ICD 08241

Amateur Radio

CQ

SERVING AMATEUR RADIO SINCE 1945
MAY 1981 $2.00

- **CQ Interviews: Jeffrey B. Young, Enforcement Division, Field Operations Bureau, FCC** ...page 10
- **1980 CQ World Wide DX Contest High Claimed Scores** ...page92

IJ7DMK DXpedition To San Pietro Island ...page17

- **A 39 Step Basic Program To Make Computer QSL Cards** ..page34
- **Results Of The 1980 CAN-AM Contest** ..page 61

THE RADIO AMATEUR'S JOURNAL

0 74820 08241 05

New 2-meter direction.

A compact transceiver with FM/SSB/CW plus...

TR-9000

The exciting TR-9000 2-meter all-mode transceiver combines the convenience of FM with long-distance SSB and CW in a very compact, affordable package, ideal for mobile installation. With its fixed-station accessories it becomes the obvious choice for your ham shack.

TR-9000 FEATURES:

- **FM, USB, LSB, and CW**
  All the popular 2-meter modes.
- **Extended frequency range**
  Covers all 2-meter Amateur frequencies as well as MARS and CAP frequencies (simplex and any repeater split) between 143.9000 and 148.9999 MHz.
- **Digital dual VFOs**
  With selectable tuning steps of 100 Hz, 5 kHz, and 10 kHz, convenient for each mode of operation.
- **Digital frequency display**
  Five, four, or three digits, depending on selected tuning step.
- **Scan of entire band**
  Automatic busy stop and free scan.
- **Five memories**
  M1-M4...for simplex or ±600 kHz repeater offset. M5...for nonstandard offset (memorizes transmit and receive frequency independently).
- **SSB/CW search**
  Sweeps between 0 and 9.9 kHz around the selected frequency in 100-Hz steps, while the main knob selects in 10-kHz steps. Easy way to find SSB or CW activity.
- **UP/DOWN microphone**
  "Beep" sounds with each frequency step. (Supplied with TR-9000.)
- **Effective noise blanker**
  Suppresses pulse-type noise on SSB and CW.
- **Improved receiver front-end characteristics**
  Low-noise, dual-gate MOSFET and two-stage monolithic crystal filter.
- **RIT control**
  Receiver incremental tuning, to tune only the receiver slightly off frequency in the SSB/CW mode. Functions on memory, also.
- **RF gain control**
  Threshold-type control, permitting accurate S-meter readings on SSB/CW and FM modes.
- **CW sidetone**
  Enables monitoring of keying during CW operation.
- **Automatic AGC selection**
  AGC time constant selected automatically with MODE switch (slow for SSB and fast for CW).
- **HI/LOW power switch**
  10 watts/1 watt RF output on FM/CW. Always 10 watts on SSB. Improved power module for reliable and stable linear RF output.
- **LED indicators**
  VFO A/B, RIT, ON AIR, and BUSY.
- **Rear-panel accessory terminals**
  Key, memory back-up voltage, tone input, standby, external speaker, DC supply voltage, and antenna.
- **Compact size**
  Only 6-11/16 inches wide by 2-21/32 inches high by 9-7/32 inches deep.
- **Adjustable-angle mobile mount**
  With quick-release levers for easy removal.

More information on the TR-9000 is available from all authorized dealers of Trio-Kenwood Communications, Inc., 1111 West Walnut Street, Compton, California 90220.

KENWOOD
...pacesetter in amateur radio

Matching accessories for fixed-station operation:

- PS-20 power supply
- SP-120 external speaker
- BO-9 System Base...with power switch, SEND/RECEIVE switch for CW operation, backup power supply for memory retention (BC-1 backup power adaptor may also be used for this application), and headphone jack

Specifications and prices are subject to change without notice or obligation.

Top-Notch.

VBT, notch, IF shift, wide dynamic range

TS-830S

Now most Amateurs can afford a high-performance SSB/CW transceiver with every conceivable operating feature built in for 160 through 10 meters (including the three new bands). The TS-830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455-kHz second IF. Its optional VFO-230 remote digital VFO provides five memories.

TS-830S FEATURES:

- **160-10 meters, including three new bands**
  Covers all Amateur bands from 1.8 to 29.7 MHz (LSB, USB, and CW), including the new 10, 18, and 24-MHz bands. Receives WWV on 10 MHz.
- **Wide receiver dynamic range**
  Junction FETs (with optimum IMD characteristics and low noise figure) in the balanced mixer, a MOSFET RF amplifier operating at low level for improved dynamic range (high amplification level not needed because of low noise in mixer), dual resonator for each band, and advanced overall receiver design result in excellent dynamic range.
- **Variable bandwidth tuning (VBT)**
  Continuously varies the IF filter passband width to reduce interference. VBT and IF shift can be controlled independently for optimum interference rejection in any condition.
- **IF notch filter**
  Tunable high-Q active circuit in 455-kHz second IF, for sharp, deep notch characteristics.
- **IF shift**
  Shifts IF passband toward higher or lower frequencies (away from interfering signals) while tuned receiver frequency remains unchanged.
- **6146B final with RF NFB**
  Two 6146B's in the final amplifier provide 220 W PEP (SSB)/180 W DC (CW) input on all bands. RF negative feedback provides optimum IMD characteristics for high-quality transmission.
- **Built-in digital display**
  Six-digit large fluorescent tube display, backed up by an analog dial. Reads actual receive and transmit frequency on all modes and all bands. Display Hold (DH) switch.
- **Adjustable noise-blanker level**
  Built-in noise blanker eliminates pulse- type (such as ignition) noise. Front-panel threshold level control.
- **Various IF filter options**
  Either a 500-Hz (YK-88C) or 270-Hz (YK-88CN) CW filter may be installed in the 8.83-MHz first IF, and a very sharp 500-Hz (YG-455C) or 250-Hz (YG-455CN) CW filter is available for the 455-kHz second IF.
- **More flexibility with optional digital VFO**
  VFO-230 operates in 20-Hz steps and includes five memories. Also allows split-frequency operation. Built-in digital display. Covers about 100 kHz above and below each 500-kHz band.
- **Built-in RF speech processor**
  For added audio punch and increased talk power in DX pileups.
- **RIT/XIT**
  Receiver incremental tuning (RIT) shifts only the receiver frequency, to tune in stations slightly off frequency. Transmitter incremental tuning (XIT) shifts only the transmitter frequency.
- **SSB monitor circuit**
  Monitors IF stage while transmitting, to determine audio quality and effect of speech processor.

More information on the TS-830S is available from all authorized dealers of Trio-Kenwood Communications, Inc., 1111 West Walnut Street, Compton, California 90220.

KENWOOD
...pacesetter in amateur radio

Matching accessories for fixed-station operation:

- SP-230 external speaker with selectable audio filters
- VFO-230 external digital VFO with 20-Hz steps, five memories, digital display
- AT-230 antenna tuner/ SWR and power meter
- MC-50 desk microphone

Other accessories not shown:

- TL-922A linear amplifier
- SM-220 Station Monitor
- PC-1 phone patch
- HC-10 digital world clock
- YG-455C (500-Hz) and YG-455CN (250-Hz) CW filters for 455-kHz IF
- YK-88C (500-Hz) and YK-88CN (270-Hz) CW filters for 8.83-MHz IF
- HS-5 and HS-4 headphones
- MC-30S and MC-35S noise-cancelling hand microphones

Specifications and prices are subject to change without notice or obligation.

BEST PRICES, DELIVERIES

FIVE STORE BUYING POWER!

SHIPPING REGULARLY TO COUNTRIES ON ALL CONTINENTS

SERVING HAMS BETTER.
North...south...east...west.

Bob Ferrero,W6RJ/K6AHV, Jim Rafferty, N6RJ other well known hams give you courteous, personalized service.

FREE PHONE

800 854-6046

CALIF. CUSTOMERS PLEASE CALL OR VISIT LISTED STORES

FREE SHIPMENT

(UPS Brown)

CONTINENTAL U.S.A.

master charge | VISA

HAM RADIO OUTLET™

ANAHEIM. CA 92801
2620 W. La Palma,
(714) 761-3033 (213) 860-2040
1 mile east Knotts Berry Farm.

BURLINGAME, CA 94010
999 Howard Ave., (415) 342-5757
5 miles south on 101 from S.F. Airport.

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

SAN DIEGO, CA 92123
5375 Kearny Villa Road (714) 560-4900
Hwy 163 & Clairemont Mesa Blvd.

VAN NUYS, CA 91401
6265 Sepulveda Blvd., (213) 988-2212
San Diego Fwy at Victory Blvd.

OVER-THE-COUNTER
Mon. thru Sat. 10AM to 5:30PM

AEA • ALLIANCE • ALPHA • AMECO • AMPHENOL • ARRL • ASTRON • AVANTI • BENCHER • BERK-TEK • BIRD • B&W • CALLBOOK • CDE • COLLINS • CURTIS • CUSHCRAFT • DAIWA • DATONG • DENTRON • DRAKE • DX ENGINEERING • EIMAC • HUSTLER • HY-GAIN • ICOM • J.W.MILLER • KENWOOD • KLM • LARSEN • LUNAR • METZ • MFJ • MICRO-LOG • MINI- PRODUCTS • MIRAGE • MOSLEY • NYE • PALOMAR • ROBOT • ROHN • SHURE • SWAN • TEMPO • TELEX • TELREX • TEN-TEC • TRISTAO • YAESU and many more!

