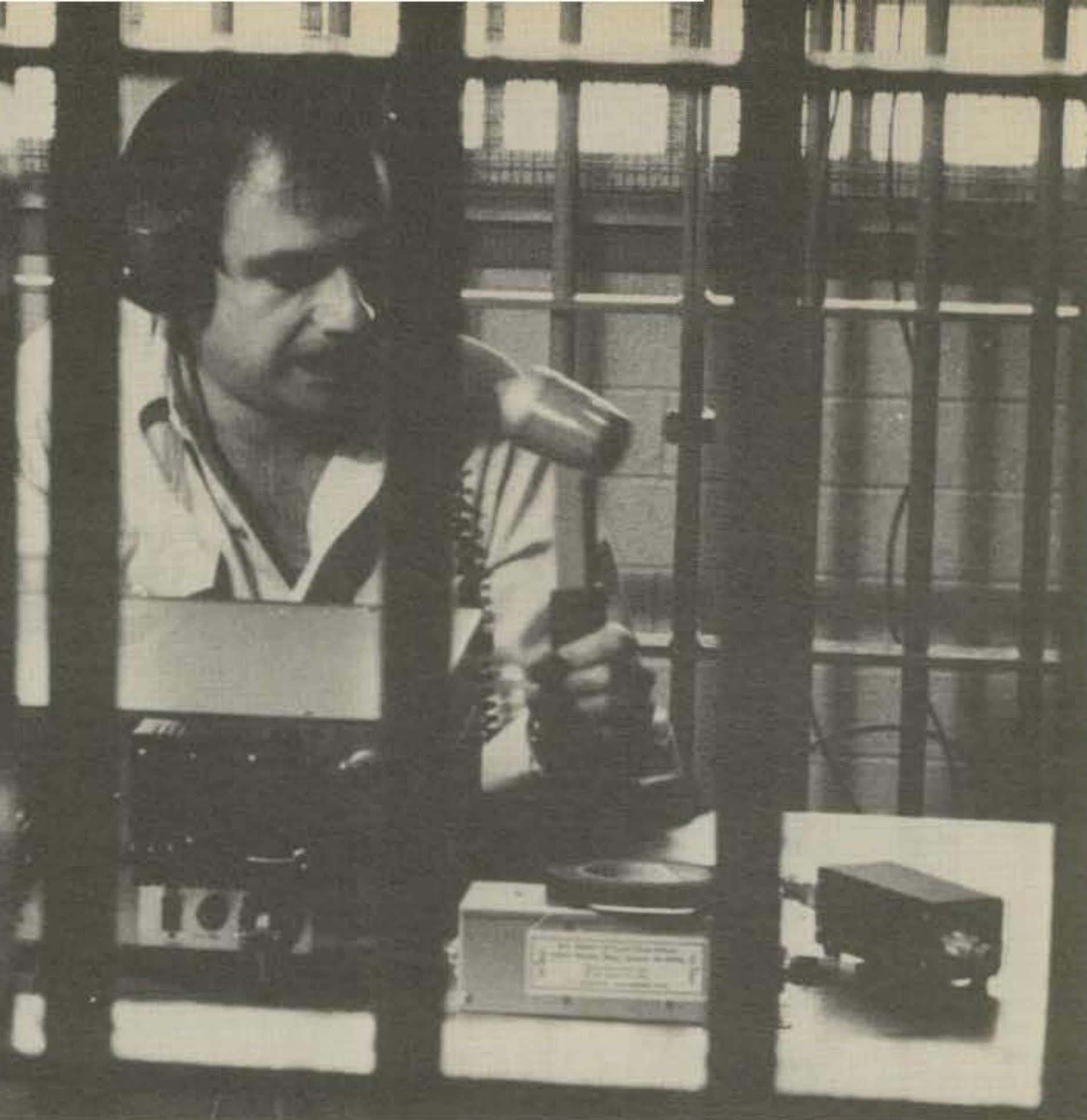
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**Because K6SSS
loves DX,
his neighbors sent him
on a little expedition.**



One neighbor sued him for interfering with Lawrence Welk. Another filed a complaint about that "monstrosity" in his backyard—a tribander at 40 feet.

7,781 tangled with the law

The K6SSS case is an example of what can happen to you these days. No matter where you live. It is hypothetical. But real lawsuits are being fought right now by people like K50VC, W2LTP, WB7NOM, W8NRM and W6UFJ/N6QQ to name a few. Last year nearly 8,000 unsuspecting hams and CB'ers ran afoul of the law. Sure, they're taking their fight to court—but they're losing! Never mind that they've got building permits for their towers. Or that the FCC says their rigs are "clean." Judges are ruling against them. The alarming part is that every suit lost makes it that much easier to nail the next guy. Prosecuting attorneys love to cite recent adverse decisions during a trial.

Legal ammunition available

The tragedy is that suits are being lost that could have been won. But TVI/RFI and tower cases fall into a little-known area of the law. Unless your lawyer is a specialist, he could spend hundreds of hours researching court decisions. And still not be sure he's put together the strongest defense possible. It's expensive (expect to spend an average \$4,000 to \$8,000 if you're sued). And risky. Which is why we formed the non-profit Personal Communications Foundation* To provide your lawyer with legal ammunition.

Who we are

We're a handful of ham lawyers, professors and judges (all volunteers) who wanted to help before it's too late. We're putting together the first research library of personal communications and zoning law. And having briefs written by the best legal brains. It's all available to your lawyer. For 10¢ a page. We can't guarantee you'll win. We can't try the case for you. But if you or your lawyer contacts us, we'll sure make sure you get a fighting chance.

Give us a fighting chance

To be even more successful in future battles, we're building an arsenal of weapons to use in court. For example, we're commissioning a study by real estate experts on the effect of a backyard tower on neighborhood property values. The pricetag is a stiff \$11,000. But without the study, more cases will be lost. And more dangerous precedents will be set.

We are winning. But it takes money to keep fighting. You can help us fight by sending a check. The ARRL did. Think of us as your insurance policy against a lawsuit. All checks are 100% tax-deductible.

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(space donated by the publisher)

1978 CQ Worldwide DX Contest - CW Results

By LARRY BROCKMAN, N6AR*, AND BOB COX, K3EST#

The hour is very, very late, and the static crashes are intense and frequent. Bleary eyed, our hero once more tunes the low end of forty. "What's this", he asks, as he picks up an endless stream of squeals? The S-meter jumps to 10 over 9; the din is deafening. "No apparent recognizable calls in that mess", he reflects. "What a pile-up!" But then, as if by magic, the din is gone; and there, sneaking from behind the static crashes and stragglers is the prize. "...Di di di di di, dah di, dah di, di di dah dah dah, di di di dah dah..." rings out through the headphones. "Holy Mackerel!", exclaims our hero. All of a sudden the adrenaline is flowing. The eyes are now bright and intense. In a flash our hero has his VFO zeroed in on the prize. There, on 40 CW, is zone 23! But *who*? Not to be denied, our hero plunges in with his call. As he comes up for air, he hears the prize once more. JT1AN. "Son of a gun, if only..." and right back into the pileup he goes.

And that's the way it was all over the bands for the 1978 CW contest. Electrifying suspense and action - never a dull moment. With a record 2400 logs received, 1978's total CW and Phone entries broke the 5000 mark for the first time ever, up almost 13% from last year! Not only that, an astounding 4 world records, 18 continental records and 4 stateside records were set - 26 in all. Conditions weren't even all that good, a real come down from the Phone contest we reported on last month.

Single Operator Winners

Marty, OH2BH, operating CT3BZ at his vacation villa in the Madeira Islands, captured the new Single Operator All Band World Record set

*7164 Rock Ridge Terrace, Canoga Park, Calif. 91307
#5801 Huntland Road, Temple Hills, Maryland 20031



Here's that rare and elusive STORK (love that call) operator, Tom, DL7AV, posting top honors for Africa in this year's 21 MHz single band efforts.

last year by Dick, N6AA at 9Y4VT. This was a sweet victory indeed for Marty, who came in second to Dick in this year's phone contest. Marty's great 5.1 Million score and fine phone

score also won him the combined phone/CW trophy. Congratulations, Marty.

Running close behind Marty were Pete, N6CJ, at KP4RF, and Leif, OZ1LO, at C5AAO, with only 260 K separating the top three scores. Marty's incredible 1790 QSOs on 10 meters, and a few extra country multipliers made the difference.

Three continental single op, all band records fell this year. Besides Marty's new African record, new records were set for Asia by UV9AX, Val; and for North America by KP4RF.

Stateside single op, all band honors went to Rich, W3RJ, who broke W3LPL's 1977 record by 600K. Frank, W3LPL finished second, 200K above his old record also. The East Coasters swept the top four, with W1ZM and N2LT rounding out the field.



Frankford Radio Club's HK0COP crew is shown here along with the Cessna Citation that took them to San Andres. Back row, from left: John, W3MA; Ed, N3ED; Dawson, K3MBF; Chris, the co-pilot; the local tree climber; and Al, N3AD. Front row, from left: Walt, WA3LRO; Francisco, HK0BKX; and Dave, N3RD.

U.S.A. Club Scores

Frankford Radio Club	107,990,050
Potomac Valley Radio Club	84,992,078
Yankee Clipper Contest Club	66,696,804
Southern California DX Club	30,602,847
Western Washington DX Club	27,413,430
Northern California DX Club	20,259,149
Texas DX Society	16,360,481
Southeastern DX Club	14,212,032
Murphy's Marauders	13,601,160
North Texas Contest Club	13,457,488
San Diego DX Club	12,725,070
Central Arizona DX Club	11,603,270
North Florida DX Association	8,440,542
Central Virginia Contest Club	7,041,878
Northern Illinois DX Association	6,817,526
Mad River Radio Club	5,495,254
Delta DX Association	5,187,611
Indy DXers	4,864,998
Williamette Valley DX Club	4,387,151
Michigan DX Association	3,894,895
Colorado Contest Conspiracy	3,593,448
Gloucester County A.R.C.	3,115,241
Kansas City DX Club	3,085,464
Alamo DX Amigos	2,864,594
Eastern Iowa DX Association	2,774,795
Fort Wayne Radio Club	2,666,798
Boiled Owls of New York	2,501,995
Virginia Century Club	2,445,287
ILL WIND Contesters	2,335,038
Flyweight DX Group	1,532,884
Wireless Institute of the Northeast	1,309,288
Milwaukee DX Association	1,176,451
Red Stick DX Club	821,008

Northern Ohio A.R.S.	665,325
Juliet A.R.S.	660,071
Waukegan V.H.F. & A.R.C.	644,635
Neenah-Menasha A.R.C.	581,389
Central Illinois DX & Contest Club	516,877
Northern California Contest Club	403,534
Four Lakes A.R.C.	333,423
Buffalo Area DX Club	244,010
Mississippi Valley DX & Contest Club	228,064

DX Club Scores

Chelyabinsk Region Radio Club	30,095,849
Rhein/Ruhr DX Association	22,955,318
Voroshilovgrad Radio Club	20,031,881
YU DX Club	16,710,916
Kaunas Polytechnic Institute	15,420,960
South German DX Group	13,148,595
Lithuanian Contest Group	11,877,832
Toronto DX Club	11,579,233
Danish DX Group	8,847,001
Channel Contest Group	5,815,807
Leningrad Radio Club	5,214,314
DX Club of Saar-Pfalz	4,108,585
SP DX Club	2,740,770
Shizuoka DX Radio Amateurs	1,468,839
Nagoya University Radio Club	1,207,748
Uniao Besouros do Recife	952,254
DX Hunters Group of Brazil	935,232
Tallinn Radio Club	890,621
Polish Boy Scouts Signal Club	365,028
Association Radioamadores da Biera Alta	316,868
CW Group of Argentina	172,913
Swiss DX Club	43,118

In the Single Band categories, it was the high bands (21 MHz and 28 MHz) that attracted most of the attention. For the first time ever, a CW en-

trant broke 1 Million on a single band. Our congratulations to Jorge, LU8DQ, for his new highest ever single band CW score, a super 1M + 21 MHz ef-

fort. Besides South America, records were set for 4 other continents on 21 MHz - Asia by JA2VUP, Europe by YU3ZV, North America by N6CW, and Oceania by KH6XX. Only the 1970 African record of TJ1AW remained intact, but even that one was in jeopardy, with STØRK falling just short of the mark this year.

On 28 MHz, new continental marks were set by HI8MOG for North America and 4X4UH for Asia, but it was Ron, FY7BC who won this year's 28 MHz top honors. Doug, VR3AH, was heard all over the place in his fine 20K Single band 160 meter effort, a new Oceania single band record, and tops for the world this year. Likewise, on 80 UI8LAG topped the old Asian record as he took the top spot for 1978, while AH6Z bested VK6HD's old Oceania record on 40 and finished first in the world on that band. Herb, KV4FZ took 14 MHz top honors world wide, adding to his abundant contesting achievements.

Stateside single band efforts by Terry, N6CW (21 MHz) and Bud, W6VPH (14 MHz) set new U.S.A. high marks. In fact, it was a great year for the West Coast in the single band categories, with W6's and W7's in the running on all bands but 10. Rounding out the U.S.A. single band winners were perennial winner K1PBW on 160, W5UN on 40, K5NU on 80, and K8MFO on 10.

Multi Operator Winners

The World High Multi-Operator/Single Transmitter effort for this year was posted by RF6F at 5.9 Million.

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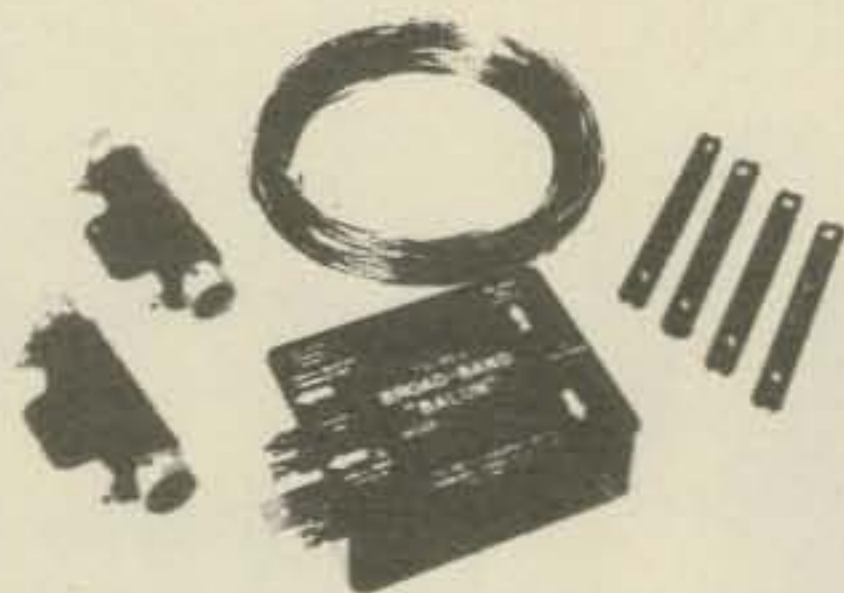
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However, the Voroshilovgrad Radio Club group, headed by UB5EC, fell shy of the 1977 6.1M record set by their rivals from UK6APA at 4L6M. Second place was taken by the HH2CQ expedition fielded by the North Florida DX Club. Cheer up fellows, at least you set a new North American record. Running third in the world, but posting a new 2.9 Million U.S.A. record, was N3RS, manned by our old friends at W3WJD.

Back for an encore after last year's record setting Mutli-Multiphone score, the gang at EA8CR demolished the old world multi-multi CW record by 6 Million points, with their fantastic 17.7M score. They'll doubtless be back at it in the phone contest this year in an effort to recapture the phone mark lost this year to PJ9JR. Several other fine Multi-Multi scores were overshadowed by the awesome EA8CR achievement. Running second was the Chelyabinsk Region Radio Club's EX9A team (normally UK9AAN) which set a new 8.7 Million Asian Record. In third place was Frankford Radio Club's HK0COP team, with a new 8.1 Million North American record. New all time honors for Europe were captured by YU1BCD.

The stateside Multi-Multi team from the K2GL contest club won stateside high at N2AA with a fine 5.1M effort. Close behind were W4BVV and W2PV.

QRPP Category

In the new QRPP category, OA8V set the world high mark, followed by G4BUE. Paul's point total just edged out Chris's fine multiplier count, with the QSO totals about equal. The high U.S.A. score was supplied by W5YZ, with KH6JLH/W8 close behind. Good show, guys, but we are hoping for a larger number of low power entries next year.

Club Competition

An incredible 107 Million points was amassed by the Frankford Radio Club as they locked up a new all time high club score total for the second year in a row. PVRC was second at 84M, with the upstart Yankee Clippers group third at 66 M, followed by the Southern California DX Club way down in the running at 30 M. In the DX Club scene, the Chelyabinsk Region Radio Club unseated the Rhein Ruhr DX Association for the first time in years with a fine 30 Million points. Congratulations on the fine group efforts fellows.

It seems that we've had a number of comments this year on the meaningless 59 or 599 exchange. Some are lobbying for a new exchange format -serial numbers, age, etc. Any way

C.W. TROPHY WINNERS AND DONORS

Single-Operator, All Band

World

Martin Laine, CT3BZ
Donor: W2AB Memorial (K4FW)

U.S.A.

Richard Klinman, W3RJ
Donor: Frankford Radio Club

Canada

VC7WJ (Opr. Stuart Santelman, K1UA)

Donor: Canadian DX Association

Caribbean/Central America

Lorne Libin, XE1VV

Donor: Mort Grotenstein, N6JT

Europe

George Rumiantsev, UA1DZ

Donor: W3AU Operators

Africa

Martin Laine, CT3BZ

Donor: Gordon Marshall, W6RR

Asia

Valentin Boshchenko, UV9AX

Donor: JA CQ Magazine

Oceania

Chuck Rademacher, ZL1ADI

Donor: Maui Amateur Radio Club

Single Operator Single Band

World (21 MHz)

Jorge Bozzo, LU8DQ

Donor: W2JT Memorial (No. Jersey DX Assn.)

World 3.5 MHz

Alex M. Konnikov, UI8LAG

Donor: Fred Capossela, K6XX

U.S.A. (14 MHz)

Bud Ansley, W6VPH

Donor: No. Illinois DX Association

Canada (14 MHz)

Raymond Post, CG6KW

Donor: Canadian Amateur Radio Federation

Caribbean/Central American (14 MHz)

Herb Schoenbohm, KV4FZ

Donor: DX Club of Puerto Rico

Europe 14 MHz

YU2CDS (Opr. Tomo Huzjak, YU2CT)

Donor: G2LB Memorial from his friends

South America (21 Mhz)

Jorge Bozzo, LU8DQ

Donor: Rafael De Leon, CX3BR

Oceania 21 MHz

KH6XX (Opr. Danny Eskenazi, K7SS)

Donor: Pacific Radio Amateur Transmitting Society

Multi-Operator Single Transmitter

World

RF6F (Oprs. UB5EC, UB5MCD, UB5MCI, UB5MDC, UB5-059-5)

Donor: Anthony Susen, W3AOH

Multi-Operator Multi-Transmitter

World

EA8CR (Oprs. EA2OP, EA7ALG, EA7TL, EA8CR, EA9EO, OH2BAD, OH2KI/OH3XZ, OH2MM, OH6DX)

Donor: Hazard Reeves, K2GL

U.S.A.

N2AA (Oprs. N2AA, N1XX, W1PM, K2BQ, K2GL, K2NG, K2SS, K2TT, K2UR, WB2SFB, WB2VYA, Robert Walsh)

Donor: Rush Drake, W7RM

Contest Expeditions

World Single Operator

C5AAO (Opr. Leif Ottosen, OZ1LO)

Donor: CQ Magazine

World Multi-Operator

HK0COP (Oprs. N3ED, N3RD, N3AD, K3MBF, W3MA, WA3LRO)

Bill Schneider, K2TT

Top World Single Operator-Combined

Phone/CW

Martin Laine, CT3BZ

Donor: John Knight, W6YY

Club Trophies

World High

Franford Radio Club, 107, 990, 050

Donor: CQ Magazine

Most Improved Radio Club

Frankford Radio Club, 107, 990, 050

Donor: Southeastern DX Club

you slice it, we plan to retain the zone number in the exchange, but perhaps a change from RST would be welcome. Two advantages to a consecutive serial number approach are that it helps us maintain order in the Multi-Single category and it would make it difficult for entrants to pad their logs (some unprincipled guys do that). Please let us know how you feel about this issue so we can consider it for a rules change.

Our duplicate cross-check sheet requirement for bands on which 200 or more contacts were made is beginning to catch on. This year's situation was greatly improved. Beginning next year, we will seriously consider disqualifying an entrant who does not submit a check sheet, since we have now given 2 years of grace to the multitude.

In the last several years computerized logs and cross checking have become very popular. Whether or not you use a computer, we remind you that you must still send us cross check sheets with your log. A com-

puterized alphabetical listing of all calls worked on each band will suffice. On computerized logs, we have no hard and fast rules yet. But, be advised that most of these logs have a great many keypunch errors in them which can hurt your score unless you check the printouts over before you submit them. Most of you don't do that. Also, those clean recopied or computerized logs don't show us what happened in the course of the contest as well as your messy originals. It is particularly easy to bury padded contacts in recopied logs, for example. So, we recommend that you send us a photo copy of your original even when you recopy or use a computerized log.

We had an entrant this year who revealed over 20% error in copying JA call signs in a sample that we cross checked, and this is just not acceptable. We urge you all to concentrate on accuracy, not so much speed. Also, on Multi-single logs that exhibit more than a token number of time rule violations, we now intend to

BAND-BY-BAND BREAKDOWN - TOP ALL BAND SCORES

Number groups indicate: QSO's/Zones/Countries on each band

WORLD TOP SINGLE OPERATOR - ALL BAND

Station	160	80	40	20	15	10
CT3BZ		274/14/41	526/16/49	856/28/84	810/24/64	1790/23/73
KP4RF	57/8/15	334/18/54	672/24/65	1001/30/81	766/29/82	967/26/76
C5AAO	2/1/1	199/11/26	888/22/53	791/26/65	839/26/64	1485/23/69
PJ9CG	47/9/12	283/20/45	559/22/58	747/33/82	881/27/63	746/24/62
ZS6WW		52/6/5	151/18/30	756/30/62	810/28/56	1269/23/58
W3RJ	9/9/8	54/16/36	210/22/65	516/34/88	371/28/76	420/28/83
ZL1ADI		13/4/3	318/15/29	857/30/68	425/22/34	1062/20/35
XE2MX	61/4/3	354/11/14	638/18/26	739/28/56	774/25/44	654/21/35
UV9AX		208/16/42	225/19/48	579/30/67	371/24/60	339/21/59
UA1DZ		298/13/48	292/22/56	653/33/71	593/29/76	169/26/61

USA TOP SINGLE OPERATOR - ALL BAND

Station	160	80	40	20	15	10
W3RJ	9/9/8	54/16/36	210/22/65	516/34/88	371/28/76	420/28/83
W3LPL	16/10/14	41/12/31	192/23/62	192/30/74	614/27/77	304/27/83
W1ZM	18/9/16	52/15/35	231/23/69	346/30/73	364/28/74	354/25/67
N2LT	5/4/3	72/16/37	151/23/62	387/32/75	469/27/76	302/25/78
W7KW	7/5/5	105/14/22	433/25/42	517/31/71	395/27/66	146/21/40
K9DX	18/8/12	60/18/34	250/24/65	470/34/72	389/26/63	154/22/59
K6NA	11/7/7	96/18/25	406/27/50	320/33/70	399/27/57	201/22/44
N9MM	4/3/4	36/15/25	164/25/61	503/32/76	360/28/65	261/24/61
N4RR	5/4/4	46/14/28	202/19/46	392/25/60	400/28/71	242/24/63
W2REH	6/4/5	65/17/42	126/21/51	368/33/84	327/30/82	162/25/65

WORLD TOP MULTI-OPERATOR - SINGLE TRANSMITTER

RF6F		463/19/65	1069/22/66	1209/35/95	812/28/75	699/23/66
HH2CQ	58/8/14	329/17/49	853/21/60	1035/34/89	1236/29/86	1185/24/71
N3RS	18/10/15	82/19/53	383/27/79	428/34/90	554/31/91	333/28/83
YU3EY	39/5/15	327/14/54	361/22/73	507/34/96	515/32/77	359/29/82
LX0RL		745/14/59	810/23/65	309/24/63	633/25/57	484/22/59
K1PR	5/5/4	50/16/41	460/27/75	452/30/80	478/30/77	265/25/74

USA TOP MULTI-OPERATOR - SINGLE TRANSMITTER

N3RS	18/10/15	82/19/53	387/27/79	428/34/90	554/31/91	333/28/83
K1PR	5/5/4	50/16/41	460/27/75	452/30/80	478/30/77	265/25/74
N4AR	10/8/9	40/16/36	373/27/78	423/34/88	492/30/82	250/29/77
K5JA	13/9/10	42/14/23	419/28/74	386/34/85	474/31/85	286/25/70
W3BGN	14/9/11	68/16/38	168/22/65	649/33/85	352/32/88	277/28/77
K4VX	11/7/10	31/13/24	291/26/75	348/31/71	550/29/76	261/29/78

WORLD TOP MULTI-OPERATOR - MULTI TRANSMITTER

EABCR	123/9/31	564/13/54	1039/19/64	2997/36/112	2693/34/109	2383/31/93
EX9A		651/14/57	1436/26/73	2301/36/103	1471/33/80	1023/28/71
HK0 COP	121/6/11	565/15/39	1216/23/59	1921/32/88	2217/29/84	1463/24/65
UF6A		769/13/52	1362/22/77	1665/37/107	1345/35/92	1063/28/77
N2AA	62/12/19	164/19/55	427/28/84	980/36/105	863/31/99	498/27/86
W4BVV	25/10/17	144/19/50	595/28/88	810/34/93	447/31/96	414/29/87

USA TOP MULTI-OPERATOR - MULTI TRANSMITTER

N2AA	62/12/19	164/19/55	427/28/84	980/36/105	863/31/99	498/27/86
W4BVV	25/10/17	144/19/50	595/28/88	810/34/93	447/31/96	414/29/87
W2PV	84/10/18	148/18/51	567/29/83	997/33/102	702/30/95	477/27/84
K3WW	37/12/18	144/21/62	516/26/87	748/35/102	762/32/95	467/29/85
K5RC	21/7/12	110/19/37	614/30/86	773/38/104	756/29/88	522/29/79
K0RF	27/11/15	172/22/38	691/31/81	681/36/92	618/29/83	281/26/49

uniformly reclassify them as Multi-Multi regardless of their objections.

Credits

It is just absolutely fantastic how our WW Contest has grown since its inception. We think it's the best conceived, best run contest around, and has the widest appeal worldwide. To make it the success it has become requires the dedication and efforts of all of you submitting logs. Also, the fine group of guys who help process the logs deserve their due. This year we have two new members of the CQ WW Contest Committee. Yuri Blarovich, VE3BMV and Jim Sullivan, W7EJ have joined our ranks. Rounding out the committee are Chairman, Frank Anzalone, W1WY; Glen Rattmann, K6NA; Gene Walsh, N2AA; Terry Baxter, N6CW; Lenny Chertok, W3GRF; Gene Zimmerman, W3ZZ; Dave Donnelly, K2SS; Lew Jenkins, N6VV; Fred Morris, AD6C; Tom Taormina, K5RC; Reg Toume, N6SV. A job well done, that's for sure.

And now, in just a few weeks, the 1979 CQ WW Phone contest will be with us (rules in last issue). With the sunspots in high gear, be prepared for a fantastic experience. See you in the melee.

73, Larry, N6AR and Bob, K3EST

USA QRM

111 QSO's per hour to Europe Sunday morning...K1ZZ. 10 Meters revived Sunday and prevented total disaster...W100. Lousy conditions...K1PBW. 25% of all contacts made during 2 1/2 hour JA opening...W2LYL.

Anticipation, exhilaration, frustration, annihilation, exhaustion-all in that order...N3AW. Never again with 100 watts...K2AJV. Neighbor came over to complain about my lighting up his bathroom lights. He left 3 hours later with a copy of the code...K3SME. 9V1RS answered my CQ with just 10 minutes left...N4RV. Trying to find operating time Thanksgiving weekend is a family crisis...AA4DR. Most enjoyable contest of the year-always...W5BE. ST0RK has the World's most fantastic call sign...N5CR. Rotor stop failed and broke 40 through 10 co-axes 25 hours into the contest-had to quit...N6VI. My call is so long it takes two contest QSO's to send it...WB6JMS. Worked a JA on 10 meters using a 150 watt light bulb load...W6SWM. With a decent 10M European opening, the West Coast might have won this one...W7KW (Opr. K7GM). How come conditions always seem to crash on the CW weekend?...W7IR and N7DX. Those 10 Meter African pileups are something else...W7JYW. Like to see the frivolous 599 report changed to something more unique...N7ES. Hope to see more DX activity in the Novice bands...WN7UMU. At 72 years of age, you don't stay up all night...W7BCS. Great to hear the Europeans on 10 instead of just hearing the East Coast working them...K9DX. Noted a new kind of QRM-CBers on sideband in our CW band...N9DP. Happiness is calling CQ on 10 and having D68AD come back...WB9POH. Amplifier blew up, bad thunderstorm, bands poor, QRM terrible-had a great time...W0IUB.

DX QRM

Fantastic 10 M opening...VU2GO. Although a fellow countryman, Murphy showed no mercy...EI2BB (opr. at EI1AA). Received 599 from Japan transmitting into a dummy load...WH2AAF. We need a Q signal to indicate that stations have worked before...VK3AEW. Sure would like to operate from a quiet location for a change...KG6JAR. Good conditions on 160 the first night only!...VR3AH. Had to call VO2BH on phone to get zone 2...VO2CW (Don't we know it, ed). First contest in six years, great to be back...VE1TG. New beam helped...CF5RA. Where were the Europeans?...VE7CML. Electrical storms bad on 40 and 80...ZS6WW. A most enjoyable contest...ZS2RM. No line voltage for 18 hours!...ST0RK. Biggest pileup only lasted 20 minutes...AP2MC. This year I tried the most difficult band- 40 meters. Even with the 30 dB attenuator, the Eastern European QRM made it difficult to copy the West Coast...I2FGP (ex 6O1FG. Very funny propagation on 40 this year- unexpected openings in the afternoon to the Far East, the West Coast on Long Path...YO3BEJ. Wow, so many Americans on 10 meters...JH1ENA. There was no one on 14 MHz. because the conditions on 21 and 28 were better...JR1RNC. Great...LX0RL. Worked a lot of JAs...EX9A. Heard ST0RK calling CQ with no takers...HH2CQ. A lot of snow pulled down the 40 meter wires, the AC was off for 3 hours, Murphy sure came around!...YU3EY. The QRM in our operating room was worse than 20M...JH1ZLA.



Two of the younger set, WB4SPB and WB4RUA man WB4RUA's station for the contest.



Barb Kelley "mans" the 40 meter position at KL7IRT's multi-multi station. Good show, Barb.



Roger, G3SXW, is shown here at his former EP2IA location. For QSL's check out W4YE.



LX0RL's antennas are shown here - note the wire dipole antennas for the low bands.



Marty, OH2BH sends this photo of his Madeira Island CT3BZ QTH. Just 5 steps in back of hut there's a 2,000 foot drop to the U.S.A. Wow!

STATION OPERATORS

Multi-Operator Single Transmitter

AL7T & KL7HMO. DF0SAR: DL8AN, DL8CH, DL8CM, DL8DL, DL8FR, DL8HA, DK5VD. DK0FR: DJ1HW, DK4GZ, DF9TF, DK1TX, DL8ZN, DF7GR, DF8GL, DF9UT, DJ7GY, DB6GW, DD8GW. DL0KF: DL2ZT, DJ2BV, DJ4FZ, DJ8FR, DK8LE, DF3LP, DJ7SW, DJ4SO. DL0PG: DK3BJ, DK5JI, DK8QA, DK5PV, DF1QQ, DK9JL, DK2JS, DK1QV, DJ9TQ, DJ1FC. DL0HN: DF1SZ, DF1TR, DF3SV, DJ9EV, DK2ZO, DL1HS, DL9TT. DL0WU: DJ4AX, DK4TP, DK5EZ, DK4EM, DK6JZ, DL9DY, DL9GSA, DA1UM. DM3GM: DM3BGM, DM3SGM, DM2FJM, DM2AGM, DM2DEM, DM2FIM. DM3PL: LUTZ, BERND, MATTHIAS. DM3QO: DM3PQO, DM3YQO, DM2CMF, DM2DTO. DM4CN: 8 OPRS. DM4FM: DM4ZFM, DM2FDM, DM4XFM. DM5VL: DM2GGL, DM5VVL, DM5VVL. EI1AA: EI2BB, EI3CP, EI6CW, EI7H. EI9CB: K3RV, N8ET. F6KAW: F6ARC, F6ASS, F6AUO, F6BPX, F6EBN, F6FBQ. G4DSE & G3RZI, G4GXL, GW4GCG, ANDREW. HA1KSL: HA1SL, Nyerges. HA1KSS: Bokor, (HAITI), Csoka, Schanner, Barta. HA1KZZ: HA1ZZ, 1XV, 1ZI, Nemeth, Czoipolri, Boilogh. HA2KME: Adam, Bereznioyi, Gersbosi, Kovdor, Varga, Gararess. HA2KMG: Szig, Gerendas, Hitzpal, Polacsck. HA2KML: Inczedi, Nagyszilitsany. HA2KRZ: Raduly, Kanizay, Balogh, Simon, Sipas. HA3KHB: HA3GO, 3HO, 3HU, Szarka, Harsany. HA3KNA: Hegedus, Szabo, Hauszknrecht, Kocsi, Neumann, Weisz. HG5A: HA5GF, 5FN, 5OM, 3NU, 7RY, 5FM, Voros, Ehmann. HA5KA: Arato, Pocsi, Kovesoi, Kovesoi. HA5KBC: Seres, Tanay, Komantinger. HA5KBM: Lukacs, Papp, Vago. HA5KFL: Olah, Szollos, Kincses, Baranyi, Szoke, Osztas. HA5KJC: Szabo, Matyus, Kovacs, Holman. HA5KKC/2: HA5LV, 5MA, 5MD, 5MO, 5KP. HA6KVB: Suszter, Simon, Szabo, Gergelyi, Varga, Csepány. HA6KVC: HA6ZV, 6ZQ, 6-304. HA6KZS: Szasz, Kovacsne, Sapl. HA7KLC: HA7LM, 7MS, 7NA, 7-058. HA7KLG: 7-015, 7-062, 7MC, 7-032, 7-033. HA7KSV: HA7UF, 7SH, Adamecz. HA8KAX: Borgula, Toth. HA8KUA: Kiss, Maczalik, Miskolczi, Risko. HA8KWG: Kulich, Pinter, HA8BM, 8BS, 8AA, 8-753. HG8U: HA8UD, HA8UI, HA8ZS, HA8UY, HA8-069, HA8-061. HA9KOB: HA8RU, HA9PV, HA9RB, Laki, Fodor. HA0KDA/p: HA0HZ, 0HG, Andresi. HA0KHW: HA0IG, Papp. HA0KLE: Kurucz, Hernadi, Fabian, Deveny, Tomasovzky, Szalontai. HA0KLU: Macsuga, Szabo, Szokolczai, Roka, Nagy. HB0AYZ: HB9AYZ, Roland. HH2CQ: W4ORT, WA4DRU, N0TO, W4QM, WB4OSN, W2SR, N4XR, HH2TD. IS0TOA & IS0DTK. JA3YEE: JA6HFV, JA3DJ, JA3JF, JE3PZC. JA2YKA: JH2QXG, JR3URO, JA4UDP, JH4TCM. JA4YFH: JH4DIT, JA4XKI. JA4YGM: NHK Ham Club. JA6YDH: Nagasaki University A.R.C.K1PR & K1TO, K1XM, WA1MAO. K2BK & W2VJN. K2FL & KA2BAO. K2TD & 2M NET. K3IU & 2M. NET. K3MD & K3VX. K3SME & WA3FZQ. K3YL & K3PA. K4CG: K3WUW, WA3ZJT, N4MO, WB4BQX. K4EBY & K1FR. K4PB & WA4PWK. K4VX & K4YEP, K0CMF. K5JA & K5MR, K5RX, N5AU, N5TR, W5GN. K6DC & W6BJH. K6XV & K6PJY, N6FJ. K6YK & WR6ACZ. K0AT & W0WP. K0SR & WB0HCH.

K0UK & K9MWM, K0CL, W0KEA. KL7HR & KL7IKX, WL7ABB. KL7PJ & AL7H, WA9IXF. LA1H: LA4KQ, LA8UL, LA9OI. LJ2S: LA6YT, LA6ZT, LA4XT. LX0RL: LX1PD, DJ9NX, DK1PD, DK5GB, DK5HH, DK6QI. LZ1KKZ: Rusev, Tenev. LZ1KOZ: Marinov, Zlatanov, Kayklev. LZ1KPM: Paskalev, Zdravkov, Valtchev. LZ1KRB: Djambazov, Stoyanov, Jordanov. LZ2KRR: Mihajlov, Ovtscharov. LZ2KSB: Sabviev, Kivilov, Genov. LZ7A: LZ1AM, 1AQ, 1BC, 1CQ, 1FP, 1GU, 1VW, 1UO, 2YE, Pavel, Bojidar. N1AC & W1IHN. N3DG & N2SB, K3KNH, N3RG. N3RL & 2M NET. N3RS & WA3NNA, W3XU. N4AR & K4KSC, N4KG, W8KIC. N4CQ & K4GFH. N4RA & WD4AXM. N4TX & 2M NET. N4UM/CGA: WA4YUE, WD4IYS, N4BP, N4UM. N6UC & N7RK. N7EF & 2M NET. N9BN & AA9N, KA9BBO, N9AKW, WD9BHB, WB9VLV, WB9ZBK. OK1ALW: OK1ALW, DWA, ADS. OK1KCF: Club. OK1KCI: OK1AMI, 1AIA, 1DIS, 1WC, 1MIL. OK1OFK: Club. OK1KPU: OK1AXA, 1MUF, 1JDX, 1AUN. OK1KPZ: Club. OK1KQJ: Club. OK1KRQ/p: OK1DFQ, OK1IAM. OK1KRY: OK1AQQ, 1AQO, 1DCM, 1DCM, 1DMW, 1DGC. OK1KSO: Club. OK1KTW: Club. OK1KUR: OK1AET, 1AYE, 3CLD, 3CLF, 3CWG. OK1KYS: Club. OK2KMR: OK2BQ2, 2SSS, 2SAA. OK2KOD: OK2BDI, Duidolf. OK2KPS: Club. OK3KAP: OK3CWU, OK3CGI. OK3KTD: OK3CES, 3TCV, 3TBA. OK3RKA: OK3TAM, 3TDP, 3COX, 3-26 016. OK3VSZ: OK3ZAF, 2FM, PQ, FON, EK, AS. OK5TLG/p: OK1DFW, FCW, MMW. RF6F: UB5EC, UB5MCD, UB5MCI, UB5MDC, UB5-059-5. SK2GJ: SM2EKQ, SM2FJG, SM2BFH, SM2ICQ, SM2DZU. SK7CC: SM7GNT, SM7IDF. SP1PEA: SP1CU, SP1ETC. SP1PTT: SP1HXC, SP1CNV. SP2ZFJ: SP2FAP, SP2ASJ, SP2HLO. SP3HXX: SP3ASN. SP3PAA: SP3FLR & others. SP2ZHB/2: SP2HJL, SP2FQT, SP2FHY. SP5KJP: SP5JAA, SP5DDJ, SP5YCC. SP5PWK: SP5SIP, SP5DOX, SP5AWV, SP5AUC, SP5TT, Sottota, SP5DER. SP6KZW: SP6BNR, SP6CQO, SP0097 WR. SP6PAZ: SP5HEK, SP6DVP. SP7KTE: Club. SP9KBY: SP5GRM, SP9BAC. UB5WF & UB5WE, UB5WCW. DOLZHENKOV, ONISCHENO, TIMOFEJEV. UK1NAD: UA1NAY, UA1NBF, UN1-088-333. UK1TAR: UA1TAC, UA9-090-117, BELOV. UK1ZAM: UA1ZAU, UA1-143-115, UA1-143-144. UK2AAB: KOSAREV, PILOSAN, ZINKEVICH. UK2AAP: BILCHENKO, HUDAKOV, TROCEVSKY. UK2AAR: ANTSIPEROWICH, DIGILEWICH, KARAJCHENCEW. UK2AAX: UCZDS, UCZ-009-522, UC2-009-523. UK2ABA: UC2AAP, UC2AFE, UC2-009-499. UK2ABC: UA2FCZ, UC2-009-478, UC2-009-479. UK2BAG: UP2BAA, UP2BAD, UP2BAE, UP2BCG, UP2BGN, UP2BZ, UP2BDT. UP2BAT: UP2-038-628, UP2-038-898. UK2BCC: UP2BDW, UP2-038-346. UK2GKW: UQ2GFM, UQ2ON, UQ2-037-83, UQ2-037-1035. UK2OAA: GORDYENKO, KOROBUSCHENKO, MELNIKOV. UK2PAD: UP2BCU, UP2PAV, UP2-038-728. UK2PAP: UP2BCI, UP2OX, UP2PAX, UP2-038-575. UK3AAC: UA3AGX, UA3DPD, UA3-170-276, UL7-03115/UA3. UK3ABB: UA3ABZ, UA3AEM, UA3AKE, UA3AKQ, UA3XAC, UA3-170-885, UA3-170-888, UW3FI. UK3QBM: UA3QAI, UA3QCU, UA3QGX, UA3-121-1518. UK3WAB: UA3WBC, UA3WZ, UA3XJ, UA3-135-228, UL7-026-199, UV3WT. UK3XAA: UA3-127-021, UA4HFG, UA4HGQ. UK3XAM: UA3-127-370, UA3-127-376, UA3-127-808. UK3ACA: BAJKOW, IVANOW, OLSHANSKIJ. UK4HAP: UA4HAM, UA4HBP, UA4HCR, UA4HGF, UA4HHL.



Leif, OZ1LO, sported this fine layout for second high World single operator honors at C5AAO.



Dave, WA2HZR, relaxes after the contest at AP2MC. Let's have an encore, Dave.



The gang at EA8CR (front, from left: EA2OP, OH2BAD, HH6DX, OH2MM; back, from left: EA8CR, EA7TL, EA9EO and OH2KI) show us the brass key they used to rack up the all time high CW mode multi-multi record. Aw, come on fellas!

UK4LAA: UA4LAJ, UA4LAS, UA4LM. UK4WAA: FILIPPOV, KUZNETOV, MARKOV, SATTAROV. UK4WAB: BARANOV, KRYLOV, PANKOV, SAKERIN. UK5GEC: UB5GBW, UB5GDX, UB5GX. UK5HAB: UB5HEH, UB5-071-73, UB5-071-330. UK5JAO: DOLOTOVSKY, GRIN, KUKSOV, ZYUGRO. UK5LAK: UB5LJC, UB5LJW, UB5-077-750. UK5MAF: UB5-059-2, UB5-059-200, UB5-059-577. UK5MAG: UB5MBP, UB5MDP, UB5-059-11, UT5HP. UK5MBE: BALNOV, DYBLJA, KUDELIN, KUSHNIR, SKVRCOV. UK5MBF: MELNIKOV, PRIJMA, SMOLKA. UK5MBQ: CLUB. UK5MBW: UB5MFA, UB5MGM, UB5MHT. UK5MDI: IZOTENKO, KARPENKO, RYNDIN. UK5QAC: UB5QA, UB5QDU, UB5QFS. UK5UAC: UB5UFY, UB5-065-1701. UK5UBB: UB5-065-271, UB5-065-750, UB5-065-837. UK5VAA: ANITSOY, DOBROVOLSKI, LISOVSKY, PETRI. UK5WBG: DESIATNIKOV, KISHCHUK, LUYIY, MARKEVICH. UK6AAA: CLUB. UK6FGF: UF6BN, UF6FDF, UF6-012-301. UK6QAA: UF6QAN, UF6-014-68, UF6-014-74. UK6WAA: UA6-086-104, UA6-086-147, UA6-086-177. UK7CAC: UL7CAZ, UL7CBP. UK7JAA: BORYSHNIKOV, KINSFATER, ZAKHAROV. UK8AAI: UI8ACI, UI8BI. UK8HAA: BEGUAUEDOV, CEPELEV, STEPANENKO, UK8JAA: UJ8JAU, UJ8JCL, UJ8JCO, UJ8JCR. UK9ADY: UA9AAF, UA9AAX, UA9ADH, UA9ADI, UA9AFZ, UA9AJA, UW9AT. UK9QAA: UA9QAP, UA9QH, UA9-134-172. UK9SAY: UA9SAX, UA9SCE, UA9SCJ, UA9SCT, UA9SCU, UA9TS. UK9UAO: CLUB. UK9WAA: CHAMATDINOW, NESTERENKO, SANAGATULLIN. UK0AAC: UA0ABB, UA0ACQ, UA0BW, UA0-103-267. UK0LAK: SHCHELKUNOV, A, SHCHELKUNOV, V, MIZOSHNIHENKO. UK0ZAB: UAZBF, UA0ZBT, UA0ZBW, UA0ZCG. VE1AI & VE1AJP, VE1MX, VE3OCU: VE2DZE, VE3KKU, VE3EXA, VE3CXL. VU2GO: VU2TS, VU2DAS. W1MX: K1MK, WA2EYC, WA4TTG. W2KI & K2PO, WB2OOG. W2MO: WA2LWT, WA2LXU, WA2QIC, WA2YLA. WB2SST & WA2HGM. W2UI & N3KR. W2YV & N2NT. W3BGN & K3OX, N3BB. W3EVW & 2M NET. W3GG & N3AM, WB3DSX, WB3FGR. W3GNQ & 2M NET. W3NX & W3HB. W3NZ & N3AMK. W3UO & 2M NET. W3YFV & WB3AOP. W4DM & 2M NET W4EI & WB4DBK. WB4RUA & WB4SPB. WA4RVC & K4IIF. W5AC: K5GN, WB5YOT. W6BIP & WA6DJI. W6UA & W6UM. W9LT & K9UWA, WD9DSU, W9FC. WB7FFF & WB7EEH, WH2AAF & WB6SSE. YO3KWF: Capraru, Gradescu. YO6KNL: Club. YO6KNM: YO6AW, 6XU. YO8KGB: Club. YO8KGV: YO8AMT, YO8AJG. YU3EY: YU3DM, 3EY, 3FK, 3TBW, 3TVI. ZL2WB: ZL2BCW, ZL2AKW, ZL2CD, ZL2OM, ZL2ARN, ZL2AYZ. 4UIUN: WA2CBB, W2AGW, W2ZZ, W2YY, W2TO, W2GM, W2RS, K5VNI. W6QLJ6Y5: W6QL, W6KG.