COLLINS KWM-380

BEAT THE PRICE INCREASE while they last

Ask for details, prices.

FREE SHIPMENT (UPS Brown)

CUBIC/ SWAN ASTRO 103

New commercial-grade transceiver provides full 9-band coverage.

Ask for details, prices.

FREE SHIPMENT (UPS Brown)

R.L. DRAKE COMBO

TR-7/DR-7 all-band transceiver.

R-7 full coverage receiver.

Ask for details, prices.

FREE SHIPMENT (UPS Brown)

YAESU RACK

RACK MOUNT YOUR FT-707 STATION

Rack neatly contains: FC-707, FP-707, FT-707, FV-707DM and MR-7

Ask for details, prices.

FREE SHIPMENT (UPS Brown)

MIRAGE B-1016 2M AMPLIFIER

160 W OUTPUT SSB, FM, CW.

REG. 279.95 $249.95

Freq. range: 144-148MHz • RF out:160W nom. (10W in). • RF power in: 5-15W • DC operating pwr: 13.6VDC @ 20-25A • Intermittent duty cycle • Built-in receiver pre-amp. Automatic internal or external relay keying.

FREE SHIPMENT (UPS Brown)

25W OUT FROM TR-2400 w/American Radio "324"

TR-2400 plugs directly into compact assembly. Linear amp features V-Mos pwr transistor, gives 25W RF across band w/1.5 watts drive. Built -in amp/spkr boosts audio more than 2W. Also current limited charger for TR-2400, 12VDC @ 4A. Socket for ext PTT mic.

FREE SHIPMENT (UPS Brown)

signal/one CX-11A

- Dual VFO's. Transmit and receive on either.
- 150W out. Solid state no-tune final.
- All amateur bands, 1.8-30MHz plus new future bands.

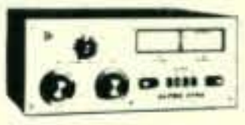
Ask for details, prices.

Unequalled selectivity. 3 cascaded xtl filters • 6 digit LED freq. readout • Built-in power supply • Full break-in CW (vacuum relays) • 16¼"W, 7½"H, 14"D, 40 lbs.

ETO ALPHA

77DX

76A



374A

SPECIAL PRICES ON ALL ALPHA/ ETO AMPLIFIERS

FREE SHIPMENT (our choice CONTINENTAL U.S.A.) on Signal/One and Alpha items.

KENWOOD

CALL FOR YOUR SPECIAL PRICES ON ALL OF THESE OUTSTANDING ITEMS

(and other well known Kenwood ham products)

TS-830-S

TS-520-SE

TR-2400

TS-130-S

FREE SHIPMENT (UPS Brown)

Prices, specs subject to change without notice

Calif. residents please add sales tax.

MASTHEAD

EDITORIAL STAFF

Alan M. Dorhoffer, K2EEK
Editor
Gail M. Schieber
Associate Editor

CONTRIBUTING STAFF

Frank Anzalone, W1WY
Contest Chairman
Hugh Cassidy, WA6AUD
DX Editor
Larry Brockman, N6AR
Robert Cox, K3EST
W.W. Contest Directors
Theodore J. Cohen, N4XX
Washington Commentary
Leo Haijsman, W4KA
WAZ Awards Manager
A. Edward Hopper, W2GT
USA-CA Director
Robert Huntington, K6XP
WPX Award Manager
George Jacobs, W3ASK
Propagation Editor
Rod Linkous, W7OM
Assistant DX Manager
Donald McClenon, N4IN
160 M. Contest Director
Irwin Math, WA2NDM
Math's Notes
Karl T. Thurber, Jr., W8FX
Antennas
Adrian Weiss, K8EEG/Ø
QRPp Editor
Bernie Welch, W8IMZ
WPX Contest Director
Bill Welsh, W6DDB
Novice Editor

BUSINESS STAFF

Richard A. Ross, K2MGA
Publisher
Dorothy Kehrwieder
Assistant to Publisher
Jack M. Gutzeit, W2LZX
Advertising Sales Manager
Arlene Caggiano
Accounting
Mary Manser
Customer Service
Janet T. Kurtz
Circulation Manager

PRODUCTION STAFF

Dorothy Kehrwieder
Production Manager
Elizabeth Ryan
Art Director
Pat LeBlanc
Phototypographer
Hal Keith
Illustrator

Offices: 76 North Broadway, Hicksville, NY 11801. Telephone: 516 681-2922. CQ (ISSN 0007-893X) is published monthly by CQ Publishing Inc. Controlled circulation paid at Hicksville, NY and Glasgow, KY. Subscription prices: Domestic—one year $14.00, two years $25.00, three years $36.00; Canada/Mexico—one year $16.00, two years $29.00, three years $42.00; Foreign—one year $18.00, two years $33.00, three years $48.00; Foreign Air Mail—one year $71.00, two years $139.00, three years $207.00.

Allow six weeks for change of address. Printed in the United States of America.
Postmaster: Please send change of address to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

CQ The Radio Amateur's Journal

ON THE COVER: The tower of San Pietro supports not only the antenna, but also the crew members' laundry.

MAY 1981 **VOL. 37, NO. 5**

FEATURES

DEPARTMENTS

Zero Bias

AN EDITORIAL

The Peterborough Principle

I've always read the editorials in *73* magazine with great relish, as Wayne, let's face it, is an amusing writer. Forget the great controversies or stupendous issues raised; it is sometimes a treat to follow him around the world and read about how he solves the problems of the electronic industry in the Orient, sets up cottage industries in Ireland to produce software, shapes up the Middle East, and in general makes the globe a better place for industry and amateur radio. I doff my cap to him.

However, while Wayne circumnavigates the globe in search of truth, justice, and the economic advantage, his keen view is somewhat myopic. In the past several issues he has also reported on hamfests at which neither Wayne or a *73* booth was present. In fact, during the last year or so there has been very little evidence of a *73* booth at any convention or hamfest. What is being reported on in *73* with regard to these events bears little relationship to reality. Oh, the names are there, but what went on, the numbers involved, and the attitude and mood that you pick up by being there are in direct contradiction with those who were actually there. *CQ* was there at just about every event he mentions, and what we and other exhibitors saw seems different. He has *CQ* packing it in early at Boxboro because we did poorly there. Point of fact is that we were greeted very warmly, and if selling a lot of subscriptions and books is doing well, then we did very well. We did leave early in order to attend a staff member's wedding (Associate Editor, Gail Schieber). Neither Jack, Dick, nor I would have missed that happy occasion. I did find out later that our booth was manned part of the day by another associate, and that the President of a well-known national amateur organization (no names) stepped in to help out for a while. To be fair, a *73* booth (no Wayne) was there also. However, when you looked at their booth, one was reminded of the Maytag TV commercials where they point out the loneliness of the repairman.

I've also read with great interest some of his comments regarding the state of the amateur economy and how bad it is supposed to be. I'm not going to tell you or anyone that things in general are terrific and better than those early 1950s days, but I do resent hearing (or reading) how great things are for Wayne and how poor everyone else is doing. Those of us in the amateur radio publishing business (ARRL included) do have economic ups and downs, Wayne notwithstanding. However, if one checks the total number of pages (not just advertising) in the February and March issues of the same magazines (*CQ, QST, Ham Radio, 73*), only one shows a very marked decrease in the total number of pages, and that one is *73*. Perhaps it is a seasonal slump or saving up for a really big issue. I don't know, but a 100 page or so decrease is noticeable in anyone's terms.

One last "Point On Peterborough" that seems incongruous to me at least is the laudatory comments Wayne heaps on one particular advertiser—a distributor, who has consistently run catalog ads in *73*. The people involved perhaps do deserve such praise; they seem honorable, pleasant, and they do appear regularly at hamfests and conventions. According to Wayne, they have taken the aggressive step towards selling to the amateur market (unlike his other distributor advertisers?), and because of this they have built up winning, successful business. I don't know what kind of deal Wayne has with them for their catalog ads, but it must be good. If the ad works fine for them, everyone could use some more business. However, they too seem to be missing from the pages of these two issues. Maybe it doesn't work that well for them (sour grapes on my part) and they can take their advertising funds elsewhere—hopefully to *CQ*.

There is a great word that perhaps William Buckley would use in this situation . . . megalopsia. It's a condition of vision in which objects appear magnified or bigger than they are in real life. I do admire Wayne's skill and tenacity, and make no doubt about it. However, I also think that perhaps in building a computer/software empire he may have tarried too long with the "wee folk" instead of watering and nourishing his roots.

Travels With CQ

For the record, the intrepid *CQ* Team enjoyed a fabulous weekend at the Miami Convention this past February, where we were warmly greeted, along with many other exhibitors (no Wayne). About six or seven thousand hams turned out for a good time and the opportunity to buy equipment either new or in the fleamarket. Everyone agreed it was a good show.

Next month (March, for me, as this is written in February) will find us at the Orlando show and at the Charlotte convention. If time permits, we might do more. I'll tell you about it (firsthand) in a future editorial. I can't promise to serve you technological breakthroughs that will save the industry or revolutionary developments to infuse amateur radio on a silver platter, but I am interested in you enough to come to as many events as possible to meet you face to face and have you meet me. You and I have crossed a lot of hurdles together over the years in the long history of *CQ*. We've had a tacit partnership in the last year and a half in seeing *CQ* grow and prosper. In that light, I think it's only fair that if you support us, we should (and do) support you wherever possible. Unlike Wayne, I don't think it's a waste of money for *CQ* and all the other exhibitors to get out and mingle with all the people who make it possible by buying our products. Those of us who continually hit the "Hamfest Circuit" year after year do so because we realize how important you really are. If we lose sight of that, or if it wears us down too much, or if we continually bad-mouth it, then perhaps we are in the wrong business.