UA9ACZ, UA9AGR, UA9AIS, UV9FN, UW9BY. HB9ZE & HB9ALU, HB9BLQ. HK0COP: K3MBF, N3AD, N3ED, N3RD, W3MA, WA3LRO. JA1YFG: JE1PYM, JG1CFO, JG1EED, JG1QNV, JG1SYJ, JI1RCB, JJ1EFG, JE3GPG, JH1CQQ, JA0LXZ. JA1YHA: JG1BQD, JH1LGZ, JA5WIO/1, Ja7UES, JA9GAE. JA1YXP: JF1VVR, JI1HGD, JA4QNJ, JA4XPT, JH4KAN, JH4OWG, JA5IEP, JR6NJD, JH7JPQ, JA8MRV, JA8RWM, JA0XUF. JA1ZLO: JE1JJI, JR1ANA, JR1FIG, JR1SWB, JH2CKX, JH2LZR, JH4EBN, JH6HDL, JA9FUU. JF1YFP: JE1QDQ, JH1OGC, JH1MTS, JH1RDI, JR1NPH. JH1YDT: JA1EPK, JE1QMV, JF1EAL, JF1EPK, JF1ODO, JH1GNU, JR1AQQ, JR1FNR, JA0VSH. JH1ZLA: JA1KSO, JE1GWP, JE1OMO, JF1BUI, JH1DTC, JH1OCO, JI1HXR, JJ1BMB, JR1JFO, JH2IRH, JA7AKQ. JA2YEF: JE2ATB, JE2LDO, JF2GNY, JH2TBS, JH2VOR, JR2LDM, JR2TPD, JR2TWA, JR2VDA. JA3YBF: JE3MCC, JE3OPD, JE3PED, JF3ELY, JH3KIL, JH3NFZ, JR3AJZ, JR3UPO, JR3VSW, JH4CES, JH4DHX, JH6UBZ, JH0FQP. JA3YKC: JR2SQU, JA3ODC, JA3REU, JA3UPK, JA3WJJ, JE3KCC, JE3MXQ, JF3KJJ, JF3SFP, JH3AIU, JH3GLP, JH3JRB, JH3KWQ, JH3PKS, JH3PRR, JH3VJT, JH3VOT, JR3AFH, JR3KEG, JR3KIN, JR3RIU, JR3WLK, JH3XGK, JH4ETH, JA5GZB, JA5TDH, JA9UDU. JA4YQO: JA2SCJ, JA4HXC, JA4QVM, JH4AQA, JH4GYV, JA5POE, JH8CGU, JH6KKD. JA7YAA: JG1IGW, JG1UJD, JA7KPK, JA7WBW, JH7AEF, JH7LIS, JH7OSI, JH7SFY, JH7WTC, JR7DON. JA9YBA: CLUB STN. JA0YAN: CLUB STN. K3RL & AA3B, K3FD, K3OA, W3AA, W3BI. K3WW & K3VA, K3VW, K3WJV, W3GRW, 9Y4VU. K5RC & K5GA, K5LZO, K5TU, K5WA, K5ZD, KA5CHW, N5AM, N5JJ, W5VQ, W5VAH. K8LX & K8GM, K8MD, N8EA, W8WA, W8KPL, W8ZDT. K0RF & K0GU N0RR, W0CP, W0UA, W0UN, W0ZV, WD0DSU. N2AA & N1XX, W1PM, K2BQ, K2GL, K2NG, K2SS, K2TT, K2UR, WB2SFB, WB2VYA. N4WW & AA4NA, KB4DU, W4EF, N4GG, N4RJ, N4SA, N4ZL, K00O, N6ND & N6KA, N6RM, WB6HGJ, W7KHN. OH1AA: OH1HU, OH1MD, OH1NH, OH1NK, OH1OG, OH1RM, OH1TV, OH2FS, OH3ZE. OYGFRA: OY2H, OY2J, OY3H, OY4R, OY5Q, OY5NS, OY7K. SK2KW: SM2CEW, SM2CPF, SM2DGU, SM2DLZ, SM2DMB, SM2DMU, SM2DQS, SM2EKM, SM2EPR, SM2GMG, SM2GMZ, SM2HAK, SM2HTF, SM2HZQ. SK5AJ: CX1AAC, SM5AD, SM5AAY, SM5BNZ, SM5CAK, SM5OBN, SM5CEU, SM5CNQ, SM5DPS, SM5HPX, SM5GLC. UFGA: UP2BBT, UP2BCR, UP2BDF, UP2BEG, UP2BFL, UP2NK, UP2OO, UP2OU, UP2PBW, UP2O38 1541. UK2BBB: UP2BAS, UP2BAW, UP2PX, UP2MB, UP2-088-517, UP2-038-727. UK4WAR: UA4WPX, UA4WAM, J. Fomin, A. Kuznetsov, V. Mogunov, T. Ohotnikov, T. Yamilov. UK5IBB: UB5-073-313, UB5-073-433, UB5-073-209, UB5-073-2887. UK6LAZ: UB5-073-420, UB5-060-901, UA4-156-366, UA6-101-152. UK6LEZ: J. Gamzelev, S. Kiblitky, W. Indienko, V. Chermensky. WIRR & W1KM. W2PV & K1AR, K1DG, K1EA, K1RA, K2AV, N2FB, WB2ODP, AA4KB, K9ES. W3FA & K3ZZ, W3ABC, W3XY, WA3KCY, WA3ZAS, N8II. W3MM & K1OME, K1PT, K3GM, K3OO, WA3UYD. W3TV & W3AOH, W3VW. W4BVV & K2BA, K3KU, K3NPV, W3IUU, W3ZZ, WA3AMH, W4BQF. YU1BCD: YU1FD, YU1NQW, YU1NZV, YU1OCV, YU1ODU, YU1ODS, YU1OOI, YU1OQZ, YU1PCF, YU1QBC. 4U1ITU: G3ZEM, SM0CCE.

STATION OPERATORS

Multi-Operator Multi-Transmitter

EA8CR & EA2OP, EA7ALG, EA7TL, EA9EO, OH2BAD, OH2KI/OH3XZ, OH2MM, OH6DX. EX9A: RA9AIL, UW3BO, UK6APA, UL7LAY, UL7LEZ, UA9AEN, UA9AN,

TOP SCORES

WORLD Single-Op All Band		USA Single-Op All Band	
CT3BZ	5,135,104	W3RJ	2,186,948
KP4RF	4,908,186	W3LPL	1,837,230
C5AAO	4,874,559	W1ZM	1,804,960
PJ9CG	4,436,556	N2LT	1,801,314
ZS6WW	2,864,224	W7KW	1,660,500
W3RJ	2,186,948	K9DX	1,657,978
ZL1ADI	2,063,712	K6NA	1,587,087
XE2MX	2,048,010	N9MM	1,580,049
UV9AX	1,966,670	N4RR	1,405,812
UA1DZ	1,935,315	W2REH	1,390,311
Single-Op Single Band 28 MHz		Single-Op Single Band 28 MHz	
FY7BC	581,117	K8MFO	151,440
ZE1BL	376,737	W1LK	123,384
4X4UH	308,485	K5TJ	120,087
HI8MOG	298,540	K4BAI	114,798
ZE8JN	255,162	W8WPC	107,378
G3MXJ	241,040	K1SA	100,985
21 MHz		21 MHz	
LU8DQ	1,011,220	N6CW	302,211
KH6XX	816,102	K4RV	277,851
ST0RK	499,296	N5CR	246,384
YU3ZV	493,816	K8CX	242,892
KH6GMP	395,458	N6TV	223,808
VK4QK	394,026	N1GL	189,924
14 MHz		14 MHz	
KV4FZ	860,580	W6VPH	468,312
W6VPH	468,312	N4EA	312,611
EL2AV	402,112	K9AM	292,680
YU2CDS	387,933	K8ZH	266,476
YU1ALZ	313,875	K3FN	249,250
UA4PNW	312,816	W2SUA	235,752
7 MHz		7 MHz	
AH6Z	387,750	W5UN	139,050
I2FGP	172,809	N6AW	121,140
ZL1AMO	166,282	W4MJ	100,686
JA2INO	161,160	W5WMU	97,929
UQ2GCN	157,635	K6ZM	92,304
YU4OY	156,216	K7UR	83,076
3.5 MHz		3.5 MHz	
UI8LAG	110,552	K5NU	19,240
UP2NV	107,250	N7RM	13,392
9K2EX	95,760	WB3AVN	11,772
YU1ACS	86,009	N7DF	11,427
UQ2GDW	82,863	K1MM	8,120
OK1DOK	70,956	W5VX	7,301
1.8 MHz		1.8 MHz	
VR3AH	20,310	K1PBW	6,006
YV1OB	12,798	K6SE	4,437
YU3EF	8,294	W8LRL	3,876
DJ8WL	8,288	W1BB/1	2,716
OK1ATP	7,890	N4PN	2,139
YU2OB	6,296	K5UR	1,296
Multi-Op Single Xmtr		Multi-Op Single Xmtr	
RF6F	5,866,744	N3RS	2,887,920
HH2CQ	5,256,944	K1PR	2,371,600
N3RS	2,887,920	N4AR	2,323,280
YU3EY	2,591,979	K5JA	2,246,264
LX0RL	2,389,965	W3BGN	2,192,400
K1PR	2,371,600	K4VX	1,985,277
Multi-Op Multi Xmtr		Multi-Op Multi Xmtr	
EA8CR	17,734,970	N2AA	5,073,642
EX9A	8,721,019	W4BVV	4,914,408
HK0COP	8,141,975	W2PV	4,737,378
UF6A	8,101,088	K3WW	4,572,884
N2AA	5,073,642	K5RC	4,431,636
W4BVV	4,914,408	K0RF	3,548,934

Number groups after call letters denotes following: Band, (A=all), Final Score, Number of QSO's, Zones and Countries. Certificate winners are listed in Bold Face.

**C.W. RESULTS
SINGLE OPERATOR
NORTH AMERICA
UNITED STATES**

Call	A	1,804,960	1365	130	334
W1ZM	A	1,804,960	1365	130	334
K1VR	**	1,089,600	974	116	284
K1ZZ	**	832,284	808	116	250
W1PL	**	650,826	686	99	247
K1WB	**	502,478	648	85	192
W100	**	416,256	544	91	180
W1XX	**	412,788	602	79	167
W1XS	**	411,522	468	104	217
W1BIH	**	382,766	441	97	217
W1FJ	**	356,622	449	95	199
K1CO	**	248,220	371	89	163
N1RI	**	141,860	274	71	134
K1WJ	**	138,546	284	62	117
WA1UZH	**	130,240	292	49	111
K1MEM	**	127,534	247	67	120
W1HX	**	122,080	201	91	133
K1BV	**	120,780	336	32	90
K1GQ	**	98,820	210	58	125
K1FIR	**	72,663	171	57	102
W1CNU	**	58,368	171	41	87
K0TB/1	**	55,187	319	50	123
K1ER	**	46,565	126	52	87
N1YL	**	41,496	122	50	83
W11UU	**	26,978	106	30	64
W1VV	**	22,878	88	34	59
WA1JGK	**	20,884	87	38	54
W10PJ	**	6,519	53	18	35
W1PLJ	**	5,850	44	20	50
K1JK	**	5,995	41	17	50
W1LK	28	123,384	401	26	80
K1SA	**	100,985	378	26	69
W1NG	**	92,494	322	26	77
WB1ANT	**	48,000	225	23	57
W1WY	**	34,358	152	23	59
K1TN	**	19,344	90	20	58
AD1Y	**	3,280	34	15	25
N1GL	21	189,924	550	29	90
WA1FCN	**	84,825	341	23	64
AA1M	**	5,612	73	15	31
K1SF	**	1,403	21	6	17
W1YN	14	224,523	678	32	85
W1YG	**	140,304	447	31	80
W1GG	**	97,882	327	30	79
AB1J	**	6,885	50	19	32
K1MM	3.5	8,120	80	16	40
K1EQA	**	940	23	8	12
K1PBW	1.8	6,006	57	12	27
W1BB/1	**	2,716	34	9	19
Call	A	1,801,314	1386	127	331
N2LT	A	1,801,314	1386	127	331
W2REH	**	1,390,311	1055	130	329
W2IB	**	1,214,760	1027	128	299
W2GD	**	1,099,947	1018	116	265
K2BU	**	1,046,848	1047	100	252
K2LE	**	1,016,136	916	114	282
AE2A	**	911,880	954	97	243
N2RM	**	842,823	897	98	235
W2AEE	**	791,903	857	93	236
Call	A	1,801,314	1386	127	331
N2MM	**	741,950	717	98	257
K2UA	**	631,890	730	91	215
N7TT/2	**	570,648	670	97	215
N2MR	**	483,298	529	102	232
W2LYL	**	428,934	546	89	202
W2YC	**	276,850	437	77	168
N2MA	**	268,332	401	90	146
W2OY	**	239,120	367	74	170
K2QIL	**	238,422	373	69	168
W9RR/2	**	238,248	414	70	146
W2AYJ	**	163,904	289	67	130
K2PA	**	142,912	280	60	46
W2XL	**	139,986	264	70	128
K2SB	**	136,998	285	59	118
W2NS	**	134,940	279	57	116
K2MFY	**	117,486	241	64	119
W2FTY	**	108,324	200	71	133
WA2LDG	**	80,033	169	55	108
WA2IKO	**	60,095	176	46	73
W2SGK	**	54,621	128	51	102
WB2LJK	**	51,876	151	48	84
K2PE	**	51,120	132	53	89
K2SX	**	36,462	130	52	66
K2FS	**	29,792	105	44	68
W2FUJ	**	25,668	94	38	54
WB2HIQ	**	24,400	96	37	63
WA2ORX	**	23,920	94	37	55
W2GGE	**	18,060	80	26	58
W2HAZ	**	15,980	71	32	53
W2IY	**	11,440	52	37	51
AA2Z	**	9,765	75	19	26
WA2EYA	**	8,946	53	33	38
K2HPV	**	7,440	51	27	33
W2HAE	**	7,208	50	25	43
W2XN	**	6,328	47	19	34
AB2W	**	3,780	49	7	20
WA2WSD	**	2,236	32	23	20
W2FGY	**	1,144	18	12	14
N2RT	**	336	8	6	8
N2IN	**	323	10	10	7
WA2TFC	28	77,794	284	25	72
WA2ZWH	**	5,510	50	12	26
N2GC	21	82,283	273	30	77
W2AZO	**	39,712	206	20	48
W2DW	**	4,635	35	16	29
W2SUA	14	235,752	729	32	82
Call	A	1,801,314	1386	127	331
K2VV	**	222,548	698	32	86

Call	A	154,105	455	34	85
W2AO	**	154,105	455	34	85
N2HI	**	15,624	117	18	38
W2RR	**	6,556	56	18	26
Call	A	69,258	266	24	73
W2ER	7	69,258	266	24	73
K2IGW	**	61,540	275	24	61
AC2U	**	19,812	103	22	56
Call	A	2,186,948	1580	137	356
W3RJ	A	2,186,948	1580	137	356
W3LPL	**	1,837,230	1359	129	341
K3NA	**	927,043	927	109	268
N3DA	**	904,596	856	116	247
W3GRF	**	871,448	787	117	271
W3FV	**	849,758	807	113	264
K3CY	**	623,040	671	110	220
K3SA	**	620,704	659	96	230
W3OV	**	611,375	657	101	234
N3LR	**	565,632	691	92	196
N3AW	**	531,576	691	83	193
K3NZ	**	473,473	564	93	208
W3GU	**	472,323	614	86	181
K3II	**	469,350	561	89	209
N3UN	**	404,547	486	95	204
W3AZ	**	365,014	483	87	191
N3AFU	**	360,412	526	70	169
K3NL	**	356,445	485	85	182
K3ND	**	331,390	397	103	207
W3GRS	**	326,400	453	86	169
K3RA	**	297,474	408	85	173
N3II	**	251,808	367	87	171
WA3UXU	**	248,832	379	81	162
W3KT	**	227,912	334	77	171
W3GK	**	227,128	354	77	155
W3UJ	**	224,547	307	111	156
N3VJ	**	214,635	396	71	134
K3UE	**	212,164	354	86	150
W3KV	**	175,376	284	77	149
W3BB	**	151,704	314	54	114
W3KFO	**	133,760	273	76	100
W3GL	**	126,876	236	84	134
W3MR	**	124,656	245	69	127
K3NS	**	117,450	205	79	146
W3ZJ	**	100,620	187	72	123
W3ARK	**	68,943	180	50	97
K3UC	**	64,090	166	50	95
N3HW	**	56,956	191	42	74
W3HVM	**	46,240	133	54	82
K3GQJ	**	40,690	127	52	78
N3GW	**	36,120	111	44	76
AD3V	**	22,500	104	35	55
K3TP	**	20,367	88	35	58
WA3NNA	**	14,504	58	44	54
WA3YIV	**	13,467	74	31	36
Call	A	10,187	68	22	39
W3RN	**	10,187	68	22	39
WA3DSD	**				

LIBERIA				JA2IU	31,293	208	24	33	JA1AVI	4,950	55	12	18	UJ8JAS	14	269,445	947	33	82	OK1FAR	28	88,700	367	26	74				
EL2AV	14	402,112	1305	29	74	JA4VAD	30,192	173	27	41	JF1WPB	4,256	52	15	17	UJ8AB	7	48,230	321	24	41	OK1ATT	39,278	195	24	58			
MADIERAS ISL.				JA1CMD	28,380	185	27	33	JH0JVZ	980	26	8	6	UJ8AQ	7	39,032	337	18	38	OK3TCD	11,634	97	14	28					
CT3BZ	A	5,135,104	4266	105	311	JA9SOT	27,115	190	24	31	JA3NMV	931	20	8	11	TURKOMAN				OK3CO	9,956	95	15	23					
RHODESIA				JE1HOO	25,300	195	22	28	JA0GZ	462	15	8	6	UH8DI	21	21,600	211	15	35	OK3CFP	7,622	94	15	22					
ZE3JO	A	163,366	538	25	73	JA2AJA	19,656	171	19	23	JA2INO	7.0	161,160	667	27	58	OK2BLG	7,520	63	16	31	OK2PDD	756	21	7	11			
ZE1BL	28	376,737	1414	25	64	JA1EM	19,096	341	23	33	JR1A00	108,472	429	31	60	OK2BBJ	703	15	7	12	OK1VE	600	13	8	12				
ZE8JN	28	255,162	993	25	61	JH6NAC/1	14,050	125	21	29	JA2HO	53,940	351	26	34	OK30M	21	112,466	425	30	76	OK2QX	107,185	435	28	69			
SOUTH AFRICA				JA7ARW	12,878	112	22	25	JA3BKC	32,550	176	24	46	U18ADQ	A	160,012	661	29	80	OK1AGN	59,500	322	27	58					
ZS6WW	A	2,864,224	3038	105	211	JH6WHN	11,070	103	19	26	JA2LA	12,878	104	17	30	OK1ASS	41,756	233	24	49	OK1DJO	29,312	211	21	43				
ZS2RM	28	222,458	513	51	96	JR3COZ	7,020	94	14	12	JG1JMH	6,804	72	17	19	OK2BPK	8,262	62	20	34	OK1MWN	8,118	79	16	25				
ZS2CW	28	62,177	219	37	60	JR2MLP	6,600	70	18	22	JA9CWJ	4,560	59	14	16	OK1PCL	1,357	21	12	11	OK1FV	14	87,135	420	28	83			
ZS6ME	28	136,008	632	21	51	JA10P	5,344	66	14	18	JA11BX	26,096	184	23	33	OK1AKU	49,680	340	23	67	OK3CAU	29,160	225	17	55				
ZS1HF	28	87360	230	18	52	JA1ERW	5,270	60	15	19	JA2AIR	12,083	119	16	27	OK2BEM	28,860	210	21	53	OK3CAN	20,475	162	20	43				
SOUTHERN SUDAN				JA6WW	4,653	66	13	20	JA6AUH	31,941	202	22	41	OE3RE	A	177,760	482	59	143	OK2ABU	16,864	110	21	41					
ST0RK	21	499,296	1496	31	81	JA6PL	3,864	50	13	15	JA1DUH	10,994	92	19	27	OE1KU	5,880	56	8	27	OK1AOJ	10,388	142	20	29				
ASIA				JA7ARW	12,878	112	22	25	JH1APZ	10,620	105	17	28	OE3PUW/1	23,912	173	18	43	OK1JPH	2,349	40	12	17						
INDIA				JA8RUZ	1,404	35	12	15	JA1ITX	10,387	100	19	28	OE1DSA/3	21	83,398	352	29	69	OK1MSO	810	20	8	12					
VU2JN	28	16,176	193	12	36	JA2VUP	273,312	917	33	71	JH1CNT	4,732	72	14	14	OK10XP	714	15	6	8	OK3TTL	135	5	4	5				
IRAN				JA2NDQ	252,555	780	34	79	JA2DCN	2,222	42	12	10	OE3AKA	14	149,778	640	29	77	OK3KFF	7	49,126	420	19	58				
EP2IA	A	1,537,820	1760	90	250	JG1EIQ	203,514	657	34	73	JA2HFB	65	5	3	2	OE1TKW	1.8	552	47	2	10	OK2PFQ	29,082	280	18	56			
ISRAEL				JE1CKA	195,910	631	33	77	JH1LKH	135	6	4	5	CT8QN	21	51,975	376	20	55	OK3CYU	13,000	151	12	40					
4Z4TA	A	145,383	385	37	92	MACAO				CR9AJ	21	98,477	916	22	49	EA6FD	28	1,122	17	8	14	OK1KHI	8,702	102	18	20			
4X4UH	28	308,485	1257	29	74	MONGOLIA				JT1AN	A	66,215	361	29	56	BELGIUM				ON4FD	A	528,786	1147	41	90				
4Z4WE	21	92,072	410	22	46	PAKISTAN				AP2MC	A	449,046	1071	62	140	ON4XG	297,620	655	64	166	OK1DOK	3.5	70,956	720	16	65			
JAPAN				JA2AXB	191,808	683	34	62	ASIATIC USSR				UJ8AW	21	13,801	192	12	25	ON4GHX	28	81,792	489	20	52	OK3BDE	49,348	552	17	56
JA1BWA	A	750,233	941	114	169	JA2ANA	183,172	688	30	62	ASIATIC RUSSIA				ON4FP	21	9,744	72	20	38	OK1DCU	36,564	462	9	57				
JA1KUV	28	571,620	963	85	125	JH3CXL	180,675	638	33	66	UV9AX	A	1,966,670	1722	110	276	ON5WL	3.5	3,531	99	6	27	OK2HI	24,400	290	11	50		
JA2MGE	28	513,540	684	117	153	JA1AYU	151,536	597	30	58	UV9AH	1,008,060	1220	88	230	BULGARIA				OK1MAW	18,144	260	10	46					
JG1CDM	28	502,916	782	93	143	JA1CJF	146,734	540	32	62	UA9MR	652,188	957	86	192	LZ1AG	A	338,352	554	87	217	OK3YCX	16,422	342	7	39			
JA1NLX	28	302,331	608	76	103	JE2BNZ	142,975	548	34	61	UA9M	596,646	909	72	182	LZ2KR	197,190	625	54	156	OK2BGR	10,890	209	6	39				
JH2CJW	28	287,100	587	73	101	JR6SJC	124,488	558	25	53	UA9FAL	441,024	818	62	130	LZ1IA	77,220	251	58	122	OK3TDO	9,558	130	10	44				
JA6WSB	28	252,672	488	81	107	JE3FCM	120,690	521	30	51	UA9QE	256,550	552	46	129	LZ2GS	37,008	135	44	104	OK1AZR	8,946	203	7	35				
JA6CNL	28	229,712	440	80	116	JH6DOG	118,938	500	26	60	UA90FB	228,534	692	32	91	LZ2BR	24,816	179	25	63	OK1DCN	5,960	140	5	35				
JA1JKG	28	213,000	596	50	75	JR1SLU	115,584	469	30	56	UA9UGA	210,541	547	56	117	LZ2CQ	21,032	87	39	49	OK1MNV	4,958	134	5	32				
JR3XEX	28	187,992	426	75	93	JK1AI	99,922	383	33	61	UA9FAR	153,178	440	43	96	LZ2QE	744	25	11	13	OK2BMA	4,368	74	7	32				
JA7BRG	28	186,219	332	88	121	JK1OSI	92,650	374	31	54	UA9ULA	28,288	221	20	44	LZ2EU	35	4	3	4	OK1DIE	3,912	103	6	30				
JF1NCT	28	169,302	362	80	94	JK1ASO	80,261	345	29	47	UA9HBT	17,900	154	21	29	LZ1W1	28	11,475	93	16	35	OK1TJ	3,861	90	5	22			
JF1SEK	28	159,194	419	63	74	JA1CSB	79,425	371	28	47	UA9ULB	17,900	154	21	29	LZ1XL	6,355	66	13	28	OK1DDO	3,683	130	4	25				
JA8SW	28	132,673	305	83	98	JE1GCI	78,234	357	28	50	UA9WDV	4,512	53	11	21	LZ1M	1,742	27	8	18	OK1MZO	2,100	67	5	25				
JA1BFR	28	131,054	317	75	79	JA8GO	77,285	427	24	41	UA9HBD	1,957	57	6	13	LZ2MD	1,742	27	8	18	OK3CSA	1,470	33	5	25				
JR3COZ	28	108,460	336	56	60	JA3EQC	71,020	376	25	42	UA9MY	1,081	21	10	13	LZ2PO	21	106,260	513	32	83	OK2SWD	1,000	28	6	19			
JJ1SOE	28	103,936	301	59	69	JA1AEW	68,908	275	33	59	UA9SCH	28	4,736	93	16	21	LZ1YF	14	83,210	468	34	72	OK3KFO	510	42	2	8		
JA1AYC	28	102,168	351	49	50	JA1IDY	62,910	245	32	58	UA9CJD	3,450	56	7	16	LZ1RU	41,925	234	24	51	OK3EV	475	13	7	12				
JA6YAP	28	100,362	319	59	70	JR3WXA	56,100	301	25	41	UA9ADQ	14	214,326	796	26	73	LZ2RF	7	22,192	172	16	57	OK2KVI	396	19	4	14		
JA2CUU	28	98,252	292	47	74	JA2BJC	53,696	294	26	38	UA9JBN	90,297	476	24	55	LZ2XW	14,580	193	12	42	OK1ATP	1.8	7,890	215	7	23			
JA60KK	28	96,906	196	78	108	JH4HLN	51,544	277	24	44	UA9WCQ	35,088	269	12	36	LZ1TD	3,280	76	13	27	OK1AXD	3,807	141	5	12				
JF3CCN	28	96,363	269	54	75	JE2SXD	46,528	264	26	38	UA9MAX	3.5	40,257	259	15	48	LZ2PP	3.5	51,684	600	13	60	OK1DJK	2,442	90	3	19		
JH7LMZ	28	93,366	257	60	73	JA8EQ	38,415	210	26	39	UA9FAJ	37,674	291	7	39	LZ2AB	-47,760	665	11	49	OK1CGI	1,518	65	5	17				
JH7MTR	28	87,075	259	63	66	JA3EQC	37,465	229	22	37	UA9LS	297,005	806	79	112	LZ2KBA	15,547	211	9	48	OK1DJK	1,804	82	4	18				
JH2JEV	28	75,499	266	49	54	JA8GO	37,465	229	22	37	UA9AG	220,780	498	62	128	LZ2WB	882	39	5	13	OK1DJK	1,804	82	4	18				
JR1LEV	28	70,840	234	51	59	JK1OEO	18,414	122</																					

ENGLAND				FRANCE				GERMANY (FRG)				GERMANY (GDR)				GREECE				GUERNSEY				HUNGARY				ICELAND				IRELAND				ITALY																							
G3ESF	A	322,308	734	69	183	OH3XX	"	16,260	144	17	43	DJ5JH	A	1,080,772	1055	106	300	DM2DUK	A	859,276	1231	95	236	SV1IU	14	32,092	280	20	51	GU5CIA	A	1,650,350	2335	81	244	HA2KMB	A	197,290	638	53	128	TF3CW	A	264,836	884	42	101	EI8CZ	21	8,073	121	12	27	I5ARS	A	579,768	1144	70	168
G3XTT	"	264,222	570	62	171	OH1EG	"	6,400	113	10	30	DJ2TI	"	709,462	1005	92	246	DM2CDL	"	302,260	605	77	177	GU4CHY	28	24,206	286	12	26	TF3YH	"	37,772	210	29	47	EI2CA	1.8	3,560	179	3	17	I1SOP	"	164,736	455	63	129												
G3NKS	"	105,700	351	52	123	OH2BCD	"	4,270	87	13	22	DJ9GW	"	654,012	908	84	249	DM2CUJ	"	283,437	567	64	167	GU4EON	21	146,939	804	23	66	TF3JB	14	93,984	677	16	50	I0HCJ	28	149,400	598	29	71																		
G2AJB	"	92,178	354	44	118	OH2BSV	"	2,520	52	9	15	DK1QC	"	575,385	1031	72	195	DM4SDA	"	228,872	627	71	173																																				
G3JKY	"	91,000	336	41	84	OH1LU	"	1,458	32	11	16	DJ9CB/P	"	539,458	1037	78	184	DM2CWB	"	209,100	667	86	119																																				
G5CRF	"	42,834	203	39	82	OH5RZ	"	391	15	7	10	DL1JF	"	329,450	553	78	197	DM3NKF	"	199,752	599	54	149																																				
G4CHH	"	41,132	201	40	73	OH8SR	7	73,760	721	20	60	DL3LU	"	323,036	549	82	196	DM9AAG	"	191,180	448	61	159																																				
G6NK	"	37,114	227	27	50	OH8PF	"	35,072	465	12	52	DL2HQ	"	162,384	349	69	135	DM4WFF	"	133,760	612	42	118																																				
G8DI	"	25,641	163	30	69	OH6UC	"	1,240	31	8	23	DF2RQ	"	147,200	369	58	102	DM3WMJ	"	94,844	197	71	191																																				
G3MWZ	"	7,056	71	17	31	OH2BCI	3.5	43,724	547	12	56	DK8BI	"	121,655	400	43	102	DM3VTL	"	88,708	440	36	118																																				
G3MXJ	28	241,040	843	30	85	OH1TN	"	31,093	454	10	49	DF4TD	"	112,608	412	43	101	DM2FIL	"	70,090	216	50	113																																				
G3FXB	21	258,980	888	32	83	OH6TI	"	24,128	317	9	49	DL7CF	"	91,938	305	51	103	DM4NJJ	"	51,480	285	28	102																																				
G3TXF	"	174,384	665	29	83	OH6ZAB	"	11,374	200	6	41	DL2JO	"	74,880	317	43	87	DM4TEK	"	51,360	295	32	75																																				
G3MZV	"	81,445	450	22	69	OH2B0	1.8	1,408	60	5	17	DL1HD	"	70,334	194	49	90	DM2AHVA	"	43,776	199	39	75																																				
G4FAM	7	95,744	767	18	70	OH3EY	"	406	27	3	11	DL0AY	"	67,640	174	62	128	DM4YEL	"	37,518	120	41	70																																				
G3XWZ/A	3.5	66,348	475	18	46							DL8BU	"	61,952	316	38	90	DM2CMM	"	29,614	147	33	101																																				
G3YMC	1.8	1,152	70	2	16							DJ1LD	"	61,710	171	56	109	DM2BTO	"	27,359	111	40	69																																				

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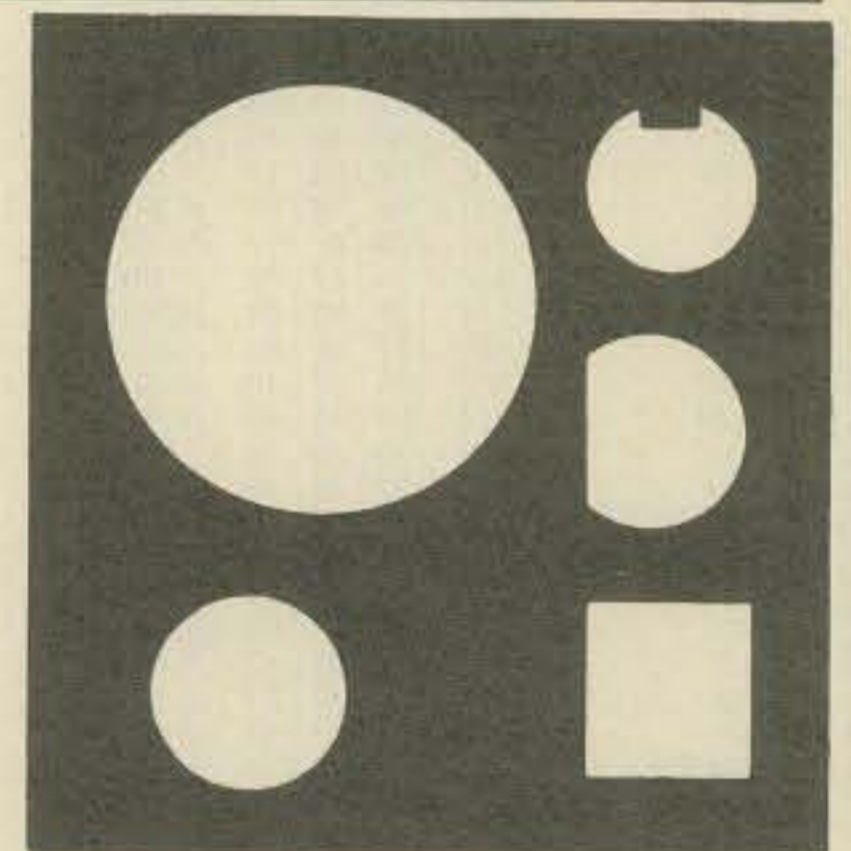


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10 DVB	89,052	416	24	58	SP5ELA	6,768	111	9	38						WALES					KALINGRAD					OCEANA				
16POY	63,120	319	23	57	SP2JEM/9	4,386	91	9	25	GW3UCB	1.8	1,026	56	3	15	UA2FBM	A	69,146	232	52	102	AUSTRALIA							
11GXR	50,235	254	27	58	SP8FG/5	1,380	63	4	19	GW3GWX		704	46	2	14	UA2DC		38,792	281	25	79	VK2GW	A	288,456	826	46	73		
150TC	40,683	224	20	51	SP5LM	1,312	38	6	26	YUGOSLAVIA					UA2FCW	3.5	25,075	372	11	49	VK3AEW		32,296	135	34	55			
14JJC/5	226,440	748	34	86	SP5IWA	1,272	54	4	20	YU4VBR	A	361,920	757	74	186	LATVIA					VK4XA	28	129,704	712	24	38			
					SP8KAF	1,050	51	5	16	YU2CCJ		269,430	637	63	147	UO2GDO	A	430,514	759	88	234	VK3OI		7,448	45	7	8		
11FDX	209,776	741	30	82	SP1GZF	533	41	3	10	YU1BM		175,602	515	64	162	UO2PQ		38,864	265	30	82	VK40K	21	394,026	1306	29	73		
14KRI	100,161	463	28	65	SP6HRK	462	19	5	17	YU1NGO		157,472	367	68	156	UO2DZ		21,924	183	37	50	VK3RJ		4,825	70	12	13		
10XXR	80,901	401	26	63	SP5ELA/5	300	12	4	11	YU1NZW		123,966	309	56	138	UO2GHJ		20,713	257	14	63	VK3MR	14	189,640	719	28	62		
13FDZ	59,100	237	25	75	PORTUGAL					YU3TZP		7,990	75	18	29	UO2GEC		13,013	143	17	60	VK3XB	3.5	5,644	112	7	9		
15YDI	40,446	290	19	44	CT8QM	21	51,975	376	20	55	YU10JT		3,036	27	20	24	UO2PP	21	7,344	80	15	36	GUAM						
11ZEU	19,023	162	15	36	ROMANIA					YU3ER	28	111,435	387	30	85	UO2PJ	14	57,464	331	27	61	KG6JAR	14	56,560	347	23	31		
15ZUF	102,500	583	30	70	Y03JJ	A	492,960	853	84	232	YU1EFQ		108,676	401	33	68	UO2GIN		25,578	183	16	33	KG6DX	7	84,864	486	28	36	
10EMV	84,870	556	20	62	Y03CR		350,448	679	87	211	YU2CBV		16,380	110	22	38	UO2GEY		21,710	200	20	45	HAWAII						
11QJC	26,455	204	18	47	Y03AC		283,024	608	80	186	YU1NZR		13,409	94	20	33	UO2GCP		10,047	103	16	35	KH6IJ	A	1,635,711	2499	98	121	
11ZVF	19,166	290	11	26	Y08DD		198,916	532	66	157	YU2RYU		227,745	831	30	85	UO2GCN	7	157,635	1027	22	71	KH6NO		830,522	1813	72	82	
12FGP	172,809	1057	23	68	Y08FR		98,735	418	54	101	YU1OFT		223,870	896	33	79	UO2GIP		6,232	126	8	30	KH6DL		634,179	1337	76	85	
14AND	28,908	315	15	51	Y03RF		82,450	173	73	97	YU2CDS	14	387,933	1124	37	110	UO2GGB		3,392	84	9	23	KH6CKJ		524,964	1430	59	64	
MALTA					Y06HQ		49,389	191	39	62	YU1AJF		205,744	1059	28	84	UO2GDM	3.5	82,863	756	16	65	KH6HC		9,765	93	19	16	
9HICH	28	132,066	546	26	73	Y02BEH		46,310	302	29	81	YU3TMF	7	22,701	159	18	51	LITHUANIA					KH6XX	21	816,102	2311	38	81	
NETHERLANDS					Y07AWQ		38,985	225	31	72	YU1SF		4,750	116	7	31	UP2BAO	A	804,450	1277	84	262	KH6GMP		395,458	1414	36	58	
PAQTAU	A	497,350	940	79	211	Y07AKY		36,784	195	26	95	YU1ACS	3.5	86,009	843	15	62	UP2CY		719,160	874	104	286	INDONESIA					
PAQUV		166,426	438	56	117	Y02BEO		36,736	316	21	61	YU5FA		49,436	559	12	56	UP2BCT		162,538	636	43	138	AH6Z	7	387,750	1382	30	64
PAQNYM/A		104,468	390	50	114	Y05AVN/3		29,104	120	37	99	YU3FE	1.8	8,294	263	6	23	UP2BCT		149,145	915	53	110	KH6IRT	1.8	2847	78	7	6
PAQTA		49,209	177	42	99	Y02BPM		26,772	229	26	71	YU2OB		6,696	236	5	22	UP2BCT		144,100	308	63	157	INDONESIA					
PAQGT		19,012	88	41	56	Y02BIN		20,915	119	29	60	EUROPEAN U.S.S.R.					UP2BAT		133,760	508	44	132	YB3AP	A	116,998	331	45	77	
PAQDIN		17,976	109	40	67	Y06MZ		12,094	111	24	50	BYELO RUSSIA					UP2BEL		105,944	498	33	119	INDONESIA						
PA3AIC		16,647	146	20	73	Y03JG		11,456	152	14	50	UC20BA	A	176,115	620	51	148	UP2BDX		82,229	512	26	93	YB3AP	A	116,998	331	45	77
PAQYN		7,252	59	21	29	Y04ZF		10,366	86	24	49	UC2WBL		48,615	320	26	79	UP2BXC		38,517	174	30	81	INDONESIA					
PAQLVB	21	7,125	54	19	38	Y08FZ		10,224	60	29	42	UC2WCH	26	6,732	66	17	34	UP2DZ		37,064	236	30	83	LINE ISL.					
PI1PT	14	104,104	473	28	76	Y09YE		7,906	80	20	47	UC2WAZ	14	47,196	316	20	56	UP2BDE		27,090	233	22	68	VR3AH	1.8	20,310	238	12	18
PAQRRS		10,857	62	26	51	Y06KNI	28	15,147	80	14	27	UC2AAD	7	17,658	272	10	44	UP2BAR	28	19,024	116	21	61	INDONESIA					
PAQWRS	3.5	9,891	95	13	50	Y03JW		14,137	80	27	40	UC2RG		12,814	221	9	34	UP2PAP	21	61,171	326	25	58	W5JW/					
NORWAY					Y04BZB		748	27	7	15	Y05BO	21	44,116	224	24	58	UP2BFI	14	47,400	314	19	56	KX6	A	263,836	637	57	85	
LA9HW	A	204,204	810	53	151	Y07APA	14	32,339	216	20	53	UR2OI	A	1,174,586	1704	97	274	UP2PCB	7	50,844	517	19	57	NEW CALEDONIA					
LA4LE		115,992	391	49	113	Y04ATW		21,045	180	19	42	UR2RSA		20,174	138	26	51	UP2PCB		34,902	458	13	50	FK8CL	A	74,825	342	30	43
LABWG		91,250	387	38	108	Y09HP		2,619	42	8	19	UR2RCU		13,904	91	27	57	UP2BDE		6,474	166	8	31	NEW ZEALAND					
LA3UG		56,525	219	43	90	Y03BEJ	7	108,300	768	26	69	UR2WZ	28	33,417	279	22	52	UP2ND		4,716	108	7	29	ZL1ADI	A	2,063,712	2675	91	168
LA6ZW		12,136	89	26	48	Y03AAQ		13,570	215	11	35	UR2OW		33,417	279	22	52	UP2NV	3.5	107,250	1126	14	61	ZL1BCG		605,230	1404	45	100
LA1VL		5,480	58	16	24	Y02BKK		6,258	119	9	33	UR2OI		7,003	83	13	34	UP2BFE		48,910	636	11	56	ZL1IL	28	78,147	459	21	36
LA1P		4,042	60	12	35	Y06BYF		6,068	103	10	31	UR2RL	21	57,996	328	21	60	UP2BDH		22,626	378	9	45	ZL1AYO	21	37,282	261	18	32
LA5SH	28	30,750	159	20	62	Y06AHP		1,113	39	5	16	UR2NP		24,583	197	19	42	UP2BDH		12,556	275	6	37	ZL1AMO	7	166,282	785	24	47
LA2AV	14	67,598	457	18	54	Y06BLU		756	45	5	13	UR2FU	14	239,408	1068	30	74	UP2BDO		10,730	277	6	31	ZL1AXB	1.8	1092	33	7	6
LA7RV		5,994	89	10	17	Y03CDN		672	29	7	14	UR2OD		39,425	265	22	61	UP2BAX		5,364	132	6	30	OGASAWARA ISL.					
LA4RQ		2,001	52	8	21	Y04BEW		340	23	5	12	UR2RER		640	13	10	UP2BOV						JD1ALM	A	56826	501	42	40	
LA6XI		464	21	7	9	Y08BDN	3.5	15,738	370	7	36	UR2REC	7	65,296	573	19	58	WESTERN SAMOA											
POLAND					Y03AWD		10,296	264	6	33	UR2RHF		35,706	384	15	51	U05AP	A	93,725	424	42	121	5W1BZ	A	140,151	367	66	71	
SPIADM	A	255,966	601	66	156	Y06AFP		7,718	217	6	26	UR2REE	3.5	41,470	538	13	52	U05AL	28	10,840	301	16	24	WESTERN SAMOA					
SP9GMI		231,957	583	65	148	Y04AYE		4,514	101	7	30	UR2RCN		24,429	428	9	42	U05GR	21	4,800	58	16	24	5W1BZ	A	140,151	367	66	71
SP8EMO		186,264	619	53	146	SARDINIA					IS0OMH	A	43,815	280	31	96	U05OA	7	15,900	229	10	40	WESTERN SAMOA						
SP5GOR		126,801	400	62	131	SCOTLAND					GM3WRN	A	46,053	227	38	83	U05OD	3.5	12,833	282	7	34	WESTERN SAMOA						
SP9EEE		72,940	292	40	100	SCOTLAND					GM3YOR	28	93,104	487	19	69	U05OGU		12,833	282	7	34	WESTERN SAMOA						
SP9CAV/9		69,007	235	49	102	SCOTLAND					SICILY					IT9VDQ	28	105,336	559	23	61	WESTERN SAMOA							
SP5AFL		59,520	185	51	109	SCOTLAND					IT9LMK	21	89,010	520	25	65	WESTERN SAMOA												
SP6DBA		54,280	348	28	90	SCOTLAND					SPAIN					WESTERN SAMOA													
SP2CMB		53,884	374	48	91	EA2IA	A	1,865,754	2485	88	261	UA10Z	A	1,935,315	2005	123	312	U05OB		7,067	166	7	30	WESTERN SAMOA					
SP2FWC		46,374	186	50	81	EA3AIR		120,736	453	54	122	UA4HAL		1,107,414	1653	101	273	U05OC					WESTERN SAMOA						
SP3EQE		39,615	266	24	71	EA1JO		92,338	396	39	98	UW3UG		366,945	852	65	190	U05OF					WESTERN SAMOA						
SP9DTH		36,170	146	42	79	EA7AAW		36,040	236	32	74	UA3ST		213,905	651	51	128	U05OG					WESTERN SAMOA						
SP7ASZ																													

PERU		25,305		251		15		20	
04AAHZ	7								
VENEZUELA									
YV1NX	A	856,514	1194	75	166				
YV40Y	7	156,216	740	18	51				
YV10B	1.8	12,798	161	10	17				
QRPp									
0A8V	A	199,383	550	51	72				
G4BUE	"	192,280	547	49	141				
W5YZ	"	116,560	226	80	108				
KH6JLH/W8	"	106,930	234	58	112				
OK1OKW	"	94,628	449	44	120				
SM5CCT	"	92,443	338	45	124				
WA6POC	"	84,784	309	51	61				
WA4IAR	"	78,507	208	55	88				
WA2JOC	"	29,402	89	42	80				
W9PNE	"	19,600	94	42	56				
VE5JQ	"	18,564	217	22	20				
HB9IK	"	15,908	159	21	61				
JA9BKU	"	15,879	90	34	33				
JF3WNK	"	13,192	78	28	40				
W1PWK	"	8,804	47	30	41				
W7RRJ	"	5,032	50	16	18				
G3IGU	"	4,272	79	14	34				
JH1HTK	"	2,268	34	13	15				
K8EEG/Q	"	8	2	2	2				
K1LWI	28	55,112	240	24	59				
OK3AIG	"	10,120	79	17	27				
WD9ENH	21	5,060	45	14	30				
OK1ASQ	"	1,040	22	8	12				
4Z4UO	14	20,436	182	8	31				
VE4NU	"	2,409	114	6	5				
KL7BT	"	1,134	20	9	12				
OK3CAA	1.8	9	4	1	2				

MULTIOPERATOR SINGLE TRANSMITTER

NORTH AMERICA UNITED STATES

K1PR	2,371,600	1710	133	351
N1AC	1,104,201	1075	102	255
W1MX	1,009,656	1003	109	270
W2YV	1,884,696	1401	129	223
W2KI	663,552	737	101	223
WB2SST	624,630	789	87	195
K2BK	542,278	625	96	218
W2UI	369,648	494	84	188
K2FL	363,200	413	98	222
K2TD	354,000	449	88	207
W2MO	41,984	130	48	80
N3RS	2,887,920	1798	149	411
W3BG	2,192,400	1528	140	364
W3GG	999,984	1070	100	232
W3NX	603,479	611	113	246
K3MD	558,056	636	95	221
K3IU	408,654	475	98	213
K3YL	393,600	612	77	169
W3GNO	301,077	474	82	161
W3UO	291,868	411	80	182
N3RL	267,244	351	93	191
K3SME	206,016	332	77	155
W3EVW	143,220	245	82	138
W3YFV	69,500	177	56	83
N4AR	2,323,280	1588	144	370
K4VX	1,985,277	1492	135	334
N4RA	585,042	618	105	242
K4CG	492,081	664	82	185
W4EI	463,151	584	94	205
WB4RUA	366,520	416	108	232
K4PB	350,075	496	80	195
W4DM	224,968	342	82	162
N4TX	160,380	280	72	148
K4EBY	128,898	239	78	120
N4CQ	77,696	215	45	83
WA4RVC	28,254	102	41	61
K5JA	2,246,264	1620	141	347
W5AC	906,675	875	125	260
K6XV	1,288,966	1397	115	207
K6DC	670,710	832	104	179
W6BIP	628,653	845	103	166
K6YK	140,448	242	93	131
W6UA	138,000	218	85	145
N6UC	69,888	256	41	55
WB7FFF	70,672	226	47	65
N7EF	61,776	325	35	31
W9LT	1,066,256	947	127	285
N9BN	65,664	183	59	93
K8UK	1,306,755	1299	119	236
K9AT	686,784	745	105	231
K9SR	239,564	390	83	138

ALASKA

KL7HR	446,512	1011	63	113
KL7PJ	326,060	902	57	83
AL7T	278,630	968	49	61

BAHAMAS ISLANDS

N4UM/C6A	2,369,400	3668	93	207
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CANADA

VE1AI	1,270,447	1475	103	250
VE3OCU	598,050	1037	91	179

HAITI

HH2CQ	5,256,944	4696	133	369
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JAMAICA

W6QL/6Y5	1,170,702	2239	69	165
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UNITED NATIONS BUILDING

4U1UN	424,564	1743	48	70
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ASIA INDIA

VU2GO	633,930	1049	83	172
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JAPAN

JA2YKA	998,694	1066	125	214
JA4YFH	400,113	721	84	119
JA3YEE	121,965	274	77	96
JA6YDH	102,096	275	66	88
JA4YGM	1,547	31	10	7

ASIATIC USSR ASIATIC RUSSIA

UK9SAY	1,658,004	1697	100	272
UK9ADY	1,636,475	1812	89	246
UK9UAD	601,475	1123	71	174
UK9QAA	453,530	911	54	136
UK9WAA	188,632	488	42	110
UK9AAC	821,025	1360	87	180
UK9LAK	331,568	743	79	133
UK9ZAB	313,390	1023	61	83

GEORGIA

RF6F	5,866,744	4252	127	367
UK6FGF	232,120	1181	19	51
UK6QAA	231,978	700	35	88

KAZAKH

UK7JAA	595,576	1195	71	147
UK7CAC	31,005	174	18	47

TADZIK

UKBJAA	701,628	1342	67	169
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TURKOMAN

UKBHAA	845,312	1264	73	183
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UZBEK

UKBAAI	71,706	247	35	79
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EUROPE BULGARIA

LZ7A	1,135,632	1370	110	291
LZ2KRR	706,746	1056	100	266
LZ1KPM	491,416	1514	60	182
LZ1KRB	187,005	668	56	139
LZ1KKZ	113,220	261	69	111
LZ1KQZ	18,414	115	37	56
LZ2KSB	3,686	71	10	28

CZECHOSLAVAKIA

OK1KSO	1,511,170	1517	118	315
OK1ALW	1,416,271	1566	114	329
OK3VSZ	920,023	1257	103	288
OK5TLG/P	580,020	1042	80	237
OK1KQJ	428,883	845	79	194
OK1KCI	341,964	860	62	145
OK3RKA	322,958	701	78	185
OK2KMR	261,030	625	70	156
OK1KPU	239,680	675	70	154
OK3KTD	202,608	609	58	143
OK1KUR	166,358	437	67	156
OK1KRY	118,900	515	44	101
OK1KPZ	70,752	401	34	100
OK1KYS	48,910	139	61	85
OK2KOD	44,541	383	19	82
OK1KTW	31,650	127	30	45
OK2KPS	24,219	151	27	54
OK10FK	7,729	85	18	41
OK3KAP	5,699	62	17	24
OK1KRO/P	2,496	65	9	27
OK1KCF	1,824	32	14	24

ENGLAND

G4DSE	860,124	1343	85	228
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FRANCE

F6KAW	805,070	1502	78	187
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GERMANY (FRG)

DL9WU	2,033,520	2091	112	332
DL9KF	1,600,159	1557	115	358
DL9PG	1,474,968	1633	108	336
DF9SAR	1,168,557	1482	94	267
DK9FR	869,400	1165	95	250
DL9HN	511,300	1007	86	204

GERMANY (GDR)

DM3QO	1,009,125	1368	105	270
DM3GM	442,980	905	81	195
DM4FM	436,150	888	79	196
DM2DUD	418,462	1112	67	186
DM3PL	105,462	535	41	121
DM5VL	93,930	376	51	155
DM4CN	42,400	316	33	73

HUNGARY

HG5A	2,168,894	2326	119	323
HG9KOB	1,099,593	1502	106	277
HG8U	1,071,656	1351	103	285
HG6KVB	894,204	1346	104	250
HG7KLG	619,458	1314	70	188
HG5KJC	609,708	1081	87	211
HG3KNA	579,150	916	92	205
HG5KFL	519,284	955	81	181
HG5KCC/2	515,440	1077	76	196
HG1KZZ	455,364	1057	69	165
HG7KSV	408,616	749	83	181
HG2KRZ				

CQ World-Wide DX Contest All-Time Phone Records

BY FREDERICK CAPOSSELA, K6SSS

In the records listed below, boldface listings denote world records. Number groups after calls are: year of operation, total score, contacts, zones, and countries. All-band and Multi-Operator records include a band-by-band breakdown of the world leader in each category.

Single Operator/Single Band

WORLD RECORD HOLDERS

1.8	KV4FZ ('76)	37,584	380	11	37
3.5	KV4FZ ('75)	275,319	1,297	23	80
7.0	KX6LA ('77)	405,678	1,523	28	63
14	KV4FZ ('78)	1,520,904	3,890	36	132
21	YU3ZV ('78)	1,212,530	2,975	37	109
28	CW3BR ('78)	1,662,718	4,028	35	104

AFRICA

1.8	No Entrant				
3.5	EA8CR ('76)	200,850	657	20	83
7.0	EA8CR ('74)	253,528	639	31	103
14	CR6WW ('74)	1,058,446	2,152	35	132
21	EA8JJ ('77)	766,125	1,900	31	104
28	ZS6BNZ ('78)	855,260	2,049	35	105

ASIA

1.8	4X4UR ('74)	1,188	35	3	9
3.5	VE3MR/4X ('71)	197,106	742	22	69
7.0	VE3MR/4X ('72)	215,840	643	27	88
14	VE3BWK/4U ('78)	1,061,634	2,532	39	122
21	4X4UH ('78)	738,315	1,907	33	102
28	4X4JU ('69)	570,836	1,522	34	99

EUROPE

1.8	PA0HIP ('74)	5,200	249	4	16
3.5	13MAU ('75)	113,535	778	18	69
7	I3MAU ('78)	240,108	1,060	24	78
14	OH2BH ('75)	981,815	2,098	37	142
21	YU3ZV ('78)	1,212,530	2,975	37	109
28	DK5WL ('78)	1,000,368	2,480	36	108

NORTH AMERICA

1.8	KV4FZ ('76)	37,584	380	11	37
3.5	KV4FZ ('75)	275,319	1,297	23	80
7.0	HR1RF ('72)	399,542	1,349	28	93
14	KV4FZ ('78)	1,520,904	3,890	36	132
21	VE3BMV ('78)	913,556	2,273	35	123
28	KP4DSD ('78)	650,650	2,738	28	82

OCEANIA

1.8	KH6CHC ('77)	1,404	36	7	6
3.5	KH6XX ('77)	116,416	606	28	40
7.0	KX6LA ('77)	405,678	1,523	28	63
14	VK6HD ('72)	706,251	1,483	37	132
21	KG6AQY ('70)	749,529	2,353	32	72
28	VR3AH ('78)	1,442,244	3,970	35	89

SOUTH AMERICA

1.8	HK4EB ('76)	3,672	34	4	9
3.5	YV4AGP ('72)	72,666	388	18	48
7.0	CX4CR ('76)	363,110	1,125	30	80
14	FY7AK ('76)	1,415,329	2,950	36	127
	(Opr. F5QQ)				
21	CW4CR ('70)	1,196,085	2,462	39	126
28	CW3BR ('78)	1,662,718	4,028	35	104

Single Operator/All Band

AF	EA0CR ('78)	7,639,624	4,876	130	396
AS	XU1DX ('74)	2,607,750	2,711	133	342
EU	OH2MM ('78)	3,649,556	3,213	110	318
NA	KV4FZ ('70)	4,961,551	4,362	128	369
O	KH6RS ('72)	5,331,072	4,739	128	256
	(Opr. K2SIL)				
SA	9Y4VT ('78)	8,281,800	6,194	118	332
	(Opr. N6AA)				

WORLD RECORD

Station	Band	Contacts	Zones	Countries
9Y4VT	1.8	31	5	6
Opr.	3.5	247	12	25
N6AA	7.0	436	18	60
(1978)	14	1986	27	78
8,281,800	21	1363	27	76
	28	2131	29	87
Total		4,876	130	396

Multi-Operator/Single Xmtr.

AF	9LICA ('78)	7,367,846	5,393	118	340
AS	RF6F ('78)	7,445,996	4,856	131	411
EU	IZ4VEQ ('78)	7,087,304	4,940	131	401
NA	FM0FC ('77)	6,832,044	5,739	128	380
O	5W1AZ ('77)	5,452,302	5,154	125	241
SA	FY7BC ('78)	8,989,695	6,125	124	371

WORLD RECORD

Station	Band	Contacts	Zones	Countries
	1.8	4	3	4
FY7BC	3.5	187	13	32
(1978)	7.0	402	20	56
8,989,695	14	1922	30	97
	21	1137	27	95
	28	2475	31	89
Total		6,125	124	371

Multi-Operator/Multi-Xmtr.

AF	EA8CR ('77)	21,351,898	10,290	153	544
AS	EX9A ('78)	15,364,080	9,233	164	519
EU	OH5SM ('69)	11,593,925	6,771	153	526
NA	PJ8CO ('78)	15,998,080	12,383	130	430
O	KH6XX ('78)	18,134,798	10,602	161	422
SA	PJ9JR ('78)	29,211,300	14,598	147	528

WORLD RECORD

	Band	Contacts	Zones	Countries
	1.8	37	5	14
PJ9JR	3.5	758	17	62
(1978)	7.0	1226	23	84
29,211,300	14	3918	35	135
	21	4055	35	123
	28	4616	32	111
Total		14,598	147	528

Club record: Frankfort Radio Club ('78) 107,990,050

CQ World-Wide DX Contest All-Time C.W. Records

Single Operator/Single Band

WORLD RECORD HOLDERS

1.8	KV4FZ ('76)	42,800	390	13	37
3.5	CT3/OH1TV ('77)	223,364	1,066	19	57
7.0	KP4AST ('73) (Opr. WA4PXP)	447,421	1,479	32	95
14	CX4CR ('75) (Opr. CX9BT)	935,025	2,303	34	103
21	LU8DQ ('78)	1,011,220	2,611	34	106
28	CX1AAC ('70)	681,636	1,711	36	93

AFRICA

1.8	EA8CR ('76)	7,696	100	8	18
3.5	CT3OH1TV ('77)	223,364	1,066	19	57
7.0	5A1TW ('64)	227,814	918	22	64
14	CR6IK ('74)	925,386	2,021	38	116
21	TJ1AW ('70)	549,888	1,447	35	93
28	CR6IK ('69)	498,800	1,439	36	80

ASIA

1.8	4X4NJ ('74)	4,818	76	6	16
3.5	UI8LAG ('78)	110,552	606	16	57
7.0	4X4FA ('64)	174,505	781	25	60
14	UA9DN ('76)	344,520	1,176	26	82
21	JA2VUP ('78)	273,312	917	33	71
28	4X4UH ('78)	308,485	1,257	29	74

EUROPE

1.8	PA0HIP ('77)	17,346	297	12	30
3.5	DK3GI ('77)	165,216	967	23	73
7.0	UA6LO ('77)	269,654	1,167	32	87
14	OH8OS ('77) (Opr. OH2BH)	625,812	1,961	34	87
21	YU3ZV ('78)	493,816	1,412	34	102
28	DL4AAP ('57)	253,680	728	36	84

NORTH AMERICA

1.8	KV4FZ ('76)	42,800	390	13	37
6.5	KV4FZ ('75)	190,082	789	24	77
7.0	KP4AST ('73) (Opr. WA4PXP)	447,421	1,479	32	95
14	KV4FZ ('70)	908,514	2,315	36	117
21	N6CW ('78)	302,211	852	32	91
28	HI8MOG ('78)	298,540	1,394	24	68

OCEANIA

1.8	VR3AH ('78)	20,310	238	12	18
3.5	VR3AH ('76)	178,560	956	24	40
7.0	AH6Z ('78)	387,750	1,382	30	64
14	VK6HD ('75)	469,320	1,325	32	8
21	KH6XX ('78)	816,102	2,311	38	81
28	VK8UG ('67)	320,008	1,048	32	72

SOUTH AMERICA

1.8	YV1OB ('77)	14,220	192	9	21
3.5	N4JI/HC1 ('77)	77,748	463	21	36
7.0	CV4DL ('75) (Opr. CX1BBL)	230,040	1,020	24	57
14	CX4CR ('75)	935,025	2,303	34	103
21	LU8DQ ('78)	1,011,220	2,611	34	106
28	CX1AAC ('70)	681,636	1,711	36	93

Single Operator/All Band

AF	CT3BZ ('78)	5,135,104	4,256	105	311
AS	UV9AX ('78)	1,966,670	1,722	110	276
EU	CT4AT ('76) (Opr. WA3HRV)	2,809,421	2,881	97	312
NA	KP4RF ('78) (Opr. N6CJ)	4,908,186	3,797	135	379
O	KH6RS ('72) (Opr. W6MAR)	2,748,307	2,990	121	190
SA	9Y4VT ('77) (Opr. N6AA)	4,697,304	3,992	122	275

WORLD RECORD

	Band	Contacts	Zones	Countries
	1.8	0	0	0
CT3BZ	3.5	274	14	41
(1978)	7.0	526	16	49
5,135,104	14	856	28	84
	21	810	24	64
	28	1,790	23	73
	Total	4,256	105	311

Multi-Operator/Single Xmtr

AF	ZD8W ('76)	3,652,143	3,385	103	260
AS	4L6M ('77)	6,095,824	4,058	128	390
EU	GU4DAA ('77)	2,842,776	3,175	111	317
NA	HH2CQ ('78)	5,256,194	4,696	133	369
O	5W1AZ ('76)	2,534,416	3,043	108	176
SA	FY7AK ('75)	4,197,364	3,670	98	288

WORLD RECORD

	Band	Contacts	Zones	Countries
	1.8	—	—	—
	3.5	465	18	58
4L6M	7.0	694	20	67
(1977)	14	1,512	31	85
6,095,824	21	1,070	35	110
	28	317	24	70
	Total	4,058	128	390

Multi-Operator/Multi Xmtr


AF	EA8CR ('78)	17,734,970	9,799	142	463
AS	EX9A ('78)	8,721,019	6,882	137	384
EU	YU1BCD ('78)	4,786,875	3,883	142	433
NA	HK0COP ('78)	8,141,975	7,503	129	346
O	KS6ER ('73)	1,415,650	2,136	102	123
SA	PJ0FC ('70)	11,586,428	7,080	150	401

WORLD RECORD

Station	Band	Contacts	Zones	Countries
EA8CR	1.8	123	9	31
(1978)	3.5	564	13	54
17,734,970	7.0	1,039	19	64
	14	2,997	36	112
	21	2,693	34	109
	28	2,383	31	93
	Total	9,799	142	463

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AT-120 and AT-180

**Antenna Tuners recommended
for TS-120S and TS-180S
All Solid-State HF Transceivers.**

Why is the use of an antenna tuner so much more important with the TS-120S and TS-180S all solid-state HF rigs than with transceivers having tube-type final amplifiers?

Tube-type final amplifiers generally handle a broader range of load impedance than a transistor final. However, RF power into the antenna system will decrease with an increasing impedance mismatch, and tube life may even be shortened if the mismatch is extreme. Transistor final amplifiers, on the other hand, require a 50-ohm nonreactive load for efficient power transfer and are not very tolerant of high SWR. Therefore, protection circuits are used in the TS-120S and TS-180S to reduce RF power output significantly under high-SWR conditions, thus preventing damage to the solid-state devices.

In the TS-120S, an SWR detection circuit detects reflected-wave voltage, which is then amplified and applied to the ALC circuit as a protective voltage to control power output. Thus, as SWR increases, RF power output decreases continuously.

In the TS-180S, the final amplifier functions normally up to an SWR of 3:1, at which point the protection circuit drops RF power output significantly.

Using an antenna tuner such as the AT-120 to match the TS-120S or the AT-180 to match the TS-180S will lower the reflected power at the transceiver to avoid detection by the protection circuit, thus enabling the transceivers to produce full RF power output and even with rigs which have tube final amplifiers, we recommend an antenna tuner (such as the AT-200 to match the TS-520 or TS-820 Series) for optimum coupling to antennas with high SWRs.

A major advantage of using an all solid-state rig such as the TS-120S or TS-180S is the elimination of final-amplifier tuning and loading. It's great to be able to switch bands, dial up any frequency, and transmit immediately, especially when operating mobile or in a contest or chasing DX. Isn't this advantage lost if an antenna tuner has to be used?

We recommend using an antenna that has a low SWR (below 1.5:1) and that presents a proper impedance match (50-ohms) to the transceiver. Then the full advantages of using an all solid-state rig can be realized. Furthermore, the antenna will be more efficient, and power will not be reflected back to an antenna tuner.

However, many antennas are not broad enough to cover an entire band, and may have an SWR below 1.5:1 in just a portion of the band. The antenna may be cut for resonance in the middle of the portion of the band that is mostly used. When operating outside this portion, where SWR exceeds 1.5:1, the antenna tuner should be switched in.



AT-120



AT-180

Therefore, with a well-designed antenna, the antenna tuner may be switched out for most operating, and the full advantage of using a no-tune all solid-state rig may be realized. But for those occasions when operating in the band portions where the antenna is not resonant and reactance increases or when, for some reason, the antenna develops a high SWR or a poorly matched antenna is used, the antenna tuner should be switched in to obtain full RF power output.

During those occasions when the antenna tuner is needed with an all solid-state rig, it would probably be advantageous with a tube-type rig also for optimum power transfer to the antenna system. With a tube-type final, plate tuning and loading adjustments would be required in addition to adjusting the antenna tuner. With an all solid-state transceiver, only the antenna tuner would need adjusting during those occasions when it is required.

What are the primary features of the AT-120 and AT-180 antenna tuners?

The AT-120 antenna tuner is very compact (only 6 inches wide, 2-3/8 inches high and 6-1/4 inches deep) - perfect for mobile mounting with the mounting bracket provided - and operates on 80 through 10 meters. It consists of an antenna coupler and an SWR meter (which can be illuminated). Although much smaller, it complements the appearance of the TS-120S.

The bandswitch has a "THROUGH" position for switching the AT-120 out of the circuit. Input impedance (to the transceiver) is 50-ohms and output impedance (to the antenna system) covers 20 to 300 ohms, unbalanced. It handles 150 watts (120 watts on 80 meters). The SWR meter measures from 1.0:1 to 10.0:1.

The AT-180 antenna tuner matches the TS-180S (same height) and consists of a through-line watt and SWR meter, antenna selector switch, and, of course, an antenna coupler.

It operates on 160 through 10 meters, with a 50-ohm input impedance and an output impedance of 10 to 500 ohms (10 to 400 ohms on 160 meters), unbalanced. Switches allow up to 20 or 200 watts of forward or reflected power to be measured. (It is not intended for use at the output of a linear amplifier.) UHF-type connectors are provided for the input, two antenna outputs, and a dummy load, and a standoff connector is provided for a wire feedline.

With both tuners, the "R TUNE" (for resistance component) and "X TUNE" (for reactance component) controls are adjusted alternately with a CW carrier applied until minimum SWR or reflected power is obtained.



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CQ World-Wide DX Contest

All-Time U.S.A. Records

BY FREDERICK CAPOSSELA, K6SSS

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

PHONE

Single Operator/Single Band

1.8	K1PBW ('76)	7,280	100	10	30
3.5	W1CF ('78)	114,227	435	23	80
7.0	W3PHL ('75)	110,799	337	29	88
14	W4AXE ('70) (Opr. WA4PXP)	595,725	1068	39	156
21	WA6ELK ('78)	635,830	1622	35	95
28	K6OQ ('78)	527,560	1579	31	90

Single Operator/All Band

	Band	QSOs	Zones	Countries
W4DR	1.8	6	5	4
Opr.	3.5	67	15	39
WA8ZDT	7.0	96	18	58
(1978)	14	509	33	103
2,727,108	21	490	29	85
	28	674	27	97
Total		1,842	127	386

Multi-Operator/Single Xmtr

	Band	QSOs	Zones	Countries
	1.8	7	5	5
	3.5	39	15	37
K5GA	7.0	173	21	64
(1978)	14	549	39	125
4,150,306	21	619	35	103
	28	1057	33	111
Total		2,444	148	445

Multi-Operator/Multi-Xmtr

	Band	QSOs	Zones	Countries
	1.8	44	8	17
	3.5	390	21	67
N2AA	7.0	278	23	73
(1978)	14	1160	39	140
8,940,909	21	1366	33	128
	28	1292	33	118
Total		4,530	156	543

CW

Single Operator/Single Band

1.8	K1PBW ('76)	22,626	157	15	39
3.5	W1MX ('76) (Opr. WA8WNU)	108,288	403	21	75
7.0	W5WZQ ('76)	322,383	907	33	90
14	W6VPH ('78)	468,312	1105	36	116
21	N6CW ('78)	302,211	852	32	91
28	K1JGD ('68)	158,510	520	28	82

Single Operator/All Band

	Band	QSOs	Zones	Countries
	1.8	9	9	8
	3.5	54	16	36
W3RJ	7.0	210	22	65
(1978)	14	516	34	88
2,186,948	21	371	28	76
	28	420	28	83
Total		1580	137	356

Multi-Operator/Single Xmtr

	Band	QSOs	Zones	Countries
	1.8	18	10	15
	3.5	82	19	53
N3RS	7.0	387	27	79
(1978)	14	428	34	90
2,887,920	21	554	31	91
	28	333	28	83
Total		1802	149	411

Multi-Operator/Multi-Xmtr

	Band	QSOs	Zones	Countries
	1.8	14	4	5
	3.5	173	25	56
W4BVV	7.0	665	33	86
(1970)	14	810	38	122
5,552,362	21	909	37	107
	28	485	31	80
Total		3056	168	456

Club Record: Frankfort Radio Club ('78) 107,990,050

CRANIUM QUERIES



CQ NOSTALGIA QUIZ

Here's a chance to test your knowledge about the pioneers who've helped build amateur radio by producing all those great radios and accessories down through the years. Each question is worth 10 points. A score of 50-60 is pretty good. 70-80 is excellent, while 90 is outstanding. If you get a perfect score, you're a ham radio nostalgia expert.

1. This old-time antenna manufacturer started out as a prize fighter before going into his own business. He invented the conical tv antenna and holds many patents for unique antenna designs. His name is

- a) Andy Andros b) Carl Mosely c) Mike Ercolino d) Les Cushman

2. During the early days of single sideband, all four of these manufacturers built ssb transmitters; but only one built receivers. Score five points for the correct name, and another five if you can name the company he headed.

- a) Wes Schum b) Barry Barker c) Don Merten d) Bill Halligan

3. Well known as an author of many fine books on amateur radio, this man also wrote many great articles in CQ over the years. At the present time he's an executive with Eimac. We're talking about

- a) Marvin Tepper b) Bill Scherer c) Bill Orr d) John Schultz

4. Back in the fifties, when ssb was coming into its own, there were several companies that made separate receivers and exciters, but one stands out as the pioneer of the ssb transceiver. That company was

- a) Hallicrafters b) Hammarlund c) Comos Industries d) E.F. Johnson

5. This former CQ technical editor passed away just a year ago. Over the years he contributed a wealth of great writing for amateurs, and is probably best known for developing the grid dip meter. We refer to, of course

- a) Bill Orr b) Larry LeKashman c) Bill Scherer d) Jim Millen

6. He started out as advertising manager for a small New England distributing company that stocked a fine line of ham equipment. Today he's president of one of the largest companies in the electronic industry. Naturally, this has to be

- a) Edgar F. Johnson b) Louis Kornfeldt c) Ed Clegg d) Lloyd Hammarlund

7. Most old timers will recall that the first CB radios were advertised in amateur magazines because the manufacturers were also producers of ham gears. All of these companies produced both ham and CB gear except one. Can you name the exception?

- a) International Crystal b) Gonset c) Globe Electronics d) Vocaline

8. Today all the ham magazines are loaded with full color ads, but that wasn't always the case. Back in the middle fifties, one major equipment manufacturer ran the first full color

ad ever to appear in a ham publication. That company was

- a) National Radio b) E.F. Johnson c) Collins Radio d) Hallicrafters

9. Most hams readily recognize this old timer as a major producer of amateur antennas. But he's also well known as a superb amateur magician. Can you name him?

- a) Leo Myerson b) Andy Andros c) Carl Mosely d) Les Cushman

10. Here are five old-time radio companies, and the names of the founders of those firms. All you have to do is match up the right name with the company. Score 2 points for each correct match

- | | |
|------------------------|------------------|
| 1. Hallicrafters | a) Don Merten |
| 2. National Radio | b) Leo Meyerson |
| 3. Eldico | c) Jim Millen |
| 4. Globe Electronics | d) Wes Schum |
| 5. Central Electronics | e) Bill Halligan |

Answers for Nostalgia Quiz DON'T PEEK

10. 1. e; 2. c; 3. a; 4. b; 5. d. prestidigitator feats.
 9. Take a big 10 points if you selected Carl Mosely. Carl has entertained tens of thousands of amateurs at countless hamfests with his Johnson ad ran a bit earlier.
 8. This was a close toss-up between b) E.F. Johnson and c) Collins Radio, as both companies ran full color ad inserts in CQ as far back as 1957. But the right answer is b, because the Johnson ad ran a bit earlier.
 7. Since Vocaline never made amateur products, take a big plus if you chose d.
 6. We hope you selected Lou Kornfeldt, who happens to be president of Radio Shack. Lou started out with the Shack many years ago, working as ad manager for the Deutschman brothers.
 5. This one should have been easy. c) Bill Scherer is a name known to all old timer hams. But we did get a little tricky here, because Larry LeKashman was CQ's first editor and Jim Millen did manufacturer the grid dip meter under a licensing arrangement with Bill.

1. c) Mike Ercolino of Telrex is the correct answer. Both Carl Mosely and Les Cushman are obviously the founders of Mosely and Cushman, while Andy Andros started the Hy-Gain antenna line.
 2. If you chose Bill Halligan of Hallicrafters, score up a correct answer. Wes Schum's company was Central Electronics (remember the great old 200-v?), while Don Merten founded Eldico. Barry Barker, of course, was the president of Barker and Williamson.
 3. The answer here is c) Bill Orr.
 4. Unless you selected Cosmos Industries, take a big fat zero for this one.
 5. This one should have been easy. c) Bill Scherer is a name known to all old timer hams. But we did get a little tricky here, because Larry LeKashman was CQ's first editor and Jim Millen did manufacturer the grid dip

Here's another piece of test equipment you can build over a weekend. Add this one to your test bench soon!

A Wide Range Combined Crystal/Transistor Tester

BY JOHN J. SCHULTZ*, W4FA

The small test instrument described in this article was built to test a wide range of transistors and crystals. It can be built as a small self contained unit or it can be built as an accessory to work with an oscilloscope or a receiver. The cost is minimal but it will test almost all commonly used transistors - bipolars (NPN or PNP), single gate junction type FET's and dual-gate MOSFET's. It will also indicate crystal activity for any fundamental mode crystal from 100 kHz to at least 20 MHz.

The circuitry used actually places

the transistor into oscillation so a relative dynamic readout of the transistor's amplification ability can be obtained. This provides far better results than simple transistor testers which measure only the d.c. current gain of a transistor. Such testers can indicate that the transistor is basically functioning but they do not provide any means to evaluate transistors or compare transistors that will actually operate at some r.f. frequency. It could well be that a transistor which checks "good" in such a d.c. tester will not operate at a desired r.f. frequency. The test instrument described does allow one to compare different transistors at r.f. frequencies. One can use it, for instance, to sort out batches of bargain transistors, to find the most active ones for an intended r.f. use. Although the test instrument will probably have its greatest application for r.f. type transistors, it will function to check a wide variety of audio transistors also using a low frequency crystal in the circuit. Many audio transistors will readily oscillate at low r.f. frequencies except for some germanium types having very low cut-off frequencies.

The test instrument makes use of the crystal-controlled oscillator circuit for bipolar transistors shown in fig. 1(A) and the crystal-controlled oscillator circuit for field effect transistors shown in fig. 1(B). A dual gate MOSFET is shown in fig. 1(B) but note that the same circuit is applicable if only a single gate FET is used. The connection for G2 is then simply redundant. Both oscillator circuits are quite simple in that the crystal itself forms the feedback network from the output to the input of the semiconductor device under test. The

circuit of fig. 1(A) uses switched capacitors to control the feedback in the circuit to allow testing a wide range of crystals of different frequencies.

The circuits of fig. 1(A) and 1(B) are combined and practically realized as shown in fig. 2. This figure has been drawn in such a manner that one can use it as a guide in constructing the actual circuit using simple point-to-point wiring. The switching used has been held to a minimum in order to

*c/o CQ

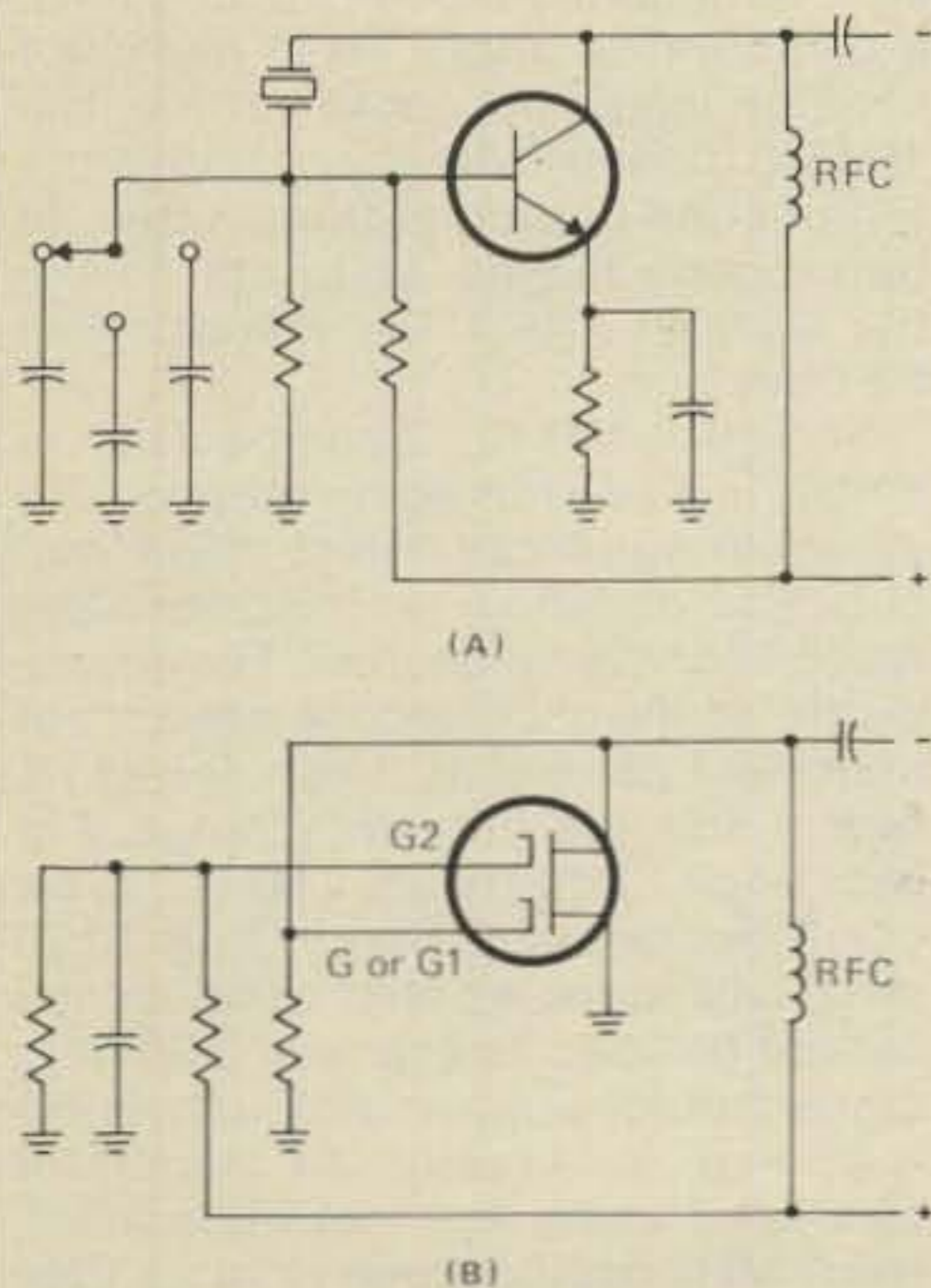
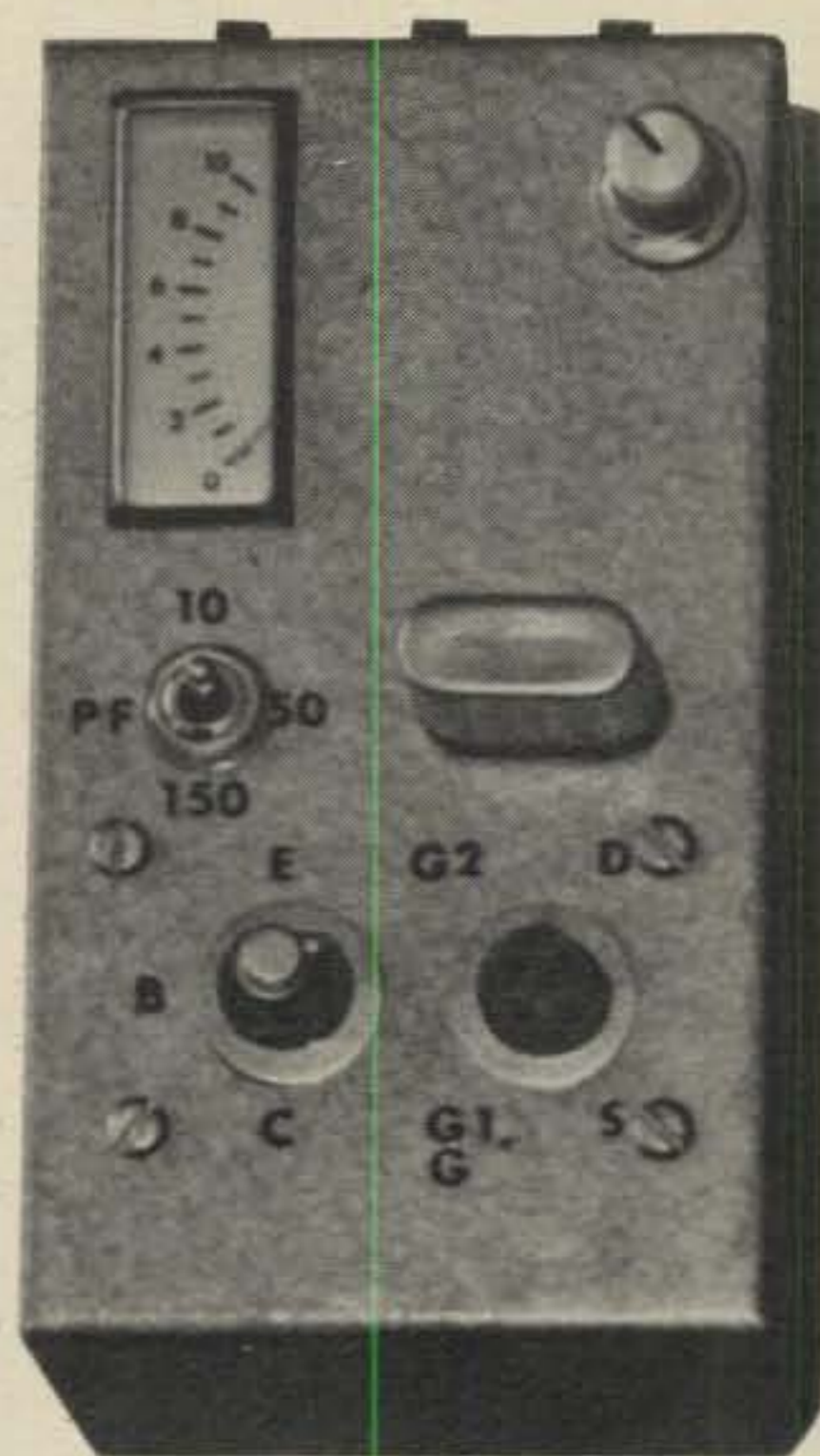
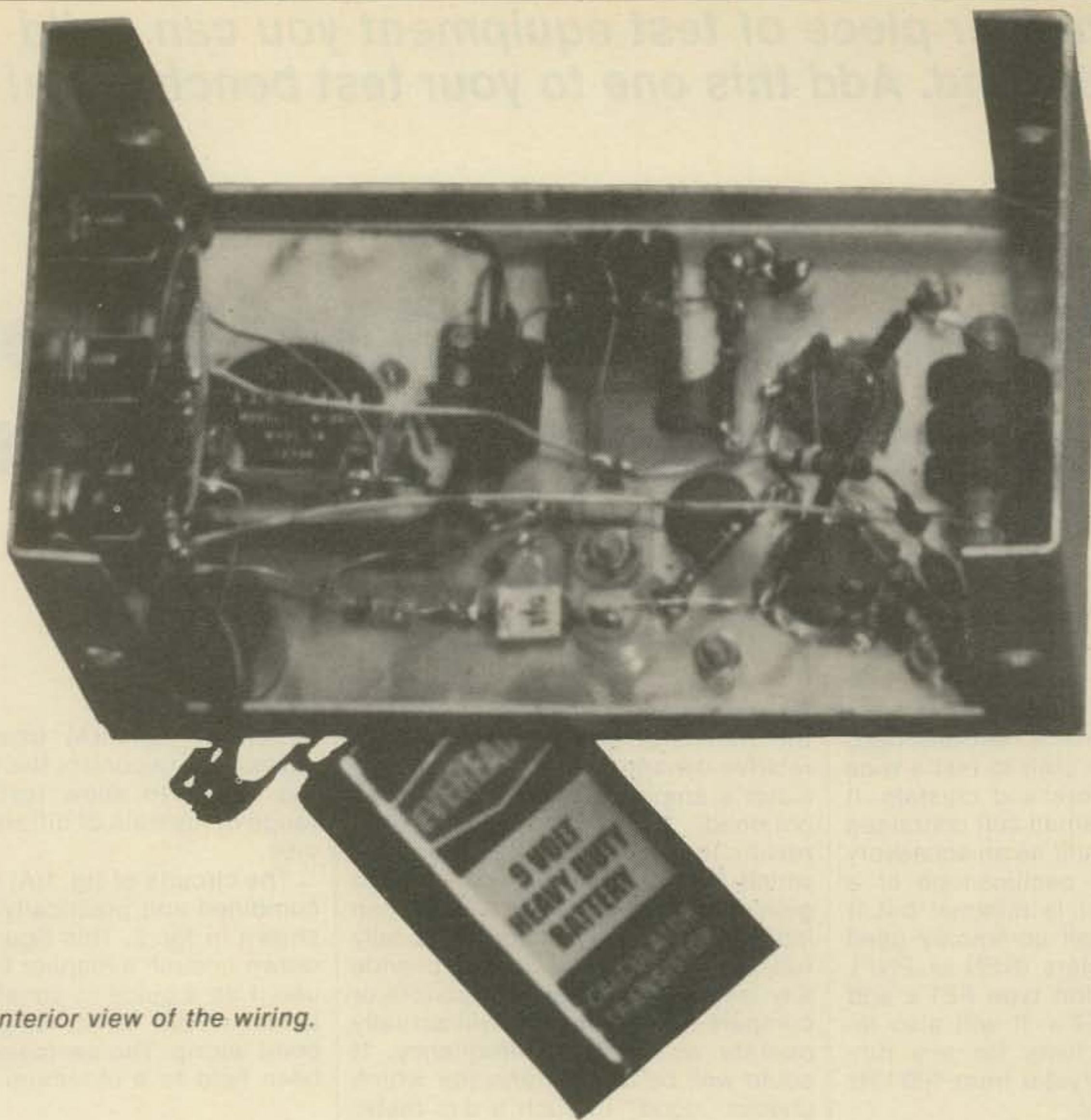


Fig. 1 - Two basic oscillator circuits for either bipolar transistors (A) or field-effect transistors (B).



This photo shows one possible arrangement of the test sockets, controls, etc., in a small aluminum snap-box.



An interior view of the wiring.

simplify construction. One switch is used to reverse the battery polarity for the testing of P or N junction devices. The other switch controls the selection of the feedback

capacitors as explained previously. Actually this latter switch is not absolutely necessary unless one wants to test low frequency crystals (100 to 500 kHz) or use the instrument

as a test oscillator in this range. For 90% of general purpose applications, a compromise single fixed capacitor of 22 pF would appear to suffice. The 1N4148 diode allows the base to emitter junction of bipolar transmitters to be properly biased while not having the voltage affect the operation of FET devices.

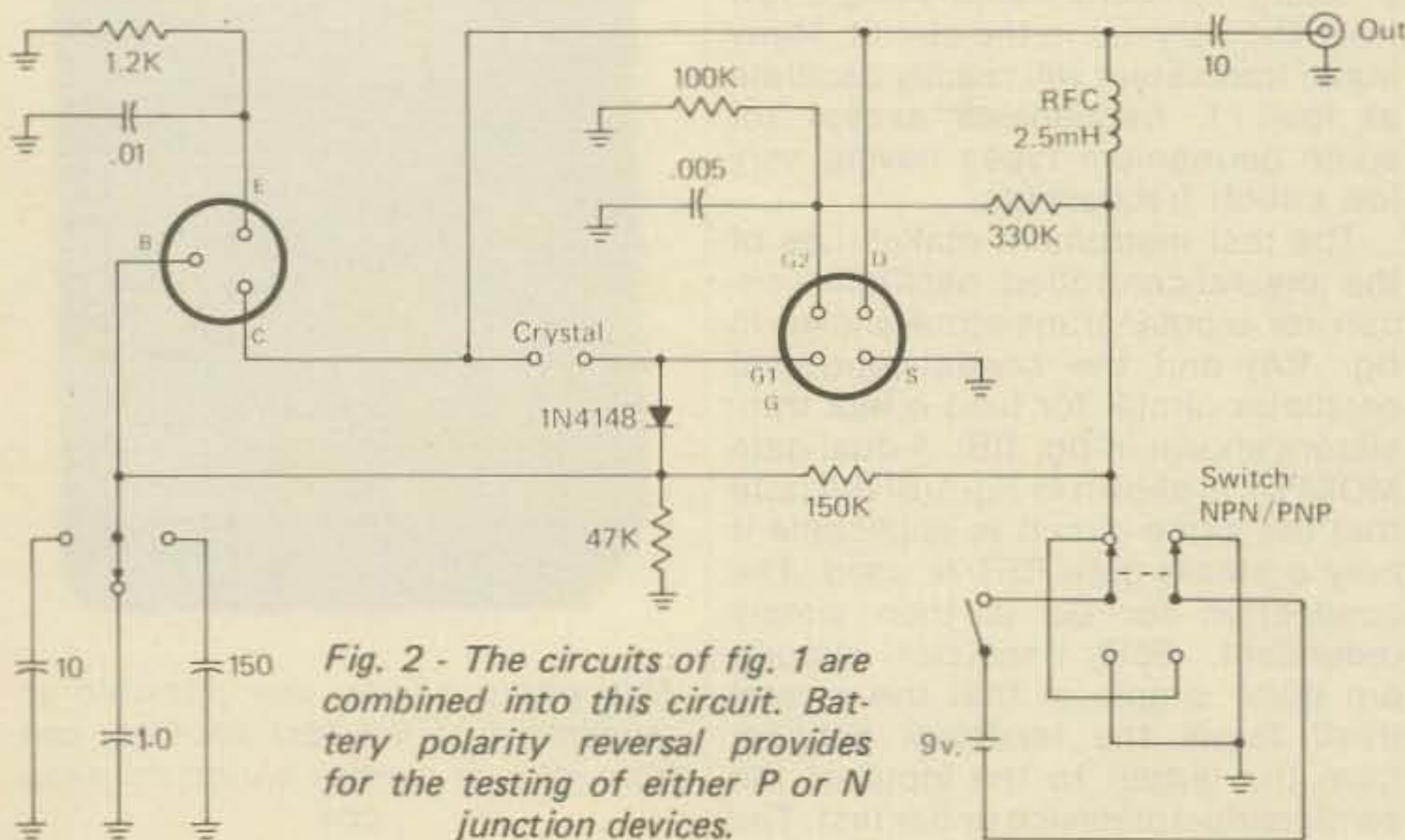
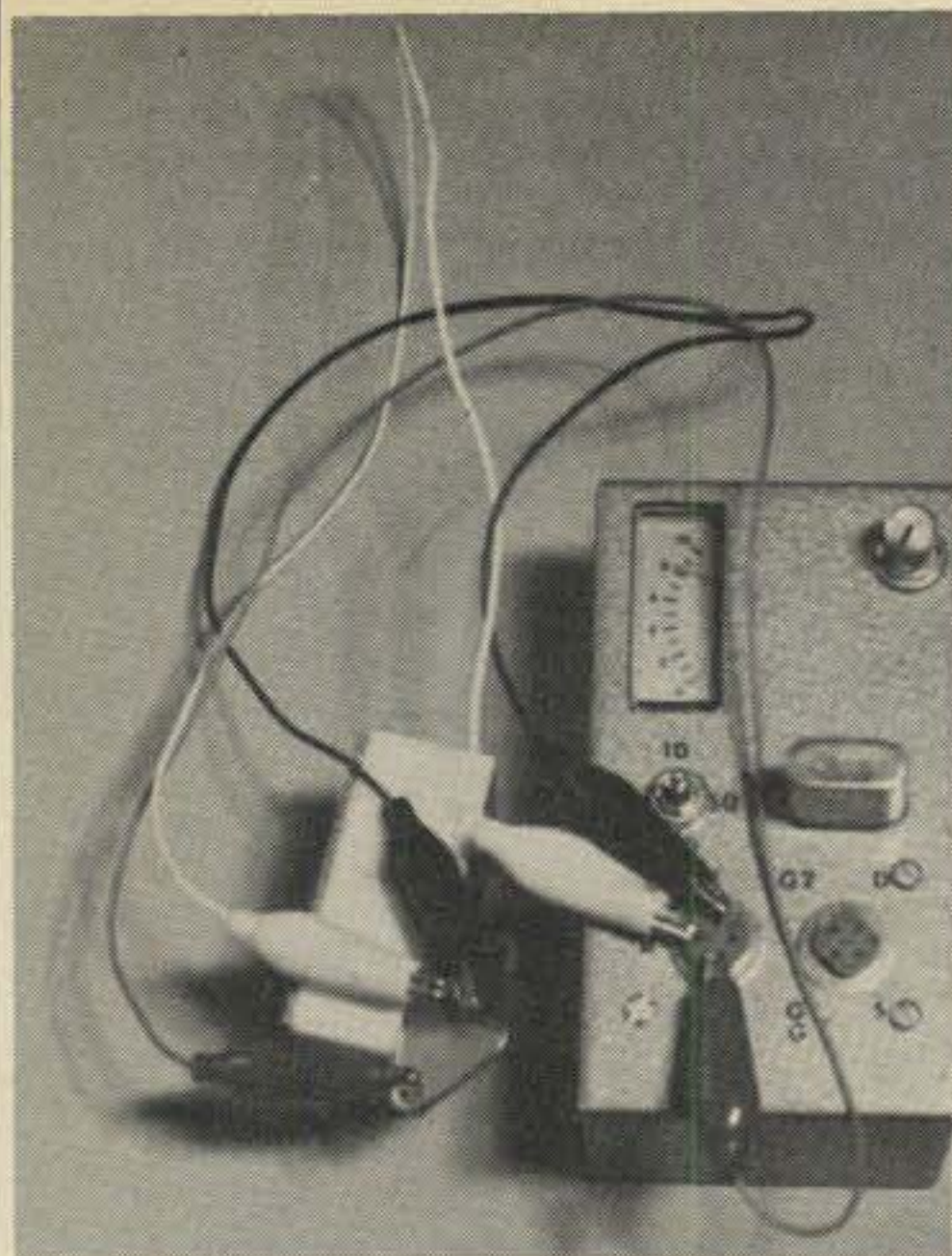


Fig. 2 - The circuits of fig. 1 are combined into this circuit. Battery polarity reversal provides for the testing of either P or N junction devices.

The circuit of fig. 2 can be used as it stands if one has some other device available which can detect the r.f. output. For instance, an oscilloscope, receiver or even a counter. The "bandwidth" of the oscilloscope used is not important as long as it can detect r.f. over a suitable frequency range. For instance, many 5 MHz type oscilloscopes can detect r.f. up to 20 MHz. Of course, a 5 MHz oscilloscope cannot be used to evaluate a 20 MHz signal but for purposes of just checking that a crystal or transistor oscillates using the test instrument, the 5 MHz oscilloscope is more than adequate. This approach using some sort of external r.f. detector will probably be found satisfactory if one only has a need for occasional crystal



The testing of larger audio type transistors can be done by using test leads. In some cases, the in-circuit testing of transistors using clip leads will also work.

or transistor checks. However, if one desired a completely portable and self contained instrument, one can add the circuit of fig. 3 to that of fig. 2. In fig. 3, the diodes are used to rectify the r.f. signal and then the resultant voltage is amplified by the FET. The FET amplifier allows a relatively inexpensive meter of the 250 microampere to 5 mA variety to be used. These meters can be found quite inexpensively as surplus items from hi-fi receivers, tape recorders, etc. In the

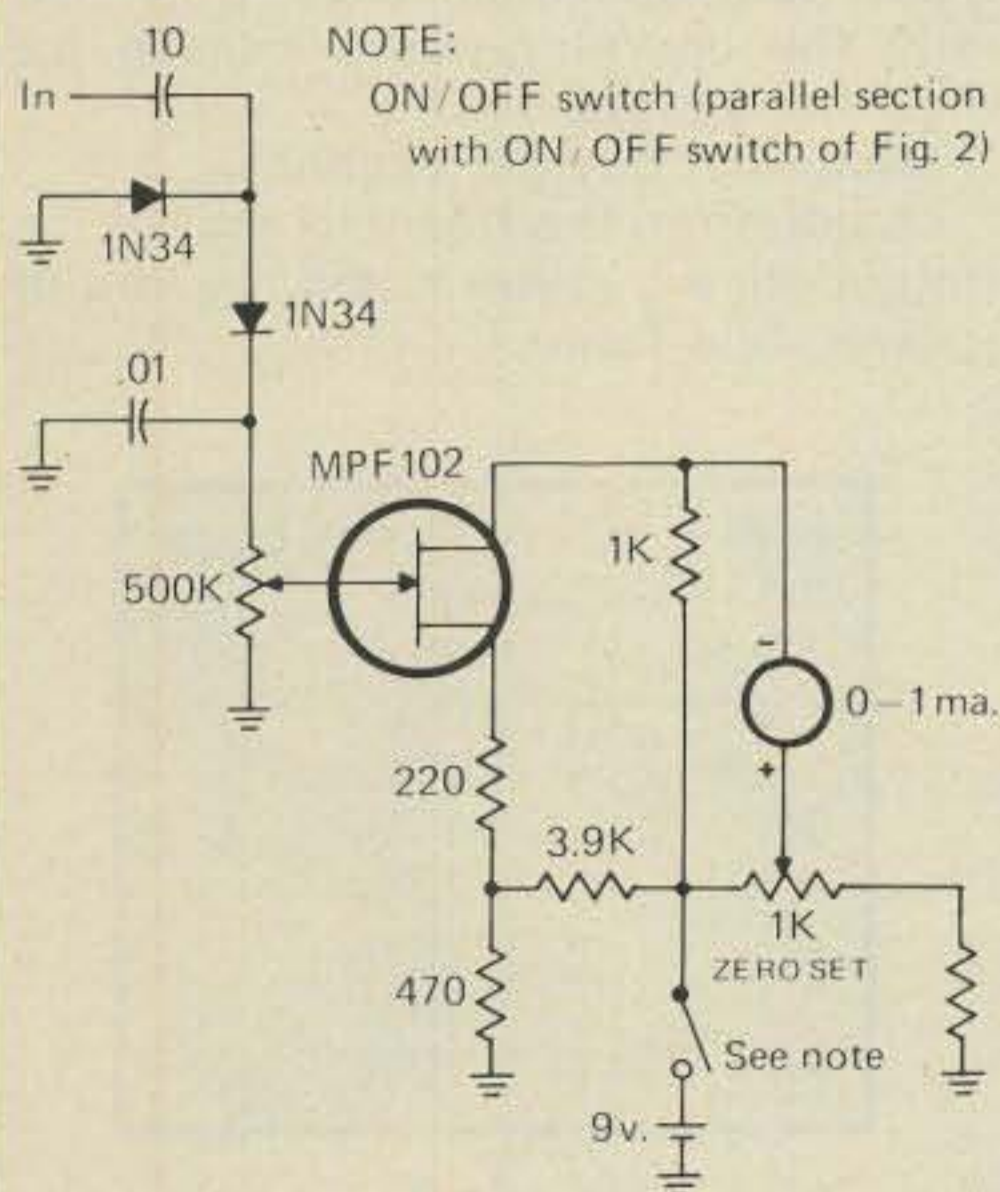


Fig. 3 - R.f. rectifier and meter amplifier circuit. The amplifier circuit will turn a 0 - 1 mA meter into the equivalent of a 0 - 2 microammeter. Zero set control is set for meter zeroing with no input signal.

case of a meter having a 1 milliampere movement, the FET amplifier circuit will turn it into the equivalent of a 2 microampere movement. So, even crystals or semi-conductors which oscillate very weakly can be readily detected. The circuit of fig. 3 is powered by a separate 9 volt transistor radio type battery using a d.p.s.t. switch as an on-off switch for both the circuits of fig. 2 and 3. There is probably some way to utilize a single battery only by keeping some of the components of fig. 3 floating above ground. But, the extra wiring complexity did not seem warranted compared to the price of an extra 9 volt battery.