73, Alan, K2EEK

The best amplifier value just got better....

Clipperton-L, now with tuned input.

Clipper ships sailing to foreign shores. Sixteen amateurs primed for adventure, coming together as the first group in 20 years to set foot on the remote French Island, Clipperton. Their goal: 30,000 QSO's in just 7 days.

If you're like most of us, a rare DXpedition is more a dream than a reality, but the Clipperton Linear Amplifier from DenTron brings the thrill of a DXpedition to you.

The Clipperton-L™ was inspired by the famous DXpedition on which 3 MLA-2500's were used. We built the Clipperton with 4 rugged, economical, 572 B's in the final to provide a full 2KW PEP on SSB and 1KW CW on 15 through 160 meters. With features like hi-lo power selector for equal efficiencies at 1 or 2 KW, a power transformer that is vacuum impregnated, wide spaced tuning and loading capacitors, built-in ALC and an improved whisper-quiet cooling system, the excitement of crashing a pile-up can be yours.

Clipperton-L suggested price $699.50.
FCC Type accepted.

CIRCLE 132 ON READER SERVICE CARD

DenTron® Radio Co., Inc.
1605 Commerce Drive
Stow, Ohio 44224
(216) 688-4973
Telex - 986456

See Us At Dayton
Booth NOs. 70 & 87

Only TEN-TEC Offers A Money Back Guarantee.

See your nearest participating dealer for details on this new no-risk trial offer.

TEN-TEC PARTICIPATING DEALERS

Alabama
Alabama Treasure Hunter
Huntsville

California
Ham Radio Outlet
Anaheim
Ham Radio Outlet
Burlingame
Ham Radio Outlet
Oakland
Ham Radio Outlet
San Diego
Ham Radio Outlet
Van Nuys

Colorado
CW Electronics
Denver

Connecticut
Hatry Electronics
Hartford

Delaware
Delaware Amateur Supply
New Castle
Amateur & Advance Communications
Wilmington

Florida
Mike's Electronics
Fort Lauderdale
Hialeah Communications
Hialeah
Amateur Electronic Supply
Orlando

Idaho
Custom Electronics
Boise
Ross Distributing Co.
Preston

Illinois
Organs & Electronics
Lockport

Indiana
Lakeland Electronic Supply
Angola
The Ham Shack
Evansville
ElectroCom Industries
South Bend

Iowa
Hi Inc.
Council Bluffs

Massachusetts
Tufts Radio Electronics
Medford

Michigan
Omar Electronics
Durand
Radio Parts, Inc.
Grand Rapids

Missouri
Henry Radio
Butler
Ham Radio Center, Inc.
St. Louis
Mid-Com Electronics
St. Louis

Nebraska
Omaha Amateur Center
Omaha

Nevada
Amateur Electronic Supply
Las Vegas

New Jersey
Radios Unlimited
Somerset

New Mexico
Pecos Valley Amateur Radio
Roswell

New York
Grand Central Radio
New York
Ham Radio World
Oriskany

North Carolina
Bino Communications
Greensboro

Ohio
Ken-Mar Industries
North Canton
Universal Amateur Radio
Reynoldsburg
Amateur Electronic Supply
Wickliffe

Oklahoma
Radio Incorporated
Tulsa

Oregon
Eugene Radio Supply
Eugene

Pennsylvania
Supelco Inc.
Bellefonte
South Hills Electronics
Pittsburgh
Carr Electronics
Telford
Ham Buerger Inc.
Willow Grove

South Carolina
GISMO Communications
Rock Hill

South Dakota
Burgharat Amateur Center
Watertown

Tennessee
ARSON
Madison
Germantown Amateur Supply
Memphis
J-Tron
Springfield

Texas
Texas Tower
Plano

Virginia
Tuned Circuit
Harrisonburg
Radio Communications Co.
Roanoke

Washington
Amateur Radio Supply
Seattle
C-COMM
Seattle

Wisconsin
Amateur Electronic Supply
Milwaukee

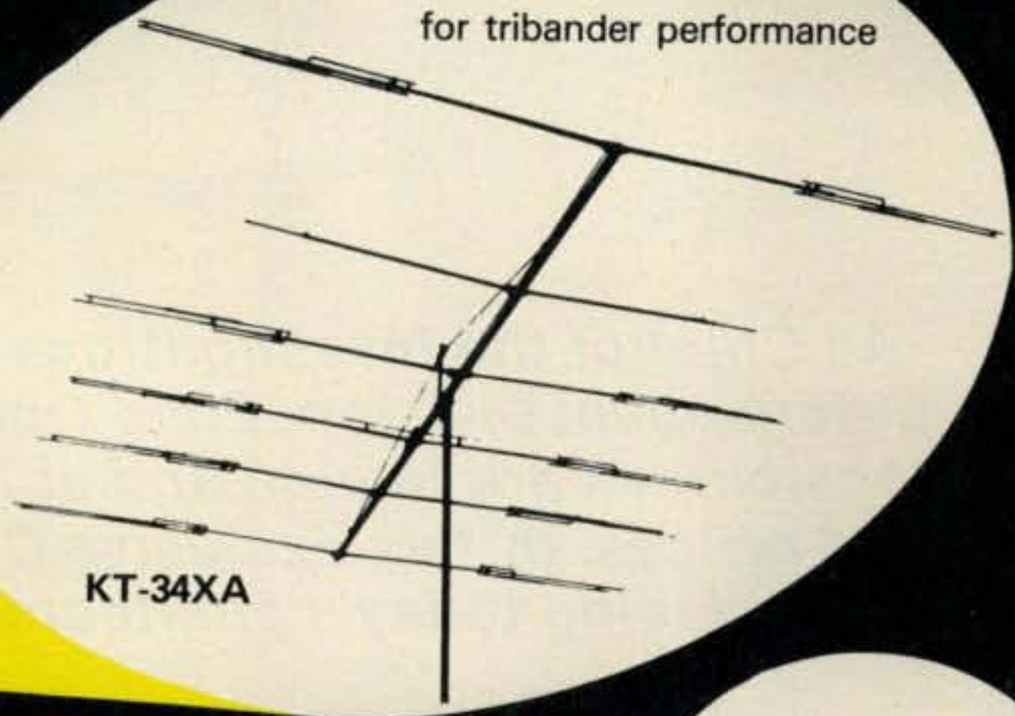
Announcing

- **Foundation for Amateur Radio Scholarships** - This non-profit organization plans to award eight scholarships for the academic year 1981-82. All amateurs holding at least a General Class license or the equivalent are eligible if they plan to enroll in a full-time course of study at an accredited institution. For additional information and an application, send a letter or postcard, postmarked no later than May 31, to FAR Scholarships, 8101 Hampden Lane, Bethesda, MD 20014.
- **Ding Dong Texas Funexpedition** - This second annual event will be held May 2 and 3 for 24 hours beginning at 1800 UTC May 2. Operating frequencies will be 7.275, 14.280, and 21.380 MHz. The call sign used will be KI5K. An 8 × 10 certificate will be issued upon receipt of a QSL card and s.a.s.e. to P.O. Box 1141, Killeen, Texas 76540.
- **Dogwood Festival QSO Party** - Members of the Greater Fairfield Amateur Radio Association will operate on six bands with the club call WB1CQO. WB1CQO will be on the air May 16 from 1300-2200 UTC. A special QSL card will be available. The stations will operate on s.s.b. 3.975, 7.235, 14.330, 21.420, and 28.710 MHz, and on 146.55 simplex. For special QSL's send s.a.s.e. or IRC's to Grace von Stein, KA1JT, 248 Euclid Ave., Fairfield, CT 06432.
- **K8DAA From Windmill Island** - K8DAA will be operating from Windmill Island in Holland, Michigan on May 16. Certificates will be sent to amateurs for contacting K8DAA between 1400 and 2300 UTC. Approximate frequencies will be 7.125, 7.275, 21.125, 21.425 MHz. Send QSL and 75¢ to Jack Van Voorst, WD8RNQ, 8737 Summit Court, Zeeland, MI 49464.
- **Area-NJ Mini-DXpedition** - The Area-NJ Radio Club will conduct a mini-DXpedition to Groton, Connecticut on May 2-3. They will operate from the radio room of the submarine USS Croaker which will be moored in the Thames River. A special QSL card will be issued. For information about times, bands, and frequencies, contact WA2SLK, Box 164A, RD #1, Georgia Tavern Road, Farmingdale, NJ 07727.
- **Alamance ARC Special Events Station** - The Alamance ARC, K4EG, will operate a Special Events Station at the Alamance County Historical Museum on May 16 and 17 from 1600 UTC to 2300 UTC. Frequencies will be 7.260 and 21.360 MHz on general phone. A special QSL will be issued to those contacted on receipt of QSL and s.a.s.e. QSL to: Alamance ARC, c/o Gary Hills, KA4KJI, 2416-C Huntington Road, Burlington, NC 27215.
- **N. and S. Dakota Special Event Stations** - The weekend of May 30, two special event stations will be on the air from one or both of these states. 80-10 meter operation is being considered. S.s.b. and c.w. will be used and 144.52 simplex. Calls will be W0BV for c.w. and W0ANZ for s.s.b. QSL's must be accompanied by an s.a.s.e. or IRC's. For more information, contact W0BV, 2304 Storm St., Ames, Iowa 50010.
- **San Benito County On The Air** - The Gabilan ARC will put San Benito County, California on the air on Sunday, May 31. Times will be 0800 PDT to 1600 PDT. Operating frequencies will be 28.775 and 21.400 USB, and 28.175 and 21.175 slow speed c.w. A special certificate and QSL will be sent to those who confirm with an s.a.s.e. QSL to John Daudet, KB6IT, 2001 Scenic Circle, Hollister, CA 95023.
- **The following hamfests and fleamarkets are slated for the month of May:**

May 2, **22nd Southern Tier ARC Hamfest**. For info contact D.R. Vasilow, W2EWO, Star Rt. 1, Box 35, Owego, NY 13827.
May 2-3, **Blue Ridge ARS Hamfest**. Contact Blue Ridge ARS, 200 Walker Sp. Rd., Taylors, SC 29687.
May 2-3, **Tri-Cities Hamfest**. Contact Tri-Cities Hamfest, P.O. Box 3682 CRS, Johnson City, TN 37601.
May 3, **Moultrie ARC Hamfest**. Contact M.A.R.K., P.O. Box 327, Mattoon, IL 61938.
May 16, **Cadillac, MI Swap & Shop**. Contact Wexaukee ARA, Box 163, Cadillac, MI 49601.
May 16-17, **Durhamfest '81**. Contact Durham FM Assoc., P.O. Box 8651, Durham, NC 27707.
May 17, **Athens County ARA Hamfest**. Contact ACARA, c/o Jeff White, WD8OXK, P.O. Box 767, Athens, OH 45701.
May 17, **Indian Foothills ARC Hamfest**. Contact W0WIE, Route 4, Box 168, Sedalia, MO 65301.
May 17, **27th Annual Breeze Shooters Hamfest**. Contact Don Myslewski, K3CHD, 359 McMahon Rd., North Huntington, PA 15642.
May 17, **Green Bay Mike and Key Club Swapfest**. Contact Robert Duescher, 1011 13th Ave., Green Bay, WI 54304.
May 24, **RVARC Mayfest**. Contact George Moore, WA4GFX, 701 Apperson Dr., Salem, VA 24153.
May 24, **Reading Radio Club Hamfest**. Contact Reading Radio Club, Box 124, Reading, PA 19603.
May 30, **North Area Repeater Assoc. Swapfest and Exposition**. Contact Amateur Fair, P.O. Box 30054, St. Paul, MN 55175.
May 30, **Columbia ARC Hamfest**. Contact Bob Burks, KC4LB, C.A.R.C., P.O. Box 5802, Columbia, SC 29250.
May 31, **Trenton, TN Hamfest**. Contact Ed Holmes, W4IGW, 501 N. 18 Ave., Humboldt, TN 38343.
May 31, **Northern Kentucky ARC Ham-O-Rama**. Contact Ken Miller, WD8ISC, P.O. Box 257, Erlanger, KY 41018.

The *KLM* Spotlight on:

The new pacesetter
for tribander performance



KT-34XA

For the new age
of satellite DX

420-450-18C

144-148-13LB

Maximum gain,
across the whole band

See your
KLM dealer

Handie Power!
35W, Charger, Preamp

MA-35BL

Broadbanded
hi-performance Verticals

SSV
80-40-15

40-10V

The ultimate H.F. monobanders

KLM's
"BIG STICKERS"

Plus much, much more!
Write for a complete catalog

KLM P. O. Box 816, Morgan Hill, CA 95037
(408) 779-7363

CIRCLE 67 ON READER SERVICE CARD

As Chief of the Investigations Branch, Enforcement Division, Field Operations Bureau, FCC, Jeffrey B. Young's responsibilities are to plan and administer the investigative programs for FCC field offices. In this exclusive CQ interview, he talks about some of the problems facing today's amateurs.

CQ Interviews: Jeffrey B. Young

Enforcement Division Field Operations Bureau, FCC

BY DR. THEODORE J. COHEN, N4XX

At the time of this interview (early 1981), Jeffrey B. Young was the Chief of the Investigations Branch, Enforcement Division, Field Operations Bureau, FCC. A graduate of the University of Maryland (BSEE), Jeff has held a number of different positions with the Commission since he joined the FCC in 1969, and today, he is Chief of the Inspections Branch (another part of the Field Operations Bureau). Jeff has been a licensed amateur for over 11 years (K3OTD), and he makes his home in Potomac, Maryland, a suburb of Washington, D.C. Together with his wife Norma, Jeff enjoys working on their home in his spare time, and as a result, he has gained quite a reputation in the home-repair area. Given the problems facing the Commission today, and especially those which involve the amateur service (see, also, this month's "Dateline...Washington, D.C." column), this interview with Jeff should be must reading for amateurs everywhere.

CQ: Jeff, tell us a little about your work.

Young: As Chief of the Investigations Branch, my responsibilities are to plan, schedule, and administer the investigative programs for FCC field offices. These programs include detecting and locating rule violators, and initiating enforcement actions to stop unauthorized activities. We also try to resolve r.f.i. problems experienced by government, military, and Commission licensees, and by the public.

CQ: Is the amateur service a source of concern to the Investigations Branch?

Young: Yes, the amateur service has increasingly become a problem for us. Unlike the past, in which amateur radio did not need a great deal of investigative or enforcement help, we are now experiencing a significant increase in the number of reports of malicious interference to amateur operations. Most of these reports cite other amateurs as the source of the interference, and in general, there seems to be a lack of respect for organized on-the-air activities by a growing number of operators. Some recent incidents of interference that come to mind are those involving the Intercontinental Traffic Net, WESCARS, and the Triple H Net. Interference is also being experienced by two-meter repeater operators around the country. It's sad to say, but almost 35% of the amateur-related complaints we receive today involve interference by one or more amateurs to the operations of other amateurs.

CQ: How are you working to resolve these cases of intentional interference?

*8603 Conover Place, Alexandria, VA 22308

The Collins KWM-380. For those who missed out last year, another chance.

Remember last year when we introduced the new KWM-380?

It sold out practically overnight. Strong testimony to the high-technology appeal of this successor to the famous Collins S/Line and KWM-2.

What makes the KWM-380 so popular? Fifty years of HF communications experience. An established technology base. AC/DC power supply, speaker and accessory functions all in one unit. Microprocessor frequency control for rate selectable tuning in 1 MHz, 1 kHz, 100 Hz or 10 Hz. Frequency memory provides split VFO function for half-duplex transmit and receive.

The high resolution frequency synthesizer locked to a high stability frequency reference is accurate to 10 Hz. Undesirable signals are easily eliminated with independently selectable I.F. bandwidths and passband tuning. Optional I.F. filters can be selected independent of operating mode.

The Collins KWM-380.

See it at your authorized dealer before someone else beats you to it. Collins Telecommunications Products Division, Rockwell International, Cedar Rapids, Iowa 52406. Phone 319/395-5963. Telex 464-435.

Rockwell International

...where science gets down to business

CIRCLE 115 ON READER SERVICE CARD

There seems to be a lack of respect for organized on-the-air activities by a growing number of operators.

Young: Well, it's not easy. What appears to many hams to be deliberate interference is often difficult to prove. Proof of deliberate interference hinges on demonstrating that the offender can hear the activity on the frequency he is allegedly jamming. Recently, with the cooperation of the victims of such interference, we have become increasingly successful in providing the Private Radio Bureau with the evidence it needs to revoke licenses for such violations.

CQ: What about problems associated with the marketing of equipment ostensibly intended for the amateur service, but really intended for use by unlicensed persons (for example, 10 GHz transmitters that are used to jam police radar units)?

Young: The marketing of radio-frequency devices that can cause interference to legitimate operations has become a serious problem for us. In fact the number of cases involving such illegal marketing activities has more than doubled in the past two years. Many of these cases involve equipment that is advertised for use in the amateur service, but that is really intended for other illegal uses. The problem, basically, stems from the fact that no FCC approval (that is, type acceptance) is required for amateur equipment. Thus, many so-called 10 GHz transmitters are, in fact, intended to be used as radar jammers, while some 15-meter linear amplifiers are really intended for CB operation. Fortunately, we have been very successful in prosecuting the largest manufacturers of illegal CB amplifiers.

CQ: What is your branch doing regarding illegal operations by so-called HFers on frequencies between the 27 MHz CB allocation and the amateur 10-meter band?

Young: My branch continues to coordinate investigations of out-of-band activities for the Commission, with attention focused on the penalties to be imposed for such operations. In many cases, operators are considered to be unlicensed, and depending on the severity of the violation, they are either fined or their cases are referred to the local U.S. attorney for prosecution in federal court. Quite often, however, the out-of-band operator holds an FCC license. . .most often CB, but occasionally amateur. In either case, my branch will refer the evidence to the licensing bureau with a recommendation for license revocation.

CQ: What is the Field Operations Bureau doing to improve its ability to respond to enforcement matters?

Young: The FOB, together with the Private Radio Bureau's Compliance Division, has made a concerted effort to streamline the processing of paperwork that follows the identification of rule violators. We have also had some success in using publicity as a tool for encouraging compliance (that is, in advertising our successes). However, these efforts still fall short of what I believe is required to effectively address enforcement matters. At this time, we are actively engaged in devising new, more effective approaches to the enforcement problems we face, and these approaches will be made public later this year.