Construction of the instrument is easily done in a snap-box type of enclosure. The photograph shows how the sockets and controls were arranged. There is nothing at all critical about the construction of the unit as long as lead lengths are kept short. This is particularly true of the components shown in fig. 2 which go directly to the pins on the sockets. The four screws shown (two on either side of each socket) hold ground lugs to which most of the somponents going to the sockets are wired. A standard 3 pin socket is used for the bipolar transistor socket and a 4 pin unit is used for the FET socket. However, any suitable socket, even an IC one, can be used if it is properly labeled. The labeling was done with dry transfer lettering and then the face of the unit was sprayed with clear plastic spray for protective purposes.

In operation, a crystal of about 4 MHz is usually left plugged into the instrument for general purpose testing of a.f. and r.f. transistors. Some a.f. transistors will require lower frequency crystals to oscillate. When testing audio power transistors simple clip leads from the transistor sockets on the instrument to the terminals of the transistor are used. Since the crystals need not be of any specific frequency, any of the low cost odd frequency crystals available from sources such as Jan Crystals will suffice. When checking crystals for activity any transistor which has been checked out to oscillate with a test crystal in the range of the crystal to be checked can be used. A 2N706 or MPF-102 seems to work quite well for general purpose crystal checks.

The unit will also function quite well as a crystal controlled test oscillator when the r.f. output is taken from the output jack in fig. 2. The output level can be considerably increased if a parallel resonant circuit at the approximate crystal frequency is connected across the output terminals.

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CIRCLE 6 ON READER SERVICE CARD

So you think you have a 1:1 s.w.r., right? Well, maybe not. Chuck Elliott explains how to check the accuracy of your s.w.r. bridge.

Calibrating An S.W.R. Bridge

BY CHUCK ELLIOTT*, W8URK

Call me a "Doubting Thomas" if you will, but I won't believe any of my test gear unless it is checked and double-checked.

The easiest way to check most test gear is against a similar instrument of known accuracy. This holds for VOMs, DVMs, oscilloscopes and the like.

Most of us check our test gear before putting it into service.

But have you ever checked your v.s.w.r. bridge?

After all, it's the most widely used piece of test equipment in amateur radio.

*4308 Princeton Rd., Hamilton, OH 45011

Most of us have one around the shack.

And when we put it in line, we tend to believe it, be it a \$75 model from the most reputable manufacturer in the business or a \$15 model marketed for the CB fraternity.

Despite the fact that they are widely used by the folks in our hobby, the v.s.w.r. bridge seems to be a piece of mystical equipment everyone accepts and knows how to use, but a piece of equipment not many people seem to understand.

So, let's go back to basics for just a few seconds.

V.s.w.r. stands for voltage standing wave ratio, but most radio buffs have shortened it to s.w.r., which is the measurement of voltage fed into

the transmission line compared to voltage returned from the antenna because of a mismatch.

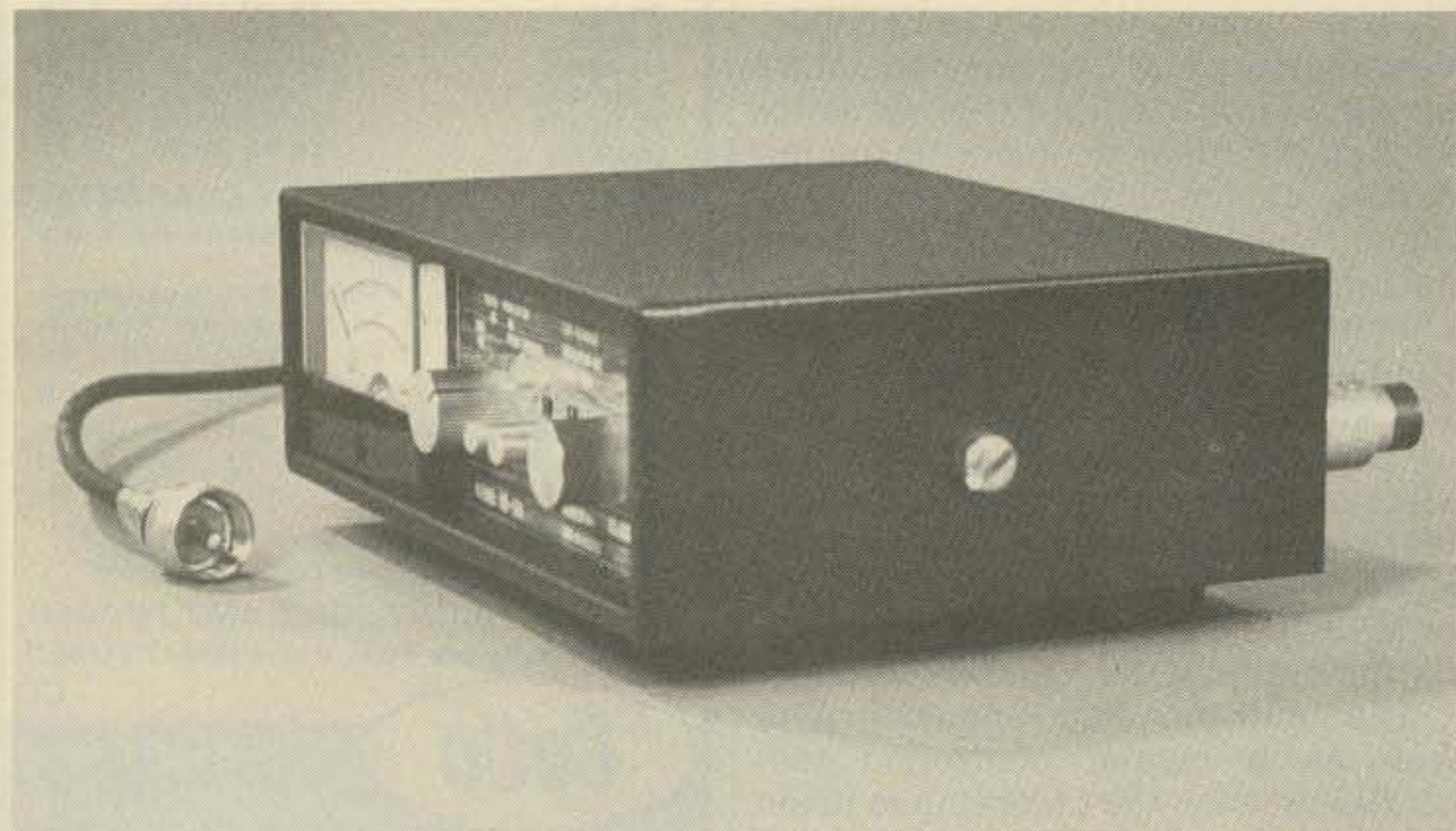
The theory is that if your transmitter is 52 ohms and the antenna is 52 ohms and the transmission line is 52 ohms, the s.w.r. will be a perfect 1:1.

But since nothing is perfect, the 1:1 match is impossible to achieve. Anything less than 1.5:1 is good, but for all practical purposes, an s.w.r. of between 1.5:1 and 2.0:1 is considered acceptable.

Today's radio transmitters are, for the most part, completely transistorized and a bad match between transmitter and antenna can return too much voltage to the finals and *poof*, up goes a small cloud of smoke and the operator starts looking for new transistors.

And, that can get expensive.

Aside from the financial end of the situation, a bad s.w.r. will rob you of power. See Table 1.



This medium priced s.w.r. bridge checked very accurate during tests. The 100-ohm dummy load can be seen at the back of the unit. The two-foot jumper cable connects to the antenna jack on the back of a low-powered amateur transceiver.

S.W.R.	Power Loss
1:1	0%
1.3:1	2%
1.5:1	3%
1.7:1	6%
2:1	11%
3:1	25%
4:1	38%
5:1	48%
10:1	70%

Table 1

So, to save yourself those hard-earned dollars and get the most out of your gear, you can set an s.w.r. bridge

in line between the transmitter and antenna.

But how do you know your s.w.r. bridge is accurate?

It may not be, you know. Just because the instruction sheet that came packed with it said it was accurate to within a certain percentage doesn't mean a thing.

Many amateur radio operators have been going to s.w.r. bridges designed for the CB fraternity because of the lower price. But before you start "bad-mouthing" that "CB junk," read on.

One of the advantages we, as amateur radio hobbyists, have realized from the CB boom, has been decreasing prices of some quality radio gear because of mass production.

Quite frankly, some of that CB gear is as good, and sometimes better, than the stuff we amateurs have been using.

Why?

The reason is simple!

When you are making a product for a hobby field of 300,000 you must (1) make a larger profit per unit to stay out of the red and (2) have a higher cost per unit.

But when you market a product for a hobby field of 13,000,000, you can make a smaller profit per unit to stay in the black and will have a lower cost per unit because of larger volume.

Don't let this large volume stuff fool you. Take it with a grain of salt.

Nine s.w.r. bridges designed for the CB fraternity were tested for this article and seven of the nine units — in the \$15 to \$20 price range from three

manufacturers — were not accurate.

The other two units — by two of the makers of the lower priced units and priced between \$35 and \$50 — check perfect to within five-percent accuracy.

You get what you pay for.

So how do you test an s.w.r. bridge for accuracy? It's simple at low power.

Build yourself a dummy load using the standard PL-259 antenna connector and a 100-ohm, two-watt carbon resistor.

The dummy load will let the s.w.r. bridge see a 2.0:1 mismatch and the meter should read accordingly. If it doesn't you're in trouble, and there's not much you can do because most CB s.w.r. bridges don't have internal adjustments.

If you don't have any low power gear around the shack, borrow a friend's CB rig for the test. Remember, you're not testing the rig or an antenna. You're checking the s.w.r. bridge.

Most of the meters designed for CB work have a working range between three and 30 megahertz, which is fine for the more popular 80 through 10 meter bands.

Building the dummy load is easy and the cost should be in the \$2 neighborhood.

All you need is the PL-259 connector and the 100-ohm, two-watt resistor. Be sure to check your junk box before you buy!

Coil one of the resistor leads so it looks like a small, flat spring. Another description would be to coil it to look



Test loads are easy to make out of two-watt resistors and PL-259 antenna connectors. The load at the left is made with a 100-ohm resistor and lets the s.w.r. bridge "see" a 2.0:1 mismatch. The load at the right is 50-ohms and lets the s.w.r. bridge "see" a 1.0:1 match. It is used for checking low powered transmitters.

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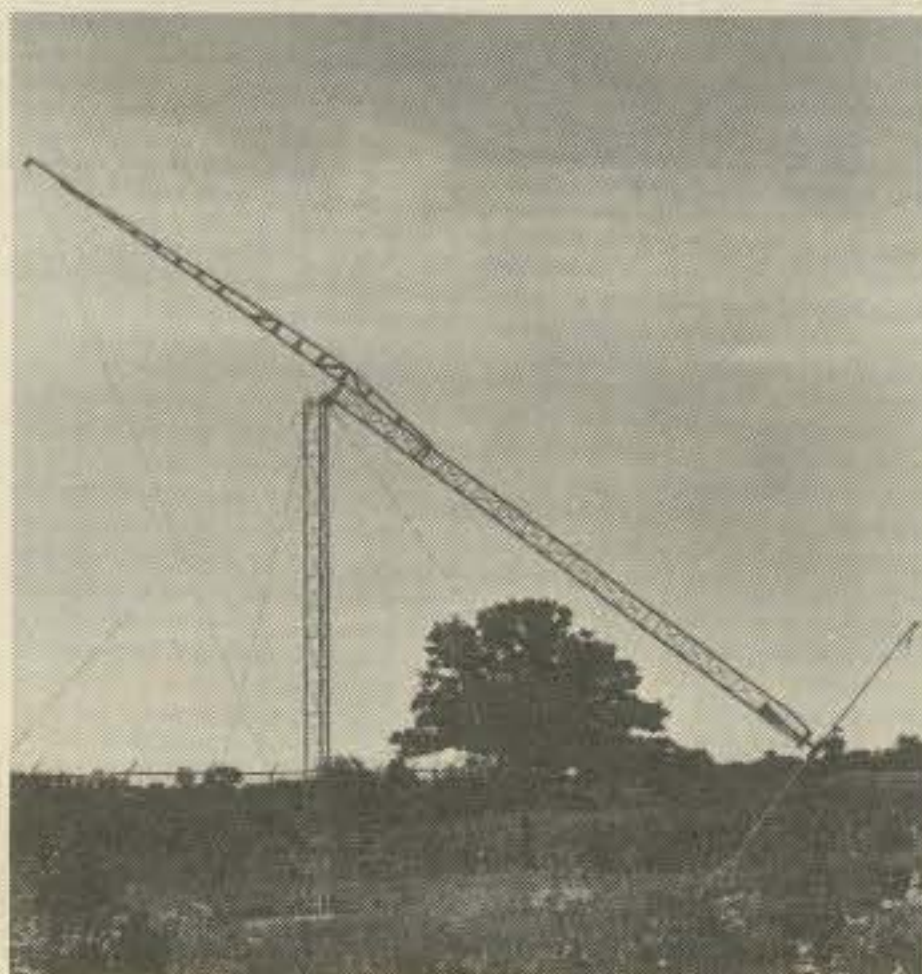
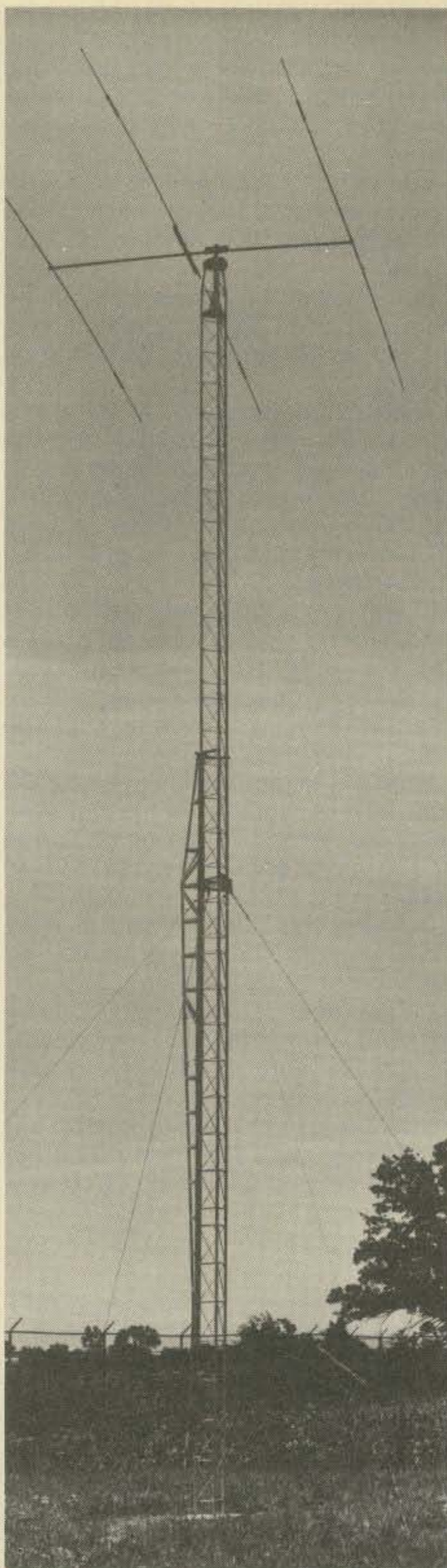
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like one of the burners on your XYL's electric range.

Insert the resistor into the PL-259 so the straight resistor lead goes through the pin end of the connector. Solder it in place.

You should now be able to look into the large opening of the PL-259 and see the wire coil. Stick your soldering iron about an inch above the large opening and drop melted solder until filled.

As an added touch, paint the soldered end red (your XYL's fingernail polish is good for the job).

The paint job is a little added protection because I also have a similar dummy load built with a 52-ohm resistor for a 1.1:1 match when working on my QRPp gear.

When testing an s.w.r. bridge, the 100-ohm dummy load goes into the SO-239 antenna connector. Use a short section of RG-58U (no longer than two-feet) to connect the bridge to the transmitter.

Flip the s.w.r. bridge switch to the *calibrate* position, key the mike or telegraph key, adjust the meter to the "set" position, flip the switch back to the s.w.r. or forward position.

The meter should now read 2.0:1.

If it reads only slightly high or low, you can take this into account when using the bridge.

For example, if with the dummy load, the meter reads 1.8:1, you'll know to add .2 to any reading you get. On the other hand, if your meter reads 2.2:1 with the dummy load, you'll know to subtract .2 from any antenna reading.

One word of caution: remember, you can't get an s.w.r. reading on single sideband; only when a carrier is transmitted.

This is true, of course, unless you're using a tone generator with your s.s.b. rig. And, many amateur rigs produce low power and a tone when tuned to the *tune* position.

When all is said and done, what good is an accurate s.w.r. bridge?


None, really.

If you have a bad match between the transmitter and antenna, an accurate bridge won't improve things.

When you use the meter to adjust an antenna, you really don't need to know how accurate the meter is.

The only thing the bridge is used for is to adjust the antenna for the lowest meter reading. If your match is 2.0:1, who really cares? You still have the antenna adjusted to its lowest possible s.w.r., and you won't be able to get it any lower with an accurate bridge.

So why bother to check the accuracy of the s.w.r. bridge at all?

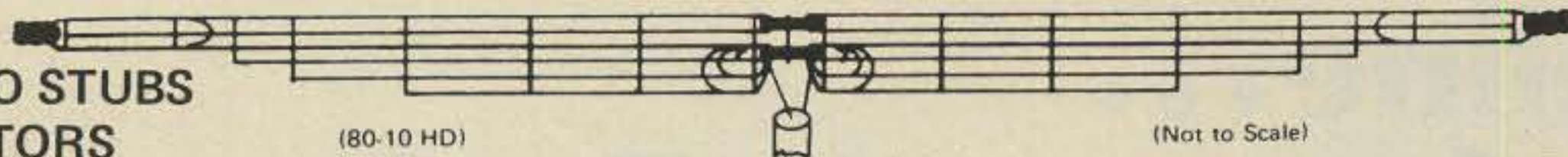
It's a matter of pride, I guess. 

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75-40 HD(SP)	75/40	66	\$68.00
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80-10 HD(NT)	80/40/20/15/10	69	\$98.50
80-10 HD(NT)A	80/40/20/15/10	69	\$103.75
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FCC Braces for Surge in Illegal HF Operations

According to reports published by *CIRCUIT BOARD* (Kap's Kolumn, Jordan Kaplan, W9QKE, in *CIRCUIT BOARD*, journal of the York Radio Club, Elmhurst, Illinois), Japan has recently approved a CB service which will operate in a band consisting of 110 channels. Channel 1 is identical to that in the U.S. CB service, with the highest channels extending to just under the 10 meter Amateur band.

As this is written, several manufacturers in Japan are modifying the phase-lock-loop (PLL) circuits of their transceivers for 110 channel operation. And while the type-acceptance laws in the U.S. will prevent the modified transceivers from being imported into this country, it only seems a matter of time before illegal users of the spectrum above the U.S. CB allocation attempt to work skip into Japan. Such operations, also illegal, will once again serve to bring pressure on the FCC to expand the present 40-channel Citizens band. This, in turn, could result in a threat to the 10 meter band.

As "Kap" states: "Watch this very carefully..."

Radar Communicator Raises Question of Application

A recent advertisement in an electronics journal for a "radar communicator" raises several questions regarding the use of such a device. Manufactured by Microwave Specialists, Inc., Houston, Texas, the advertisement contains certain statements which imply that the "communicator" can be used for more than communications.

*8603 Conover Place, Alexandria, VA 22308

The device is advertised to be "legal, effective, (and) instantaneous," terms which somehow seem more befitting a jammer than a communication device. However, Microwave Specialists is quick to note that "The MS-1 is an amateur radio transmitter designed for communication to radar-frequency receiving devices," and that "Federal Communication Commission regulations require the operator to possess an amateur license of technician class or higher."

The company is equally quick to note that "Purchase of the MS-1 is unrestricted."

Should the above devices prove popular with the non-Amateur community, the Amateur service will undoubtedly face restrictions on its use of the affected band, and will probably incur type-acceptance restrictions relating to the design and construction of equipment for this band.

As a final note, any doubts about the use of the "radar communicator" will be dispelled by an examination of its front panel. The device has a control which is calibrated in miles per hour (MPH), with numerical values ranging from 18 to 81 MPH.

ARRL Testifies Before Senate and House of Representatives

Using testimony prepared by Mr. Harold Steinman, K1FHN (Washington Area Coordinator) and Robert M. Booth, Jr., Esq., W3PS (General Counsel), Mr. Booth recently testified before the Senate in the matter of bills S. 611 and S. 622, and before the House on bill H.R. 3333.

There appeared to be a little in either S. 611 and S. 622 which was of direct interest to Radio Amateurs, as was pointed out by Mr. Booth. However, the League's counsel took the opportunity to offer several con-

structive suggestions for amendments to the Communications Act of 1934 (as amended) "which, if adopted, will improve the efficiency of operation of the Federal Communications Commission."

In this regard, attention was called to a number of recent actions by the Commission which will probably have a substantial adverse effect on the Amateur Radio services. Included were actions which limited the funds allocated to processing applications for, and administering to, the Amateur services, and which implemented a confusing mechanism for issuing Amateur call signs.

Attention was also called to the Commission's lack of action in the matter of radio-frequency-interference (RFI), and in the matter of point-of-sale control over transmitting equipment. With respect to the RFI problem, Mr. Booth again urged the Senate to enact the provisions of S. 864, the so-called "Goldwater RFI Bill."

In his statement on H.R. 3333, related to the proposed rewrite of the Communications Act of 1934, Mr. Booth touched on a number of subjects of concern to the Amateur services. Comments were made on areas related to telephone terminal equipment and connections, fees, license terms, time to respond to Notices, and secrecy of communications.

A considerable amount of time was spent by Mr. Booth in his House testimony of the susceptibility of devices to unwanted signals (i.e., RFI) and on point-of-sale of transmitting equipment. In particular, the League's counsel was highly critical of the FCC, and he noted that the Commission's Notice of Inquiry on RFI (Docket 78-369) "was essentially a holding action which very probably will not bring about positive, forceful action by the Commission."

To say the least, continued

testimony on the Hill by the ARRL is critical to the future of Amateur Radio, and the League, sensing this, appears to be making its presence known in the Federal City on a more frequent basis.

ARRL Long Range Planning Committee Continues Deliberations

According to Mr. Victor (Vic) Clark, W4KFC, Chairman of the LRPC, the Committee is continuing to examine matters of concern which will affect the future of the Amateur and Amateur-Satellite services. Observing that the LRPC had already received a large number of comments from ARRL members and nonmembers alike, Mr. Clark noted that "for the most part, the comments, suggestions and criticisms are well thought out, and they indicate that the writers have given considerable thought to the future of the Amateur services."

Have you submitted your comments to the LRPC? If not, ask yourself this question: Where should Amateur Radio be in 10 or 20 years?

And in answering that question, ponder the following queries:

What growth is needed to make our services (Amateur and Amateur-Satellite) viable?

How should the services be structured in terms of its operators and their capabilities (i.e., what type of balance should exist between communicators and experimenters?)?

What changes should be made in our national organization (the ARRL) to insure that Amateur Radio's voice is well represented in the national and international communities?

How should the ARRL be structured so as to insure that member's requests are serviced, and, at the same time, that national and international issues are addressed on a timely basis?

How can Amateur Radio restore the respect it once commanded in the electronics industry?

How can we insure that government, industry, and the public are made aware of the benefits in having strong Amateur services?

These are but a few of the questions which must be addressed by the LRPC. And if you have comments or opinions which will assist the LRPC in its deliberations, this Committee earnestly requests that you send your thoughts to:

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What I forgot to do was to take the long view of this new award. *CQ* is very fortunate to have Leo Haijsman, W4KA, head up the WAZ program and to experience his enthusiasm is a real pleasure. He works very hard and in fact is a dynamo of activity geared to making WAZ and 5 Band WAZ a success. What I neglected to do was to think past my tenure or Leo's and what the passage of time and personnel would mean to the program. Any system seems to grow with time, expanding, changing and hopefully improving. Our Award Program and our Contest Program have evolved through several changes in editorial direction. Some rules have been changed to clarify situations and to make things more relevant and meaning-

ful, always with a long ranged view. Some things have just evolved or grown without apparent direction and have been carried on by each new Editor and passed on and on. Well, sometimes things have to be changed in midstream, not arbitrarily but to provide direction and to ensure a smooth future. Things and systems of value cannot simply "grow like Topsy" or become academic questions such as "Does the tail wag the dog, or does the dog wag its tail?" There hopefully exists a hierarchy, which exists because it exercises judgement and leadership in a positive direction. The dog wags its tail because the tail is merely an extension of the dog and Topsy can only grow in a desired direction when properly nurtured towards that direction.

The 5 Band WAZ Award will undergo some fundamental changes in its rules. The concept will remain the same in that the ultimate goal is 5 Band WAZ. What will change and must change is the plateau system. The 5 Band WAZ Award will mean just that, the applicant has demonstrated confirmed contact with 200 zones on 5 bands. The certificate will be issued upon completion of working 200 zones on 5 bands. The first 5 amateurs to complete the


requirements will also receive a plaque to mark their achievement. I know that this action at this time will make a lot of people unhappy and some quite angry at this unilateral decision. We have received numerous applications to date for the basic award and I must apologize to these people for their inconvenience. Their efforts are not wasted or taken lightly. The zones they have accumulated so far will certainly count towards the 5 Band WAZ Award and many of them are approaching the 200 zones already. The monies received for the original award will be credited to the new award unless the individual wishes a refund.

It should come as no surprise to many of you that the first 5 Band WAZ Award (all 200 zones) will be awarded to John Devoldere, ON4UN. John wrote the book on 80 meter DXing and is perhaps one of the most active amateurs around today. Congratulations, John, on a masterful job. Several others are breathing down John's back at this writing and we expect a few more winners shortly. Remember to take advantage of 10 now while we still enjoy favorable sun-spot activity.

73, Alan, K2EEK

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Math's Notes

A look at the technical side of things

With the growing interest in home computers, and complex programmed devices, it is only natural for the amateur radio operator to begin to apply those devices to his station. As a result, we felt that it would make sense to look at the characteristics of two of the more common interconnection signals so that non-computer devices could be handled. These two signals, which are probably more familiar to RTTY enthusiasts, are the RS-232 bipolar voltage signal, and the 4ma/20ma current loop. Both are used for both input and output devices and understanding how to handle them

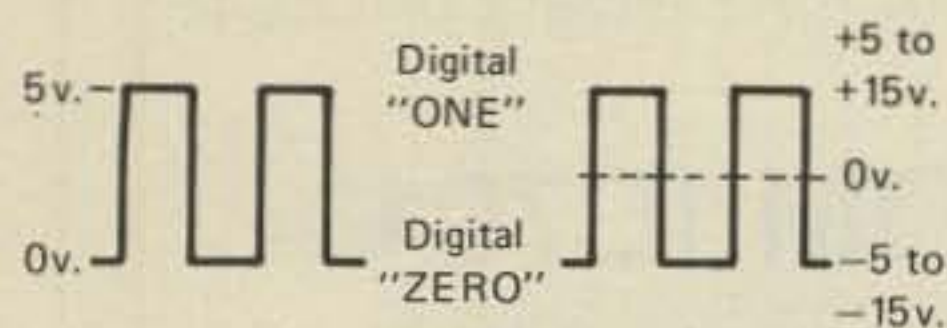


Fig. 1—Comparison of RS-232 and TTL

will enable experiments to interface all sorts of peripheral devices.

The RS-232 bipolar voltage signal was originally developed to allow various types of data communications devices to "talk" to each other over long telephone quality lines. As shown in fig. 1, it is a bipolar signal with +3.5 to +15 volts as a logical one and -3.5 to -15 volts as a logical zero. You will notice that it can be thought of as simply an offset signal. The reason for the offset is to positively differentiate between ones and zeros even under conditions of extreme noise.

With the understanding of the nature of the signal, conversion to and from conventional TTL is quite simple. Fig. 2 shows two RS-232 to TTL conversion circuits. In the first,

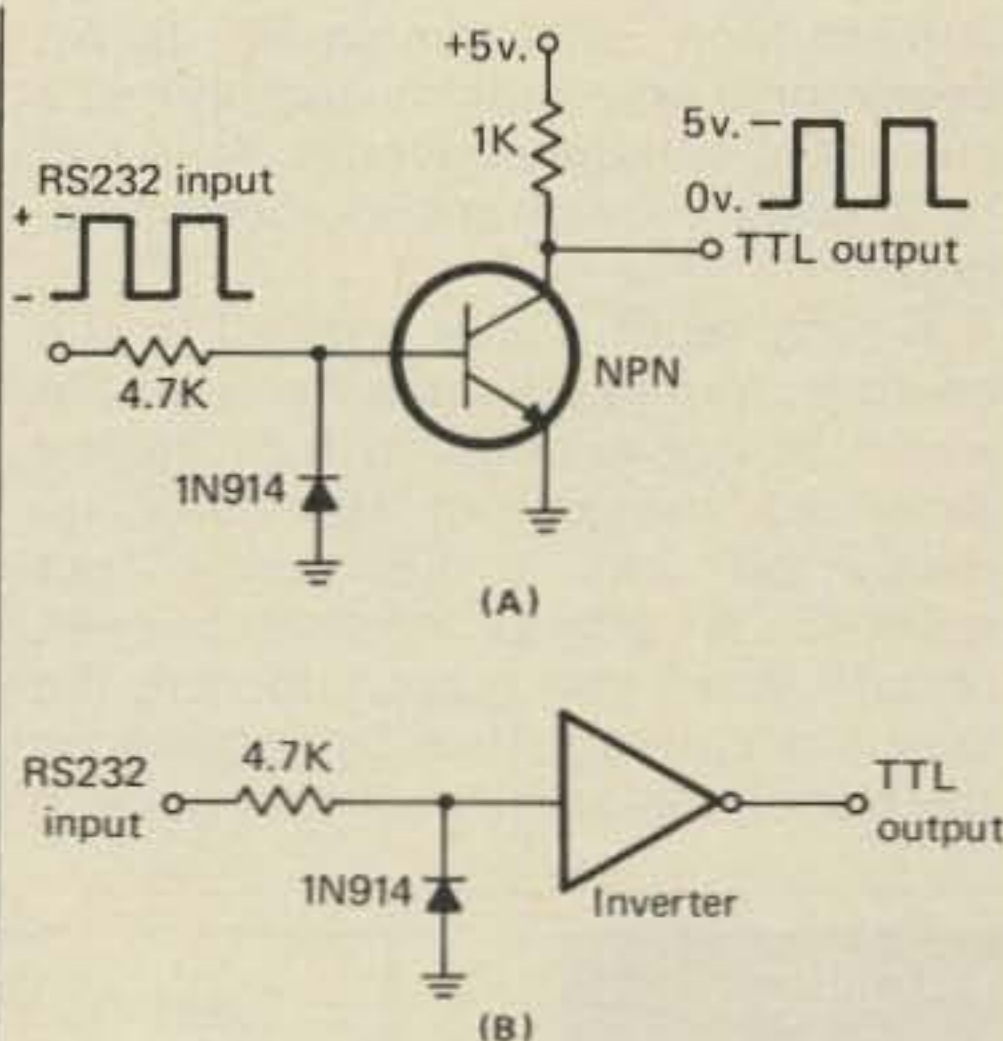


Fig. 2—Two RS-232 to TTL Converters. The inverter may be TTL or CMOS

the negative portion of the RS-232 signal is shunted away from the transistor by means of the 1N914 diode and the transistor does not conduct. When the positive signal comes along, the diode is reverse biased and base current flows which turns on the transistor. The second circuit operates in exactly the same way except that a TTL inverter is used instead of the transistor. Both circuits invert the incoming signal and should be followed with another inverter if necessary. The only design consideration is to be certain that the input resistor is more than the 3K minimum RS232 load, but low enough to assure turn on by the gate or transistor.

Converting TTL to RS-232 is equally simple and fig. 3 shows two methods to accomplish this. In the first, we again use a transistor inconjunction with a + and - 5 volt supply and a 5.1 volt zener diode. With zero input to this circuit, the transistor is cut off and the zener blocks conduction even though a negative 5 volts is applied to the emitter. This produces an output

of +5 volts. When the TTL input now rises to +5 volts, the transistor sees the +5 volts across the 10K resistor added to the 5 volts from the negative supply (remember whether or not conduction occurs is a function of total base to emitter voltage). This causes the zener to conduct and the tran-

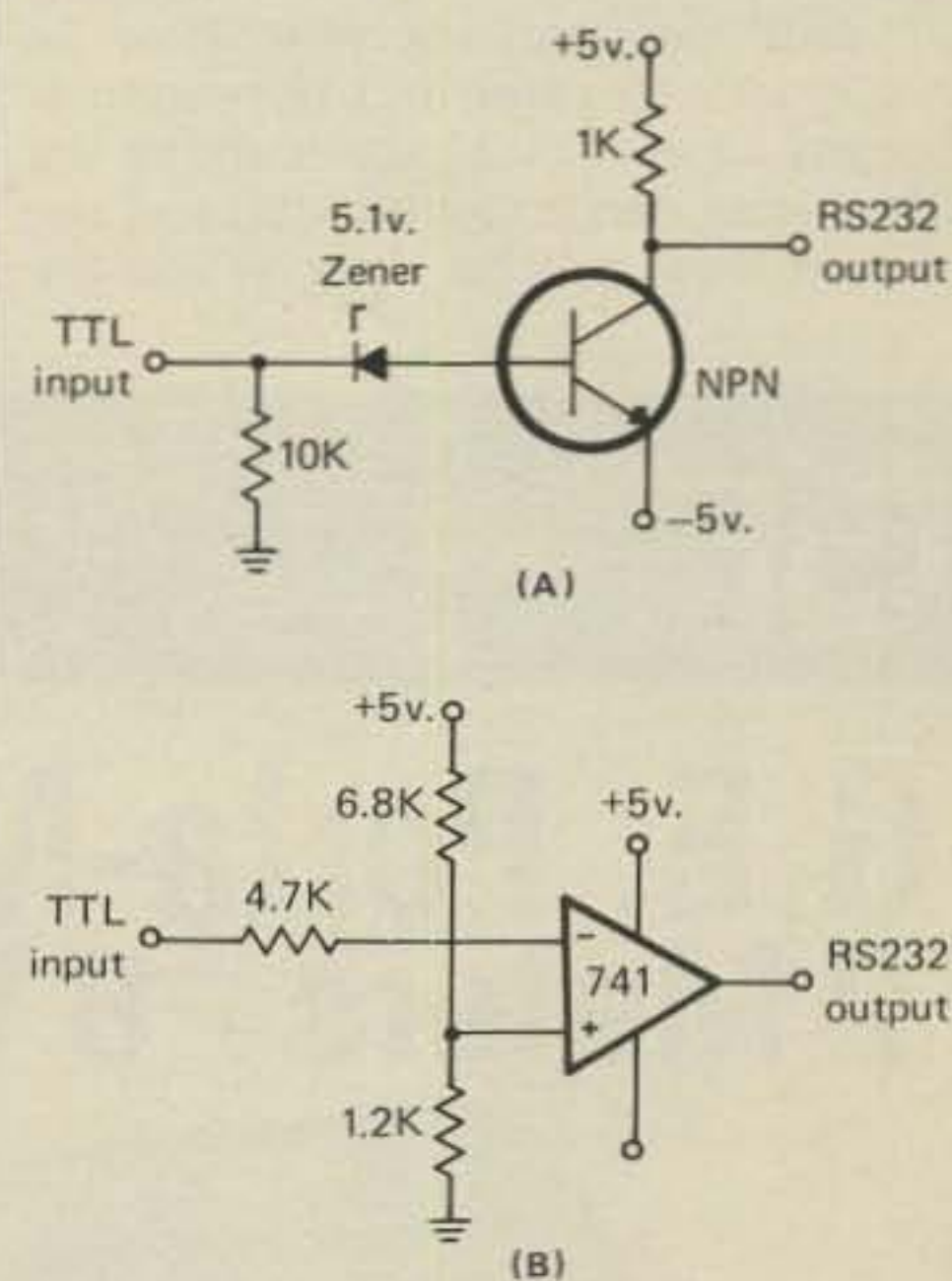


Fig. 3—TTL to RS-232 Converters as discussed in text

sistor to turn on which produces a -5 volt output.

In the second circuit of figure 3, our operation amplifier is connected as a comparator to achieve the same results. The non-inverting terminal of the op-amp is biased to roughly 2 volts, near the center of the TTL swing. With zero input to the op-amp, the input difference is positive and the output swings to +5 volts. With +5 volts into the input, the difference is now +3 volts into the inverting terminal and the output is -5 volts.

In both cases inversion again takes

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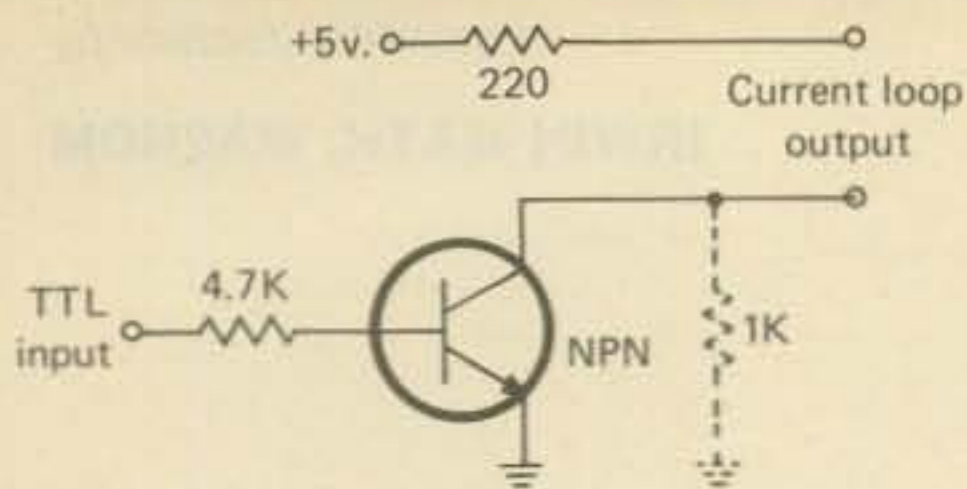


Fig 4—TTL to current loop input. If 4ma is desired for a digital low, use the 1K as shown. If zero is OK, leave it out.

place so the inputs should be run through an inverter if this is not desired.

The other interconnection system we mentioned is the 4ma/20ma current loop. Also originally designed to eliminate noise, this signal produces a zero to 4ma current to signify a logical zero and a 20ma current for logical one. This signal is most often found in industrial transducers of all types and can be just as easily handled.

Fig. 4 shows the TTL to current loop converter. You will notice that the actual current loop path is floating with respect to ground, but since most compatible equipment also floats, this is normal. When the input is TTL zero, the transistor is cut off and the only current flow is through the 220 ohm and 1K resistors—roughly 4ma. In most applications the 1K resistor can be eliminated and the current flow will be zero. When the

+5 volt level is applied to the input, the transistor conducts and 20ma flows through the loop. Note that this circuit does not invert the output. You may have to vary the value of the 220 ohm resistor to accommodate other B+ voltages or external circuit impedances, but such variation is often not at all critical.

The conversion back to TTL from a current loop is shown in fig. 5. An operational amplifier is used here in a current to voltage converter, followed by a zener diode/transistor combination.

A 4ma input signal applied to the op-amp input results in a 1 volt output which is not enough to turn on the zener so the output transistor remains off and a +5 volt output results. A 20ma input however, results in a 5 volt output, forcing the zener to conduct thereby turning on the transistor, and the output goes to

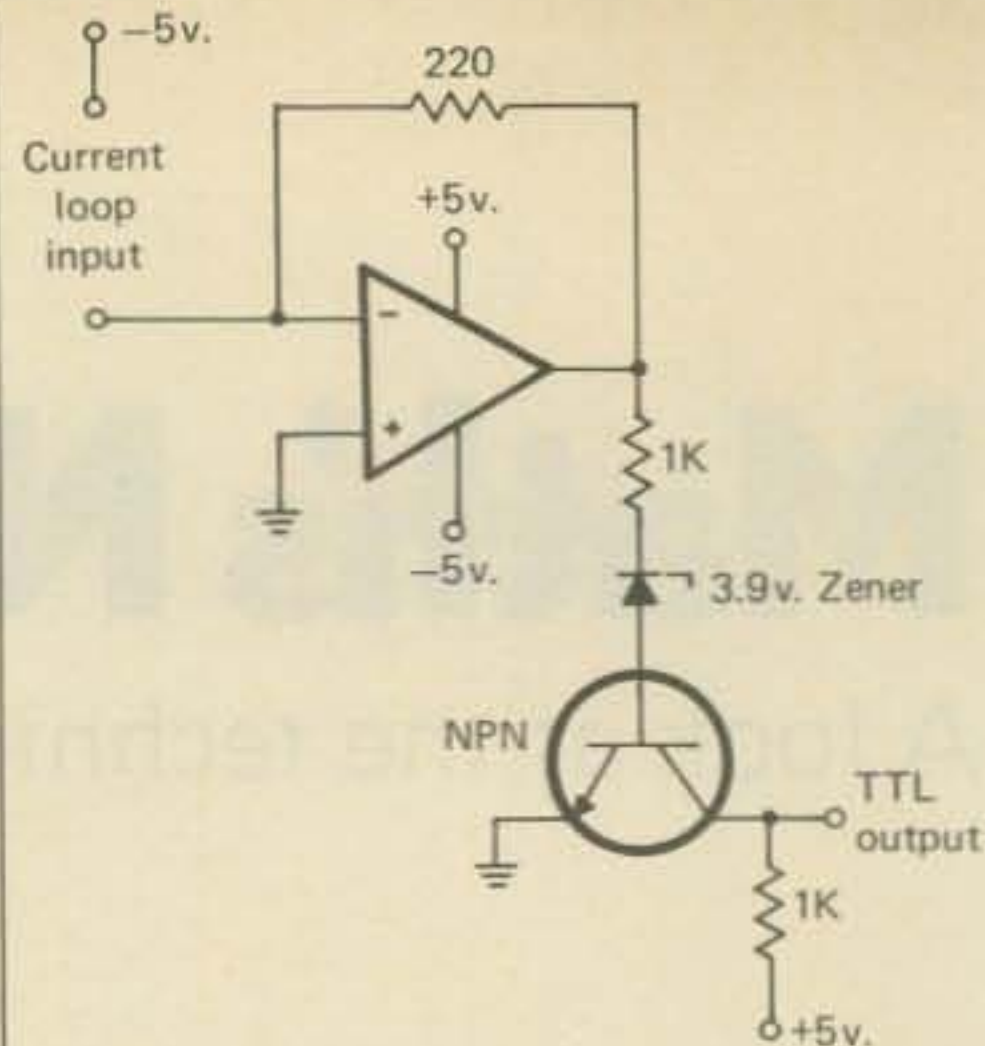


Fig. 5—Current loop to TTL Converter

zero. This circuit again inverts the signal.

All of the previous conversion circuits may be used as is, or may be modified to accommodate the exact equipment you might have on hand. The important thing is to understand what the signals are. Once you accomplish this, the designing of converting circuits is straightforward.

See you next month, 73, Irwin, WA2NDM



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Novice

"How to" for the newcomer to Amateur radio

Answering Information Requests Received From Newcomers to Amateur Radio

Most of the letters I receive from people who are just getting started in the amateur radio services contain questions which have been answered in previous Novice columns. This is to be expected since it is unlikely that these people would have read amateur radio publications very long before they write their questions. This situation will continue to exist as new people are attracted to amateur radio. Consequently, I am starting this month's Novice column with a summary of the previous columns that contain information which is most useful to prospective and beginning amateurs. You can do these people a very real favor by directing them to this source of answers to the most common questions. I consider these articles to be a bridge which allows me to get information across to those who need it. These articles are not written to impress anyone; they are intended to inform those who need help.

Please do not request issues of CQ magazine or Novice column reprints from me since I do not have them. However, past issues of CQ can be purchased from Cowan Publishing Corporation, 14 Vanderventer Avenue, Port Washington, Long Island, New York 11050.

Articles

If you know someone who is thinking about becoming an amateur radio operator, you could make it easier for that person that become a licensed amateur by advising her/him to read specific previous Novice articles in the sequence in which they are discussed in the following paragraphs. Amateur radio is a communication service but it is in my opinion that most amateurs do not communicate well with those who need help in learning about our amateur radio service.

*2814 Empire Ave., Burbank, CA 91504

The first Novice article I advise a prospective amateur to read is the June 1978 one which details the advantages one can derive from starting as a Novice. The July and August 1978 issues contain an article that tells how to get started in amateur radio. The December 1978 column covers sources of aid available to prospective and new amateurs and that information is expanded upon in the October 1977 column about getting technical help from experts.

The June through August 1979 Novice columns contain an article about code. This article clears away most of the mystery and apprehension regarding learning and using code. I have had many students tell me that they

feared having to master the International Morse Code. However, I have learned that an honest discussion of code and its advantages almost always eliminates their fears and motivates them to master code, which is still the most effective communication mode. Naturally, on-the-air practice is an excellent way to increase code receiving proficiency and the September 1979 issue of CQ provides worldwide sources of on-the-air code practice.

Once the prospective amateur has become a licensed amateur, two Novice articles should be read with care to assure that an efficient station is established. It is very important that the initial station provide the



Here are some members of the Lake County Junior High School Amateur Radio Club. Standing (left to right) are Dave Kohls (KA0CZS), Steve Hren (KA0DLT), Matt Carter (KA0CZP), Allan Hren (KA0CZR), Lee Bagby (KA0EOB), and Mike Sadar (KA0DLS). Kneeling (left to right) are Steve Harelson (KA0DRT), John Marta (KA0CZT), behind Mike Slifka, Mike Slifka, John Wilder (KA0CZU), and Tony Fabian (KA0CZQ). Bill Arcieri (K0PNO) is the electronics class instructor and he has helped license several amateurs. His students built the Heath HW-101 Transceiver with its matching AC power supply/speaker shown on the operating table behind them. Their antenna is a rotatable 3 element beam for 10, 15, and 20 meters. Class materials and the station equipment were purchased using money acquired through a career education mini-grant. Station activity is excellent with students operating before school, during lunch-time, and after school. Their antenna is 10,300 feet above sea level at their Leadville, Colorado location. They have worked all 50 states and several countries since they started in January 1979. As an ex-high school electronics instructor, I know the satisfaction K0PNO must be experiencing from watching his students become proficient operators in our amateur radio service.

excellent communication performance that is essential to maintaining peak interest in amateur radio. Amateur radio station installation tips is split into five parts and it appears in the November 1977 through March 1978 Novice columns. Amateur radio station grounding is well covered in a three part Novice article printed in the September through November 1978 issues.

Once the beginner has become licensed and has set up a good station, possibly with the help of the previously discussed articles, there are three more useful Novice articles he/she should read to increase their enjoyment and understanding of amateur radio. One of the most confusing aspects of amateur radio to a newcomer is the variety of callsigns used on the amateur bands. The amateur radio callsign structure used by Americans is particularly confusing and a plain language explanation of callsigns was printed in the April and May 1979 Novice columns. The May 1978 issue provides simple operating tips regarding what should and should not be done when operating in the amateur bands. As one becomes increasingly active on the air, it is common to develop an interest in the exchange of QSL cards to confirm two-way radio contacts. The January through March 1979 Novice columns provide an excellent three part article covering all aspects of QSL cards. This article generated more response than all of the other ones combined and the mail came from all classes of licensees. Even shortwave listeners and a couple of foreign broadcast station executives forwarded their comments about QSL cards and their uses. QSL cards are a colorful and interesting part of amateur radio. They are extremely important to most amateurs and it is good to know how to select, design, fill in, record, exchange, display, and store cards.

You will note that the Novice articles referenced in the preceding paragraphs were printed in the October 1977 through September 1979 issues of *CQ* magazine. If you frequently come in contact with people who express interest in amateur radio, you could do them a favor by having a few sets of the referenced articles available for them to read, with the material arranged in the indicated preferred sequence. Make it easy for the general public to learn about amateur radio. We have room for all the dedicated amateurs we can get.

Amateur Radio Exposure

I have worked with many new

amateurs during the past 30 years and too many of them have told me that they had a hard time finding information about amateur radio and how to become a licensed operator. Amateur radio clubs are often in a good position to provide the public with an introduction to amateur radio and I think they should actively pursue each opportunity of this type. Participation in parades, hobby shows, scout fairs, walk-a-thons, bike-a-thons, and similar activities provide good public exposure and it is advisable to have free introductory material at such events for distribution to those who express interest in amateur radio. Excellent introductory items are readily available at little or no cost. The ARRL maintains a supply of such items and it has been my experience that the League is always glad to provide them at no charge to clubs and individuals who will put them to good use. If you are active in a club that performs public services, it is advisable to request one set of amateur radio introductory material from the American Radio Relay League, Inc., Clubs and Training Department, 225 Main Street, Newington, Connecticut 06111. Tell the League why you want this set of material, evaluate each item received to determine how useful it would be during your event, and then request reasonable quantities of the specific printed materials which you believe will be most effective in your situation. I have found that magazine reprints are most effective with older people (30 and up), whereas color posters, brochures, and photographs are more appealing to younger prospective amateurs. The availability of introductory information can also be advertised using standard three-by-five inch cards posted on free bulletin boards in schools, supermarkets, laundromats, and similar places where they can be seen and read by the public. I do not believe that such announcements should be restricted to stores that cater to amateurs, although these are also good places to post this information. I think it is reasonable to request that a self-addressed and stamped envelope (SASE) be supplied with each request for amateur radio introductory information and/or licensing course data.