Proof of deliberate interference hinges on demonstrating that the offender can hear the activity on the frequency he is allegedly jamming.

CQ: R.f.i. complaints again appear to be on the rise (80,244 in FY80 vs. 72,069 in FY79). To what do you attribute this increase?

Young: Given the collapse of CB as a publicized national pasttime, it is difficult to explain why there has been a gradual increase in the number of complaints filed with the Commission. My opinion is that increases in reported interference problems result mainly from the proliferation of susceptible electronic devices. . .hi-fi systems, television receivers, and so forth. We are not shocked by the modest increase in reported r.f.i. cases, but we continue to watch for trends that may signal that problems are mounting with specific devices and/or radio services.

CQ: Is your branch working with others in the Commission on the matter of improving TV receiver specifications?

Young: Not really. The Investigations Branch has only been involved to the extent that we provided r.f.i. statistics to those groups which were more directly involved with this matter. The Office of Science and Technology (OST) has a contract with Texas Instruments to build an "interference-proof" TV receiver, but I am not aware of any progress that has been made in implementing standards for receiver susceptibility.

CQ: To what extent is the FOB active in reducing incidental interference from consumer devices (razors, heating devices, etc.)?

Young: Interference from what we call "Part 15 and 18 devices" must be handled almost entirely by this Bureau since "operators" are not required to have licenses to operate them. In general, notifications of interference, filed with the manufacturers involved, resolve most of the interference problems that are called to our attention. We do, however, have the authority to fine those manufacturers who do not take corrective action, though we have rarely had to resort to this option.

CQ: What is your position on Section 605 of the Communications Act, and on the pirating of MDS or satellite TV pictures by amateurs and others?

Young: That's a tough question. We face a difficult task in regulating the production and use of MDS, satellite, and subscription TV receivers and decoders that challenge the privacy aspects (Section 605) of the Act. This, however, is a subject which I have neither the legal expertise nor the time to develop. Suffice it to say that the Field Operations Bureau has instructed its personnel to refer such questions to the FCC's Office of General Counsel.

CQ: Jeff, thanks for taking the time to meet with us.

WE BACK EVERYTHING WE SELL WITH OUR PERSONAL GUARANTEE

PRICES F.O.B. HOUSTON

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ITEMS SUBJECT TO PRIOR SALE

MADISON
Electronics Supply

master charge

VISA

ORDER YOUR
KWM 380 NOW!
OLD PRICE & FREE GOODS

TS830S TRANSCEIVER
160-10 METERS, 3 WARC BANDS, NOTCH, VBT, I F SHIFT, BUILT IN AC
929.00
FREE FILTER 59.00
FREE MC50 45.00
929.00

HARD TO FIND SURPLUS

TELSTAR ENTERPRISES TR-2400 BATTERY ELIMINATOR FOR MOBILES/REQUIRES MINOR RADIO MOD $19.95

COMING SOON
2 METER FM 800 CHANNEL
10 MEMORIES, 25 WATT/3 WATT
MAJOR MANUFACTURER LIST 339.00
YOUR COST 289.00

LIST 1498.00 WITH AC SUPPLY.
CALL

CALL
6 p.m. - 10 p.m. CENTRAL
MON., WED., FRI.,
NIGHTIME: 1-800-231-3057
DAY: 1-713-658-0268

LARGE BOOKSTORE—WHAT DO YOU NEED?

TS 130S
WARC TRANSCEIVER
80-10 METERS
SOLID STATE RIG
3 WARC BANDS
PROCESSOR
759.00
AT 130 139.00
80-10M & WARC
ANTENNA TUNER
FREE
Total 759.00

BELDEN

RG8/u Dbl. Shield	Part Number	MHz	db/ 100 ft.	db/ 100 m
	9888 65 ¢/ft.	50	1.2	3.9
		100	1.8	5.9
		200	2.6	8.5
		300	3.3	10.8
		400	3.8	12.5
RG8/u Foam .81VF	8214 36 ¢/ft.	50	1.2	3.9
		100	1.8	5.9
		200	2.6	8.5
		300	3.3	10.8
		400	3.8	12.5
RG8/u Regular .66VF	8237 32 ¢/ft.	100	2.0	6.6
		200	3.0	9.8
		400	4.7	15.4
		800	7.8	25.6
RG 213 Non-contaminating	8267 43 ¢/ft.	100	2.0	6.6
		200	3.0	9.8
		400	4.7	15.4
		800	7.8	25.6

8448 27 ¢/ft.
No. of Cond. — 8
AWG (in mm) —
6-22. (7 × 30).
2-18. (16 × 30). (1.19)

9405 45 ¢/ft.
No. of Cond. — 8
AWG (in mm) —
2-16. (26 × 30)
6-18 (16 × 30). (1.17)

BELDEN MINI

RG-8 19¢/ft./9258

ALL BAND COVERAGE!
160 THROUGH 10 INCLUDING WARC
9 BANDS FULLY OPERATING

ASTRO 103
Professional Grade
HF SSB Transceiver

- 100 WATTS ALL BANDS ALL MODES
- AGC DYNAMIC RANGE GREATER THAN 100 dB
- SELECTIVITY 16 POLE CRYSTAL FILTER 2.7 kHz at - 6dB; 3.78 kHz at - 100 dB

$1395.00 SUGGESTED LIST
CALL FOR QUOTE

ET CETERA

Cubic-Swan 102BXA	$999.00
Astro 150 A	849.00
Robot 800 A	749.00
Mirage B23 1 watt-30 Watt amp	89.95
DSI 5600A w/Ant/Ac	185.00
Cushcraft A3 Tribander	169.00
Bird 43, Slugs	Stock
CDE Ham-4 Rotor	199.00
Ham-X	269.00
FDK Palm 2 Handie with BP/AC	149.00
Cetron, GE 572 B	38.00
GE 6146B	9.95
Fits Kenwood Yaesu Kenwood Service Manuals Stock	10.00 ea.
Telrex TB5EM	425.00
Belden #14 8000 Stranded Antenna Wire	10¢ ft.
Lunar 2M4-40P	109.00
Adel Nibbling Tool	8.95
Janel QSA5	41.95
Rohn Tower 25G,45G Sections	20% off dealer
Alliance Hd73 Rotor	109.95
Amphenol Silverplate PL259	1.00
ICOM 255A 2M Synthesized w/TT Mike	339.00
ICOM 260A 2M SSB/FM/CW	449.00
Kenwood TS 180S/DFC/SSB	Call
New-Icom IC 720 w/AC/mike	Call
Bearcat 220 - $299.00	300-399.00
Manual Typewriters Guaranteed to Work	$35
Mallory 2.5A/1000 PIV Epoxy Diode	19¢ ea.
Antique Tubes	Call

2 Guaranteed Service Techs on COLLINS KWM-2/KWM-380/S-LINE CALL!

713-658-0268 **CALL FOR QUOTES** **1508 McKINNEY HOUSTON, TEXAS 77010**

CIRCLE 78 ON READER SERVICE CARD

Key Down

How Long?

Nine Hundred Consecutive Hours At A Full Kilowatt!

It couldn't be anything but...

Back in 1977 we ran an ***ALPHA 76*** for eighteen days with a brick on the key at a full kilowatt. To emphasize that ***ALPHAs*** keep getting even better, we recently fired up a new ***ALPHA 76A*** at maximum legal power ***and let it operate twice as long***—more than 37 days—900-plus hours!

WHAT MAKES AN ***ALPHA*** SO GOOD THAT WE DARE WARRANT IT FOR EIGHT TIMES AS LONG AS OTHER LINEARS, SPECIFY "NO TIME LIMIT" AT FULL RATED POWER, AND CONFIDENTLY PUT A "BRICK ON THE KEY" FOR HUNDREDS OF HOURS? Above all, such spectacular durability depends upon a truly rugged transformer and excellent cooling.

ALPHA TRANSFORMERS ARE LEGENDARY. Every one is designed and built to handle full rated power ***CCS***—in practical effect, forever. As ETO's remarkable two year factory (limited) warranty suggests, they virtually ***never*** fail.

Alpha!

A FIVE YEAR TRANSFORMER WARRANTY? Yep. The Hipersil* transformer design used in ***ALPHA*** models ***76CA, 78,*** and ***77Dx*** is so tough that we've extended the warranty on transformers in those specific models to five years!

SUPERB COOLING DESIGN IS ANOTHER ***ALPHA*** TRADITION. ***AMATEUR RADIO PROFILES,*** the new "Consumer Reports" type publication, says, "... the ***(ALPHA)*** 76A possess(es) perhaps the best cooling system yet encountered. After prolonged use, the amplifier is barely warm to the touch ... ambient noise is barely audible."

ARP adds, "... Service is spectacular ... Alpha gives a full 24 months (warranty) ... evidence that they really stand behind their product!" And the editor of a prominent DX newsletter recently cited ***ALPHA*** amplifiers as notable examples of equipment ***designed by experienced operators for real-world use.***

It's been said that forethought is the only sure cure for buyer's remorse. We couldn't put it better. Every ***ALPHA*** linear amplifier is meticulously engineered and built to handle continuous operation in any mode, at maximum legal power, with no time limit. The factory warranty protects you for years, not months. Isn't that food for (fore)thought?

Ehrhorn Technological Operations, Inc
Box 708/Canon City, CO 81212/
(303) 275-1613

CIRCLE 49 ON READER SERVICE CARD

ETO

(1)

(3)

(2)

A small island outpost, a stone fortress guarding the sea lanes, and amateur radio. Relax and let your mind wander over the possibilities.