Be sure to include the complete address where such requests should be mailed. The SASE makes it possible to handle requests with minimum of expenditure of time, effort, and money. It is my opinion that it is not wise to provide a telephone number for answering calls regarding requests for introductory information. Such calls require too much time for

the benefit provided and one usually has to also send written material to help the prospective amateur. I believe you should use printed materials to let the public learn about amateur radio. Some clubs simply post licensing course announcements in public places and send introductory material, plus course data, to those who express their interest in amateur radio. If the introductory material kindles a more active interest in becoming amateurs, provide you prospects with information about amateur radio licensing courses in your area and show them at least the first four Novice articles recommended in this month's column. Even if you are not active in a club, you can still do your part to make amateur radio better known and more accessible to the public.

Course Materials

Licensing course handouts are sometimes mentioned in these Novice articles and requests for them are received almost everyday. Some items are too large to be incorporated in this column, but they remain available to anyone who requests them and furnishes the usual SASE. Such requests should be sent to Bill Welsh (W6DDB), 2814 Empire Avenue, Burbank, California 91504. The most popular items of this type are as follows and the current correct amount of postage is shown with each item. Indicated postage should be attached to self-addressed ten-by-twelve inch manila envelopes. It is important to specify which items are wanted. I often receive someone's SASE with no note indicating which item is desired. Here are the most popular large aids:

Code Sheet	(15¢)
Coaxial Cable	(67¢)
DX QSL Cards	(15¢)
Equipment	(41¢)
Headphones	(28¢)
On-the-Air Code Practice Sources	(67¢)
Formula Sheet	(15¢)

One of the most common requests I receive that I cannot fill is the request for a complete set of licensing course materials. The offer to provide this set of items was only made to individual amateurs serving as instructors of amateur radio licensing courses. This offer was not made to anyone other than instructors. More than 100 sets of these licensing course materials have been sent answering requests initiated by the recent *CQ* Novice column and more than 1400 have been mailed during the past 30 years in response to other announcements. Paper costs alone prohibit sending these sets of printed materials to individual amateurs or prospective

amateurs. However, there is nothing wrong with students letting their instructors know that these aids are available from myself at their present four dollar cost, including shipping costs. Instructors are welcome to duplicate my material and to use them as they are, or they may alter items to suit their individual needs and preferences. I have a set of 15 cassette tapes that will take one from no knowledge of the International Morse Code to a code receiving proficiency of about 15 words per minute. These cassettes were taped from 7 inch diameter reels and they have helped more amateurs learn the code than most amateurs contact during a lifetime on the air. As is true with the printed materials, instructors are welcome to duplicate the code training tapes for use with their students. The set is available at my \$25 cost, including shipping. If you make an effort to find them, you will find many other helpful introductory items.

Reading the Mail

Jim Walroth (KA3AZR) is a college student in Youngwood, Pennsylvania who tries to contact other college students on the ten meter Novice band. Jim extols the benefits of ten meter operation but he laments the fact that so few Ten-Ten International members work the Novice code band. I proposed establishing the ten meter Novice band for many years before it became a reality. My Novice columns continue to point out the unique advantages of ten meter operation. I contact a lot of Novices on this band but many of the amateurs who answer me on this band are not Americans. Jim reports good results using a Swan 270-B Transceiver and a dipole antenna on ten meters. He suggests that other amateurs should pick up a few station aids by visiting the school supplies section in their local drug, variety, and department stores. Corkboard can be used for mounting maps, cards, and operating aids. Note paper and writing utensils are available at the same locations. Plastic memo boards allow one to make notes about operating activities and to easily "erase" them when they are no longer needed. Jim uses a road atlas to see where his contacts are located and to ascertain their counties. If he works someone in a small town with just one zip, and he does not have their complete mailing address, he just sends his QSL card to that amateur in that town and state, using the zip code taken from the zip code directory. My personal experience is that it is best to get the other amateur's first and last names, mailing address, city or town, state,

and zip. It is advisable to include all of the preceding information on each QSL card being mailed. Amateur radio stations are not individually as well known to local post office personnel as broadcast stations. Including the last name in the address can keep your card out of the dead letter office, which receives too many QSL cards intended for amateurs.

Jim reports that he posts lists on the corkboard in his station. Contest data, anticipated DX operation, Q signals, call signs of particularly interesting amateurs, and similar items are posted on his corkboard. He urges Novices to maintain a neat and complete radio station log so that they will have a good record of operating achievements and station changes. It has been his experience as a retired Novice that used equipment is the best dollar value. Last but not least Jim recommends posting a duplicate copy of the station license in the station just in case a licensed amateur is allowed to operate when the station licensee is not present.

G.V. Haylock (G2DHF) can be heard on the Novice bands about 1600 to 1730 UTC. George has switched from the 15 meter to the ten meter Novice band and is working Novices almost daily. Cards can be sent to him via the ARRL Outgoing DX QSL Bureau (by League members), via the Radio Society of Great Britain (RSGB QSL Bureau, c/o E.G. Allen, G3DRN, 30 Bodnant Gdns, London SW 20 OUD, Great Britain), or to his home address of 28 Longlands Road, Sidcup, Kent, England. If you have not yet worked England, this is an open invitation. George will be on 15 when conditions are not suitable to work American Novices on 10 meters.

Lee Hiers (AA4GA) is the net control station (NCS) of the Georgia Training Net which starts daily at 6:15 pm Eastern time on 3718 kilohertz. Lee invites Novices and Technicians to participate in this slow speed net to learn operating procedures and to increase code proficiency. The net Q signals you should know are as follows:

ARRL QN Signals for CW Net Use

- QNA* Answer in prearranged order.
- QNB* Act as relay between . . . and . . .
- QNC All net stations Copy. I have a message for all net stations.
- QND* Net is Directed (controlled by net control station).
- QNE* Entire net stand by.
- QNF Net is Free (not controlled).
- QNG Take over as net control station.
- QNH Your net frequency is High.
- QNI Net stations report In.* I am

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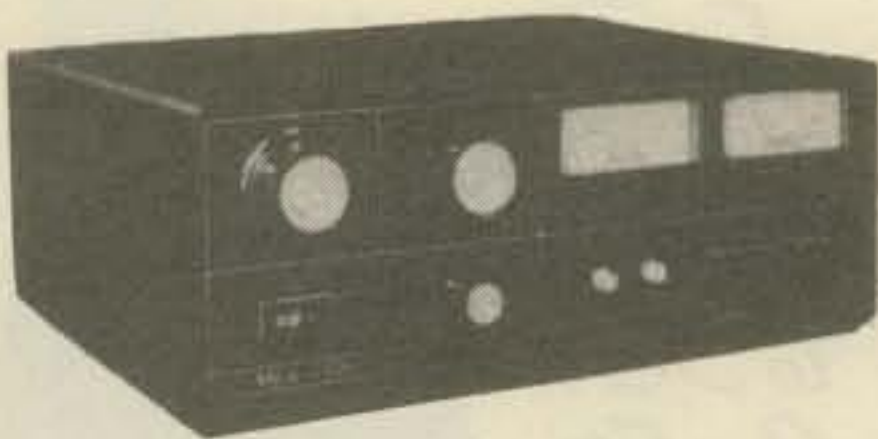
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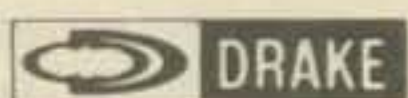


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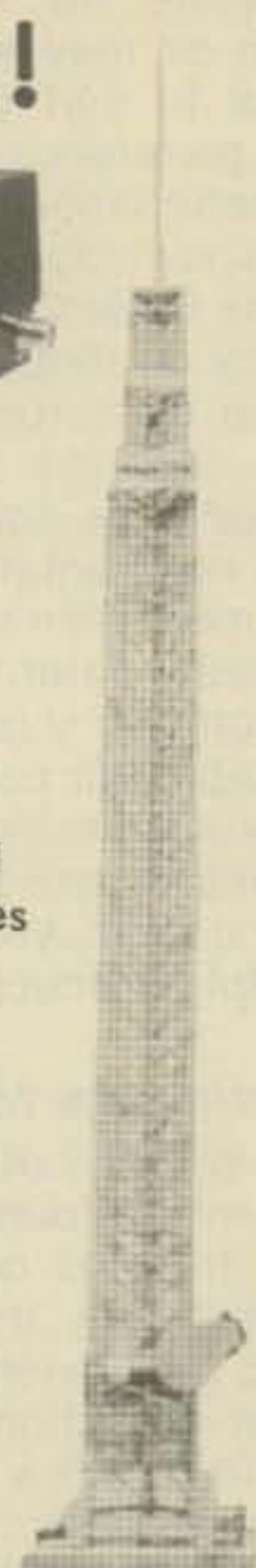


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CIRCLE 3 ON READER SERVICE CARD

- reporting into the net. (Follow with a list of traffic or QRU.)
- QNJ Can you copy me? Can you copy ...?
- QNK* Transmit messages for ... to ...
- QNL Your net frequency is Low.
- QNM* You are QRMing the net. Stand by.
- QNN Net control station is ... What station has net control?
- QNO Station is leaving the net.
- QNP Unable to copy you. Unable to copy ...
- QNQ* Move frequency to ... and wait for ... to finish handling traffic. Then send him traffic for ...
- QNR* Answer ... and Receive traffic.
- QNS Following Stations are in the net.* (Follow with list.) Re-

- quest list of station in the net.
- QNT I request permission to leave the net for ... minutes.
- QNU* The net has traffic for you. Stand by.
- QNV* Establish contact with ... on this frequency. If successful, move to ... and send him traffic for ...
- QNW How do I route messages for ...?
- QNX You are excused from the net.* Request to be excused from the net.
- QNY* Shift to another frequency (or to ... kHz) to clear traffic with ...
- QNZ Zero bear your signal with mine.
- * For use only by the Net Control Station.

Notes on Use of QN Signals

The QN signals listed above are special ARRL signals for use in amateur code nets only. They are not for use in casual amateur conversation. Other meanings that may be used in other services do not apply. Do not use QN signals on phone nets. Say it with words. QN signals need not be followed by a question mark, even though the meaning may be interrogatory.

Novices are urged to submit good black-and-white pictures of themselves at their operating positions. If your photograph is printed in a future Novice column, you will receive a one year subscription (or renewal) to CQ. A brief description of operating activities and some personal background information are needed with your picture.

Antennas

Design, construction, fact, and even some fiction

"Before any antenna talk, why don't you bring me up to date on the activities of all my friends?", I asked.

Doctor Livingston I. Presume relaxed in his chair, dropping a magazine on the operating desk and thought for a moment.

"Well, Johnathan Cadaver is still waiting for his Novice license. He took the exam a few weeks ago. And Pendergast has jilted Bella Amtrak and is now going with Gloria Goosby.

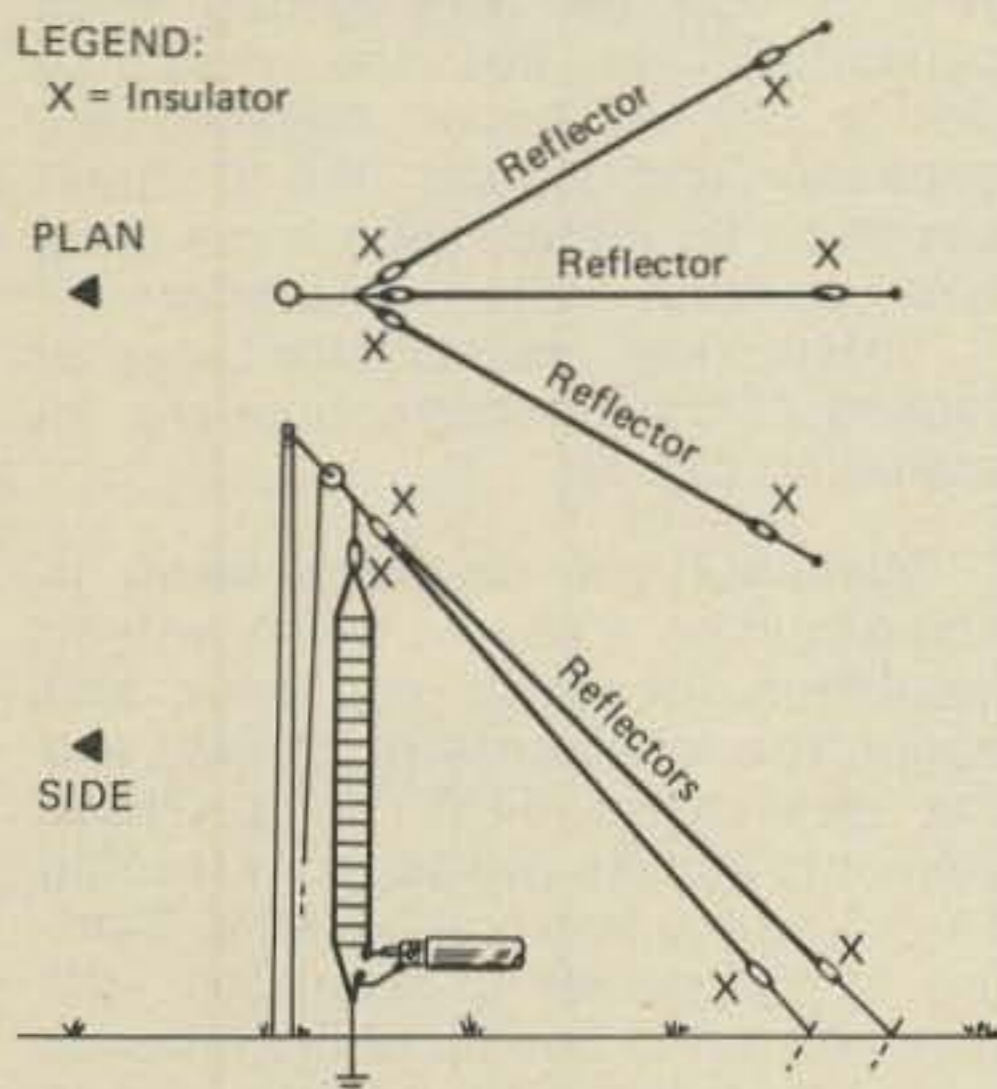


Fig. 1 - The 40 meter vertical beam of G3HCT. Three reflectors are placed behind a quarter-wave vertical antenna (from *Radio Communications*.)

Society of Great Britain. There's an interesting article on a simple quarter-wave 40 meter vertical beam by G3HCT (fig. 1). He uses a folded unipole about 34 feet long, with 3-1/2 inch spacing between the wires. It is operated against a good radial ground system. Three "sloper" reflector wires are used to obtain directivity and front-to-back ratio. The reflectors are about a half-wavelength (71 feet). Gain measurements were not made, but many comparative tests were run against a neighboring ham who had a two element 40 meter Yagi beam at 120 feet. This simple antenna, in the best direction, was only 1/2 to 1 S-unit down from the Yagi beam. In fact, G3HCT says it is the best 40 meter antenna he's ever used".

"What does he use for a matching network?", I asked. "I bet the feedpoint resistance of that antenna is a lot higher than 50 ohms".

"Yes", replied Doctor Liv. "He used a stub matching system (fig. 2). The length E was determined by shorting through the coax line with a pin. When the correct spot was determined, the line was trimmed and the end shorted with a more permanent joint".

"That looks like an interesting antenna", I admitted. "More and more hams are experimenting with versions of the sloper antenna and it looks like it is evolving into one of the

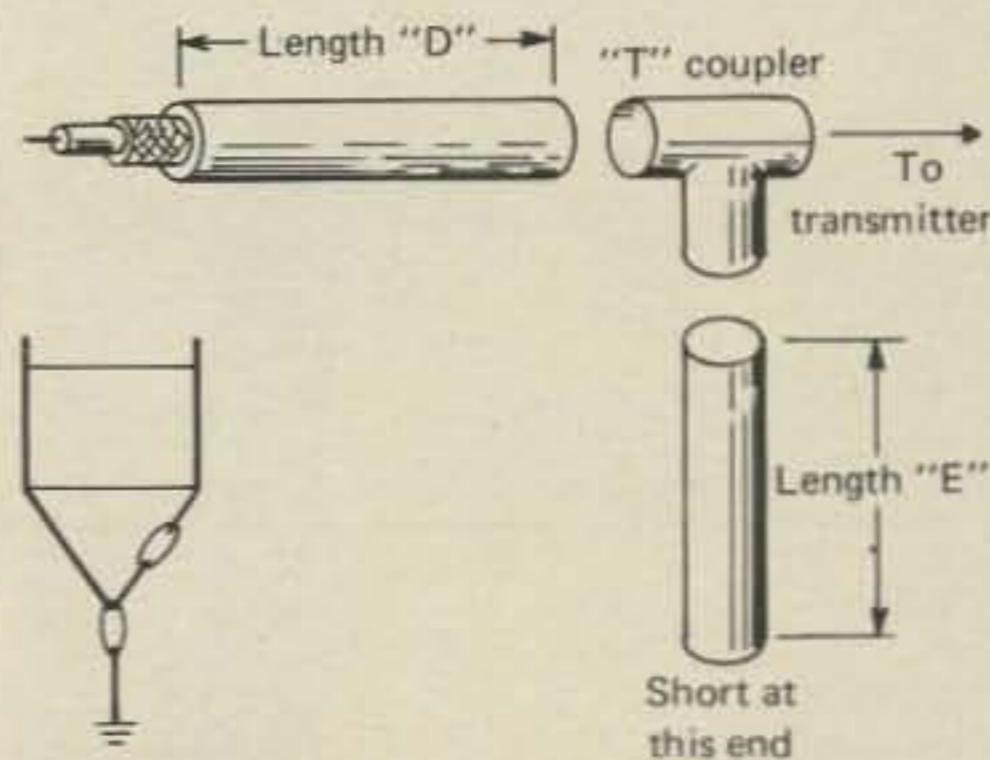


Fig. 2 - The coaxial matching system for the 40 meter beam. Length D is 16' 2" and length E is 9' 3" for 50 ohm cable (from *Radio Communication*.)

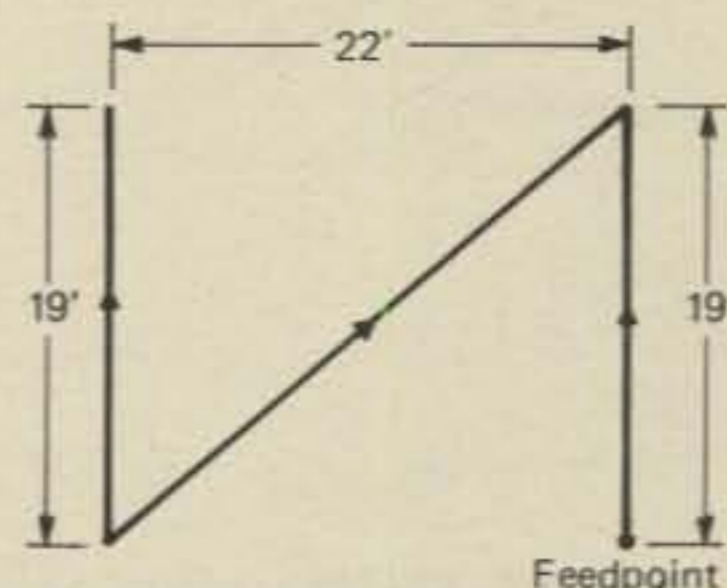


Fig. 3 - The zig-zag "sloper" antenna for 40 and 15 meters at G4GMX (from *Radio Communication*.)

more popular types."

Doctor Liv pointed to another illustration in *Radio Communication*.

"Here's another short note on a zig-zag sloper for 40 meters that was an offspring of the 160 meter design of VE7BS. This small antenna was built for 40 meters by G4GMX. He says that it works well not only on 40 meters but also on 15 meters, with the low points only a few feet above ground (fig. 3).

"On 40 meters this is a half-wave element, voltage fed from the base by means of a standard L-network (a series inductor and a parallel capacitor). On 15 meters the antenna forms a 3/2-wavelength system, providing good broadside directivity.

"And, finally, G3GMM points out the virtues of the 40 year old Bisquare antenna (fig. 4). He's revived this design, which is merely a loop (open at the top) that has two wavelengths of wire in it—as opposed to the Quad loop which has only one wavelength of wire. G3GMM uses two loops at right angles to each other and switches back and forth between them. Each antenna has a broad figure-8 pattern, so he gets nearly complete coverage with this simple system. The antenna is slung from a 40 foot pole and the dimensions for a 10 meter array are given in the drawing. The closed stubs are about a quarter-wave long, each loop being put on frequency by a dip-oscillator coupled to the stub. Radiation resistance is high and the antenna

and I am going to get back on the DX bands after a long, summer layoff".

"Now that we are getting into fall weather, you should notice a great improvement in 15 and 10 meters", I replied. "And the summertime static is rapidly dropping off on 40 and 80 meters. All in all, it looks like a great winter season for DX".

Doctor Liv pushed the magazine across the table to me. "This is a recent issue of *Radio Communication*, the monthly publication of the Radio

*48 Campbell Lane, Menlo Park, CA 94025

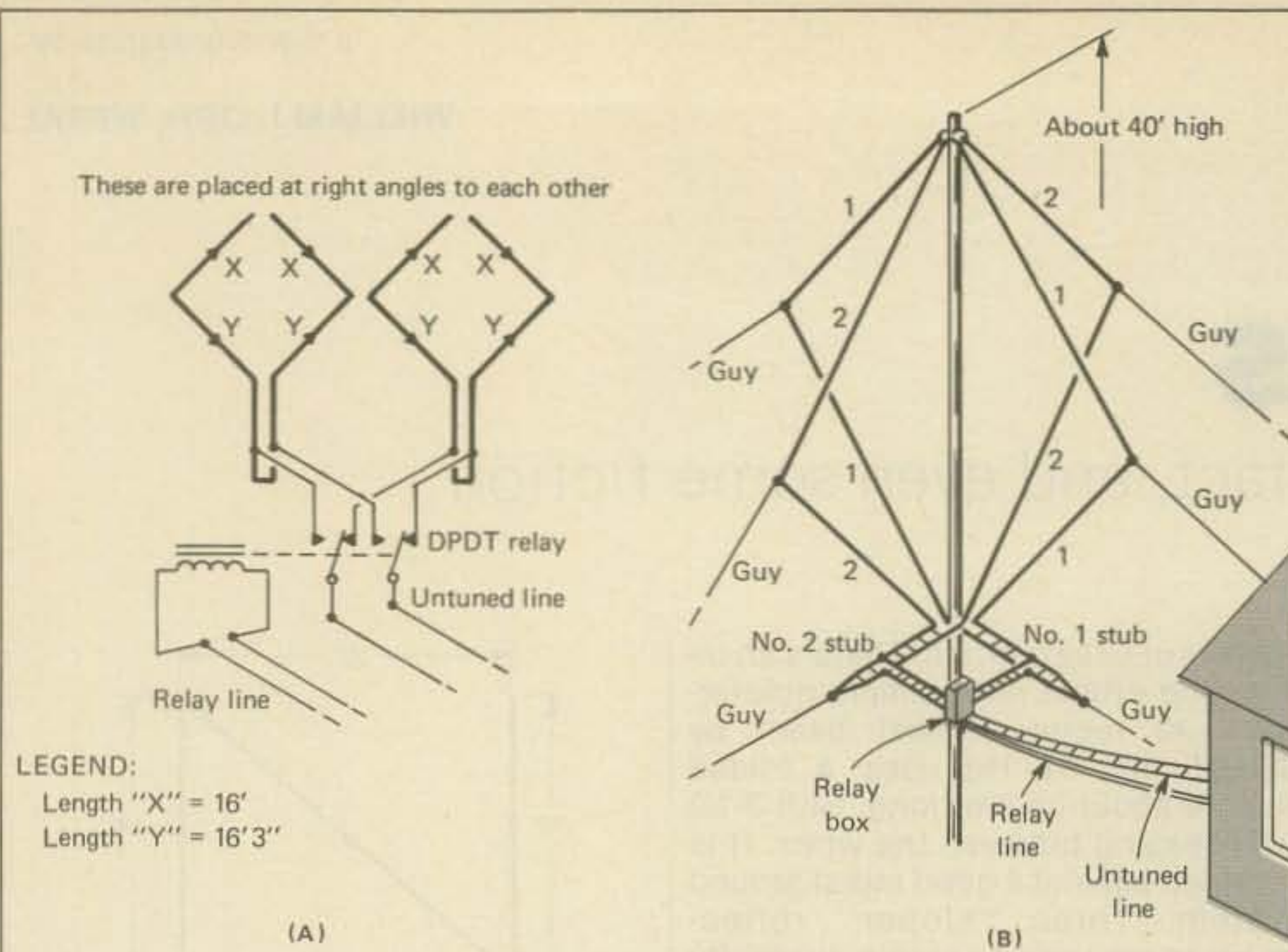


Fig. 4 - Radio G3GMM uses a pair of Bi-Square loops for full coverage. Large loop has about 4dB gain over a dipole. Quarter wave stub is used for good match to transmission line. Dimensions shown are for 10 meters. Loops are open at the top (from Radio Communication.)

provides excellent bandwidth. Of course, a 50 ohm line and 4-to-1 balun may be substituted for the open wire transmission line."

"I remember that antenna", I said. "While not many hams use it, it is one of the best wire beams that can be slung from a single pole. In this case, the gain of the big loop is about 4 dB over a dipole."

Doctor Liv leaned back in his chair and said, "Well, I have exhausted my antenna ideas. What do you have to offer me?"

"I just returned from Washington", I said, "And I had a good chat with K4VX, one of the big-gun DXers on the East Coast. He excels in 80 meter DX and has worked with a lot of antennas on that band. His primary antenna is a

three element 40 meter beam on a 130 foot steel tower and he's hung many 80 meter antennas from that tower—slopers, dipoles, delta loops, inverted V's and lots more.

"About a year ago Griff was experimenting with an 80 meter inverted-V suspended near the top of the tower. While adjusting the wire lengths to resonance at about 3.8 MHz, he noticed that there was interaction between the 40 meter rotary beam and the inverted-V. In fact, the SWR of the V varied from 1-to-1 when the boom of the Yagi was perpendicular to the plane of the inverted-V to nearly 6-to-1 when the boom was parallel to the inverted-V. Obviously the 40 meter beam possessed boom resonance somewhere in the 80 meter band!

"So Griff took down the inverted-V and decided to put the boom resonance to work on 80 meters. He fabricated a 15 foot long gamma match rod out of 1-inch diameter aluminum tubing and constructed a gamma matching capacitor of 450 pF (a 250 pF variable capacitor in parallel with a 200 pF transmitting mica capacitor). He put the matching device on the boom, tweaked the capacitor and loaded the 40 meter boom on 80 meters with a resulting SWR of about 1.2-to-1 for starters!"

"Interesting", said Doctor Liv as he looked at the photograph of the installation (fig. 5).

"Well, K4VX's 40 meter beam is home-built on a 48 foot boom with no insulation between elements and boom. The reflector is 70'8" long and the director is 64'0" long. These elements act like two capacity loading "hats" on the boom at 3.8 MHz. Starting at the center of the boom, the distance out to one tip of the reflector is about 59 feet. The distance out to the tip of the director is about 56 feet. This produces a physical length of the 80 meter antenna element of 116 feet. But since there is tubing going in two directions in the "hat" (the parasitic 40 meter element, that is,) the electrical length on 80 meters is slightly longer. Incidentally, the length of the 40 meter driven element has little or no effect upon the resonance of the boom and produces no interaction.

"The 80 meter SWR curve of the 80 meter loaded boom-dipole is shown in fig. 6. It runs about 200 kHz. between the 2-to-1 SWR points, which is very good.

"Griff points out that not everyone has a full sized 40 meter rotary Yagi on a 130 foot tower to play boom matching games with; however the same principles should apply to 20 meter beams or large tribanders for adaptation to rotary 40 meter dipoles. There

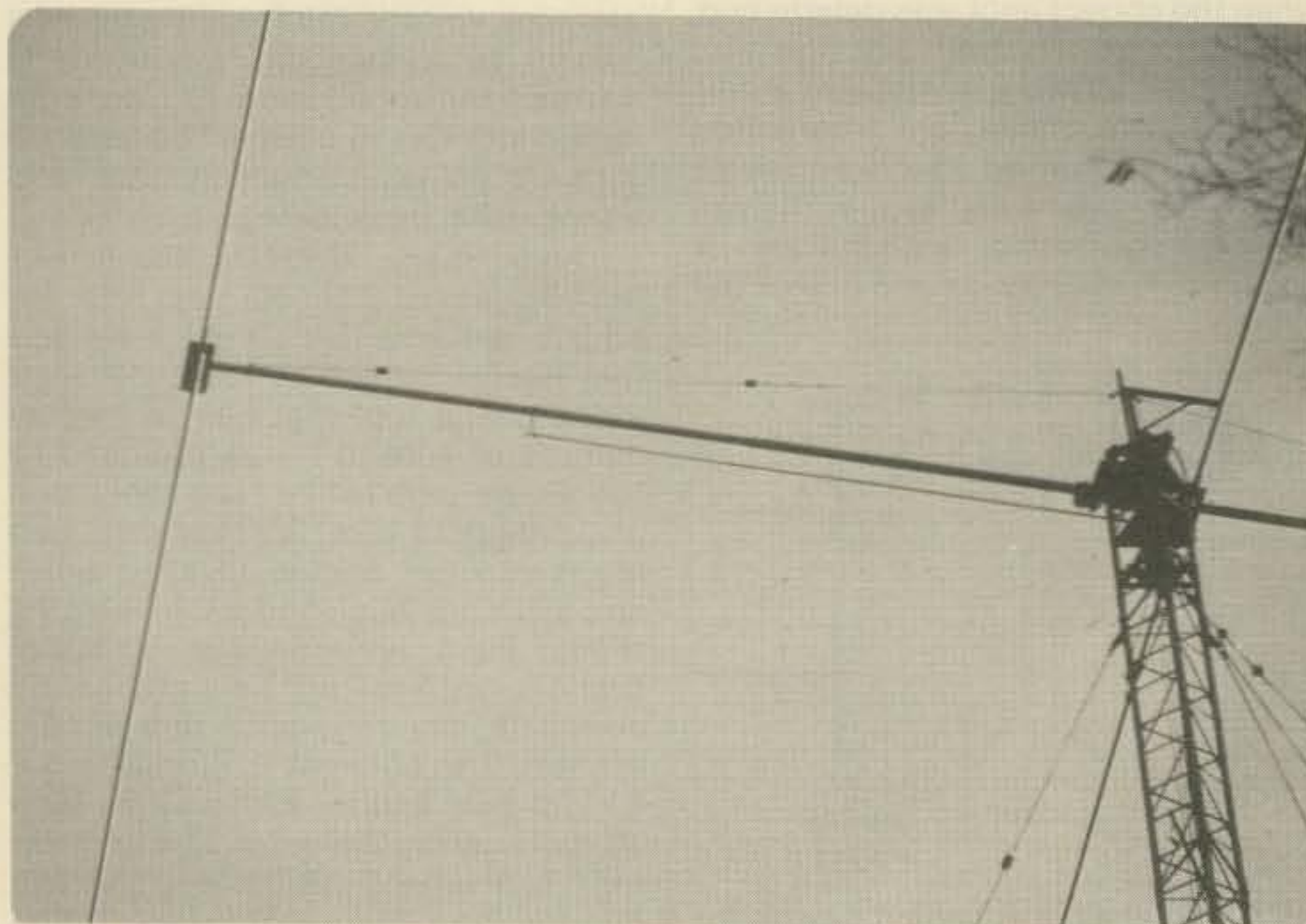


Fig. 5 - The 40 meter beam at K4VX also serves as an 80 meter dipole. Boom is end-loaded by 40 meter elements and is matched to 50 ohm line by means of a gamma match rod shown below the boom.

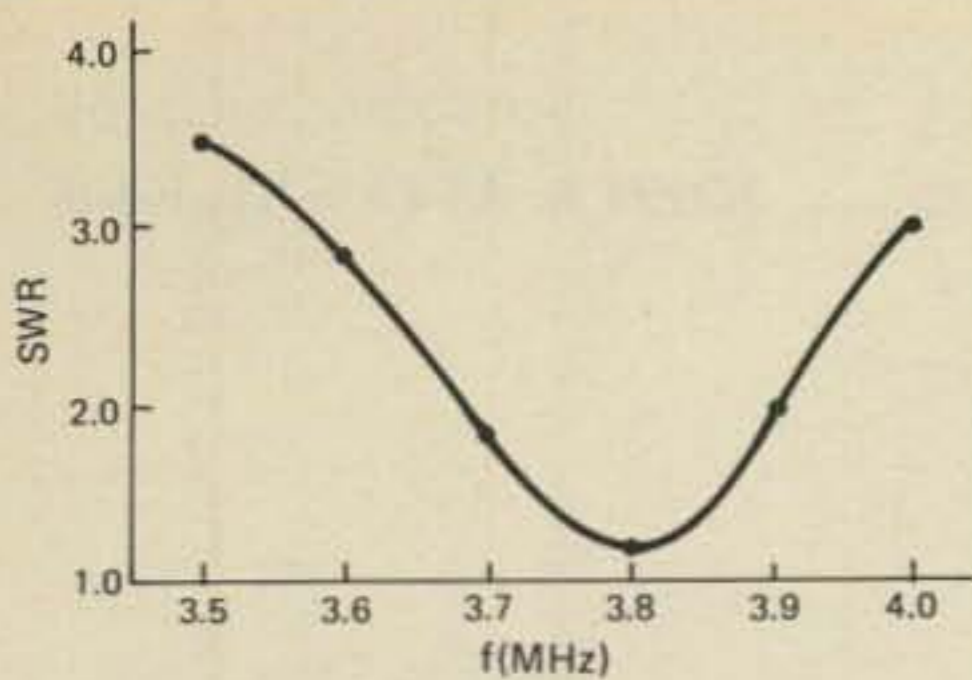


Fig. 6 - The SWR curve of the boom-loaded 80 meter antenna at K4VX.

are literally thousands of amateurs with antennas that could be adapted to become rotary dipoles on 40 meters. The TH-6 and TA-36 beams should be capable of being boom-matched for 40 meters with no modification other than the addition of a gamma match. The 204-BA is another likely candidate.

"Another idea which bears investigation is to use insulated boom to element mounts on the parasitic elements and then insert loading coils or capacitors (as applicable) to make the electrical boom-plus-element length resonant at a lower band than used by the Yagi. Using this technique, correct resonance could be produced with almost any combination of boom and element length."

Doctor Liv smiled and said, "I think that's a great idea and can be adapted to make almost any beam work on a lower band. But what about the fellow who doesn't have a beam?"

Before I could reply, he answered his own question. "I've got a letter from W4BV. Buck tried out the G3NGD multiband antenna idea that you reprinted from *Radio Communication* in your January, 1977 column in *CQ*. The antenna looked like fig. 7. A 33 foot mast was used for 40 meters and a top wire had two traps: one for 80 meter operation atop the mast and one for 160 meter operation placed in the horizontal wire.

"Well, W4BV tried this stunt. He had a 4-BTV vertical for 10 to 40 meter operation. He built a lightweight version of the traps using B&W inductors and used No. 16 wire for the flat top to reduce the wind load. The drawing of the original G3GND trap is shown in fig. 8. The 40 meter trap is dipped to 7.1 MHz and the 80 meter trap is dipped to 3.7 MHz. Exact antenna resonance is determined by adjustment of the flat top. The 80 meter section is adjusted first. Buck reports that he's worked W7 and W7 stations on 160 meters with this simple antenna—using a good ground system, of course."

"That should work well", I said. "This is a good idea to get a simple six band antenna in a small space."

"You read a lot about big antennas

but most amateurs use quite simple antennas. I think there are more ground planes and dipoles than Monster Quads", remarked my friend. He turned to me and said, "Did you read the fine article on Quads versus Yagis by N6NB in the May issue of *ham radio* magazine? I found it very interesting. What do you think of his conclusions?"

I laughed. "You're not going to draw me into the old argument about which antenna is best—the Yagi or the Quad. There's a lot to be said for each antenna design. Wayne has made an important contribution to the discussion and all DX-minded hams should read his article.

"There's a lot of dangers in measuring antenna gain and trying to draw conclusions from antenna measurements between antenna types is like walking through a minefield. Wayne didn't step on any mines, however, and he has some pretty impressive measurements on many different antennas.

"A lot remains to be learned about the Quad. For example, some amateurs have found unwanted boom resonance in a large Quad array. I received a letter some time ago from an amateur who had a four element Quad on a crank-up tower. He had the tower down at 20 feet to do some maintenance on the antenna. By chance he was standing atop a tall ladder and touched the end of the boom near the director while the antenna was being fed a little power through an SWR meter. He was surprised to see the SWR change when he touched the boom. Normally the boom is assumed to be "cold" and doesn't affect antenna operation. How do you account for the change in SWR when the outer end of the boom is touched?"

LEGEND:

Length A to B = 22'
Length C to D = 40'

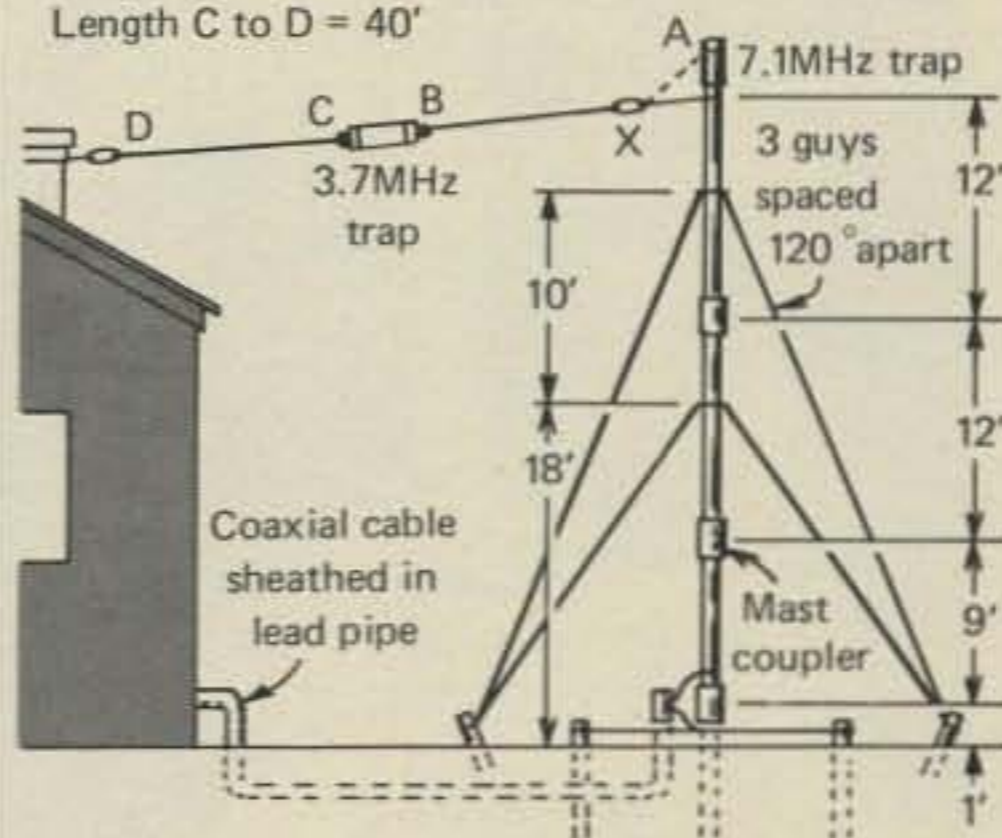


Fig. 7 - The original G3GND all-band (10-160 meters) antenna. It has been modified by W4BV. He uses a 4-BTV vertical with traps using B&W inductors.

"I don't know", admitted Doctor Liv. "I imagine the boom must be coupled to the Quad loops in some fashion."

"It might be that the Quad spider and metallic Quad arms are interfering with proper antenna operation. I know that long aluminum arms can ruin Quad operation. But how about short arms? Many Quads use an aluminum spider that has short stub arms to which fiberglass poles are attached. How long can the stub arms be before you get into trouble? I don't know."

"Beats me", said the Doc. "But it looks as if the physical assembly of the Quad, particularly the amount of metal in the plane of the loops, has more to do with operation of this antenna than has been previously thought. I hope Wayne and other ex-

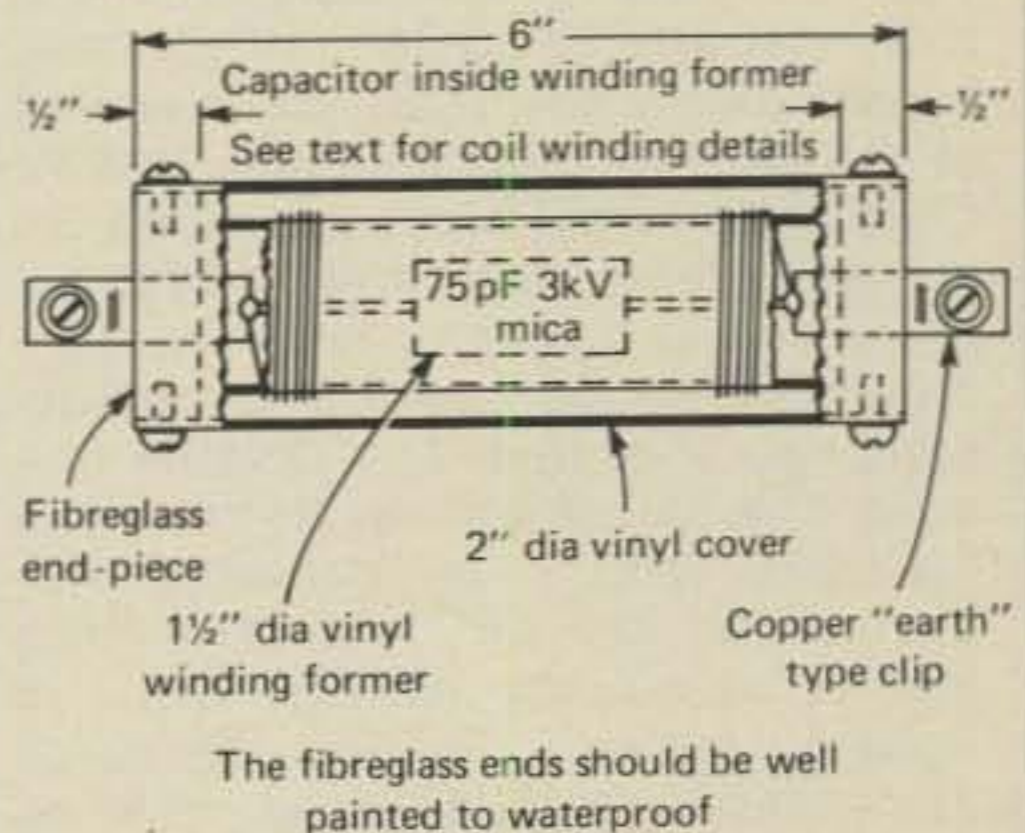


Fig. 8 - The original G3GND trap. Coil is 40 turns No. 20 enamel wire spaced wire diameter on 1 1/2 inch diameter form. Turns are adjusted for resonance at 3.7 MHz. The 40 meter trap consists of 20 turns No. 16 enamel wire on 1 1/2 inch diameter form, close-spaced. Trap is adjusted for resonance at 7.1 MHz. Drawings from *Radio Communications*, a RSGB publication.

perimenters can come up with some of the answers. But that's what makes antenna work so fascinating. As far as many hams are concerned, the design of an antenna is the last frontier in the exciting world of amateur radio!"

(Those amateurs interested in more information on the Cubical Quad antenna should take note of the publication "All About Cubical Quad Antennas", by W6SAI. It is available for \$4.75 plus 75¢ postage and handling from Radio Publications, Inc., Box 149, Wilton, CT 06897.)

For more information on *Radio Communication* magazine, contact the Radio Society of Great Britain, 35 Doughty St., London WC1N 2AE, England.

DX

News of communications around the world

Devoldere Scores First Five Band WAZ

He pulled it off! John Devoldere, ON4UN, premier low frequency DXer, is the first to qualify for the ultimate DX operating achievement, the 5-Band Worked All Zones award, and he did it in shocking time.

On June 30, 1979, exactly 6 months to the day after the 5-Band WAZ chase began, John's last 5 QSL cards arrived at the QTH of Leo Haijsman, W4KA, CQ's WAZ Award Manager. When we announced the award in late 1978 we predicted a year's time at the minimum before anyone would accomplish this feat, but ON4UN has done it in half this time. Not only did he make valid 2-way contacts with each of the 40 zones on each of the 5 bands, he already has the QSLs in hand to prove it. Getting the cards alone was expected to consume in excess of 6 months. Maybe John will follow up his successful book, "80 Meter DXing" with another entitled "How to QSL!"

Most DXers who qualify for WAZ equate the difficulty with working 250 or more countries. For those of you who haven't yet worked a WAZ this will provide a measure of appreciation of ON4UN's achievement.

John Devoldere is a 37 year old Belgian amateur with many DX and contest accomplishments. He was first licensed in 1961 at the age of 19, thanks in part to the efforts of Gaston Geirnaert, ON4GV, who was his first tutor. He progressed rapidly into contest operating, scoring a world record for 80 meters in the 1965 CQ World-wide Phone Contest and another world record in the multi-operator, single transmitter class of the 1969 CQ World-wide Phone Contest. John credits his early knowledge of antennas to Urbain Allayes, ON4UA. Some of the low frequency antennas he used in achieving 5-Band WAZ include an 85 ft. vertical, a delta loop at 79 ft. and several 1000 ft. Beverage antennas.

The staff of CQ and the CQ DX Award's advisory committee extend their congratulations to ON4UN on

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701...WA4NQG	713...W8LKG
702...WD8IXV	714...G4BSW
703...WD8MGQ	715...W0PSH
704...XE1VV	716...WB4VQO
705...K5JI	717...VK3NDY
706...WD5GX1	718...WB0TLL
707...G3NML	719...DK6CC

C.W.

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300...DL6KG/301	150...K1RH/150
275...OE3WWB/297	28 mHz...PA2TMS
200...W2FGY/225	3.57 mHz...PA2TMS
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this extraordinary achievement, 5-Band WAZ # ONE!

Contest DXpedition Info, But Not Much

For the want of a nail the shoe was lost and for the want of some s.a.s.e's this column was almost lost. In order to make the October issue with news of DXpeditions planned for the fall contests it's necessary for us to have the details in early July. This is very difficult as most groups are just beginning to formulate their plans. However, we did put together enough for an interesting column last year by sending a special request, accompanied by a self-addressed, stamped envelope to each group making a contest DXpedition the previous year. This time we tried to attain the same result by putting a notice in each of the major world-wide DX bulletins asking for the information by July 5. It wasn't enough. There is no substitute for that special sense of urgency which only a self-addressed, stamped



Janos Nemeth, HA5-142, has been a short wave listener in Hungary since 1925. He specializes on the 160 meter band and is renowned for his detailed logs of stations, events, frequencies, conditions and observations. Hopefully he will be transmitting someday. (photo via W1BB)

envelope can provide. Only the following responses were received in time for publication:

de N4MM: A group of Potomac Valley Radio Club members are planning a trip to Curacao for the CQ Worldwide DX C.W. Contest in November. To date, this group consists of K4VX, N4MM, W3LPL, N4RV and K3EST. It will be a multi-operator, multi-transmitter operation to shoot for the world record in this class. The Potomac Valley contesters already hold the world record for the multi-operator, multi-transmitter phone class.

de N6CW/K6SDR: I will be active from the British Virgin Islands again this year during the CQ Worldwide DX Phone Contest in October. It will probably be a multi-operator, multi-transmitter operation using the call VP2VDH. Some 6 meter operation is also planned.

de PY5GA: PY5EG and I plan another DXpedition to Trindade Island (PY0) in October. We will be there for 2-3 days. (It is not definite that this will occur during the contest - DX Ed.)

de W2LZX: Dave, N2KK, will be operating from Saipan as N2KK/KH0 during the CQ Worldwide DX Phone weekend in October and from J28 during the CQ Worldwide DX C.W. weekend in November. After the contest, Dave will join Scotty Meadows, K5CO, for a sweep through the FR7 countries Reunion, Juan de Nova and Glorioso. The usual DX frequencies will be used on both phone and c.w.

de N4KE: The North Florida DX Association plans to send 2 groups to the Carribean, 1 group for the phone weekend and the other for the c.w. weekend. QTHs have not been finalized, but VP5 and HH2 are strong probabilities.

de W1XK: The Yankee Clipper Contest Club plans to operate from St. Maarten and St. Martin during the Phone Weekend in October. We will be in the multi multi class from St. Maarten and multi single from St. Martin. The St. Maarten call will be K1CO/PJ7, but we do not have a definite call from St. Martin as yet. We will be active from Oct. 23 - 30 and will operate c.w. before and after the test using the call W1XK/PJ7. QSLs go via K3RYA for K1CO/PJ7 and via W1XK for W1XK/PJ7.

de GW4BLE: The '79 WELSH CONTEST GROUP', consisting of members from the Blackwood Amateur Radio Society, the Gwent



Olimpio Porcellini, I6PQO, is interested in becoming QSL Manager for several stations. He now handles cards for I6NOA as well as his own QSLs. If you would like to have a European QSL Manager and are a DX station, contact Olimpio at Via P.A. Valignani 119, 66100 CHIETI, Italy.

Contest Group and the Cardiff RSGB Contest Group, have joined forces to shoot for the European record in the CQ Worldwide Phone Contest. They will use the call GW6GW. The individual operators will include GW3GHC, GW3KYA, GW3NJW, GW3NWS, GW4BLE and GW4EAI, all of whom are first rate contest operators.