DXpedition To San Pietro Island, IJ7DMK

BY MASSIMO "MAX" DI MARCO*, I2DMK

For the second time in recent history (the first was the IJ7EX effort in 1977) a group was organized for a DXpedition to San Pietro (St. Peter) Island in the Jonio (Ionian) Sea. The operation took place from June 15th through the 22nd of 1980 and was sponsored by INORC (Italian Navy Old Rhythmers Club), part of the Royal Navy Amateur Radio Society. The island, along with another (St. Paul) from the Cheradi Island group, is "owned" by the Italian Navy.

The small island (about 150 acres) boasts a fortress built in 1893 complete with a stone watchtower which rises about 60 feet above the horizon, a perfect place for antennas as the pictures will bear out. The Navy has stationed a detachment of 15 sailors on the island under the command of Lt. Bernardo Ceravolo. Lt. Ceravolo provided invaluable assistance to the DXpedition along with another Naval officer, Capt. Francesco Catinella. It didn't hurt the cause any to have Capt. Catinella also hold the call I7IOI and be President of the Taranto Amateur Radio Club.

The team consisted of three amateurs from Milan. Enzo, I2BVS, a refrigeration technician, is also the Award

(1) The Commandant, Catinella, I7IOI, IJ7BVS, I2DMK Junior, and Carlo, I7SPC (one of the radio amateurs of Taranto). (2) The entrance of the fortress with 2 meter transmitting antenna. (3) San Pietro Island's shack for IJ7DMK.

*Via Pascoli 60, Milano 20133, Italy

Manager for INORC; me, "Max," I2DMK (I'm also a sports writer), and my son Marco, "I2DMK Junior," who is a 16-year-old student. We had hopes of having St. Peter Island declared a separate country, but that didn't work out.

We basically used two antennas for the low bands—an Echo-8G four band antenna and W3DZZ multiband antenna emanating from the stone watchtower. Two meter coverage was supplied by a beam located on a mast in the courtyard. We ran higher power (250 watts) during the day when it was possible to tap off the island's 64 kw Fiat generator, but at night we were reduced to using a small French pocket-sized 750 watt generator, thus lowering our power to about 70 watts.

We had sort of an informal ceremony on the night of the 15th to start the DXpedition off, and during the ensuing operation we logged about 6000 QSOs on five bands. Most of our activity was concentrated on 10 and 15 meters and propagation conditions were in our favor. There were spectacular stateside pile-ups on our frequencies and in general things couldn't have been better. We made DXCC in less than four hours of operating and logged 115 countries during the trip.

We would like to thank all of those people who made this trip a success, including the Italian Navy command and the Italian licensing authorities.

The Best Rig on Wheels!

Preserve U.S. Economy – Buy American!

ASTRO 150A

Base Station Performance Tailored to the New Generation Small Cars.

ASTRO-150A, the synthesized transceiver for easy and safe tuning in the mobile environment. VRS for hands-off tuning; you set the rate and the microprocessor does the work. In addition, microphone up-down tuning allows tuning with one hand and eyes on the road. When off-road the microprocessor controlled synthesizer holds frequency, no matter how rough the going.

The **ASTRO-150A** is an extremely high quality Transceiver in both circuitry design and construction. Emphasis has been placed on performance and human engineering. A leading editorial Review stated, "The quality of construction is second to none. In fact the reviewer was reminded of a well-executed piece of expensive commercial or industrial test gear."

MIL grade double sided plated through epoxy glass boards are used throughout. Circuit boards are interconnected by means of stripline connectors and coax microconnectors for reliability and ease of service. No bulky wiring harnesses. The choice of circuitry prompted a reviewer to also add, "It is this design choice that is probably responsible for the excellent dynamic range of the receiver."

The VRS tuning system employs a knob with a center detent. In the center position the receive or transmit frequency is locked and indicated by the LED frequency readout. If the knob is rotated clockwise or counterclockwise scanning up or down is initiated. The rate of scanning is proportioned to the degree of knob rotation. Returning to the detent position stops the scan. "Reading the mail" is a simple and automatic function!

A Cubic Transceiver for Every Need

ASTRO-102BXA. The performance rig for base stations. Dual PTO's, Passband tuning, 235 watt input on all bands, and much, much more!

ASTRO-103. THE TRANSCEIVER, today's performance and no-nonsense features leader. All the features of the ASTRO-102BXA, plus WARC bands, RTTY mode, and more!

Sophisticated Mobile Antennas

Cubic mobile antennas for the most sophisticated user. **Model M34** with up to 4 bands rated at 200 watts PEP. The M34 features good efficiency, and no coils to change. **Model 45** features 5 bands with excellent efficiency. The Model 45, rated at 500 watts PEP, gives the ultimate in mobile performance.

CUBIC COMMUNICATIONS, INC.
305 Airport Road, Oceanside CA 92054
(714) 757-7525

CIRCLE 77 ON READER SERVICE CARD

Part III of this elongated series concerns itself with the Kw E a superheterodyne receiver which was a basic Telefunken design.

German World War II Communications Receivers

Technical Perfection From A Nearby Past

Part III

BY DICK ROLLEMA*, PAØSE

Part III now takes up with a 1938 design for a superheterodyne receiver. The Kw E a as you will see from the photos is a marvel of mechanical engineering. While PAØSE regales us with the theoretical aspects of the design, one can only imagine how that was transformed into the mechanical beauty we see unfold. Still, the thought of lugging 77 pounds of hardware around leaves a lot to be desired. -K2EEK

Short Wave Superhet Kw E a

The first of the two superheterodyne receivers we are going to discuss is the Kw E a (**Kw** = "Kurzwellen" = short wave, **E** = "Empfanger" = receiver, **a** is serial indicator). This radio was designed by Telefunken and it became operational in 1938.

Photograph 8 gives you a first impression of what it looks like. Photograph 9 shows the receiver out of its cabinet and photograph 10 a rear view.

*v.d. Marckstraat 5, 2352 RA LEIDERDORP, Netherlands

The dimensions of the radio are 69.2 cm wide, 27.4 cm high and 34.6 cm deep. It weighs 38 kg (77 lbs). Not directly a set to take on holidays.

The total frequency span of 1 to 10 MHz is covered in five ranges, as follows: 980-1610 kHz; 1560-2550 kHz; 2470-4060 kHz; 3940-6395 kHz and 6205-10000 kHz. Again the subbands are kept relatively narrow which improves the ease of tuning and the frequency read-out.

Looking at photograph 8 you notice several by now familiar features. Left of the dial the band-selector control above ("Grob" = coarse) and main tuning control with crank ("Fein" = fine) below. The dial features the rotating mask we already met on the previous receiver with a slot that displays only the frequency scale in use. The mask also shows the limits of the selected range and the frequency increment that corresponds to one dial division, 10 kHz on range III, as seen in the photograph. The receiver uses the same filament type tube in all 11 stages. It is the type RV 2 P 800 pentode we also encountered in the Torn E b. The radio consumes 1.6 a. at 2 v. for the filaments and 15-20 ma. at 90 v. anode current. The bottoms of the tubes with extraction knob can clearly be seen in photographs 9 and 10.

The simplified diagram in the instruction manual is too complicated to reproduce here. Therefore we present a block schematic diagram as fig. 8.

The mixer is preceded by two r.f. amplifier stages. There are five tuned r.f. circuits that are ganged to the oscillator tuning circuit. The user has the option to use a single or a double tuned circuit between the antenna and the first r.f. tube. Normally one circuit is used. But the manual says that when interference is experienced from a very strong near-by transmitter the second circuit between antenna and first r.f. tube should be brought into operation. The switch for this is the top one of the two controls at the right on the front panel.

The lower one of these controls is an antenna attenuator. Not a resistive one but a variable series capacitor between antenna and input circuit. To avoid detuning of this circuit a second section of the capacitor adds just as much capacitance in parallel with the tuned circuit as the series capacitor detracts. In other words the input attenuator is a differential capacitor. It is called "Ankopplung" (= coupling) on the front panel. There is also a series trimmer in the antenna that compensates for different antenna capacitances. It is set once and for all for a particular antenna and therefore has screwdriver adjustment (top right just

to the left of the antenna connector in photograph 8).

The six sets of coils that have to be switched for the five frequency ranges are mounted in a coil turret. This one is of particular beauty. Photograph 11 shows the turret, taken out of the receiver, which is a simple operation. The turret is moved from one position to the next by means of a Maltese cross mechanism that can just be seen at the extreme left of the turret. But before the turret starts to rotate the contact fingers are lifted from their partners on the turret by means of a camshaft that can be observed in photograph 11 in front of the turret. When the turret has come to rest in the new position, the contact fingers are lowered onto the turret again. The fingers make a slight wiping movement when pushed onto the ring shaped contacts on the turret, thereby removing possible dirt deposits.

The receiver uses the relatively low intermediate frequency of 250.9 kHz. But because five tuned circuits are used ahead of the mixer the image response is sufficiently suppressed (on the order of 80 dB).

The oscillator is of the tuned anode circuit variety. A coil in the grid circuit is inductively coupled to it. A second coil, coupled to the anode circuit of the oscillator is in series with the coil that forms the r.f. tuned circuit connected to the grid of the mixer tube. In this way the oscillator signal is injected into the mixer.

There are three i.f. amplifier tubes. They are preceded by double tuned i.f. transformers on 250.9 kHz.

The receiver offfers the selection of seven different bandwidths, of which four are meant for telephone, the fifth, sixth, seventh and eighth are for c.w. only. The bandwidth in positions seven and eight is identical, but in the eighth position the b.f.o. is switched to the other side of the passband. The bandwidth selector control can be seen in photograph 8 directly under the meter.

The principle of the bandwidth variation is indicated in fig. 8 in simplified form. In positions 1–5 the bandwidth of the i.f. amplifier is changed by varying the coupling between the tuned circuits of the i.f. transformers. By going from position 1 to 5 the coupling capacitors between the tuned circuits are made smaller and smaller. This would also shift the center frequency of the passband slightly. But this is compensated for by adding extra capacity in parallel with the tuned circuits as the coupling capacitors become less. Also the damping resistors in parallel with the tuned circuits are increased in value as the bandwidth narrows. In position 5 no extra damping is used. In positions 6–8 of the bandwidth control the i.f. bandwidth remains the same but the a.f. bandwidth is reduced. This is done by a tuned circuit that resonates at 900 Hz between the detector and the a.f. final amplifier. In position 6 it is brought into the circuit but the response is broadened by means of a parallel resistor. In positions 7 and 8 the resistor is removed and the bandwidth is at its narrowest.

The b.f.o. is crystal controlled and works at a fixed frequency of 250 kHz, thereby generating a beat note of 900 Hz with the 250.9 kHz i.f. signal. The b.f.o. can be brought into operation by means of a separate switch. It is directly under the bandwidth selector switch. If in position seven interference is experienced the operator can go to position eight. The b.f.o. is now changed from 250.0 to 251.8 kHz, again generating a beat note of 900 Hz but now

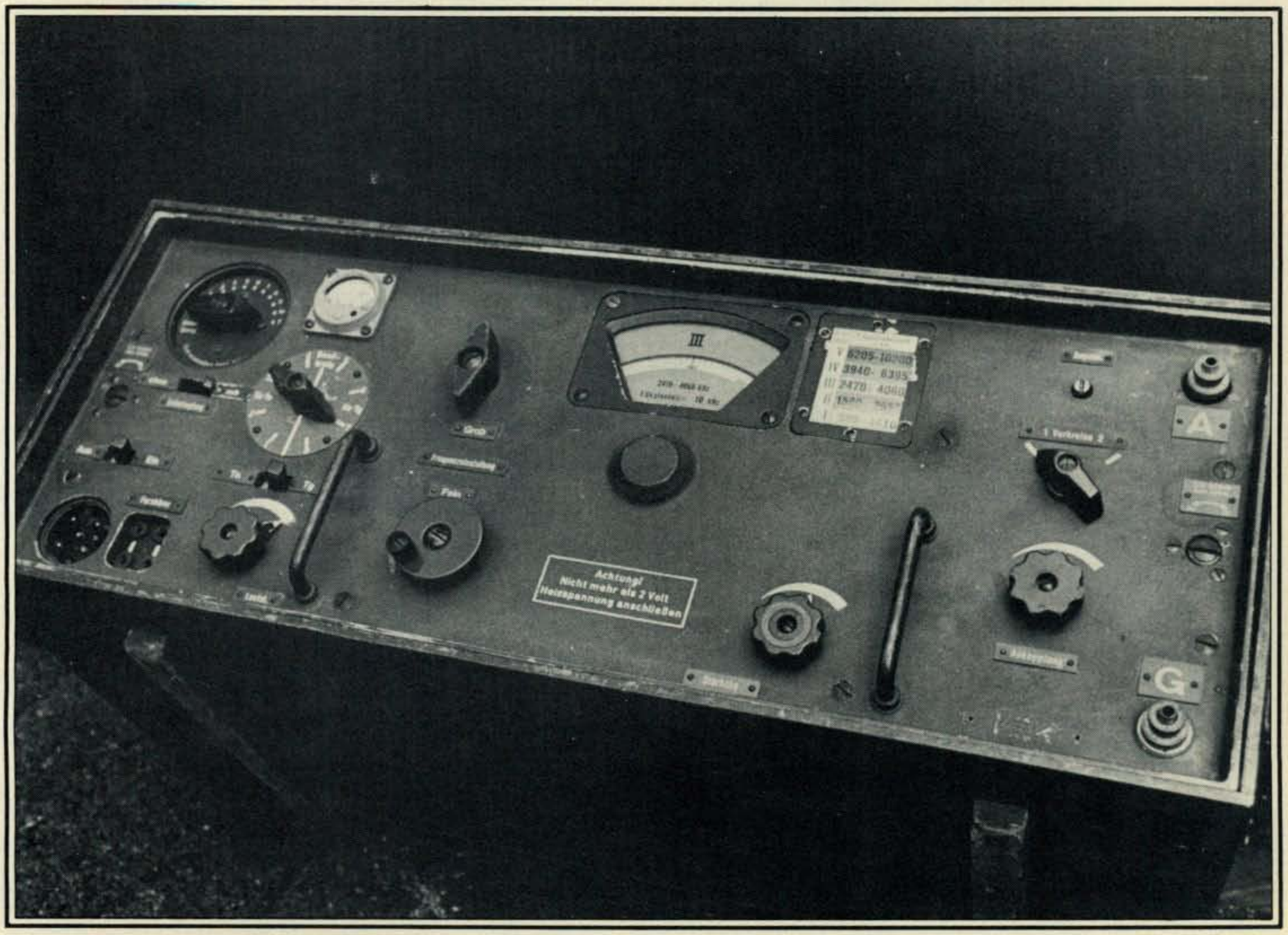


Photo 8– Front view of short wave superheterodyne receiver Kw E a.

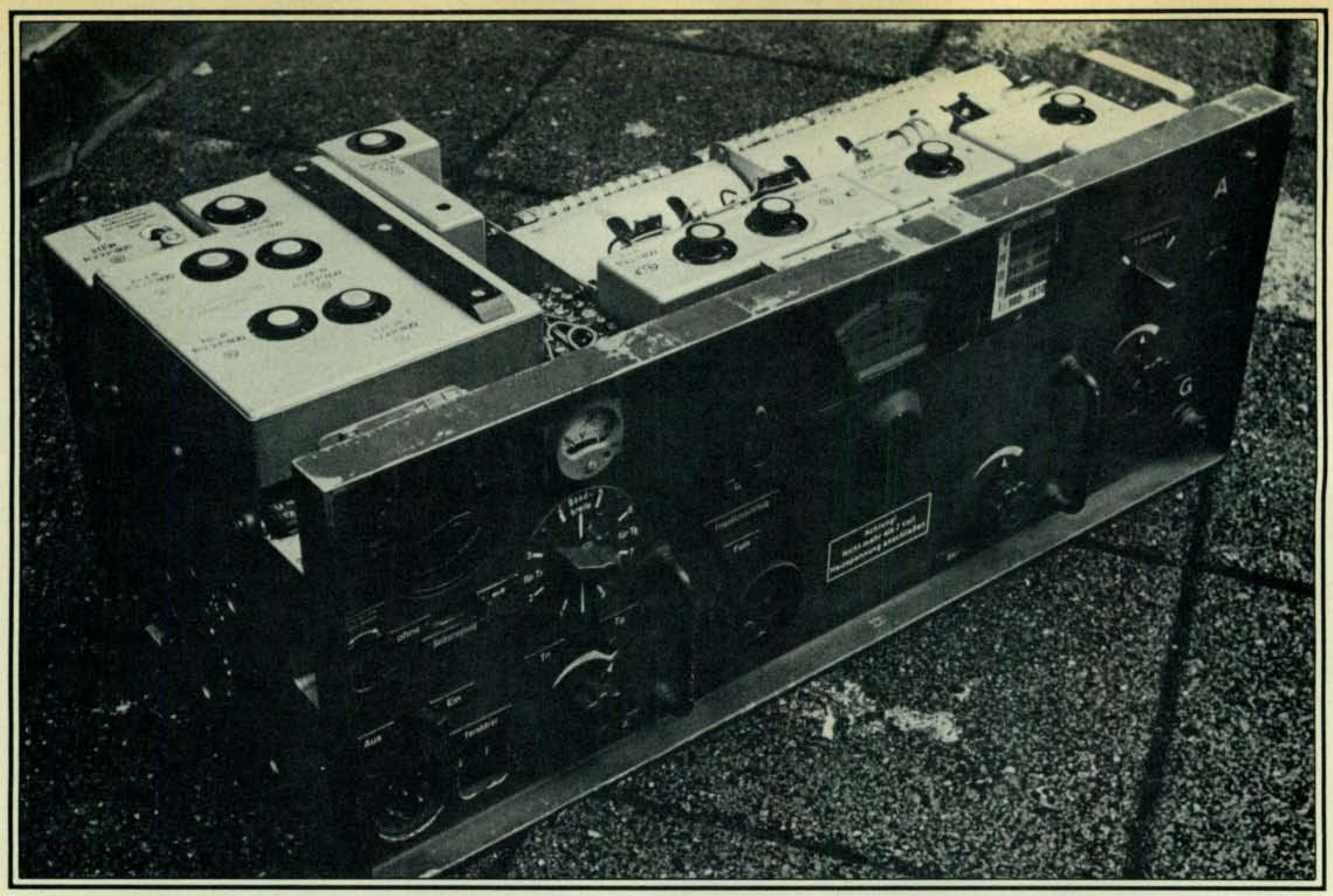


Photo 9- Receiver Kw E a taken out of its cabinet.