IMPORTANT NOTE: When applying for certificates and plaques (WAZ, CQ DX, WPX, and USA-CA), please make all checks payable to the appropriate Award Manager. For WAZ, make out check or money order payable to—Leo Haijsman, W4KA, 1044 Southeast 43rd St., Cape Coral, FL 33904. For CQ DX—Billy Williams, N4UF, 911 Rio St., Johns Drive, Jacksonville, FL 32211. For CQ DX—Bob Huntington, K6XP, 5014 Mindora Drive, Torrance, CA 90505 and for USA-CA—A. Edward Hopper, W2GT, P.O. Box 73, Rochelle Park, NJ 07662.

DX Club Officers

Periodically the CQ DX Department prepares a list of officers of radio clubs primarily oriented toward DX. This is done to recognize these officers for the contribution they make to DX, and also to facilitate communications between like-minded amateurs around the country. Unfortunately, some clubs are missing from the following list as they didn't respond to our inquiry or else the response went astray. If your club officers aren't shown please drop a note to K4IIF and we will include them in the next listing. The clubs are shown in alphabetical order:

Alamos DX Amigos: President, Bruce

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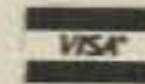
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CIRCLE 25 ON READER SERVICE CARD



Kurt von Escher, HB9OO, is an electronics engineer at the University of Bern and operates a pair of Drake twins from his apartment. He has almost 300 countries confirmed and is one of 2 Swiss hams to achieve 5-band DXCC. This is the 50th year for the Swiss Amateur Radio Union, USKA, and Swiss hams are using the prefix HB7 to commemorate the occasion. Since Switzerland is adding cantons, the H-22 award has been phased out, but there is a special award for working all 23 cantons this year with the HB7 prefixes. (photo courtesy WA4NTP)

Woodard, W5OSJ; Vice President, Derwin King, W5LUU; Secretary, Peggy DeLay, WA5GZO; and Treasurer, Dan DeLay, W5DUI.

Arkansas DX Association: President, Paul Wynne, AF5M; Vice President, Andy Toth, W5LQN; and Secretary/Treasurer, Leonard Mendel, K5OVC.

Canadian DX Association: President, Martin Rosenthal, VE3MR; Vice president, Mort Wolfson, VE3MJ; Secretary, Harry Mabson, VE3BZ and Treasurer, James Montagnes, VE3BIF.

Central Arizona DX Association: President, Edward Stearns, AA7A; Vice President and Secretary,



Ingmar Larsson, SM5 3583/SM0BHP, is a very active SWL with a reverse phase interest in amateur radio. Ingmar has a Class A ham license but pursues his SWL hobby first. He has over 300 countries confirmed and is interested in obtaining more U.S.A. cards. If you have an SWL card from Ingmar, he much appreciates a QSL back from you.

Thomas Taylor, W7RV and Treasurer, Lawrence Molitor, W7IUV.

Frankford Radio Club: President, Jay Gerber, N3AW; Vice President, Alan Donzinger, N3AD; Secretary, Howard Miller, N2MM and Treasurer, Lewis Thompkins, N2LT.

Greater Milwaukee DX Association: President, Bill Brossman, W9EQP; Vice President, Noll Amidzich and Secretary/Treasurer, Jerry Kolata, K9BN.

Honolulu DX Club: President, Pat Corrigan, KH6DD; Vice President, Gary Belcher, KH6GMP and Secretary/Treasurer, Joe Wiete, KH6GDR.

Kansas City DX Club: President, Steve Gecewicz, K0CS; Vice President, Bill Henderson, K0VBU; Earl Dryer, W0DHN and Dick Posz, AE0K.

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Mile Hi DX Association: President, Roger Preece, WB0RTZ; Vice President, Bob Pierce, WB0CGJ and Secretary/Treasurer, Joe Hart, WB0HAD.

National Capital DX Association: President, Bob Thames, K3RT; Vice President, Pete Huber, K3ZR; Secretary, Burt Cohen, W3GG and Treasurer, Dick Vincent, K3AO.

Northern California DX Club (1978-79 officers): President, Charlie Kump, W6ZYC; Vice President, Ted Davis, W6BJH; Secretary, Ron Rasmussen, K6OP and Treasurer, Howard Hale, W6SC.

North Jersey DX Association: President, George Wright, W2GW; Vice President, Arnie Freeman, W2YD; Secretary, Brother Pat Dowd, W2GK and Treasurer, Charlie Moraller, K2CM.

Potomac Valley Radio Club: President, Eric Scace, K3NA; Vice President, William McKinsey, WB3DNL; Secretary, Dick Boyd, WA3DSD and Treasurer, Melvin Roberts, W3MR.

Southeastern DX Club: President, Stew Woodward, K4SMX; Vice President, Dwight Dover, KA4C; Secretary/Treasurer, Dave Thompson, K4JRB and Activities Manager, Bob Harrell, N4OL.

Southern California DX Club: President, Dave Bell, W6AQ; Vice President, John Browning, W6SP; Secretary, Perry Esten, W6PN and Treasurer, Martin Woll, N6VI.

Southern New England DX Association: President, Bob Rudko, W1HSS; Vice President and Secretary, Bob Berger, K1VSK; Treasurer, Peter George, WA1HXH and Activities Manager, Bob Beaudet, W1YRC.

South Florida DX Association: President, Joe Picior, WB4OSN; Vice President, Norm Alexander, W4QQN;

Secretary, Rob Robinson, W2SR and Treasurer, Vic DuBois, N4TO.

Texas DX Society: President, Clarence Sharp, K5DX; Vice President, R. Jan Carman, K5MA and Secretary, John W. Stevens, K5JS.

Twin Cities DX Association: President, John Pembroke, W0NUH; Secretary/Treasurer, Hal Newell, WA0KDI and Director, Dick George, W0TRF.

The WAZ Program

10 Meter Phone

13...JA2FCZ
14...JA2LMA
15...JA8CFA
16...I0AMU

15 Meter Phone

16...N4MM

20 Meter Phone

232...EA8LD
233...JH1IAQ
234...G2AMV
235...K7ICW
236...SM4ACH
237...JA7BAL
238...CN8AK
239...ZL1BIL

80 Meter Phone

5...SP3GEM

15 Meter C.W.

14...JG1EIQ
15...JF3LBD
16...JH6BZI

20 Meter C.W.

82...JH7LMZ
83...DL1PM

All Band WAZ S.S.B.

1661...OZ4TT	1674...SM7BOL
1662...JH6OFX	1675...W6AED/7
1663...W0PSH	1676...WB8FIW
1664...F3SG	1677...EA2QU
1665...IV3YRN	1678...DJ9NB
1666...WA2NHE	1679...ZL1BOQ
1667...SM5CSS	1680...LU3EX
1668...SP5JB	1681...W9NB
1669...WA6IJZ	1682...WA4HDD
1670...I0AAF	1683...W2IOZ
1671...W4LCL	1684...WB6PEF
1672...W4TJC	1685...KL7JFJ
1673...WA6CPP	1686...WB0NHD

C.W. Phone

4564...N2KA	4579...W2PK
4565...K1RH	4580...SP1CTN
4566...N6UH	4581...IT9QDS
4567...W9AMM	4582...K1EM
4568...HB9BGI	4583...W8NZD
4569...W8IMZ	4584...K1SA
4570...HB9ARE	4585...WD4IHV
4571...JF1DMY	4586...DL6SS
4572...OH6AC	4587...DF3FJ
4573...JA3EOP	4588...W8LKG
4574...WB9YXY	4589...KB4QB
4575...SP2WI	4590...WB9VWI
4576...JA0GCI	4591...K1TO
4577...F9XL	4592...JE1WIH
4578...JA1EZE	4593...JA7DUI

All Phone

554...W4NYN
555...W3KHQ

The complete rules for WAZ are found in the May 1976 Issue of CQ Magazine. Application blanks and reprints of the rules may be obtained by sending a self addressed stamped envelope, size 4 1/2 x 9 1/2 to the WAZ Manager, Leo Haijsman, 1044 S.E. 43 Street, Cape Coral, Florida, 33904. Applicants forwarding QSL cards direct to the WAZ Manager should include sufficient postage for the safe return of their QSL cards. Please note that effective June 1, 1979 the processing fee for all CQ certificates was raised to \$5.00. This fee must accompany all applications.

Virginia Century Club: President, Pete Cyr, AF4H; Vice President, Glynn Bashford, K4TIA and Secretary/Treasurer, Richard Cook, WA4OUF.

Western Washington DX Club: President, Tom Owens, K7RI; Vice President, Mike Lamb, K7CAZ; Secretary, Sam Rubin, WB7FFF and Treasurer, Gerry Johnson K7YDO.

Heard Island

There hasn't been any amateur activity from rare VK0, Heard Island, since 1970, and the *West Coast DX Bulletin* now estimates this country to be number 5 on the most needed list.

The first operation from Heard Island took place in 1949 and in later years the Australian government maintained a cable station on the island. Some buildings from this installation are still intact at Atlas Cove, but the station has been abandoned for many years and visits to



Bob Sommer, N4UU/W4CRW, qualified for the WPX Award of Excellence including the 160 Meter bar, in January 1977. If the ultimate award for prefix hunters interests you, contact Bob Huntington, K6XP, our WPX Award Chairman for complete details. (photo courtesy K6XP)

the island are rare. The antarctic supply vessels from Australia stop every year or two to check on the island wildlife.

Although many of the most rare countries on the DXCC list are bare rocks or sandbars, Heard Island is an "honest" island, being roughly 20 miles wide and 35 miles in length. The most significant geographic feature is Big Ben, a massive, ice-capped mountain in the center of the island. There are other important peaks including Mt. Olson. The latitude and

longitude of Heard Island is 72° south and 53° east. It is part of the same ocean ridge as FB8X, Kerguelen Island, which lies to the northwest.

Recent activity from Heard Island included that of Don Miller, W9WNV, who signed VK2ADY/VK0 for a short interval in 1966. The USCG cutter *Southwind* made a brief stop in early 1968, the summer period on Heard Island, during which the island was activated by Bill Rohrer.

The most lengthy operation took



The 4th amateur world-wide to receive the 10 meter single band WAZ is M. Nakamura, JH1ARC. He is 29 years old, married with 2 daughters, and the superior of a Buddhist temple. His rig is a TS-820 to a 5-element, homebrew yagi up 51 feet.

The WPX Program Mixed

752...WB2SJJ	758...KB4QB
753...AA4NC	759...JE1BQE
754...N0ZA	760...I1ZEU
755...AB5C	761...K9SM
756...HB9BGI	762...WD4IHV
757...K3RL	763...JA1SXH

S.S.B.

1165...F6DZU	1171...JE1BQE
1166...I8TWB	1172...J11NOY
1167...F3SG	1173...I8QAF
1168...DK5VA	1174...K9SM
1169...JA1RCE	1175...LU5EPI
1170...JA1SHY	1176...WA1TPR

C.W.

1832...WB2SJJ	1838...I3HDH
1833...N2GG	1839...K1RH
1834...JA1GLT	1840...VE7AVC
1835...DK8VU	1841...K9SM
1836...JH1KYY	1842...JA3BAG
1837...WN4KKN	

WPNX

159...WD0AVG	160...I5XYU
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VPX

162...DL-L05-161771

Mixed: ...400 WB2SJJ, AA4NC, N0ZA, AB5C, K3RL, JE1BQE, WB4IHV, JA1SXH. 450 AE1T, KB4QB. 500 I1ZEU, WB2SJJ, AB4Z. 550 PA0TO. 600 N5FG, K9SM. 650 HB9BGI. 700 DJ8WD. 800 WA0TKJ, I8RFD, N4VA. 850 H18LC. 900 K8LJG. 1350 K2POA. 1700 YU2DX. SSB: ...300 DK5VA, JA1SHY, JE1BQE, J11NOY, I8QAF. 350 I8TWB, JA1RCE. 400 F3SG, KL7AF, WA1TPR. 500 I6ZJC, I0PSB. 550 K9SM. 600 F6DZU. 800 W4BQY. 1000 XE1J. 1650 I0AMU. CW: ...300 JA1GLT, DK8VU, JH1KYY, WN4KKN, K1RH, K9SM, JA3BAG. 350 WB2SJJ, JH3XCU. 400 VE7AVC. 450 GW3SB. 500 N2GG, SM6AYM, I3HDH, I2DMK. 600 AA4A. 700 JA2IU. 1050 K5UR. 1100 N2AC. 1400 DL1QT.

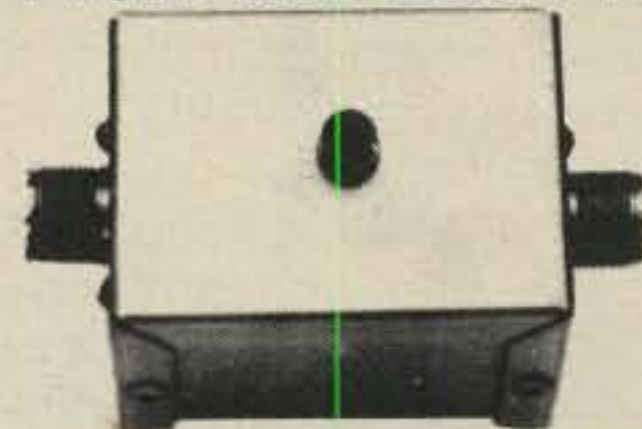
10 meters:	N8II, JA1RCE.
15 meters:	N8II, N4WX, JA7HMZ, W2NC.
20 meters:	AE1T, I3HDH.
160 meters:	WA0TKJ.
Africa:	N5FG.
Asia:	W2CC, SM6AYM, HB9BGI, N4VA.
Europe:	N8II, WB2SJJ, JE1BSD, HB9BGI, N4VA, JH3XCU.
No. America:	GI4FUM, AE1T, WB2SJJ, N0ZA, AB5C, HB9BGI, KL7AF, N4VA.
Oceania:	KL7AF, JE1BSD.

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, 5014 Mindora Dr., Torrance, Calif. 90505. USA. The processing fee for WPX awards is \$5.00 per certificate and \$1.00 for endorsement stickers.

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Leo Snowden, 9H1CH, of Malta qualified for certificate #2, 10 meter c.w., single band WAZ and #4 on 15 meters. Leo retired in 1970 as Deputy Chairman of the largest department store group in England and is pursuing his favorite hobby, c.w. DXing on 10 and 15 meters. He was first licensed in 1927 as 6XP, later G6XP, and relicensed in 1946 as G2BW. He uses a Yaesu FT-501 barefoot to a TH3 Jr. or an 18 AVT.

place in 1969 when VK0HM was put on the air by Hugh Milbourn who remained on the island for several months under the auspices of the U.S. Coast and Geodetic Survey. It was activated again in the spring of 1970, but as key and mike have been conspicuously quiet for the past 9 years Heard Island has moved steadily up the list of needed countries. After the recent activity from Spratly and Bouvet it is probably now in the top 5 as last year's poll showed 75% of the respondents needed Heard Island.

Australian DXers are looking for a way to put Heard Island on the air again. The best possibility is to seek transportation via one of the Australian antarctic supply vessels bound for the subcontinent this winter, antarctic summer, December-February. Nothing is definite, and years may go by before Heard Island



Franz Langner, DJ9ZB (left) operating from OE6XG/A on Abu Ail, one of the rarest of countries for DXCC and the CQ DX Awards. Franz has many firsts in the CQ DX Award Program including #1 on 10 Meter Single Band WAZ, s.s.b. mode. On the right is the QTH for the OE6XG/A operation. All the equipment, food and water had to be carried to the top of the mountain by hand with the temperature over 40°C and 95% humidity. QSL OE6XG/A via WA3HUP. (photo courtesy DJ9ZB)

The WPX Honor Roll

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ Master prefix list. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or to confirm present total. If no up-date, file will be placed into "inactive" until next up-date.

Mixed

1760	K6JG	1433	W9DWQ	1199	N6JV	1023	YU1ODS	848	W6ANB
1751	F9RM	1428	N4MM	1150	W0AUB	1016	SM7TV	844	K8CH
1745	W4WV	1424	W4BQY	1123	I2PHN	1015	W0SFU	835	PA2TMS
1742	K6XP	1415	DJ7CX	1121	YU1AG	1000	SM6DHU	831	JA1AG
1703	YU2DX	1401	PA0SNG	1120	YU2OB	952	WA2AUB	830	W0IUB
1525	W2NUT	1368	W8LY	1120	N4NO	950	JH1VRQ	811	W9WHM
1514	W3PVZ	1361	K5UR	1109	I6SF	949	WA6TAX	811	YU3EY
1514	W2NC	1297	N6CW	1095	K6ZDL	938	W0SD	782	YU4EBL
1512	VE3GCO	1286	AA4A	1095	I0JX	925	I3ANE	755	YU2CBK
1502	W7LLC	1254	W9FD	1094	WA0KDI	902	K7NHG	605	I4BFY
1487	N4UU	1250	WB4KZG	1066	WA1JMP	902	K6DT		
1477	YU1BCD	1250	N6AV	1065	K5DB	900	K8LJG		
1476	ON4QX	1235	N2AC	1063	W8CNL	873	N6JM		
1450	K2VV	1200	N9AF	1062	DL1MD	860	PY4OD		

S.S.B.

1650	F9RM	1200	I4ZSQ	1017	F2MO	908	I0MBX	789	W2NC
1621	I0AMU	1193	PA0SNG	1007	N4UU	900	WB4KZG	722	WA2AUB
1600	W4UG	1182	YU1BCD	1000	N2SS	896	DJ7CX	720	N2AC
1535	K6XP	1170	ZL3NS	975	WA6TAX	825	YU1ODS	709	ZP5RS
1465	K6JG	1150	K2VV	967	I2PHN	809	YU1AG	702	N4NO
1352	K2POA	1148	K5UR	957	W6RKP	808	OZ5EV		
1339	I8KDB	1142	W9DWQ	948	DL1MD	805	W4BQY		
1300	I8YRK	1102	AA4A	938	OE2EGL	802	PA2TMS		
1250	N4MM	1051	WB2NYM	909	PY3XW	800	JH1VRQ		

C.W.

1427	W8KPL	1158	W9FD	1000	K2VV	788	YU1ODS	650	JH1VRQ
1382	DL1QT	1101	G2GM	986	N4NO	729	OY4OD	647	W9OYZ
1350	W8LY	1090	W3ARK	976	WA0KDI	728	I5IZ	623	JE1JKL
1341	K6JG	1087	W4BQY	973	K6ZDL	700	WB4KZG	612	WA2AUB
1333	W2NC	1086	N2AC	936	IT9AGA	698	OK2BLG	607	I1TLA
1287	K6XP	1056	WA2HZR	916	YU1AG	676	SM0GMG		
1230	N4UU	1044	K5UR	905	N4MM	668	LZ1XL		
1202	YU1BCD	1031	DJ7CX	877	I6SF	660	DL1MD		
1162	N6JV	1012	VO1AW	802	KH6HC	658	EA2OP		

Complete rules and application forms are available for the CQ DX Awards program. Send a business size, No. 10, envelope, self-addressed and stamped to: "CQ DX Awards", 911 Rio St. Johns Dr., Jacksonville, Florida 32211 U.S.A. The processing fee for CQ Awards is now \$5.00/certificate and \$1.00 for endorsement stickers.

is again activated. Money will be needed so perhaps this is a good one for the Northern California DX Foundation to look at. What say guys!?

Nigerian Prefixes

Prefixes for the 20 Nigerian states are as follows: 5N1 - Ogun & Oyo, 5N2 - Kwara & Niger, 5N3 - Ondo & Bendel, 5N4 - Rivers & Anambra, 5N5 - Imo & Gross Rivers, 5N6 - Gongola & Bauchi, 5N7 - Burno & Kano, 5N8 - Bemie & Plateau, 5N9 - Kaduna & Sohoto and 5N0 - Lagos & Abujo.



Credits and Acknowledgements

The life's blood of a DX column in a monthly magazine are the weekly bulletins and DX club publications which provide us with a far greater breadth of news than we could possibly collect over the air. Our special thanks to the following, with the editor's callsign shown in parentheses where possible: *Balanced Modulator* (N4UF), *DXers Magazine* (W4BPD), *DX News-Sheet* (Geoff Watts), *DX'Press* (PA0TO) *Kansas City DX Club Bulletin* (K0CS), *Long Skip* (VE3FRA), *Long Island DX Bulletin* (W2IYX), *Northern California DX Club-The DXer* (WB6RIU), *North Florida DX Association Bulletin* (WB4EYX), *Southern California DX Club Bulletin* (W6ET), *The Totem Tabloid* (K7ZR) and the *West Coast DX Bulletin* (WA6AUD).

We also thank *HR Report* for permission to use items of DX interest from their weekly newsletter, and Jack Gutzeit, W2LZX, CQ's advertising manager. Jack is an avid DXer and a continuing source of hot DX news.

Those Confusing Russian Zones

One of the most frequent requests to the DX Department is from DXers asking for help in identifying the zones of UA9 and UA0 stations. This,

of course also includes UK9 and UK0, UV9 and UV0, and UW9 and UW0. The following guide will help you in this regard. The location and oblast are shown in parentheses for those who are interested in this additional information.

Zone 16: UA9WAA-WZZ (Bashkir, 084) and UA9SAA-SZZ (Orenburg, 167).

Zone 17: UA9AAA-AZZ (Chelyabinsk, 165); UA9CAA-CZZ (Sverdlovst, 154); UA9FAA-FZZ (Perm, 140); UA9GAA-GZZ (Komi-Permlak, 141); UA9JAA-JZZ (Khanty-Mans, 162); UA9KAA-KZZ (Yamal-Nenets, 163); UA9LAA-LZZ (Tumen, 161); UA9QAA-QZZ (Kurgan, 134); and UA9XAA-XZZ (Kumi, 090).

Zone 18: UA9HAA-HZZ (Tomsk, 158); UA9MAA-MZZ (Omsk, 146); UA9OAA-OZZ (Novosibirsk, 145); UA9UAA-UZZ (Kemerova, 130); UA9ZAA-ZZZ (Gorno-Aital, 100); UA0AAA-AZZ (Krasnoyarsk, 103); UA0BAA-BZZ (Talmyr, 105); UA0HAA-HZZ (Evenk, 106); UA0OAA-OZZ (Buryat, 085); UA0SAA-SZZ (Irkutsk, 124); UA0TAA-TZZ (Ust-Orda Buriat, 174); UA0UAA-UZZ (Chita, 166); UA0VAA-VZZ (Aginsk Buriat, 175) and UA0WAA-WZZ (Kahkass, 104).

Zone 19: UA0CAA-CZZ (Khabarovsk, 110); UA0DAA-DZZ (Jewish, 111); UA0FAA-FZZ (Sakhallin, 153); UA0IAA-IAA (Magadan, 138); UA0JAA-JZZ (Amur, 112); UA0KAA-KZZ (Chukotka, 139); UA0LAA-LZZ (Primorye, 107); UA0QAA-QZZ (Yakutsk, 098); UA0XAA-XZZ (Koryak, 129) and UA0ZAA-ZZZ (Kamchatka, 128).

Zone 23: UA0YAA-YZZ (Tuva, 159).

QSL Information

C5ABK - Via G3LOP, R. Brown, 32 Albert Rd., Sutton, Surrey SM1 4RX, England

CM7FM - To Box 247, Ciego de Avila, Cuba

CT2CF - c/o WA4MAV

DA1WA/HB0 - Via DJ0LC

EA9FH - To Box 252, Melilla, Via Spain

FB8XV - c/o F5VU

FK8CR - To W7OK

FY7ITU - Via FY7AN

FY0E00 - To F6DQM

HD1A - c/o WA4QMQ

HD9X - Via K8LJG

H18XDF - c/o K3SWZ

HM1DH - To K1GI

HZ1SH - c/o Box 3366, Jeddah, Saudi Arabia

J3ABN - To WB4SGV

J6LIY - Via WA1IOB

J7DB - c/o Accountant General's Office, Rouseau, Dominica

J20BS - Via WA3HUP

JY8FG - To I2FGP

KA7AXB/HC1 - c/o Box 691, Quito, Ecuador

KG6DX - Via W100

KG6SW - To W7OM

KH6XX - Via W3HMK

KV4KV - c/o N200

KZ5GH - Via WB2DCP

N5RM/KC6E - To N5RM

OE6XG/A - c/o WA3HUP

OX3CO - Via WB3KGY

P29EJ - To Box 1486, Lae, Papua New Guinea

S8AAA - P.O. Box 750, Umtata, Transkei

T2AAA - Bob Taylor, c/o Weather Station, Funafuti, Tuval Islands, Pacific Ocean

TK6ITU - Via F6DCQ

TY9ER - To W2TK

VK0XU - Via K4CF

VP2MEC - c/o K4TVE

VP2MH - Via W8HM

VP2VJ - To VE3MJ

VP8QE - W/K and VE

Amateurs via K8FLI, 10006 N. Market, Hartsville, OH 44632

VQ9MR - c/o N5GU

VR1CA - Via WA3UTA

VR3AR - To W7OK

VR6HI - c/o ZL1ADI

VS5M - Via N4GG

VS5SW - To K4SMX

WA7JRL/SU - c/o W8LZV

XE1FR - Via W5QK

XE1SDN - c/o Box SM 6021, Mexico City, Mexico

XE2Y - To Box, 267, Laredo, Mexico

YA0AA - Via EP2EX

YN1JCC - c/o Box 52, Managua, Nicaragua

YV0AA - Via YV5AJ

ZF1SV - To VE7BXG

ZF2CL - c/o DK7PZ

1S1DX - Via VK2BJL

3B6CD - To 3B8CD

3B8FA - c/o 3B8DU

3V8AA - Via IS0LYN

5H3VT - To K5VT

5N0NAS - c/o WB9MFC

5V7AR - Via F6ACB

6W8EX - To R.E.F., Boite Postal 70, 75 Paris 12 France

6W8GT & 6W8MW - Jack C. Lockhart, 2918 W. La Verne Ave., Santa Ana, CA 92704

7X4AN - DJ2BW

8P6KY - Via P.O. Box 814E, Barbados

9J2BO - c/o W6ORD

9N1BMK - To JA8BMK

9N1DRL - c/o YU3DRL

9V1VV - Via Box 214, Singapore 28, Singapore

9X5OM - To DK3MO 73, John, K4IIF

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CIRCLE 4 ON READER SERVICE CARD

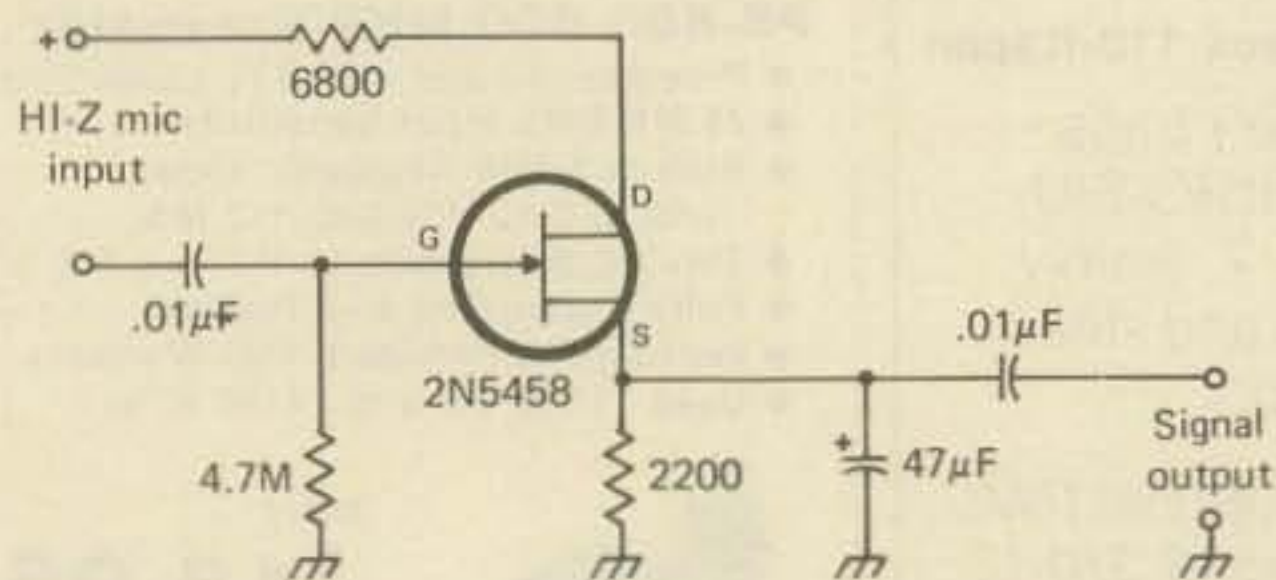
GRANIUM QUERIES



"FIND THE ERROR"

BY MARTIN BRADLEY WEINSTEIN, WB8LBV
130 Coe Avenue, Apt. 73
East Haven, CT 06512

WHAT'S WRONG?



HIGH IMPEDANCE PREAMP

I know the biasing resistor values are right (I copied them from a book). And the N-channel JFET leads are right. The caps look logical, so why won't it work?

(Solution next month)

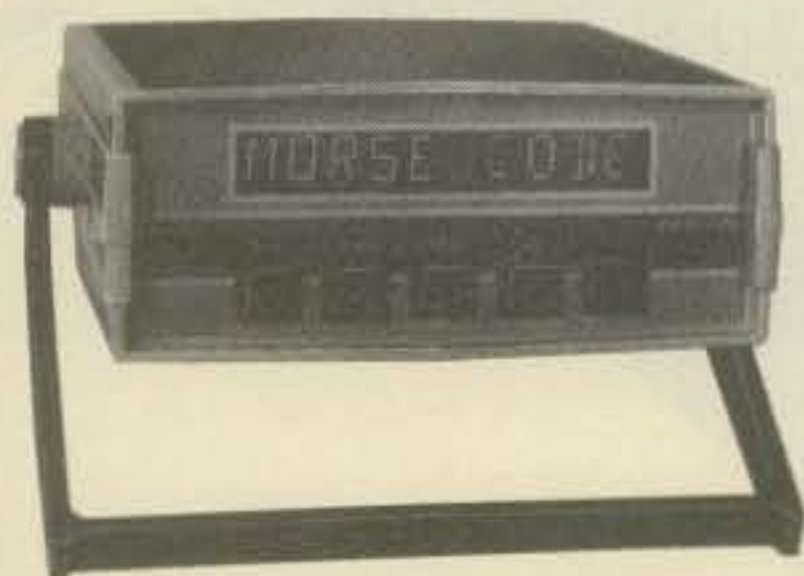
This month we're introducing a new feature, called "Find The Error," a spot quiz on circuitry to amuse and perhaps embarrass you. After all, for many years devoted readers of **CQ** have picked up unintentional errors and picked nits by the hundreds which have plagued and embarrassed us, so this feature is only fair. The gremlins are striking back twofold.

First you can have the pleasure of finding the error thereby exclaiming aloud "Ahaaaa" and putting you one up on your friend who can't figure it out and secondly, it makes you reason out a little theory while giving you an interesting construction project.

The answer and corrected diagram will appear next month along with the next diagram. Of course, this will not replace our own goofs and errors, so check the "Our Readers Say" and "Announcements" columns from time to time for those corrections.

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CIRCLE 42 ON READER SERVICE CARD

Awards

News of certificate and award collecting

"Experiences of 5½ Years in the Military"

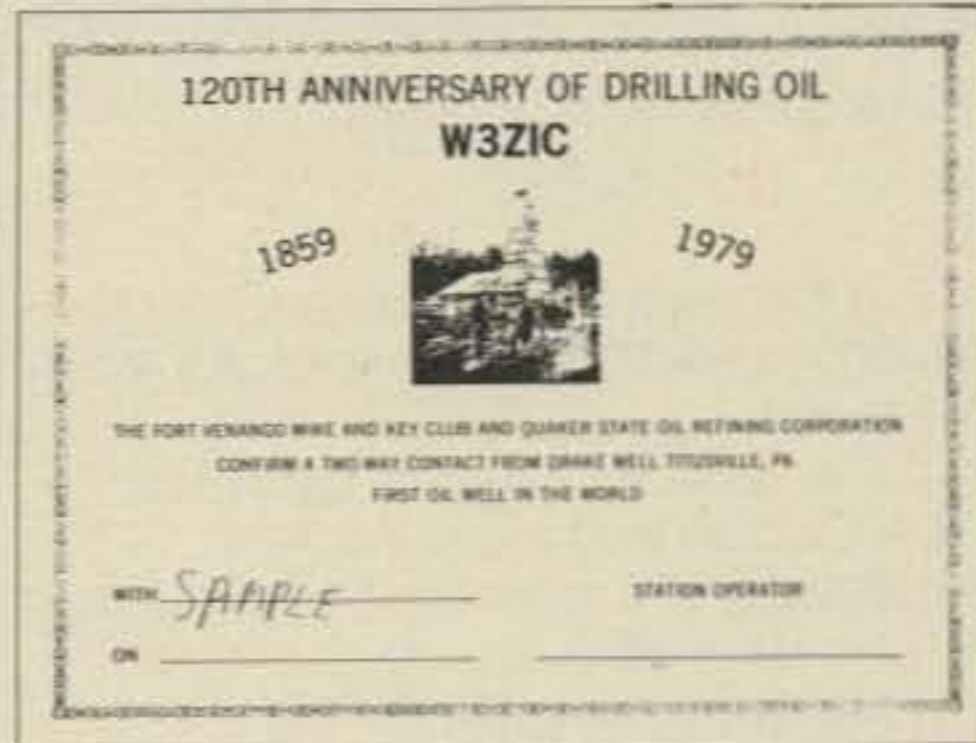
Garnet H. Downing, W7CUJ
All Counties #210, 1-3-79.

"In September 1940, Uncle Sam said he wanted me in the Army to train selectees. I started at the Field Artillery School teaching communications. That got to be a drag, so I asked to be returned to the FA. General Grunther (then Major) tried to talk me out of it, but I said NO NO NO. If I had stayed I'd be set with regular promotions and a very dull job.

When I got back to the 3rd Division I was the communication specialist for the whole division with nothing to do but overhaul the communications, that was a challenge. I must have pleased General Anderson because the XYL and myself were 'the fair haired ones' much to the chagrin of some of the higher ups (I was just a 1st Lt.). I got my recommendation for Captain out of it, but as usual, politics reared its ugly head and just because I hit 35, I was too old for combat. The Signal Corps had its eye on me and even with all the clout I had, I was transferred to the Signal Corps at Fort Lewis and was told to install a dial system on the post. That was an interesting job, and when it was finished I was ordered to Ft. Ored, California as a C.C. of a Military Police Co. I did not have a high opinion of MPs but I got along fine. From there I was sent to Camp Haan at Riverside as Post Signal Officer. Later I got the job of organizing Radar Repair Shops. I soon found out they had been investigating me for 6 months before I got that job. In those days you did not dare mention the word "RADAR", it was all so top secret.

My promotion to Captain finally caught up with me, it had been chasing me for 5 months and as I had not actually been sworn in as Captain, so I lost 5 months Captain's pay.

*P.O. Box 73, Rochelle Park, NJ
07662



120th Anniversary of Drilling Oil
(Please keep at it—Hi.)

I set up one shop in S.D., one in LA and one in Camp Haan. That was a beautiful assignment, my XYL acted as my right hand, without pay, as it was against regulations to have her on the payroll.

Just as that job became routine, I was ordered to start inspecting all the radar locations and report to the Chief Signal Office in Washington, D.C. After some run-ins with a Captain from the Pentagon, we became

good friends and he promised to help me get sent overseas - I did not want to have to tell my son that I was a desk soldier all through the war.

Next thing I knew, I was ordered to Camp Kohler to set up a Signal Corps training center. After many different experiences, I got the job of designing and installing a telephone system for the camp.

After that job I got orders to go to the Command and General Staff School at Ft. Levenworth, then to the Advanced Signal Corps School at Ft. Monmouth.

Then to Camp Crowder and more unusual experiences. I was recommended for Major, but before it came through (due to the help of that aforementioned Captain from the Pentagon) my overseas assignment came through.

I embarked on the S S Luraline and spent time all over the South Pacific and ended up in the hospital with "jungle rot".

They finally let me go to the PIs and later I ended up on General MacArthur's Staff as officer in charge of



Station of Gar Downing, W7CUJ

installation of communications for the landing craft tanks, etc., that were to make the Kaushu landing in Japan.

After things came to a screaming halt, General Mac said all those who had enough points could go home. I had enough so I put in to go home. I was offered immediate promotion to Major if I would go to Japan as part of the Occupation Forces. NO WAY, I said and in 3 months I was back in the states and out. That was enough wars for me".

(Note: This was a rather different story, but I thought you would all like it, 73, Ed.)

Awards Issued

Clayton Baenziger, W8NJC waited until he had them *all* and then collected USA-CA-500 through all counties.

Jim Latimer, WB9OOE finally collected those last few QSLs to grab All Counties endorsed ALL A-3.

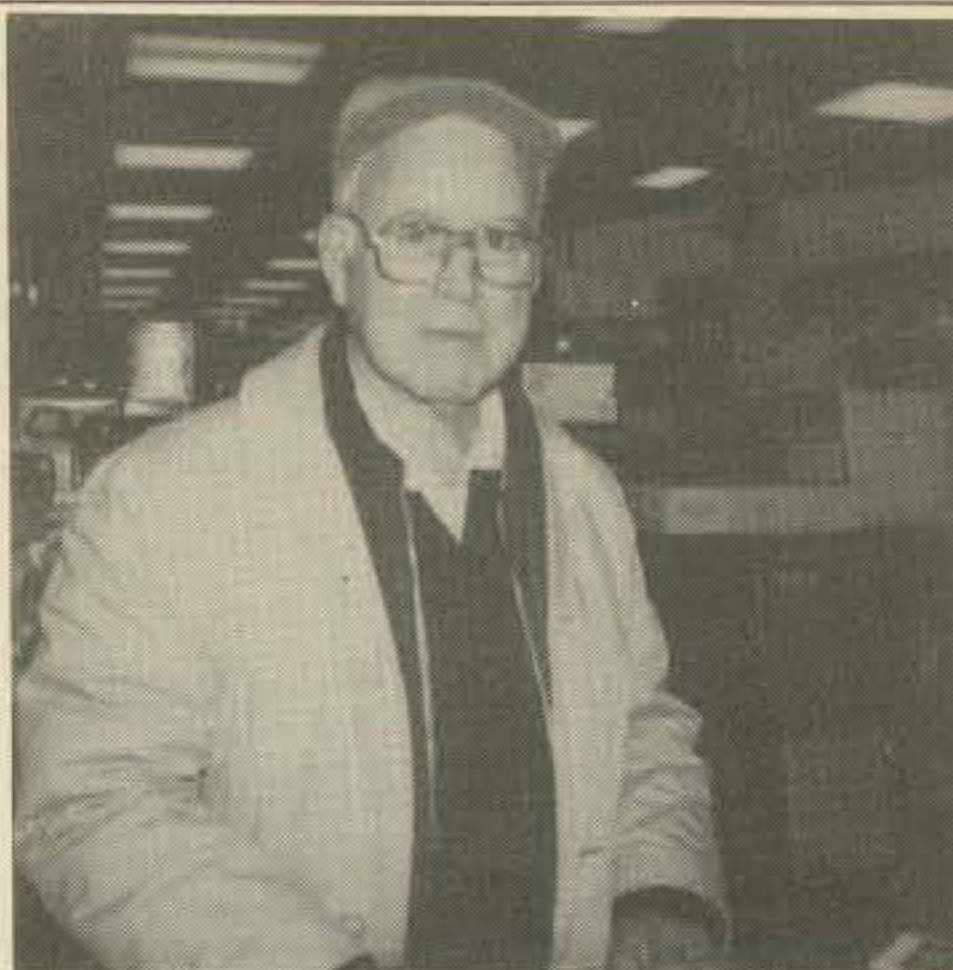
Bob Rennie, VE3IR obtained USA-CA-3000.

Karel Tettelaar, VE7ATH (ex-VE6AAV) added USA-CA-2500, endorsed All SSB, to his fine collection. Karel's wife, Margaret, VE7ATI (ex-VE6ABP) has All Counties #133, dated 7-12-75.

James Hood, W0PUD came through with his application for USA-CA-500 and 1000 endorsed All SSB, All Mobiles, All 20, All 75. USA-CA-1500 endorsed All SSB, All Mobiles, All 20. USA-CA-2000 endorsed All SSB, All Mobiles.

Mat Santos, CT1TZ claimed USA-CA-1500 and 2000 endorsed All SSB.

Bob Craig, K6XZ (exWA2GMD) applied for USA-CA-2000.



Mike Gilmore, K7CLO All Counties-#197.

Pat Callaway, N4AOB sent for USA-CA-500 and 1000 endorsed All SSB, All Mobiles.

John Bruce, K6AYB qualified for USA-CA-500 endorsed All A-1.

USA-CA-500 certificates endorsed Mixed were sent to:

Taichiro Ishida, JA1KF.

Billy Koehl, WA8QPU.

Hans Thorgren, SM5BRW.

Awards

Portuguese Counties Award (DCP): The Portuguese "COUNTIES" Award, sponsored by ARP (Associacao de Radioamadores Portugueses) is issued for confirmed contacts with specified number of Portuguese "Counties" under rules and conditions as follows:

A. Award Classes: The DCP is issued in 4 classes, according to the type of station used by the applicant:

- Class A - HF, fixed.
- Class B - HF, mobile
- Class C - VHF fixed.
- Class D - VHF, mobile

B. Grades: According to the number of Portuguese "Counties" confirmed, one may achieve the following grades:

- Grade I - 75 Counties (basic award).
- Grade II - 125 Counties
- Grade III - 175 Counties
- Grade IV - 200 Counties
- Grade V - 225 Counties
- Grade VI - 250 Counties
- Grade VII - 274 Counties

C. Conditions:

1. "DCP" is available to all licensed amateurs and club stations anywhere and it is issued to them for all contacts made, regardless of calls held and date. However, their DXCC country must remain the same during operations for the award.
2. This award is not available for SWLs.
3. Counties worked under 2 or more classes cannot be combined.
4. QSLs must be in one's possession.
5. QSLs found to be altered in any way will disqualify applicant.

D. County Identity:

1. Unless otherwise indicated on QSL cards, the QTH printed will determine county identity.
2. When in doubt, the "LISTA DO CODIGO POSTAL", issued by the Post Office, will be the official guide. This booklet is available from ARP (Price U.S. \$2.00)
3. For mobile or portable operations: when in doubt of location, mobile stations should name the nearest municipality as identified by road sign or road map.

E. Administration of the Award:

1. The Award will be administered by ARP, P.O. Box 2145, 4021 Porto Codex, Portugal. All applications and information requests should be sent to this address.

IMPORTANT NOTE: When applying for certificates and plaques (WAZ, CQ DX, WPX, and USA-CA), please make all checks payable to the appropriate Award Manager. For WAZ, make out check or money order payable to—Leo Haijsman, W4KA, 1044 Southeast 43rd St., Cape Coral, FL 33904. For CQ DX—Billy Williams, N4UF, 911 Rio St., Johns Drive, Jacksonville, FL 32211. For CQ DX—Bob Huntington, K6XP, 5014 Mindora Drive, Torrance, CA 90505 and for USA-CA—A. Edward Hopper, W2GT, P.O. Box 73, Rochelle Park, NJ 07662.



Jan Slama, OK2BKR USA-CA-500-#1223 Photo: Courtesy Bob, W6MPZ.

**Special Honor Roll
All Counties**

#229 Clayton Baenziger, W8NJC
6-27-79
#230 James H. Latimer, WB9OOE
7-9-79

F. Record Books and Bookkeeping:

1. Application for Basic Award is made in a special booklet (Publication no. 1) available from ARP or from WB9RCY, U.S./CANADIAN coordinator - Price U.S. \$1.00.
2. This booklet becomes the property of ARP, for record purposes. It is recommended that one should have a second copy for your personal file.
3. Subsequent applications for higher grades should be made in special log sheets (Publication no. 2) available from ARP. (Price U.S. \$30).

G. Application:

1. Basic Award:

Make necessary entries in publication no. 1 (Record Book). Have it certified and signed by 2 licensed amateurs (any class) or an official of a legally recognized amateur organization. Mail it to ARP, P.O. Box 2145, 4021 Porto Codex, Portugal and include handling fee and award postage of U.S. \$2.50 or equivalent in any other currency.

2. Additional Seals:

Make necessary entries in special log sheets (Publication no. 2). Have them certified and signed by 2 licensed amateurs (any class) or an official of a legally recognized amateur organized organization. Mail it to ARP, and include handling fee and postage of U.S. \$50 or equivalent in any other currency. (Thanks to Dorothy, WB9RCY for all this data).

JARL Awards Program: As promised a few months ago, here is data on the Awards of the Japanese Amateur Radio League.

USA-CA Honor Roll

3000	1500	500
VE3IR 260	W0PUD 425	JA1KF 1359
W8NJC 261	CT1TZ 426	W0PUD 1360
2500	W8NJC 427	N4AOB 1361
W8NJC 324	1000	WA8QPU 1362
VE7ATH 325	W0PUD 544	K6AYB 1363
2000	N4AOB 545	W8NJC 1364
W0PUD 368	W8NJC 546	SM5BRW 1365
CT1TZ 369		
K6XZ 370		
W8NJC 371		

Rules:

1. JARL awards will be issued to any amateur or listener on payment of a fee of eight IRCs.
2. Each claim must be accompanied by a list showing the data of the two-way communications achieved for the award concerned.
3. Each list must be accompanied by documentary proof in the form of letters or cards showing that two-way communication has taken place, or by a statement from the applicant's national society or from any two amateurs other than applicant himself, that the necessary cards have been checked.
4. Cards will be returned by registered mail at no additional cost.
5. Contacts with maritime or aeronautical mobile stations will not be accepted.
6. Cards dated on and after July 30, 1952 only may be submitted as proof of contact.
7. Endorsements will be added upon request for earned operating distinctions as follows:

AJD, SWL-AJD	1.9 MHz, 3.5 MHz, 7MHz, 14MHz,
WAJA, HAJA,	21 MHz, 28MHz, 50MHz
JCC, SWL-JCC	CW, AM, SSB, FM, SST, RTTY, ATV.
JCG, SWL-JCG	SATELLITE
WACA, HACA,	
WAGA, HAGA	
HAC, ADXA,	1.9MHz, 3.5MHz, SSTV, RTTY.
SWL-ADXA.	

8. Contacts may be made from any location in the same call area, or if no call area exists then from the same country.
9. Contacts with KA stations will not be accepted. They are considered not amateur but military.
10. All correspondence should be sent to: Awards Manager, Japan Amateur Radio League, P.O. Box 377, Tokyo Central, Japan.

All Japan Districts (AJD): This award may be claimed for two-way communications with amateur stations located in all ten (1 through 0) Japanese call districts.

Worked All Japan (WAJA)/Heard All Japan (HAJA): This award may be claimed for two-way communications (or by listeners) with amateur stations located in all forty-seven Japanese prefectures.

Japan Century Cities (JCC): This award may be claimed by any amateur (or listener) for two-way communications with amateur stations

located in at least one hundred Japanese cities. JCC-100, 200, 300, 400, 500, 600 will be issued as separate awards.

Japan Century Guns (JCG): This award may be claimed by any amateur (or listener) for two-way communications with amateur stations located in at least one hundred Japanese cities. JCC-100, 200, 300, 400, 500 will be issued as separate awards.

Heard All Continents (HAC): This award may be claimed by any listener who can produce evidence of having heard signals from amateur stations in all six continents.

Asian DX Award (ADXA): This award may be claimed by any amateur (or listener) for two-way communications with amateur stations located in at least thirty Asian countries (according to DXCC rules) including Japan.

Worked All Cities Award (WACA)/Heard All Cities Award (HACA): This award may be claimed by any ama-

teur (or listener) for two-way communications with amateur stations located in all the existing Japanese cities.

Worked All Guns Award (WAGA)/Heard All Guns Award (HAGA): This award may be claimed by any amateur (or listener) for two-way communications with amateur stations located in all the existing Japanese guns.

Note— Cities and Guns list together with countries list available for three IRCs to JARL.

120th Anniversary of Drilling Oil: An interesting subject. If you were lucky to work W3ZIC on August 26th, 1979, they were operating at Drake Well in Titusville, Pa, celebrating the 126th Anniversary of Drilling for oil. This was sponsored by the Fort Venango Mike and Key Club, W3ZIC. If you had a QSO on that day, you can receive a certificate by sending an s.a.s.e. to: Bob Culbertson, WA3YGQ, 601 Cornplanter Avenue, Oil City, Pennsylvania 16301.

ERC PROMISES UP TO THE MINUTE STATE-OF-THE-ART DESIGN AND PERFORMANCE WE'VE DONE IT FOR 1979

FOUR SIMULTANEOUS FILTERS IN ONE FOR UNPARALLELED QRM FREE RECEPTION (SSB & CW)
PLUS A SPECIAL PATENTED CW PROCESSOR



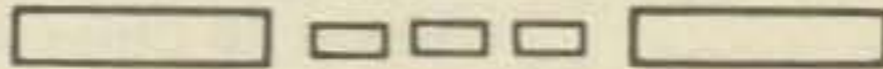
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THE BRAND NEW SL-56 AUDIO ACTIVE FILTER SUPERCEDES OUR SL-55 IN BOTH CONCEPT AND PERFORMANCE. CONSOLIDATION OF MANY COMPONENTS HAS ALLOWED US TO MAKE 16 OPERATIONAL AMPLIFIERS (COMPARED TO 6 IN THE SL-55) INTO A FILTER GUARANTEED TO OUT PERFORM ANY OTHER AT A COST ONLY SLIGHTLY HIGHER THAN THE SL-55. THE FEATURES OF THE SL-56 ARE SO ADVANCED FROM ITS PREDECESSOR THAT CALLING IT THE SL-55A IS NOT JUSTIFIED. UNLIKE OTHER FILTERS THAT SIMPLY OFFER A CHOICE OF ONE OR TWO FILTER TYPES AT A TIME (NOTCH, BANDPASS, ETC.) SL-56 PROVIDES WHAT IS REALLY NEEDED --- THE SIMULTANEOUS ACTION OF A 6 POLE 200 Hz FIXED HIGH-PASS FILTER AND A 6 POLE 1600 Hz FIXED LOWPASS FILTER WITH A 60 dB NOTCH WHICH IS TUNABLE OVER THE

200-1600 Hz RANGE. THIS 3 FILTER COMBINATION IS UNBEATABLE FOR THE ULTIMATE IN QRM FREE SSB RECEPTION. ADJACENT CHANNEL QRM IS ELIMINATED ON THE HIGH AND LOW SIDES AT THE SAME TIME AND DOES NOT INTRODUCE ANY HOLLOWNESS TO THE DESIRED SIGNAL. ON CW THE SL-56 IS A DREAM. THE LOWPASS, HIGHPASS AND NOTCH FILTERS ARE ENGAGED ALONG WITH THE TUNABLE BANDPASS FILTER (400-1600 Hz) PROVIDING THE NEEDED ACTION OF 4 SIMULTANEOUS FILTER TYPES. THE BANDPASS MAY BE MADE AS NARROW AS 14 Hz (3dB). ADDITIONALLY, A SPECIAL PATENTED CIRCUIT FOLLOWS THE FILTER SECTIONS WHICH ALLOWS ONLY THE PEAKED SIGNAL TO "GATE ITSELF" THROUGH TO THE SPEAKER OR HEADPHONES (4-2000 OHMS). RECEIVER NOISE, RING AND OTHER SIGNALS ARE REJECTED. THIS IS NOT A REGENERATOR, BUT A MODERN NEW CONCEPT IN CW RECEPTION. THE SL-56 CONNECTS IN SERIES WITH THE RECEIVER SPEAKER OUTPUT AND DRIVES ANY SPEAKER OR HEADPHONES WITH ONE WATT OF AUDIO POWER. REQUIRES 115 VAC. EASILY CONVERTED TO 12 VDC OPERATION. COLLINS GRAY CABINET AND WRINKLE GRAY PANEL.

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1.8-30 MHz

THE MODEL SL-65* (20-2000 WATTS) AND THE QRP MODEL SL-65A* (0.2-20 WATTS) DIGITALLY INDICATE ANTENNA VSWR UNDER ANY TRANSMISSION MODE -- SSB, CW, RTTY, AM Etc. THERE IS NO CALIBRATION REQUIRED AND NO CROSSED METER NEEDLES TO INTERPRET. SIMPLY LOOK AT THE READOUT AND THAT IS THE VSWR. SPEAKING NORMALLY INTO A SSB TRANSMITTER MIC, INSTANTLY CAUSES THE VSWR TO BE DISPLAYED THROUGHOUT YOUR ENTIRE TRANSMISSION. REVERSING THE POSITION OF A FRONT PANEL TOGGLE SWITCH AND THE DISPLAY INDICATES THE NET POWER (FORWARD LESS REFLECTED) THAT IS ACCEPTED BY THE ANTENNA. THE PEAK OF THE NET PEP IS DETECTED AND DISPLAYED WITHOUT FLICKER FOR ANY MODULATION TYPE. DISPLAY UPDATE IS CONSTANT YET FLICKER FREE AS YOU MAY CHANGE THE POWER ACCORDING TO YOUR VOICE. THERE IS NOTHING LIKE THIS QUALITY INSTRUMENT AVAILABLE ANYWHERE ELSE. IT IS THE ONLY VSWR-NET POWER INDICATOR THAT LETS YOU KNOW THE STATE OF YOUR ANTENNAS AND TRANSMITTED POWER AT ALL TIMES WHILE TRANSMITTING. EITHER MODEL IS A SOPHISTICATED DEVICE CONTAINING FOUR CIRCUIT BOARDS AND THIRTEEN INTEGRATED CIRCUITS.

**SL-65
VSWR INDICATOR**

- TWO DIGIT DISPLAY SHOWS VSWR TO AN ACCURACY OF .1 FOR VALUES FROM 1.0 AND 2.2. ACCURACY IS TO .2 FOR VALUES FROM 2.3 TO 3.4 AND TO .3 FROM 3.4 TO 4.0. FROM 4.1 TO 6.2 THE INDICATION MEANS THAT VSWR IS VERY HIGH.

- FOR VSWR VALUES NEAR 1.0, THE POWER RANGE FOR A VALID READING IS 20 - 2000 WATTS OUTPUT. FOR HIGHER VALUES THE UPPER POWER LIMIT FOR A FLICKER FREE VALID READING IS SOMEWHAT LESS (35 - 1000 WATTS FOR VSWR AT 2.0).

- DIVIDE THE ABOVE POWER LEVELS BY 100 TO OBTAIN THE PERFORMANCE OF THE SL-65A QRP MODEL.

WARRANTY ONE YEAR

**SL-65
NET POWER INDICATOR**

- THE POWER DISPLAYED IS THE DETECTED PEAK OF THE PEP FOR ANY MODULATION. THIS IS THE POWER THAT THE TRANSMITTER IS "TALKED" UP TO. DISPLAY DECAY TIME IS ABOUT ONE SECOND.

- THE POWER DISPLAYED IS THAT WHICH IS ACCEPTED BY THE ANTENNA (FORWARD LESS REFLECTED).

- POWER IS DISPLAYED ON THE SAME TWO DIGITS AS VSWR IN TWO AUTORANGED SCALES. 20 TO 500 WATTS AND 500 TO 2000 WATTS. TRIPOVER AT THE 500 WATT LEVEL IS AUTOMATIC EX: A READING OF 1.2 COULD MEAN 120 OR 1200 WATTS. YOU MUST KNOW WHICH RANGE YOU ARE IN.

- ACCURACY IS TO 10 WATTS IN THE LOWER RANGE AND 100 WATTS IN THE UPPER RANGE. DIVIDE POWER SPECS BY 100 FOR SL-65A.

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Please send all reader inquiries directly.

Notes

Results of the 1979 County Hunters SSB Contest, courtesy John, W0QWS.

Fixed

1st N7TT/2	2,034,760#
2nd WD4FGW	835,835*
3rd WA9MSW	809,710*
4th WB4UPW	786,828*
5th W8WT	346,104*
6th K9GTQ	341,964*
7th W7JYW	173,019*
8th WB9DCZ	165,200*
9th WA2GPT	83,185*
10 W1DIT	64,288*
11 WD4PZN	60,288*
12 N7SU	54,802
13 WD8MDG	50,400
14 VE3RN	39,344
15 K2EL	8,250
16 K8BBH	5,610
17 N5QQ	3,320
18 WA9WGW	3,124
19 WB1ANT	1,088
20 VE3IR	460

Mobile

1st N4UF	555,385#
2nd AI5P	477,688#
3rd K3KX	253,242*
4th WA0YJL	94,188*
5th W0BK	62,964*
6th W5AWT	51,531*
7th W0EWH	48,160*
8th VE3IR	17,861*
9th K9DZG	15,067*

W0QWS 343,555 (check log)

DX

1st CT1BY	61,236#
2nd I2PHN	48,440*
3rd VK4VU	45,288*
4th CT1TZ	1,804
5th LA5YF	1,612*

SWL

1st SWL-NL-4276#	
Netherlands	24,336

NOTE: # Plaque Winner
* Certificate Recipient.

Hope that most of you know that new USA-CA Record Books should be available by the time you read this. They will be \$1.25 and will be up-to-date on the new costs of USA-CA and up-to-date on Counties.

QSL manager for CT1TZ's mobile activities under the call CT1RTA is: Tom Ross, K9GTQ, Rt. 1, Box 137A1, Irma, Wisconsin 54442. Don't forget to send s.a.s.e. or s.a.e. and IRC.

Dorothy, WB9RCY tells me that the Portuguese amateurs need special licenses for every piece of equipment and a good transceiver costs about \$2,000.00 if imported legally.

Good Hunting, 73, Ed., W2GT.

SAVE \$10.00 ON A GREAT DEAL!



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*Please allow 6 weeks for our computer to digest the information to handle your subscription. We could do it faster, but we know that you'll want the magazines sent to the right address.



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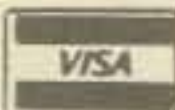
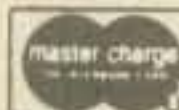
ORDERS OVER \$15.00 WILL BE SHIPPED POSTPAID EXCEPT ON ITEMS WHERE ADDITIONAL CHARGES ARE REQUESTED. ON ORDERS LESS THAN \$15.00 PLEASE INCLUDE ADDITIONAL \$1.00 FOR HANDLING AND MAILING CHARGES. SEND SASE FOR FREE FLYER.

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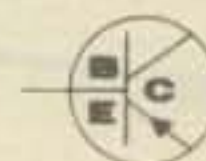
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Propagation

The science of predicting radio conditions

DX Contest Special

The 1979 CQ World Wide DX Contest will be held on the following dates:

Phone Section: 0000 GMT Saturday, October 27 - 2400 GMT Sunday, October 28
C.W. Section: 0000 GMT Saturday, November 24 - 2400 GMT Sunday, November 25 -

For the 29th successive year, this month's Propagation column contains a special forecast for use during the Contest sections, both Phone and C.W.

Best Contest Conditions In 20 Years Expected!

The present sunspot cycle is expected to be near a peak level of activity during the Contest periods. A smooth sunspot count in the lower to mid 150's is expected. This would be the highest level of solar activity experienced during any CQ World Wide DX Contest since the Contest periods of 1958!

Band-By-Band Conditions

The following is a band-by-band summary of DX propagation conditions expected from mid-October through mid-December, and centered on the 1979 Contest periods.

10 Meters: Best conditions in 20 years expected. Good, solid openings should be possible to just about every corner of the world during the daylight hours, and the band should remain open to southern and tropical regions well into the early evening. Openings towards Europe and in a generally easterly direction should peak an hour or two before noon, while those towards South America and Africa are expected to peak during the early afternoon hours. Optimum conditions towards the Far

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for October, 1979

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 14, 18	A	A	B	C
High Normal: 5, 7-8, 15, 17, 26-27	A	B	C	C-D
Low Normal: 1, 4, 6, 9-10, 12-13, 16, 19, 21, 25, 28, 31	B	C	C-D	D-E
Below Normal: 2-3, 11, 20, 22, 24, 29-30	C	C-D	D	E
Disturbed: 23	C-E	D-E	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9+30 dB.

B—Good opening, moderately strong signals varying between S9 and S9+30 dB, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be fair (C) on Oct. 1st, fair to poor (C-D) on the 2nd and 3rd, fair (C) on the 4th and good (B) on the 5th etc. Conditions look good for the contest period Oct. 27-28.

For updated information subscribe to bi-weekly MAIL-A-PROP, P.O. Box 1714 Silver Spring, MD 20902.

East, Australia, Southeast Asia, etc., are forecast for the late afternoon and early evening hours. Expect exceptionally strong signal levels on most openings, especially if conditions should rise to HIGH or ABOVE NORMAL.

15 Meters: Fantastic might well describe DX conditions expected on 15 meters! Excellent propagation conditions should exist from shortly after sunrise through the early evening hours, and possibly to as late as Midnight. Look for a peak on 15 meters towards a particular geographical area about an hour or so after the peak has occurred to the same geographical area on 10 meters. Expect good, solid openings to all areas of the world, with exceptionally strong signals most of the time. This

should be the best band for DX openings during most of the daylight hours, but it could be a toss-up with 10 meters during the afternoon.

20 Meters: DX openings should be possible on this band just about around-the-clock. Conditions should peak for about an hour or two after sunrise, and again during the late afternoon and early evening hours. Expect to work into most areas of the world between sunrise and sunset. Excellent openings should be possible to many areas of the world well into the hours of darkness as well. When conditions are HIGH or ABOVE NORMAL, expect 20 meters to remain open for worldwide DX during most of the night. Look for long-path openings for about an hour or so after sunrise and again for an hour or so before local sunset. Signal levels are expected to be exceptionally strong during peak periods of propagation. If you plan to operate on a single band during the Contest, this should be it!

40 Meters: The band should open first for DX towards Europe and in a generally easterly direction during the late afternoon hours, and steadily improve towards evening. During the hours of darkness expect good DX openings to most parts of the world. Signals should peak from an easterly direction about Midnight, and from a westerly direction just after sunrise. Conditions towards the south should be excellent throughout the nighttime period. When conditions are no better than LOW NORMAL, 40 meters is likely to be the best band for DX openings during the hours of darkness. When conditions are HIGH or ABOVE NORMAL, this honor will be shared between 40 and 20 meters.

80 Meters: This should be a good band for DX openings to many areas of the world during the hours of darkness and into the sunrise period. The band should peak towards Europe and in a generally easterly direction around Midnight. For openings in a generally westerly direction, except a peak just after sunrise. The

*11307 Clara St., Silver Spring, MD 20902

band should remain open towards the south throughout most of the night. Propagation on this band is quite similar to that expected on 40 meters, except signals will be somewhat weaker on the average, noise levels a bit higher, and the period for band openings in a particular direction a bit shorter.

160 Meters: Expect some DX openings on this band during the hours of darkness and into the sunrise period. Signals tend to peak at *local sunrise* at the more *easterly* terminal of a particular path. Greater ionospheric absorption, higher levels of static, and the lower power levels used on this band, should result in generally noisy and weak DX openings, but some good ones should be possible. Look for openings towards Europe and towards the south from the eastern half of the USA, and towards the south, the Far East, Australasia and the South Pacific from the western half of the country. Other DX openings should also be possible. The best propagation aid for this band (and for 80 and 40 meters as well), is a set of sunrise and sunset curves, since DX signals tend to peak when it is local sunrise at the easterly end of the path.

Contest Work Charts

The *DX Propagation Charts* on the following pages show the times when each amateur band 10 through 160 meters is expected to open from the United States to the major areas of the world. The information contained in the Charts can easily be reorganized into more convenient types of operational work plans, or operating schedules, which can serve as valuable guides during the Contest. Experience gained during previous Contests has shown that such plans can be extremely useful in piling up contacts and points with a minimum of wasted time.

The following is an example of one of several type plans that can be devised. It is a single band operational work schedule for 20 meters, which shows the times when propagation conditions are expected to be optimum to various areas of the world (propagation index 3 or 4), for each three hour period throughout the day. A Pacific time zone QTH has been chosen for this example, but similar plans can be devised for other time zones and other bands.

Table 1
Sample Twenty Meter Work Plan
Western USA QTH

Time PST	Areas To Which Conditions are expected to be Optimum
----------	--

- 00- 03 S.E. Asia, Far East, South Pacific, New Zealand, Australasia, Antarctica
- 03- 06 South Pacific, New Zealand, Australasia
- 06- 09 Central and South Asia, S.E. Asia, Far East, South Pacific, New Zealand, Australasia, Far East, Caribbean, Central America, Northern Counties of South America, Europe
- 09- 12 Far East, Caribbean, Central America
- 12- 15 Western & Central Europe, North Africa
- 15- 18 Europe, Africa, Caribbean, Central America, South America
- 18- 21 Africa, Central and South Asia, South Pacific, New Zealand, Caribbean, Central America, South America
- 21- 00 Far East, South Pacific, New Zealand, Australasia, Caribbean, Central America, South America, Antarctica

Radio Storm

If Mother Nature should play a trick on us and produce a radio storm during the Contest periods, expect conditions to drop **BELOW NORMAL** or **DISTURBED** to many areas of the world, depending upon the storm's severity. Under such conditions, expect considerably fewer openings on

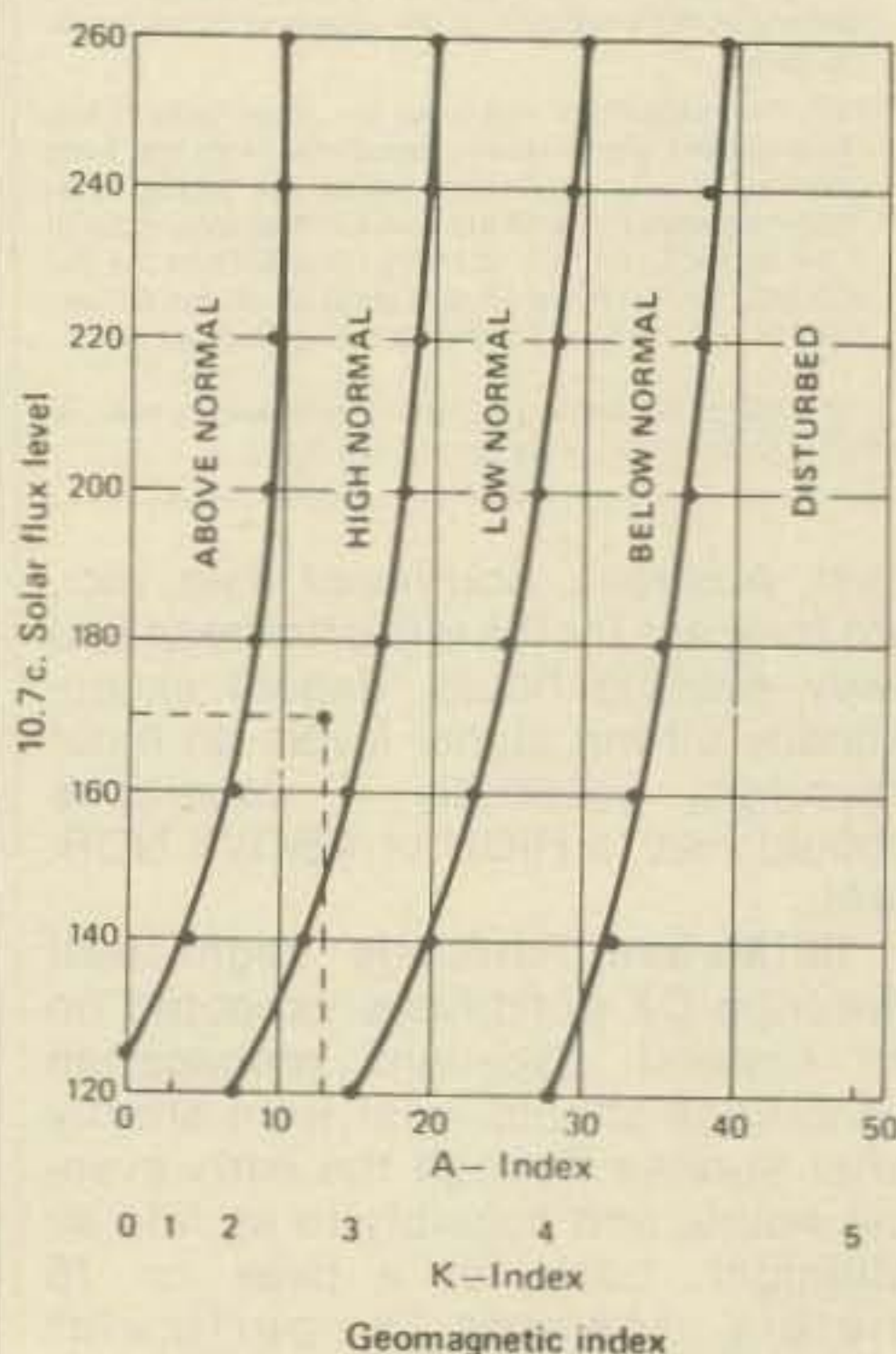


Fig. 1 - Intersection of given values of solar flux and geomagnetic activity determine expected h.f. ionospheric propagation conditions. (Example: Solar flux is 170 and A-index is 13; expect High Normal conditions.)

10, 15 and 20 meters, with paths passing through the polar regions and the northern latitudes being most affected. Conditions on 40, 80 and 160 meters should become erratic as well, with the possibility for considerably increased noise levels. During certain type radio storms, conditions may improve somewhat for short periods of time on paths to southern and tropical areas.

If a storm should develop, concentrate on working trans-polar paths and to the northeast, north and northwest, on 10, 15 and 20 meters during the daylight hours.

A "Last Minute Forecast" for the Phone section of the Contest, made at press time, appears at the beginning of this column. A similar forecast for the c.w. section will appear in next month's column. For updated geomagnetic and solar data during the Contest periods, check the National Bureau of Standards Radio Station WWV broadcasts at 18 minutes past each hour. These broadcasts, transmitted on 2.5, 5.0, 10.0, 15.0 and 20.0 Mhz, contain the latest geomagnetic K-figure and the 10.7 cm solar flux reading. They also contain a short-term forecast of geomagnetic and solar conditions given in subjected terms. Fig. 1 can be used to convert the geomagnetic and solar data given on the WWV broadcasts into expected h.f. ionospheric propagation conditions.

The hourly forecasts broadcast on WWV, along with the latest solar flux and geomagnetic indices, also may be contained by telephoning Area Code 303- 449- 8129 at any time. This is *not* a toll free number, but there is no other charge for this service.

V.h.f. Ionospheric Propagation

Solar activity is now high enough so that exceptionally good DX openings can be expected on the 6 meter band during the hours of daylight. During October, it should be possible to work stations in most areas of the world where this band is allocated for amateur use. Although the DX Charts contained in this month's column do not include the 6 meter band directly, 6 meter DX openings can be expected at those times and to those areas of the world where 10 meter openings are shown with a propagation index greater than 3. Generally speaking, check for openings from the eastern half of the USA towards Europe and the east *before* noon, and towards Africa an hour or so *after* noon. Best chance for 6 meter DX openings towards the Caribbean, Central and South America from *all* areas of the USA should be during the afternoon hours. Look for openings towards the

Far East, the South Pacific area, New Zealand and Australasia during the late afternoon hours. These openings will favor stations located in the western half of the USA, but some openings should extend considerably eastward. There will be lots of DX surprises in store for the 6 meter band during the next six months, with a good chance for some new DX records to be established.

Trans-continental and 6 meter openings over shorter distances are also expected to increase dramatically during October and the fall, winter and early spring months, with conditions likely to peak during the afternoon hours.

A major meteor shower, which could produce meteor reflection type ionospheric openings on the v.h.f. bands is expected October 20-22. Called ORIONIDS, the shower should reach peak intensity at about 7 p.m. EST on October 21, with an hourly meteor count of approximately 25. Peaks in minor meteor showers are also expected on October 3 and 12.

Auroral activity generally increases during October, and an increase in auroral-scatter type v.h.f. openings can be expected. There is also the likelihood for increased short-skip sporadic-E propagation resulting from expected auroral activity, particularly on 10 and 6 meters. The best time to check for such openings is when conditions on the h.f. bands are expected to be BELOW NORMAL or DISTURBED, as shown in the "Last Minute Forecast" appearing at the beginning of this column.

C.w. Contest Forecast

The DX Propagation Charts contained in this month's column are valid for both the Phone and C.w. sections of the 1979 Contest. *Be sure to keep them handy for use during next month's c.w. section as well.* Short-skip propagation forecasts for October appeared in last month's column.

DX contests afford an excellent opportunity to verify the accuracy of the CQ propagation forecasts, since contests generate a large amount of activity in just about every corner of the world and on all h.f. bands. Data reported during previous CQ World Wide DX Contest have helped considerably in improving the accuracy of these forecasts over the past 28 years. Comments concerning this year's Contest forecast would be appreciated and should be sent directly to W3ASK, the Editor of this column.

Good luck in the 1979 Contest, it looks like it is going to be an exceptional one!

73, George W3ASK

October 15- December 15, 1979

Time Zone: EST (24-Hour Time)

EASTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	06-07 (1) 07-08 (3) 08-13 (4) 13-14 (3) 14-15 (1)	06-07 (1) 07-08 (3) 08-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	04-06 (2) 06-09 (4) 09-10 (3) 10-12 (2) 12-14 (3) 14-18 (4) 18-20 (3) 20-22 (2) 22-00 (1) 00-02 (2) 02-04 (3)	16-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-02 (3) 02-03 (2) 03-04 (1) 19-21 (1)* 21-23 (2)* 23-01 (3)* 01-02 (2)* 02-03 (1)*
Northern Europe & European USSR	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (4) 11-12 (2) 12-13 (1)	06-07 (1) 07-08 (3) 08-13 (4) 13-14 (3) 14-15 (1)	04-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-01 (3) 01-04 (2)	17-19 (1) 19-02 (2) 02-04 (1) 20-03 (1)*
Eastern Mediterranean & Middle East	07-08 (1) 08-09 (3) 09-13 (4) 13-14 (3) 14-15 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-12 (1) 12-15 (2) 15-17 (3) 17-22 (4) 22-00 (3) 00-01 (2) 01-03 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-01 (2) 20-00 (1)*
Western Africa	06-07 (1) 07-12 (3) 12-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	04-05 (1) 05-07 (2) 07-14 (3) 14-20 (4) 20-22 (3) 22-00 (2) 00-01 (1)	03-04 (3) 04-06 (2) 06-13 (1) 13-15 (2) 15-17 (3) 17-03 (4)	18-22 (1) 22-01 (2) 01-03 (1) 00-03 (1)*
Eastern & Central Africa	07-08 (1) 08-09 (2) 09-12 (3) 12-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (3) 09-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-22 (2) 22-00 (1)	03-05 (2) 05-09 (1) 12-14 (1) 14-16 (2) 16-17 (3) 17-01 (4) 01-03 (3)	19-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Southern Africa	07-08 (1) 08-10 (3) 10-14 (4) 14-16 (3) 16-17 (2) 17-18 (1)	06-08 (1) 08-11 (2) 11-13 (3) 13-16 (4) 16-18 (3) 18-20 (2) 20-22 (1)	06-09 (1) 11-14 (1) 14-15 (2) 15-17 (3) 17-21 (4) 21-02 (3) 02-05 (2)	18-19 (1) 19-22 (2) 22-23 (1) 19-21 (1)*
Central & South Asia	08-09 (1) 09-10 (2) 10-11 (1) 20-22 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-20 (1) 20-22 (2) 22-00 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-11 (1) 18-20 (1) 20-21 (2) 21-23 (3) 23-00 (2) 00-01 (1)	18-21 (1) 06-08 (1)
Southeast Asia	10-12 (1) 12-14 (2) 14-15 (1) 17-18 (1) 18-20 (2) 20-21 (1)	09-10 (1) 10-12 (2) 12-13 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	02-06 (1) 06-09 (2) 09-11 (1) 18-21 (2) 21-23 (1)	18-20 (1) 05-07 (1)
Far East	08-10 (1) 16-17 (1) 17-18 (2) 18-20 (3) 20-21 (1)	08-09 (1) 09-11 (2) 11-12 (1) 16-17 (1) 17-18 (2) 18-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	00-04 (2) 04-06 (1) 06-07 (2) 07-09 (3) 09-10 (2) 10-11 (1) 16-18 (1) 18-20 (2) 20-00 (3)	04-05 (1) 05-07 (2) 07-08 (1) 05-07 (1)*
South Pacific & New Zealand	09-12 (1) 12-14 (2) 14-16 (3) 16-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	08-09 (1) 09-11 (2) 11-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-23 (2) 23-00 (1)	13-19 (1) 19-21 (2) 21-22 (3) 22-02 (4) 02-04 (3) 04-07 (2) 07-10 (3) 10-13 (2)	00-02 (1) 02-03 (2) 03-07 (3) 07-08 (2) 08-09 (1) 03-04 (1)* 04-07 (2)* 07-08 (1)*
Australasia	08-09 (1) 09-11 (2) 11-12 (1) 14-16 (1) 16-17 (2) 17-18 (3) 18-19 (4) 19-20 (2) 20-21 (1)	07-08 (1) 08-11 (2) 11-16 (1) 16-17 (2) 17-18 (3) 18-20 (4) 20-22 (3) 22-23 (2) 23-00 (1)	07-08 (3) 08-10 (4) 10-11 (3) 11-12 (2) 12-14 (1) 17-19 (2) 21-23 (1) 23-00 (2) 00-01 (3) 01-03 (4) 03-04 (3) 04-07 (2)	03-05 (1) 05-07 (2) 07-08 (1) 05-07 (1)*
Caribbean, Central America & Northern Countries of South America	07-08 (2) 08-11 (4) 11-13 (3) 13-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	06-07 (1) 07-08 (3) 08-11 (4) 11-13 (3) 13-20 (4) 20-21 (3) 21-23 (2) 23-01 (1)	07-09 (4) 09-11 (3) 11-14 (2) 14-16 (3) 16-02 (4) 02-03 (3) 03-06 (2) 06-07 (3)	18-19 (1) 19-21 (3) 21-04 (4) 04-06 (2) 06-07 (1) 19-21 (1)* 21-03 (2)* 03-05 (1)*

Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-09 (4) 09-11 (3) 11-15 (2) 15-16 (3) 16-20 (4) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-22 (4) 22-23 (3) 23-00 (2) 00-01 (1)	06-08 (2) 08-11 (1) 14-16 (1) 16-17 (2) 17-19 (3) 19-02 (4) 02-03 (3) 03-05 (2) 05-06 (3)	20-23 (1) 23-04 (2) 04-06 (1) 23-04 (1)*
McMurdo Sound Antarctica	16-17 (1) 17-19 (2) 19-20 (1)	15-17 (1) 17-18 (2) 18-21 (3) 21-22 (2) 22-23 (1)	16-18 (1) 18-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-07 (1) 07-09 (2) 09-10 (1)	00-06 (1)

Time Zones: CST & MST (24-Hour Time)

CENTRAL USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	06-07 (1) 07-08 (3) 08-11 (4) 11-12 (3) 12-13 (2) 13-14 (1)	06-07 (1) 07-08 (3) 08-12 (4) 12-13 (3) 13-14 (2) 14-15 (1)	03-06 (1) 06-08 (3) 08-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-20 (2) 20-00 (1) 00-03 (2)	17-18 (1) 18-20 (2) 20-23 (3) 23-01 (2) 01-02 (1) 19-20 (1)* 20-23 (2)* 23-00 (1)*
Northern & Central Europe & European USSR	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-08 (3) 08-11 (4) 11-12 (3) 12-13 (2) 13-14 (1)	02-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-16 (3) 16-17 (4) 17-19 (3) 19-20 (2) 20-22 (1) 22-02 (2)	18-20 (1) 20-23 (2) 23-01 (1) 20-23 (1)*
Eastern Mediterranean & Middle East	07-08 (1) 08-09 (2) 09-12 (3) 12-13 (2) 13-14 (1)	06-07 (1) 07-08 (2) 08-11 (3) 11-12 (4) 12-13 (3) 13-14 (2) 14-15 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	17-19 (1) 19-22 (2) 22-23 (1) 20-22 (1)*
Western Africa	06-07 (1) 07-11 (3) 11-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	05-06 (1) 06-10 (2) 10-14 (3) 14-18 (4) 18-19 (3) 19-21 (2) 21-22 (1)	05-12 (1) 12-15 (2) 15-17 (3) 17-23 (4) 23-01 (3) 01-05 (2)	17-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Eastern & Central Africa	07-09 (1) 09-11 (2) 11-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-12 (2) 12-15 (3) 15-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	06-14 (1) 14-16 (2) 16-19 (3) 19-21 (4) 21-23 (3) 23-00 (2) 00-02 (1)	20-00 (1) 21-23 (1)*
Southern Africa	07-08 (1) 08-09 (2) 09-11 (3) 11-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-10 (2) 10-12 (3) 12-15 (4) 15-17 (3) 17-18 (2) 18-20 (1)	06-13 (1) 13-15 (2) 15-17 (3) 17-20 (4) 20-23 (3) 23-02 (2) 02-04 (1)	18-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Central & South Asia	07-08 (1) 08-10 (2) 10-11 (1) 18-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-10 (2) 10-11 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	04-06 (1) 06-07 (2) 07-09 (3) 09-10 (2) 10-11 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-02 (1) 02-04 (2)	18-20 (1) 06-08 (1)
Southeast Asia	07-08 (1) 08-09 (2) 09-10 (3) 10-11 (2) 11-13 (1) 15-16 (1) 16-19 (2) 19-20 (1)	07-08 (1) 08-09 (2) 09-10 (3) 10-12 (2) 12-13 (1) 16-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-10 (2) 10-12 (1) 18-19 (1) 19-21 (2) 21-23 (1)	04-07 (1)
Far East	15-16 (1) 16-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 15-16 (1) 16-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	04-05 (1) 05-07 (2) 07-09 (3) 09-10 (2) 10-11 (1) 17-19 (1) 19-20 (2) 20-22 (3) 22-23 (2) 23-00 (1)	02-03 (1) 03-07 (2) 07-09 (1) 03-06 (1)*
South Pacific & New Zealand	09-12 (1) 12-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	08-11 (1) 11-13 (3) 13-16 (2) 16-17 (3) 17-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	11-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-03 (3) 03-07 (2) 07-09 (4) 09-10 (3) 10-11 (2)	23-01 (1) 01-02 (2) 02-07 (3) 07-08 (2) 08-09 (1) 00-02 (1)* 02-07 (2)* 07-08 (1)*

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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. Time shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M. etc. Appropriate standard time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts c.w., or 1 kw, p.e.p. on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 db gain above these reference levels, the propagation index will increase by one level for each 10dB loss, it will lower by one level.

6. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado, 80302.

Region	10 Meters	15 Meters	20 Meters	40/80 Meters
Australasia	08-09 (1) 09-11 (2) 11-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	06-08 (1) 08-09 (3) 09-11 (2) 11-12 (1) 16-18 (1) 18-19 (2) 19-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	06-07 (2) 07-09 (4) 09-10 (3) 10-11 (2) 11-12 (1) 15-17 (1) 20-22 (1) 22-00 (2) 00-04 (3) 04-06 (1)	02-04 (1) 04-07 (2) 07-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-06 (1) 06-07 (2) 07-08 (3) 08-10 (4) 10-13 (3) 13-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	06-07 (3) 07-09 (4) 09-11 (3) 11-14 (2) 14-16 (3) 16-00 (4) 00-02 (3) 02-06 (2)	18-19 (1) 19-21 (3) 21-03 (4) 03-05 (2) 05-07 (1) 19-21 (1)* 21-02 (2)* 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	06-07 (1) 07-08 (3) 08-10 (4) 10-14 (3) 14-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2) 13-15 (3) 15-20 (4) 20-21 (3) 21-23 (2) 23-00 (1)	04-06 (1) 06-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-02 (3) 02-04 (2)	19-21 (1) 21-01 (2) 01-03 (1) 03-04 (2) 04-06 (1) 21-05 (1)*
McMurdo Sound, Antarctica	07-08 (1) 08-09 (2) 09-10 (1) 17-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (2) 09-10 (1) 14-16 (1) 16-18 (2) 18-22 (3) 22-23 (2) 23-00 (1)	06-08 (2) 08-09 (1) 16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-06 (1)	23-05 (1)

October 15- December 15, 1979 Time Zone: PST (24-Hour Time) WESTERN USA TO:

Region	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	06-07 (1) 07-08 (2) 08-11 (3) 11-12 (2) 12-13 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-12 (4) 12-13 (2) 13-14 (1)	05-06 (1) 06-08 (2) 08-10 (1) 10-12 (2) 12-14 (4) 14-16 (3) 16-18 (2) 18-20 (1) 23-01 (2)	18-20 (1) 20-22 (2) 22-00 (1) 19-23 (1)*
Central & Northern Europe & European USSR	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	05-07 (1) 07-09 (3) 09-10 (2) 10-14 (1) 14-17 (3) 17-19 (2) 19-23 (1) 23-02 (2) 02-03 (1)	18-20 (1) 20-22 (2) 22-23 (1) 19-22 (1)*

Eastern Mediterranean & Middle East	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-10 (2) 10-14 (1) 14-16 (2) 16-18 (1) 18-20 (2) 20-22 (1) 00-02 (1)	18-22 (1) 06-08 (1)
Western Africa	06-07 (1) 07-08 (2) 08-11 (3) 11-13 (4) 13-15 (3) 15-16 (2) 16-17 (1)	05-06 (1) 06-07 (2) 07-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	05-10 (1) 10-14 (2) 14-15 (3) 15-20 (4) 20-22 (3) 22-02 (2) 02-03 (1)	18-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Eastern & Central Africa	07-08 (1) 08-10 (2) 10-14 (3) 14-15 (2) 15-16 (1)	06-08 (1) 08-12 (2) 12-16 (3) 16-17 (2) 17-19 (1)	06-14 (1) 14-16 (2) 16-22 (3) 22-23 (2) 23-00 (1)	18-21 (1) 06-08 (1)
Southern Africa	07-08 (1) 08-10 (3) 10-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-10 (1) 10-12 (2) 12-13 (3) 13-16 (4) 16-17 (3) 17-19 (2) 19-21 (1)	06-12 (1) 12-14 (2) 14-16 (3) 16-19 (4) 19-22 (3) 22-01 (2) 01-03 (1)	17-19 (1) 19-20 (2) 20-21 (1) 06-08 (1) 18-19 (1)*
Central & South Asia	16-17 (1) 17-19 (3) 19-20 (1) 07-09 (1)	16-17 (1) 17-19 (3) 19-20 (2) 20-21 (1) 07-09 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-11 (1) 16-17 (1) 17-19 (3) 19-21 (2) 21-22 (1)	17-19 (1) 04-09 (1)
Southeast Asia	08-09 (1) 09-10 (3) 10-11 (4) 11-12 (3) 12-13 (2) 13-14 (1) 14-15 (2) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	07-08 (1) 08-11 (3) 11-12 (2) 12-15 (1) 15-17 (3) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1) 19-22 (1) 22-01 (2) 01-03 (3) 03-06 (2)	02-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Far East	13-14 (1) 14-15 (3) 15-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-13 (2) 13-15 (3) 15-17 (2) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-14 (2) 14-18 (1) 18-20 (2) 20-21 (3) 21-23 (4) 23-02 (3)	23-01 (1) 01-05 (2) 05-07 (3) 07-08 (1) 01-05 (1)* 05-06 (2)* 06-07 (1)*
South Pacific & New Zealand	08-09 (1) 09-10 (2) 10-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	07-08 (1) 08-11 (4) 11-18 (3) 18-00 (4) 00-02 (3) 02-03 (2) 03-04 (1)	11-18 (1) 18-19 (2) 19-21 (3) 21-04 (4) 04-07 (3) 07-09 (4) 09-10 (3) 10-11 (2)	21-22 (1) 22-00 (2) 00-07 (3) 07-08 (2) 08-09 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
Australasia	09-11 (1) 11-12 (2) 12-14 (4) 14-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	07-08 (1) 08-12 (3) 12-14 (2) 14-18 (1) 18-20 (2) 20-21 (3) 21-00 (4) 00-01 (3) 01-02 (2) 02-03 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-04 (4) 04-07 (3) 07-09 (4) 09-10 (3) 10-12 (2) 12-14 (1)	02-03 (1) 03-04 (2) 04-07 (3) 07-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	05-06 (1) 06-07 (2) 07-10 (4) 10-13 (3) 13-18 (4) 18-19 (3) 19-21 (2) 21-22 (1)	06-07 (3) 07-09 (4) 09-10 (3) 10-13 (2) 13-15 (3) 15-23 (4) 23-01 (3) 01-06 (2)	18-19 (1) 19-21 (3) 21-02 (4) 02-05 (2) 05-06 (1) 19-21 (1)* 21-02 (2)* 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-13 (3) 13-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2) 13-15 (3) 15-20 (4) 20-22 (3) 22-00 (2) 00-01 (1)	12-14 (1) 14-16 (2) 16-18 (3) 18-23 (4) 23-01 (3) 01-03 (2) 03-05 (1) 05-07 (2) 07-09 (1)	20-22 (1) 22-04 (2) 04-05 (1) 22-04 (1)*
McMurdo Sound, Antarctica	07-08 (1) 08-09 (2) 09-10 (1) 19-20 (1) 20-22 (2) 22-23 (1)	06-07 (1) 07-09 (2) 09-12 (1) 14-17 (1) 17-20 (2) 20-23 (3) 23-01 (2) 01-02 (1)	16-18 (1) 18-20 (2) 20-04 (3) 04-05 (2) 05-06 (1) 06-08 (2) 08-10 (1)	00-05 (1)

* Indicates best time to listen for 80 Meter openings. Openings on 160 Meters are also likely to occur during those times when 80 Meter openings are shown with a Propagation Index of (2), or higher. F-2 layer DX openings on 6 Meters may occur at the same times and over the same paths shown with a Propagation Index of (4) under the 10 Meter column.



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Contest Calendar

News/views of on-the-air competition

As indicated in last month's Column, the rules for this year's World Wide DX Contest are the same as previous years and appeared in details on page 46 of last month's CQ.

There has been one change however. After all these years we have found it necessary to discontinue the issuing of certificates by call areas in Australia. We feel that over the years the returns from that country have not justified the number of certificates awarded.

We are also taking a closer look at awards in other areas. Last year we issued over 900 certificates. I think we have been very generous in our awards, even awarding certificates to stations placing 3rd and 4th in the same country and call areas. We have reached a point of saturation and now find it necessary to make some adjustments.

The requirement of having a minimum of 12 hours of operation to be eligible for an award will also be receiving closer scrutiny.

In commemoration of 50 years of Amateur Radio in the Netherlands the Dutch stations will be allowed to add 50 to the figure in their calls during the period of Oct. 10th to Nov. 10th. (e.g. PA0 will be PA50, PA3 will be PA53, PI1 will be PI51 and etc.) A high activity of Dutch stations can be expected during our Phone contest which falls within this period. This also offers a good opportunity to fatten your totals for the popular PACC Awards.

The 20th Anniversary of the Bermuda Contest last April was a huge success. With the addition of West Germany in this year's contest the returns far exceeded those of previous years.

The following winners will be guests of the Radio Society of Bermuda at their Annual Banquet later this month. GU5CIA (329,120), DK5WL (301,595) N1GL (268,025) and VE3BVD (119,250). The local winner was VP9IX

*14 Sherwood Road, Stamford, CT 06905

Calendar of Events

Sept.-Oct. 30-1	Classic Radio Exchange
Oct. 6-7	California QSO Party
Oct. 6-7	ARCI QRP QSO Party
Oct. 10-11	YLRL Anniv. Phone Party
Oct. 6-7	VK/ZL/Oceania Phone
Oct. 13-14	VK/ZL/Oceania CW Contest
Oct. 14	RSGB 21/28 MHz Phone
Oct. 13-14	NINE Land QSO Party
Oct. 20-21	Arrowhead QSO Party
Oct. 20-21	RSGB 7 MHz Phone
Oct. 20-21	WADM DX Contest
Oct. 20-21	Boy Scouts "Jamboree"
Oct. 28	Crazy Eight QSO Party
Oct. 27-28	CQ WW DX Phone Contest
Nov. 1-2	YLRL Anniv. CW QSO Party
Nov. 3-4	RSGB 7 MHz CW Contest
Nov. 3-4	ARRL CW Seepstakes
Nov. 10-11	Int. Police Assoc. Party
Nov. 11	Czechoslovakian Contest
Nov. 17-18	ARRL Phone Sweepstakes
Nov. 17-18	Austrian 160 M Contest
Nov. 24-25	CQ WW DX CW Contest
Dec. 1-3	Connecticut QSO Party
Dec. 1-3	No. Carolina QSO Party

(2,141,300), a "YL" by the way. Nice going Edna.

73, for this time, Frank W1WY

Classic Radio Exchange

Starts: 2000 GMT Sun. September 30
Ends: 0300 GMT Mon. October 1

This is the Fall edition of this unusual activity sponsored by the Southeast A.R.C. of Cleveland, Ohio.

The object is to restore, operate and enjoy older equipment with like-minded amateurs. A classic Radio is any piece of equipment built since 1945 but at least 10 years old. (An advantage but not required to enter.)

The same station may be worked on each band and mode and with different equipment combinations. (Non contestants may also be worked.)

Exchange: Name, RS(T), state, province or DX country, receiver and transmitter type. (ie: home brew, 807 final and etc.) Also any other interesting information.

Scoring: Multiply total QSOs by number of different receivers, transmitters, states, provinces and

DX countries worked on each band and mode. Multiply that total by your Classic multiplier, total years old of all receivers and transmitters used. (min. of 3 QSOs per unit) If equipment is a transceiver multiply age by two.

Frequencies: CW - 60 KHz. up from low edge of each band. Phone - 3910, 7280, 14280, 21380, 28580, Novice/Techs. - 3720, 7120, 21120, 28120.

Awards: Certificates to the highest scorers, longest DX, most equipment combinations, oldest equipment, and unusual achievement.

Send logs with comments, pictures, anecdotes and etc. to: Stu Stephens, K8SJ, 2386 Queenston Road, Cleveland Heights, OH 44118. Include a s.a.s.e. for Newsletter with results.

California QSO Party

Starts: 1800 GMT Sat. October 6
Ends: 2359 GMT Sun. October 7

This year's party is again sponsored by the Northern California Contest Club.

Operating time is limited to 24 out of the 30 hour contest period for single operator stations. Multi-operator stations may operate the full 30 hours. Off times must be at least 15 minutes and clearly shown on the log.

The same station may be worked once per band and mode, simplex only. CA stations that change counties are considered new stations.

Exchange: QSO no., and QTH. County for CA stations, state, province or DX country for others.

Scoring: Two points per QSO. The multiplier for CA is the number of different states (50) and VE call areas (8) worked. (max. of 58) Others use CA counties for their multiplier (max of 58).

Frequencies: CW - 1805, 3560, 7060, 14060, 21060, 28060. SSB - 1815, 3895, 7230, 14280, 21355, 28560. Novice - 3725, 7125, 21125, 28125.

Awards: The usual certificates to

individual winners and clubs.

Indicate each new multiplier on log as worked. Include a summary sheet showing the scoring, type of entry and etc. A large s.a.s.e. will get you a copy of the results.

Mailing deadline for all entries is November 1st. This year they go to: The Northern California Contest Club, c/o Alan Brubaker, K6XO, 34456 Colville Place, Fremont, CA 94536

ARCI QRP QSO Party

Starts: 2000 GMT Sat. October 6
Ends: 0200 GMT Sun. October 7

This is the Fall edition of the Amateur Radio Club International QRP contest. It's open to all, both members and non-members. Stations may be worked once per band for QSO and multiplier credit.

Exchange: RS(T) and state, province or country. Members will include their QRP number, non-members their power input.

Scoring: Contacts with a member counts 3 points, with a non-member 2 points. Stations other than W or VE 4 points.

Multiplier: One for each state, province and country worked on each band.

There is also a power multiplier.
Over 100 watts input X 1.
25 to 100 watts input X 1.5
5 to 25 watts input X 2.
1 to 5 watts input X 3.
Less than 1 watt input X 5.

Final Score: QSO points from all bands X states, provinces and countries worked on each band X your power multiplier.

Frequencies: C.W. - 1810, 3560, 7060, 14060, 21060, 28060, 50360. S.S.B. - 1810, 3985, 7285, 14285, 21385, 28885, 50385. Novice - 3710, 7110, 21110, 28110.

Awards: Certificates to the highest scoring station in each state, province and country. Additional awards depending on activity. And a certificate to the station showing three "skip" contacts using the lowest power.

Include a summary sheet with your entry showing the scoring, equipment and power used, and a signed declaration. Also include a large s.a.s.e. if results are desired.

Logs must be received by October 31st and go to: E. V. "Sandy" Blaize, N5BE, 417 Ridgewood Drive, Metairie, LA 70001

YLRL Anniversary Party

Phone: Oct. 10 - 11 C. W.: Nov. 1 - 2
Phone: 1800 to 1800 GMT Wed./Thurs.
C.W.: 1800 to 1800 GMT Thurs./Fri.

This is strictly a YL only affair, open to YL's around the world. It's the 40th annual party run by the YL Radio League.

All bands may be used. Phone and c.w. are separate contests and require separate logs. A dupe sheet is also required for logs with 100 or more contacts.

Exchange: QSO no., RS(T) and ARRL section, country for DX stations.

Scoring: One point per QSO between stations within a ARRL section, and between DX stations. Two points if QSO is between DX and ARRL section stations. The same station may be worked once only regardless of the band.

Multiplier: Is derived from the number of ARRL sections and DX countries worked. There is also a low power multiplier of 1.25 if power input is 150 watts or less on c.w., 300 watts p.e.p. if on s.s.b.

Final Score: Total QSO points times ARRL sections and DX countries worked, times the power multiplier if any.

Awards: 1st, 2nd and 3rd place certificates to world winners, and to winners in each US call district and DX country. Only YLRL members are eligible for Trophy awards. There are two gold cups, c.w. and phone, to the top members in the world. There are also three special plaques. The Corcoran for the highest combined phone/c.w. score in a ARRL area, the Hager for the highest combined score for North and Central America and Caribbean areas, and one for the rest of the world.

Logs must be received no later than November 20th and go to: Margaret Williams, K14W, 5 Redwood Circle, Virginia Beach, VA 23462

VK/ZL/Oceania DX Contest

Phone: Oct. 6 - 7 C.W.: Oct. 13 - 14
Starts: 1000 GMT Saturday
Ends: 1000 GMT Sunday

Stations in the rest of the world will be concentrating on working stations in Oceania, with the emphasis on VK/ZL for their multiplier

Following rules apply to other than VK/ZL.

Exchange: RS(T) plus a progressive QSO number starting with 001.

Scoring: For Oceania - Two points for VK/ZL contacts, 1 point per QSO with rest of world.

Outside Oceania - Two points for VK/ZL contacts, 1 point for other Oceania contacts.

Final Score: Total QSO points from all bands multiplied by the sum of

1978 WAE C.W. Contest Results U.S.A. and Canada

Single Opr.		*N6AR	
*K1GQ	682,506	N6AA	55,120
*K1RX	606,480	N6ND	22,916
*K1TO	495,388	N6ZZ	12,660
K1ZZ	98,612	WA6NEL	2,464
W1PL	19,665	K6XT	432
WA1FCN	10,672	WD6EQI	16
W1CNU	484	*K7NHV	44,240
*N2LT	630,834	W7JYW	5,940
*K2SS	566,932	K7UR	2,160
*K2BMI	547,200	N7RO	888
*W2AEE	455,760	*K8CBK	90,720
WB2VYA	226,050	AA8S	7,268
WB2SJK	180,688	KB8CR	896
WA2FYA	102,120	*W9OA	27,202
W2KHT	27,027	W9QMW	15,912
N2CM	25,802	N9UN	1,456
WA2ZWH	18,802	*W0IUB	19,200
*DK5AD/W3	334,341	WB0GOB	11,594
W3ARK	58,760	W0BMM	8,385
W3AP	16,566	W0ODT	520
*K4BAI	118,992	*VE3BR	20,512
W4BV	36,309	*CG4SW	32,062
W4OMW	8,052	VE6MP	7,098
W4KMS	4,087		
WB4WHE	3,268		
*K5NW	80,640		
K5RC	31,600		
W5NR	380		

Multi-Opr.	
*K3FD	159,168
*N4OL	120,564
W4CUE	46,416
*N6AW	31,348
N9AFU	2,412

* Certificate Winners

VK/ZL call areas worked on each band. (Single band logs also accepted)

There is a special 8 hour only period, and a 80 and 160 section for VK/ZL stations only.

Awards: Attractive certificates to the top all band scorers, both phone and c.w., in each country and call areas of Japan, USA and USSR. This year there is a mounted medallion for the top world scorer and bronze medals for each major area. Single band awards will be issued if returns warrant.

Logs: Date/time in GMT, station worked, number sent/rec'd, band, QSO points. Underline each new VK/ZL call area worked on each band. Use a separate sheet for each band. Include a summary sheet showing the scoring, name and address in BLOCK LETTERS, and a signed declaration

1978 VK/ZL/Oceania Contest Results North America

Phone	C.W.		
KA1BQ	8,568	AC1O	3,425
K1MEM	4,872	W1DMD	390
WB1EUB	24	N2LT	2,912
N2LT	4,810	WA2ZWH	52
W2FCR	880	W3TV	6,562
WA2ZWH	270	N3RL	640
W2CC	102	WB4RUA	112
W3TV	5,760	W5SOD	300
N3RL	2,184	N6JM	492
WA4QMQ	720	W6DWJ	40
K5DEC	52	N7DF	3,220
N6AR	20,360	W7TY	2,200
W6TYX	8,274	W7KPL	1,512
W6DWJ	2	K9BG	1,349
K0UK	20,292	K9AB	945
WA0TKJ	5,859	W9QWM	520
W0IUB	1,287	K0FX	6,272
		W0IUB	1,377
		WB0GOB	1,031
KZ5FR	3,900		
OX3BX	1,364	HP1AC	1,260
CH3GCO	7,202	KL7HBK	55
VE3EVK	1,350		
VE7DIO	671	VE4MF	252
VE7VT	400	VE3HAB	8
VE1BNN	52		
XE1VV	2,110		
XE1LLS	1,578		

that all rules and regulations have been observed.

There was no mention of a s.w.l. section this year but perhaps that was an oversight.

Logs must be in the hands of the Committee by January 31, 1980. This year they go to: The W.I.A. Contest Committee, G.P.O. Box N1002, Perth, West Australia 6001. Results may be obtained by enclosing 1 IRC with your log.

RSGB 21/28 MHz SSB Contest 0700 to 1900 GMT Sunday, October 14

It's the world working the British Isles on 21 and 28 MHz in this one. There are 7 countries in the British Isles. G, GD, GI, GJ, GM, GU and GW. A total of 42 prefixes when the numerals are included. (G2, GD3, GI4 and etc.)

The same station may be worked once on each band for QSO and multiplier credit. Entries are limited to single operator only.

Exchange: The RS report plus a progressive contact number starting with 001.

Scoring: Each contact with a British Isle station is worth 3 points. Multiply total QSO points from each band by the sum of the prefixes worked on each band. (A max. of 42 possible on each band. The GB prefix does not count.)

There is also a s.w.l. section. Only British Isles stations are to be logged. Scoring is the same as indicated above.

Awards: There are two Trophies for the British. Overseas entries will settle for 1st, 2nd and 3rd place certificates for world winners.

Separate logs are required for each band, include a summary sheet showing the scoring, and the usual signed declaration that rules and regulations have been observed.

Logs from overseas entries must be received no later than December 3rd. This year they go to: RSGB HF Contest Committee, c/o M. Harrington, 123 Clensham Lane, Sutton, Surrey SM1 2ND, England.

NINE Land QSO Party

Starts: 1800 GMT Sat., October 13
Ends: 2359 GMT Sun., October 14

This one is again being sponsored by the I11 Wind Contesters of Indiana.

There is a time limit of 24 hours out of the 30 hour contest period for operation. The same station may be worked once per band and mode, and mobiles in each county change.

Exchange: RS(T) and QTH. County and state for 9 Land; state, province

or DX country for others.

Scoring: Each QSO is worth 2 points. 9 Land stations use (states + provinces + DX countries + 9 Land counties) for their multiplier. Others use 9 Land counties.

Frequencies: CW - 1805, 3560, 7060, 14060, 21060, 28060 + VHF. SSB - 1818, 3895, 7230, 14280, 21355, 28600 + VHF. Novice - 3725, 7125, 21125, 28125.

Awards: Certificates to top scorers in each state, province, DX country, 2nd and 3rd place if justified. Also to top mobile, portable, multi-single, multi-multi, club and novice.

Indicate each new multiplier as worked, include a summary sheet and a s.a.s.e. for copy of results.

Logs go to: I11 Wind Contesters, c/o John W. Sikora, WB9IWN, 8155 Woodlawn Street, Munster, Indiana 46321

Arrowhead QSO Party

Two Periods, Oct. 20 & 21 (GMT)
1500 Sat. to 0300 Sun. and 1500 to 2359 Sun.

This party was organized by the Arrowhead R. A. C. to celebrate 50 years of organized amateur radio in the Duluth, Minn. / Superior, Wis. areas. All stations within 50 air miles of this area are considered Arrowhead Amateurs.

Exchange: RS(T), county and state for Arrowhead stations. RS(T), ARRL section or country for others.

Scoring: One point per QSO, 5 points if it's with a Novice or Tech.

Final Score: Arrowhead multiply QSO points by sections/countries worked, and again by the bonus multiplier.

Others multiply QSO points by 5, again by counties worked, and again by the bonus multiplier.

The bonus multiplier is as follows: Novice/Techs. by 5, power input of 5 watts or less, also 5, 6 to 200 watts by 2, and nil for over 200 watts.

Dupe sheets are request for log with 100 or more contacts.

Awards: Plaques to the top scoring Arrowhead station, and station outside the area. Certificates to 2nd and 3rd place scores in the Arrowhead area, and to the top scorers in each ARRL section and country.

There is a special 50th Anniversary certificate. To receive this award US and Canadian amateurs must work five Arrowhead Amateurs, and DX stations two. Contacts may be made in the party or during the month of October.

All entries must be postmarked by November 21st and go to: Arrowhead Radio Amateur Club - 50, 123 East 1st

Street, Duluth, Minn. 55802. Include a s.a.s.e. for results and awards

RSGB 7 MHz Contest

Phone: Oct. 20 - 21 C.W.: Nov. 3 - 4
Starts: 1200 GMT Saturday
Ends: 1200 GMT Sunday

Like the 21/28 MHz phone contest this one also for exchanges between the British Isles and the rest of the world. However a different scoring format is used. Only single operator entries are eligible. Phone and c.w. are separate contests.

Exchange: RS(T) report plus a progressive contact number starting with 001.

Scoring: Stations in Europe score 5 points for each QSO with a British Isle station. Those outside Europe score 15 points. In addition, all may claim a bonus of 20 points for each different British Isle country prefix worked. (G2, GC3, GD4, GW4 and etc., a max. of 42 possible. No credit for GB prefix.) There is no multiplier, just add your QSO and bonus points for your score.

There is a s.w.l. section with scoring same as above except that the prefix bonus is 50 points. Overseas listeners to log British Isle stations only.

Appropriate awards will be made.

Since I have not received an official announcement I am using last year's format and mailing address for logs.

The phone entries must be received no later than December 15th, the c.w. January 2nd. Try the RSGB HF Contest Committee, c/o D. Thom, G3NKS, 37 Whittington Road, Cheltenham Glos, GL51 6DB England.

WADM DX Contest

Starts: 1500 GMT Sat. October 20
Ends: 150 GMT Sun. October 21

This year's contest is to commemorate the 30th anniversary of the founding of the German Democratic Republic.

Use all bands 3.5 thru 28 MHz, both c.w. and phone. However the first 10 and last 25 KHz of the 3.5 and 14 MHz band are kept free of contest operation. The same station may be worked on each band and mode for QSO and multiplier credit.

There are three classes, single operator, multi-operator and s.w.l.

Exchange: Signal report plus a 3 figure QSO number starting with 001. The DM stations will send a signal report and 2 figures denoting their district. (Kreiskenner)

Scoring: Three points for each DM contract. Multiply total by sum of DM

districts worked on each band. A district is identified by the last letter in the call, A thru O, not by the number in the call. A max. of 15 on each band. DM7, DM8 or DM0 may be substituted for missing districts.

S.w.l.s get 1 point for each DM station reported, and 2 points if the worked station is reported. Rest of scoring same as above.

Awards: Certificates to the top stations in each section of each country.

Use a separate log sheet for each band and include a summary sheet showing the scoring, name and address and the usual signed declaration that rules and regulations have been observed.

Entries must be postmarked no later than 30 days after the contest. They go to: DM Contest Bureau, RKDDR, Hosemannstr. 14, DDR 1055 Berlin, German Democratic Republic.

Scouts Jamboree-on-the-Air

Starts: 0001 Saturday, October 20
Ends: 2359 Sunday, October 21
(Suggest Local Times)

This is the 22nd annual worldwide Jamboree in which Boy Scouts Amateurs promote worldwide friendship on the air. It is also a fine opportunity to introduce amateur radio to newcomers. Individual amateurs and

radio clubs are encouraged to invite scouting to their shacks to QSO other Scout amateurs. Interested amateurs should inform their local scout council concerning their availability for the JOTA.

Frequencies: Phone - 3940, 7090, 7290, 14290, 21360, 28990, C.W. - 3590, 7030, 14070, 21140, 28190. Also 6 meters and Novice frequencies. (These are suggested calling frequencies.) Listen especially for K2BSA the National Headquarters station.

Logging: List all stations worked or heard in JOTA activity. Indicate time in GMT and if the other station is a Scout, Scouter or has been either one. And how many Scouts or Scouters were present. Tally up the number of JOTA contacts, stations with Scouts or Scouter operators, and number who participated from your station.

Awards: The JOTA Certificate will be awarded to all participants, amateur Scout groups and s.w.l.s who submit a report.

Additional and more detailed information may be obtained by sending a s.a.s.e. to Harry A. Harchar, W2GND, 216 Maxwell Ave., Hightstown, N.J. 08520.

To commemorate the 50th Anniversary of amateur radio in Switzerland, Swiss stations are allowed to use the special prefix HB7. The World Bureau

callsign will therefore be HB7S/p.

Logs and reports for the JOTA and QSLs for K2BSA go to your National Coordinator. In the U.S. it is Harry A. Harchar, JOTA Coordinator, Boy Scouts of America, North Brunswick, N.J. 08902

Crazy Eight QSO Party

0000 to 2400 GMT Sunday, October 28

This is the first annual QSO party held by the Crazy Eight Net of Pittsburg, Pa.

(A QSO party on October 28th? Now whose crazy idea was that? Ed.)

All are welcome to participate, however only certificate holders may submit logs.

Activity is limited to 10 meters only. Each contact is worth one point, add an additional point if it's with a 10/x number, and one more point if it's a Crazy Eight member. Maximum point value for a QSO is three points.

Awards will be issued to the top scoring entry in each U.S. and Canadian call area, and one award to the top scoring DX station.

Your log should indicate your 10/x and Crazy Eight number, and submitted no later than November 28th to: Contest Manager, Jim Lundberg, WB3ICC, 571 Washington St., McKeesport, PA 15132



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Cushcraft Corp.'s New Two-Meter Yagi

Cushcraft introduces the new *Boomer* 3.2 wavelength yagi for two meter DX communications. The antenna exhibits a 16.2 dB

forward gain and 24 dB front-to-back ratio.

Mechanical features include a large diameter round boom, reversible truss supports, high strength aluminum mounting plates and all stainless steel hardware.

Two or four *Boomers* can be

stacked using Cushcraft power dividers, coaxial cable and stacking frames for up to 22.2 dB gain.

More information is available directly from Cushcraft Corp., P.O. Box 4680, Manchester NH, or circle number 71 on the reader service card.

A Record Album Describing Shortwave Radio

Trans-Island Productions Ltd. has recently marketed a 33-1/3 r.p.m. record which describes the ins and outs of shortwave listening. According to the album jacket "this album is dedicated to the Short-Wave Stations of the World and to the men and women behind them.

"Whatever their motives in broadcasting; whether political, commercial, religious or for

reasons of national prestige, these radio stations provide millions of people in all countries with, not only a unique source of information and entertainment, but also with the cheapest and most comfortable form of worldwide travel...and you don't even need a passport!"

For more information about "Long Live Short-Wave," which sells for \$6.95, write to Trans-Island Productions, Ltd., P.O. Box 24, Douglas, Isle of Man, British Isles; or, circle number 70 on the reader service card.

Mitch Murray presents

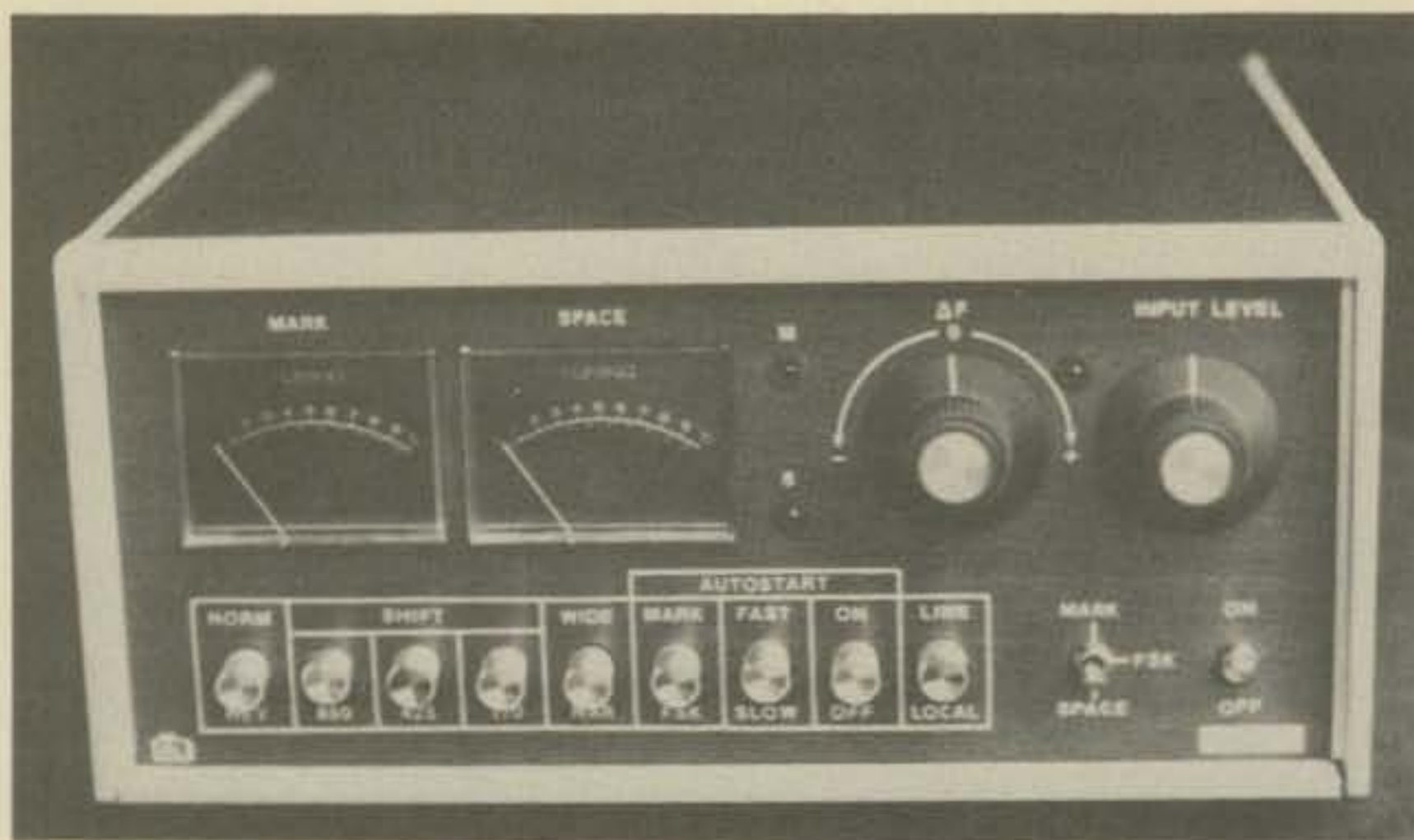
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IRL's Model FSK-1000 Terminal Unit

IRL has recently marketed a new RTTY terminal unit, called the FSK-1000.

Features include switch-selectable shifts of 170, 425 and 850 Hz (plus front panel tuning from 50 to 1000 Hz); active filtering; limitless operation; compensation for selective fading; individual tuning meters for mark and space; standard 20 mA or 60 mA loops, RS232 compatible; autostart, antispace and many other features.

The unit measures 5.22 x 11.37 x 10 inches. Several options are available including a 230 volt power supply, an AFSK unit and an ASCII/Baudot video terminal driver.

The FSK-1000 sells for \$449 and is available from IRL, 700 Taylor Rd., Columbus OH 43230. For further information circle number 61 on the reader service card.

Nye Viking's Phone Patches

Nye Viking announces the availability of two phone patches that can be plugged directly into the telephone line without need (or cost) of a telephone company-supplied coupling device.

The Nye Viking Phone Patch comes in two models: No. 250-0046-001, without speaker, which provides connection to your own external speaker; and No. 250-0046-003, with built-in loud speaker, for most transceiver installations. Model -001 is priced at \$45.50, and Model -003 at \$55.00, at dealers throughout the U.S.



quite a few other features in this unit and the interested amateur can get more information from ICOM, 3331 Towerwood Drive #304, Dallas TX 75234, or by circling number 60 on the reader service card.

For more information about the two phone patches and available accessory equipment, contact Nye Viking at 1614 130th Ave., N.E., Bellevue WA 98005, or circle number 68 on the reader service card.

ICOM's IC-551 50 MHz Transceiver

The new ICOM IC-551 50 MHz transceiver features microcomputer control of frequency and scanning.

Three memories are available for programming and beacon watching. Using the s.s.b. squelch and scan mode, three beacon frequencies may be scanned and the 551 is set to stop on the first one heard. When not scanning, the three memories and two v.f.o.'s provide five different frequencies for use by the 551.

The IC-551 is an all-mode six meter unit in a compact and easy-to-read instrument. There are



DEE Company's INCAPS™

DEE Company has recently marketed a family of unique electronic parts that they say can reduce the cost and complexity of electrical circuitry.

INCAPS™ (INDuctor-CAPacitor) are single, low cost components that replace the separate inductors and capacitors traditionally used to provide the series or parallel resonant circuits that are the heart of many electronic devices. Use of INCAPS™ can reduce the number of parts needed in these basic circuits by 50%.

A 28-page brochure providing technical data on the various styles of INCAPS™, and showing experimental RFI/TVI filters is available on request from The DEE Company, 8360 Rushton Rd., South Lyon MI 48178. For further information circle number 66 on the reader service card.

Waneco Radio's Audio Filtering Processor

The Waneco Radio Model 1040R audio filtering processor features an 8-pole c.w. filter with a 45 Hz bandwidth, three-way audio distribution with an internal speaker and 70 dB rejection of interfering carriers.

Further specifications of the 1040R include an audio level meter, a maximum notch depth of -70 dB, audio output of 1.5 watts, an internal speaker and a c.w. filter center frequency of 800 Hz $\pm 10\%$.

The unit's dimensions are 8 x 3 x 6.2 inches and weighs 3.5 pounds.

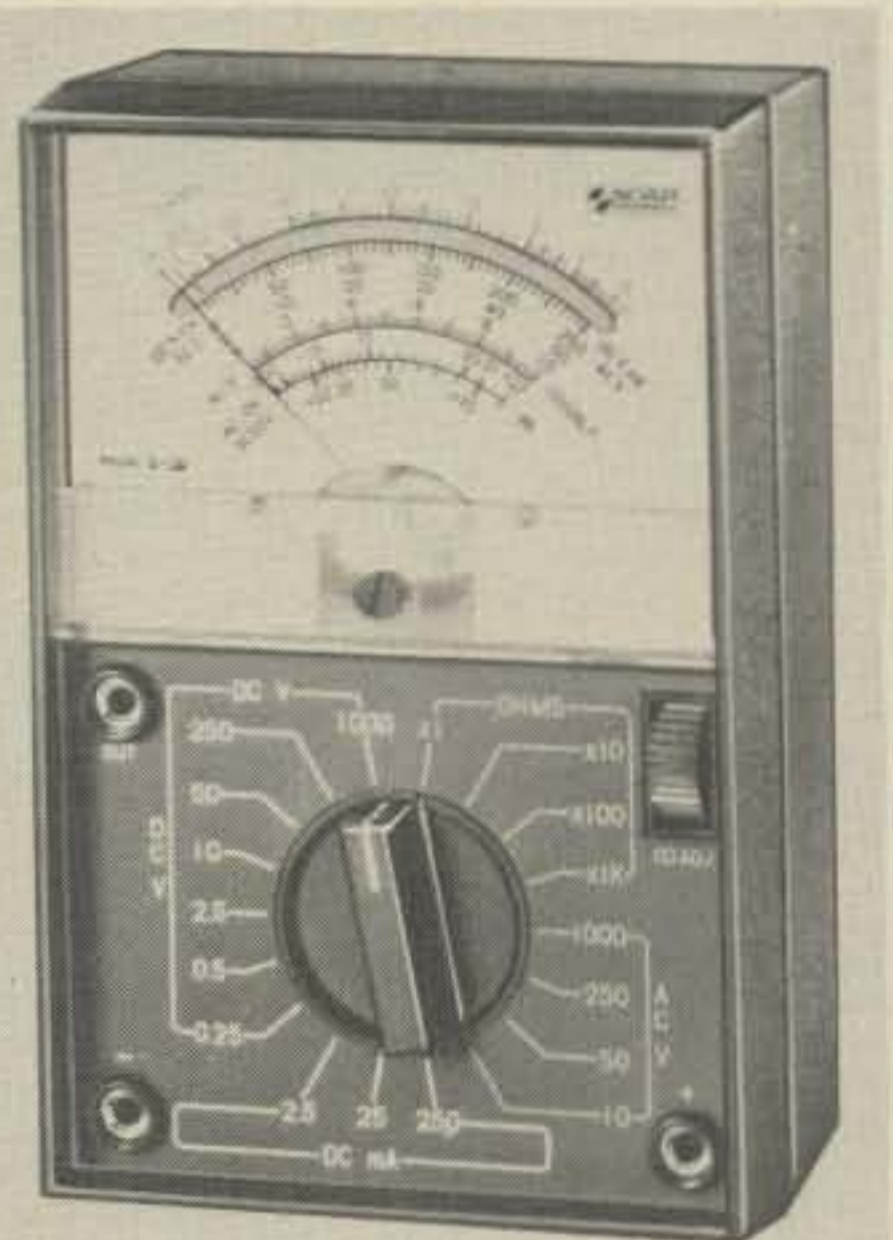
For more information contact Waneco Radio at P.O. Box 491, Hawthorne CA 90250, or circle number 62 on the reader service card.

Soar Electronics' New Analog Multimeter

The new Soar S-20 Analog Multimeter features a d'Arsonval meter movement that guarantees high accuracy. Five function modes - d.c. volts, a.c. volts, d.c. mA, ohms and dB - as well as twenty measurement ranges make this low-cost instrument a versatile tool for the amateur.

Completely portable (weight is 12.6 ounces), the battery-operated S-20 can measure a.c. and d.c. voltage from 0 to 1000 volts, d.c. current from 0 to 250 mA, resistance from 0 to 1 megohm, and dB from -20 to +36. Typical accuracies are $\pm 3\%$ d.c. and $\pm 4\%$ a.c. (full scale).

The price of the S-20 is \$35 and is available from Soar Electronics, 200 13th Ave., Ronkonkoma NY 11779. For more information, circle number 64 on the reader service card.



Aluma Tower Company's Steel Towers

Aluma Tower Co. has a series of telescoping steel towers that amateurs will find interesting. According to Aluma "telescoping steel towers have the inherent qualities and strength of steel with the flexibility and 'storm proof' features of the crank up (and down) design. All steel towers are electric welded (not gas welded) for added strength, then thoroughly rust treated before a final aluminum spray finish. All hardware is either sprayed or galvanized for durability and stain resistance."

For more information about Aluma's product line, contact them at Box 2806, Vero Beach FL 32960, or circle number 67 on the reader service card.



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MUSEUM for radio historians and collectors now open. Free admission. Old time amateur (W2AN) and commercial station exhibits, 1925 store and telegraph displays, 15,000 items. Write for details. Antique Wireless Assn., Holcomb, NY 14469.

WANTED: Pre-1925 wireless gear, books, magazines, spark transmitters and tubes. Jim Kreuzer, 1428 Main Rd., Corfu, NY 14036.

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QSL with Class! Unbeatable quality, reasonable price. Samples: 50 cents refundable. QSLs Unlimited, 1472 SW 13th Street, Boca Raton, FL 33432.

ARRL ROANOKE DIVISION CONVENTION & HAMFEST. Fourth Annual Tide-water Hamfest-Computer Show-Flea Market will be held in the Norfolk, Va. Cultural and Convention Center SCOPE October 20 and 21, 1979. 60,000 square feet of airconditioned exhibit and Flea Market tailgating space are available. Doors open at 9:00 AM. ARRL meetings, DX, Traffic forums, plus a CW contests are scheduled. FCC Exams are planned for amateur upgrading Saturday 9-12AM. A special feature will be a dinner cruise and banquet on the Spirit of Norfolk Cruiseship Saturday night. Advance registrations \$2.50 (SASE) \$3.50 at the door. Flea Market tailgate spaces \$3 day. Cruise and banquet \$16 person, \$30 couple. Tickets and information-TRC, P.O. Box 7101, Portsmouth, Va. 23707.

WANTED: Hallicrafters S-1 through S-7, H8PA, S-T, SX-10, SX-12, and other early Hallicrafter gear, parts, and manuals-any condition-for private collection. Price and condition frist letter. C. Dachis, WD5EOG, 4500 Russell Drive, Austin, Texas 78745.

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FOR SALE: TS-600 Kenwood with VO4-3, only used approx. 12 hrs. Perfect condition, \$600. Swan 350-A with VXO2, one year old and in very good condition, \$550. H. Krupa, AI3F, WB3JBD, 213 Park Ave., Woolrich, PA 17779, (717) 769-6780.

WANT: 1920's radios, horn spkrs and catalogs. SELL: Stoddard interference rcvr NM 30-A (20-300 MHz) \$35 and Tektronix 105 square wave gen. \$20. W6THU, 1545 Raymond, Glendale, CA 91201.

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QSL — QSL — QSL: Please send QSL Cards to: Philip Steven Kurland, P.O. Box 1686, New Haven, CT 06507.

The book "CQ YL" has been updated again with a new supplement bringing the YLRL Officers section up to date through 1977, plus a report on the 7th International YLRL Convention held in Houston in June 1976. If you have a copy of "CQ YL" and would like to add the new supplement (the pages are "slotted" so they can be inserted directly into the book's spiral backbone), drop a note with your request to author/publisher W5RZJ, Louisa Sando, 9412 Rio Grande Blvd., NW, Albuquerque, NM 87114. Please enclose \$1 to cover cost of printing and mailing. The one and only book about YLs in ham radio, "CQ YL" contains 23 chapters, over 600 photographs. Order your autographed copy, or a gift copy from W5 RZJ, \$3.50, postpaid.

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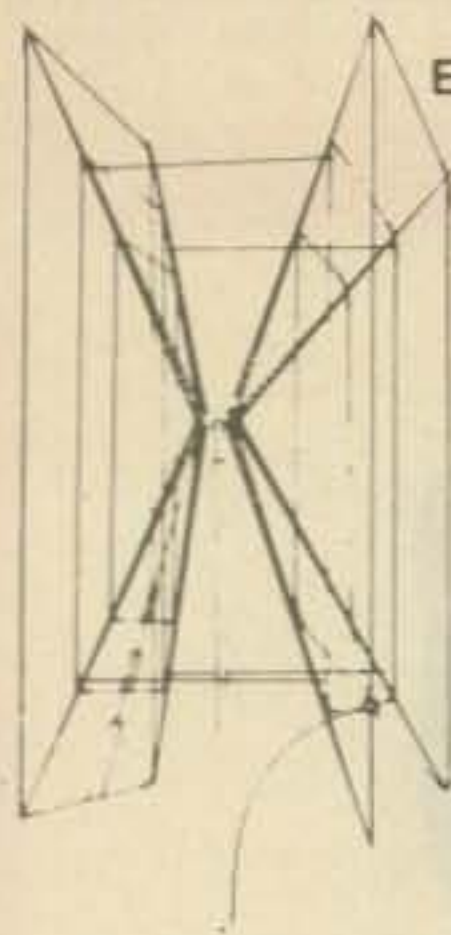
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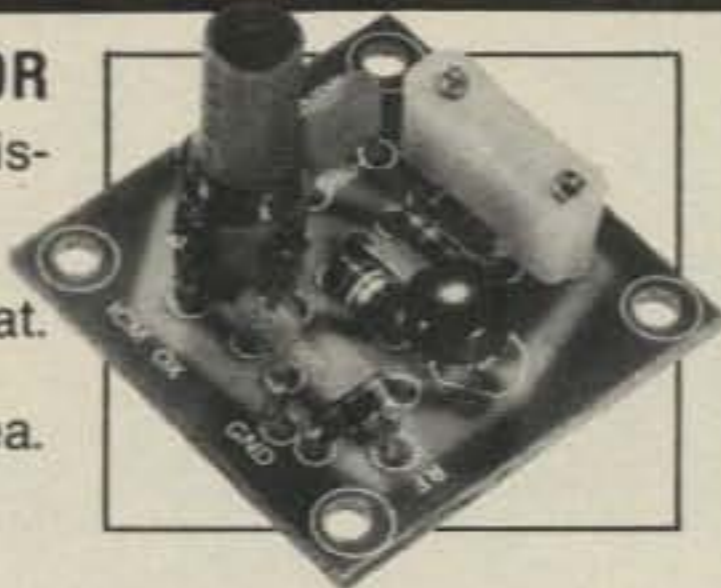
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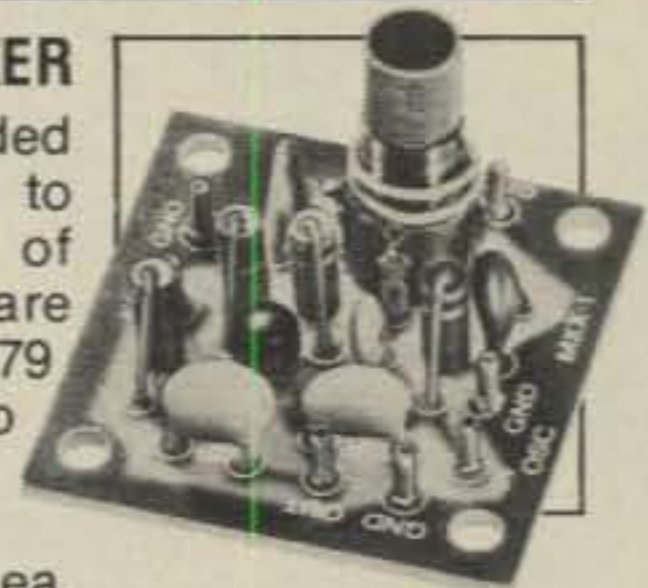
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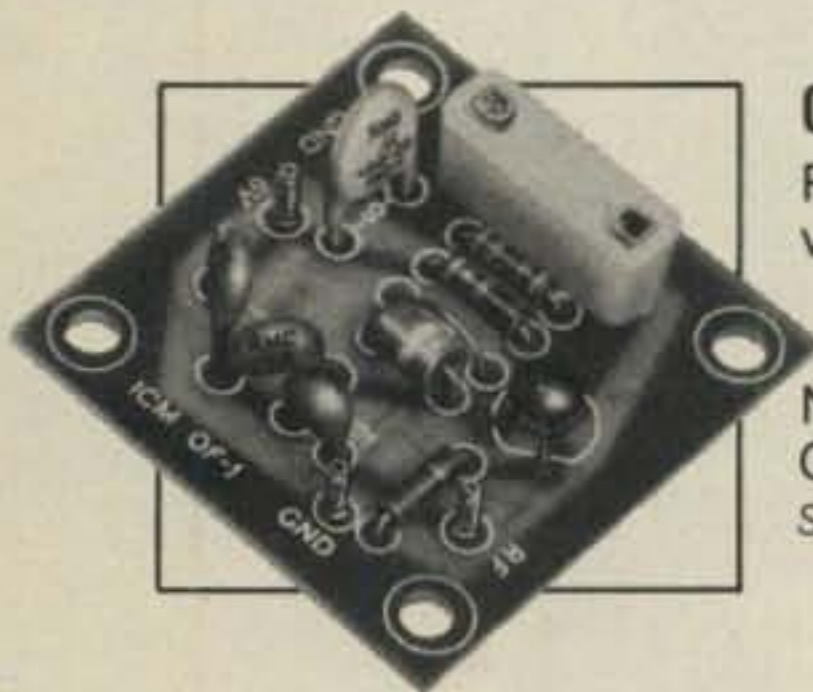
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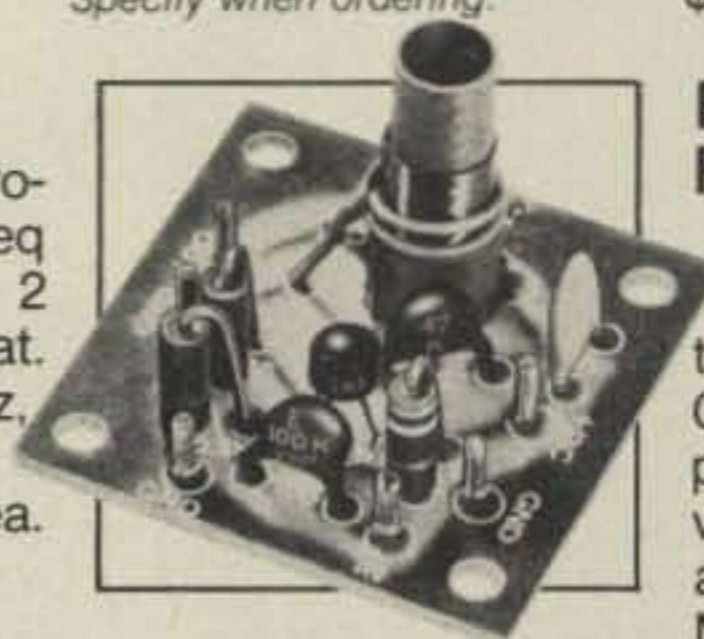
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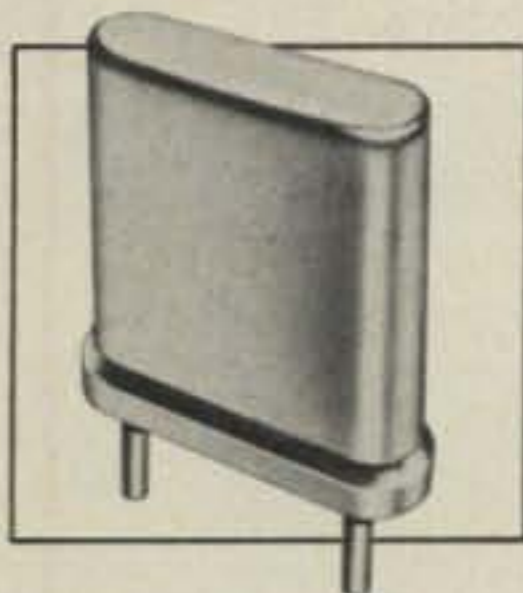
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KLM's 7.2-1 Dipole Module is the Answer!

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- **ROTATABLE** — right along with your other antennas
- **BROADBAND** — VSWR 2:1 and better across the whole amateur band — or OPTIMIZE, 6.95 to 10 MHz
- **VERSATILE** — divide for 2 el. vertical or add modules later and upgrade to 2 or 3 el. beam!
- **COMPACT** — KLM's unique linear loading system reduces size to a practical and efficient 46 ft.

You get the same quality materials as KLM's world famous HF "Big Stickers"; virtually indestructable Lexan insulator, stainless steel electrical hardware, seamless 6063-T832 alloy elements. Assembly is simple and speedy. No special tools or skills are needed.

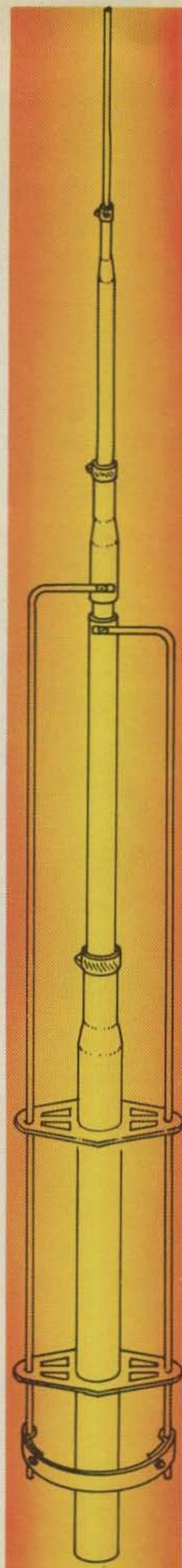
Why wait any longer? 40 METERS IS EASY WITH KLM'S 7.2-1 DIPOLE MODULE. IT'S AVAILABLE NOW. SEE YOUR LOCAL KLM DEALER

KLM ALSO BUILDS THE FULL SIZE 7.2-4 ELEMENT "BIG STICKER" AND A VARIETY OF MONOBANDERS, LOGS, DIPOLES, VERTICALS, AND OTHER ANTENNAS FOR HF, VHF, OSCAR, AND UHF. POWER AMPS, PREAMPS, AND CONVERTERS, TOO. WRITE FOR A COMPLETE CATALOG.

KLM — HELPING YOU MAKE THE MOST OF AMATEUR RADIO

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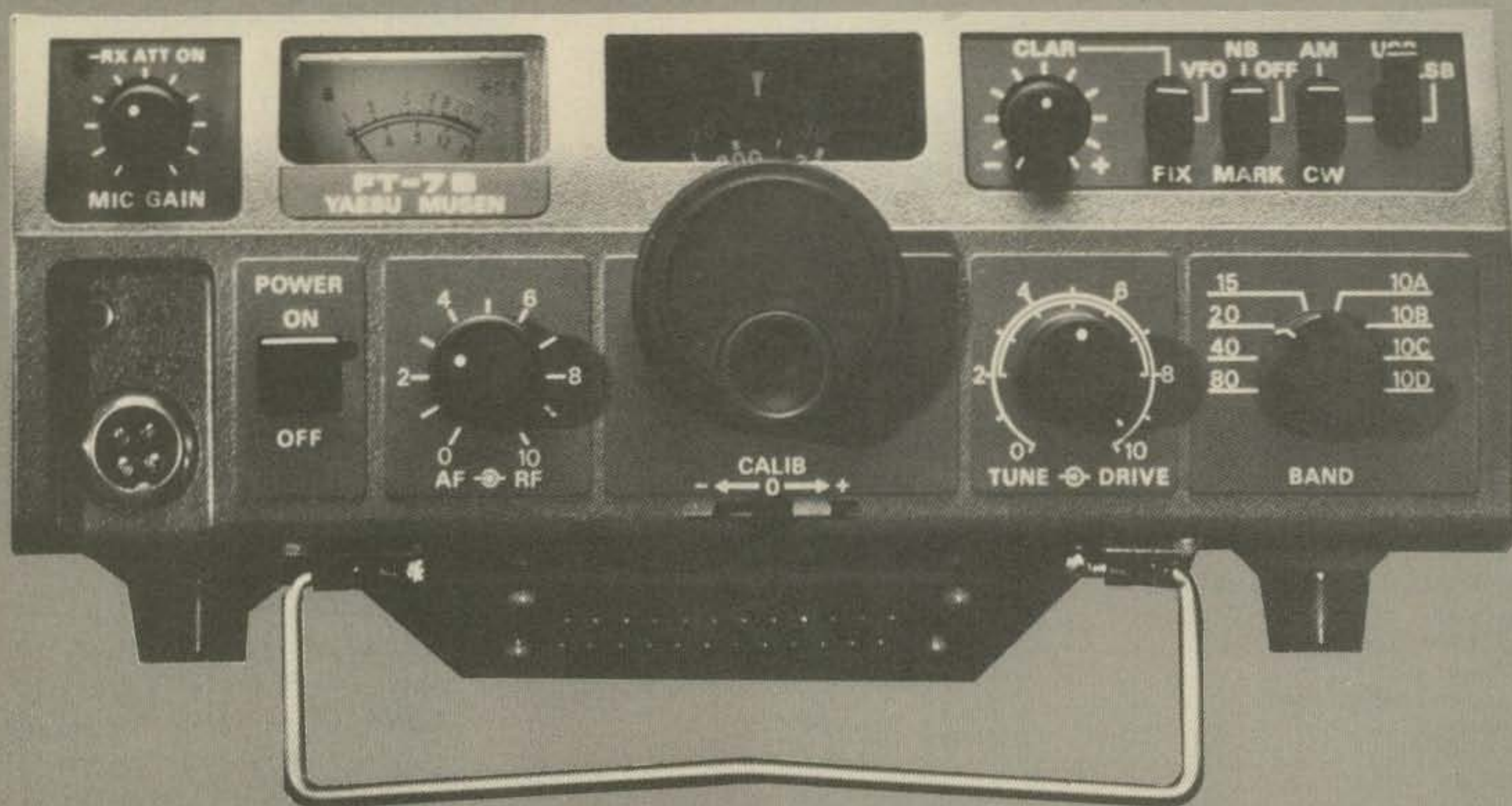
CIRCLE 46 ON READER SERVICE CARD



1/2 element condensed

NEW FT-7B 100 W MOBILE/BASE HF TRANSCEIVER

Enough power to drive those linears! The FT-7B is the high powered version of the popular 20 watt FT-7 that so many hams are running mobile in cars, boats, and planes around the world. Use the FT-7B as a top quality base station. New improvements include an audio peak filter (like our FT-901DM) to give you super CW selectivity, drive control, four 10M positions, full 80-10M coverage, 28.5-29.0 MHz crystal supplied (other crystals available as options), optional YC-7B Plug-in Remote Digital Readout, optional FP-12 Speaker/Power Supply Console.



RECEIVER

Sensitivity: 0.5uV for S/N 20 dB
Image rejection: Better than 50 dB
IF rejection: Better than 50 dB
Selectivity: -6 dB: 2.4 KHz, -60 dB; 4.0 KHz
Cross-modulation: Better than 60 dB immunity at 20 KHz off a 20 dB input signal typical
Audio output: 3 watts @ 10% THD

TRANSMITTER

Emission: LSB, USB (A3j), CW (A1), AM (A3)
Input power: A1, A3j; 100 watts DC
Carrier suppression: Better than 50 dB below rated output
Unwanted sideband suppression: Better than 50 dB @ 1000 Hz
Spurious emission: Better than -40 dB
Distortion products: Better than -31 dB



Price And Specifications Subject To
Change Without Notice Or Obligation

YAESU
The radio.

579X

CIRCLE 58 ON READER SERVICE CARD

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A Breakthrough In Technology!

THE YAESU FT-207R

MICROPROCESSOR CONTROLLED SYNTHESIZED HANDIE



***The Yaesu FT-207R Synthesized Handie
has all the features you could want in a very compact package***

- 144-148 MHz Range
- 10 KHz Steps
- 3 Watts Output
- 4 Memories plus Programmable Offset
- Priority Channel
- Memory and Band Auto Scan
- Optional Equipment:
- Keyboard Encoded Frequency Entry
- 2 Tone (Touchtone®) Input from Keyboard
- Keyboard Lock guards against accidental frequency change
- Odd Splits Can Be Programmed from Keyboard
- Automatic Battery Saver Feature for LED Display
- Rubber Flex Antenna

Tone Squelch, Speaker/Mike, Nicads, Battery Charger



CIRCLE 48 ON READER SERVICE CARD

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Heathkit SB-221 linear amplifier uses EIMAC 3-500Zs for efficiency, economy and performance.

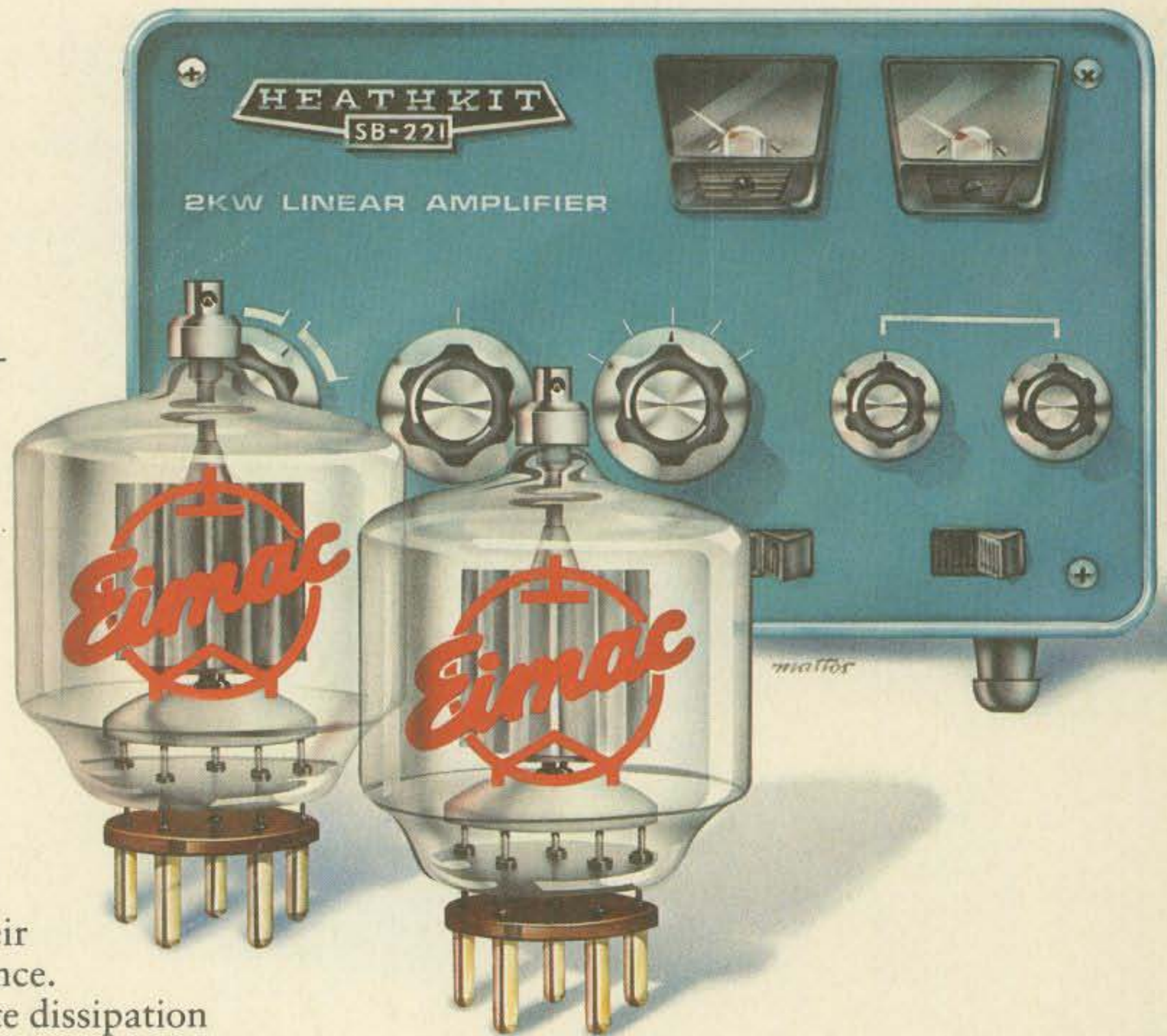
Designed for rugged service.

The new desktop Heathkit SB-221 linear amplifier provides up to 2000 watts PEP input for SSB and 1000 watts input for CW service. Only 100 watts drive power is required to achieve these power levels.

Designed for rugged contest and traffic service, the SB-221 uses the highest grade components including two EIMAC 3-500Z high gain power triodes, well-known for their reliable, efficient performance. One thousand watts of plate dissipation is available from the two tubes, providing ample safety factor for long life service.

The designer's choice.

Top-notch equipment designers, such as Heathkit, choose EIMAC power tubes for commercial as well as amateur products. The 3-500Z power tube used in the SB-221 also serves in many commer-



cial broadcast, FM and point-to-point radio systems where reliability and long life are paramount.

Make sure this fine EIMAC 3-500Z is in your equipment. For full details and a data sheet on the 3-500Z, write Varian, EIMAC Division, 301 Industrial Way, San Carlos, CA 94070. Or contact any of the more than 30 Varian Electron Device Group Sales Offices throughout the world.