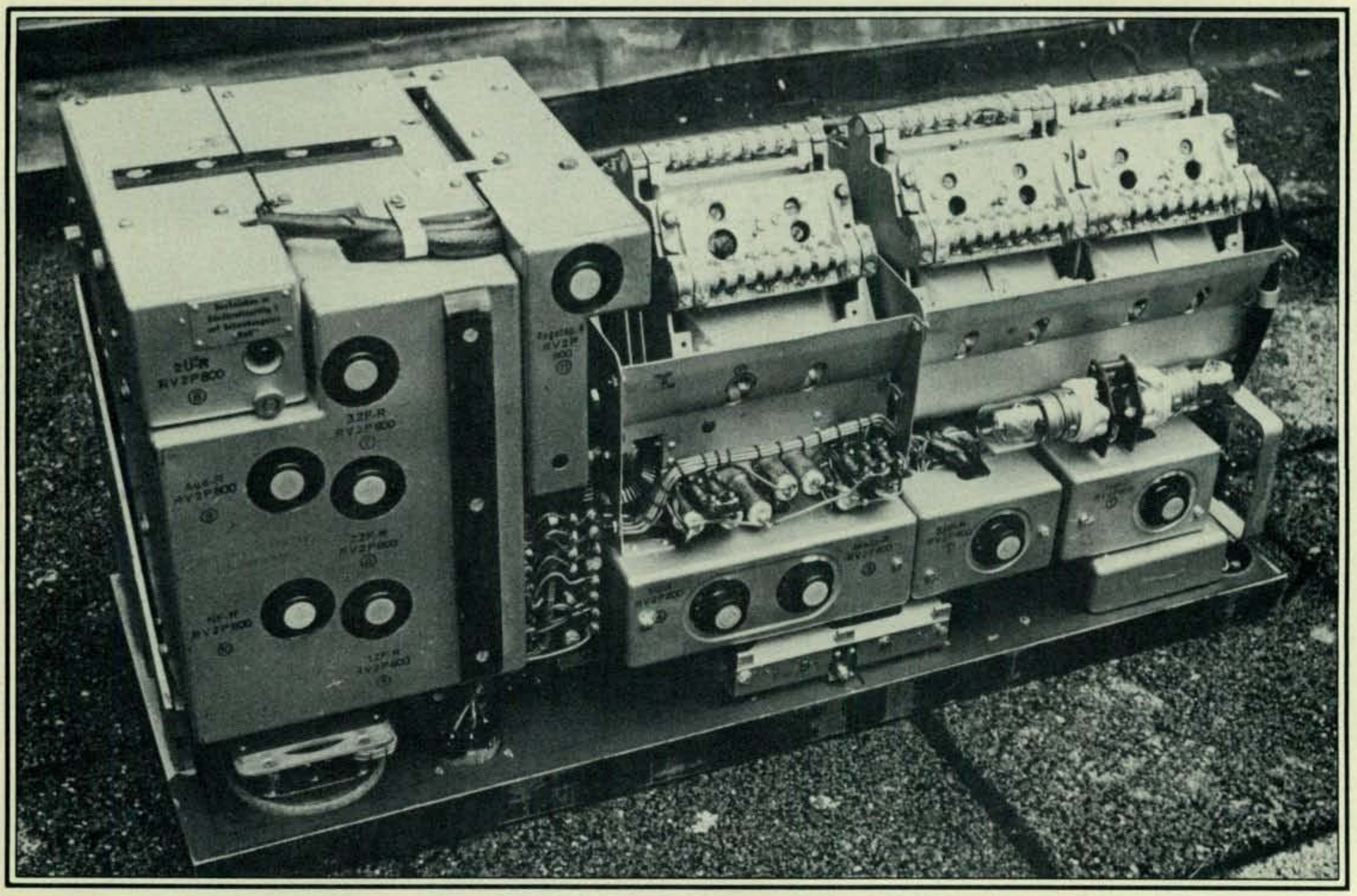


Photo 10- Short wave receiver Kw E a as seen from the rear. The two neon lamps at the right protect the input circuits against high voltages when the set is operated near a transmitter.

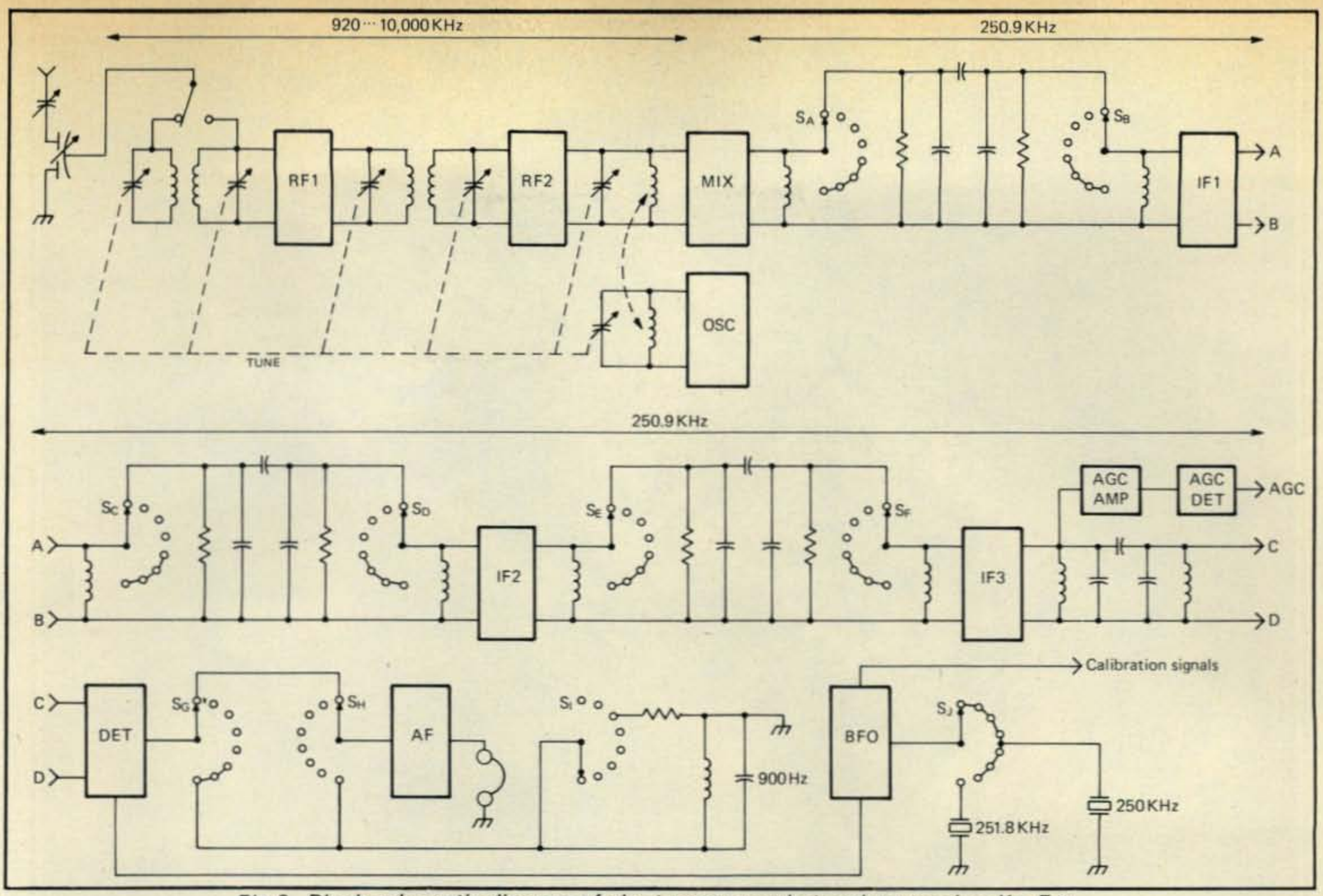


Fig 8- Block schematic diagram of short wave superheterodyne receiver Kw E a.

using lower sideband reception instead of higher sideband in positions six and seven. The b.f.o. has a separate crystal at 251.8 kHz for this.

The detector is of the leaky grid type. Both i.f. and b.f.o. signals are introduced on the control grid of the RV 2 P 800 pentode tube that is used throughout the receiver. The detector tube is coupled to the final a.f. tube by means of the tuned circuit at 900 kHz that we already mentioned. In positions 1-5 of the bandwidth control it is replaced by a RC-type coupling.

According to the manual the set should normally be used with manual gain control. This varies the screen grid voltage of the first and third i.f. amplifier tubes. But in case of fading automatic gain control can be used. There is a separate i.f. amplifier for the a.g.c. It receives the same i.f. signal as the leaky grid detector and it feeds two diodes in a voltage doubling rectifying circuit for the a.g.c. voltage. This is fed to the second r.f. amplifier and the second i.f. tube. The manual gain control is made inoperative when the a.g.c. is switched on and replaced by an a.f. control that is on the same shaft as the manual i.f. gain control. But the i.f. gain can still be controlled manually when using a.g.c. by means of a separate potentiometer that has the same function as the manual gain control for use without a.g.c. but is only operative in the a.g.c. position. The manual says it should only be used in case of very strong interference.

The combined i.f./a.f. gain control can be seen to the left of the left handle that is used to pull the receiver out of its cabinet. The separate i.f. gain control that only works in case of a.g.c. is to the left of the right handle in photograph 8.

The last item of the Kw E a we will discuss is the metering facility. It is like the one on the Lo 6 K 39 a. The meter is at the top left of the front panel and to the left of it you will notice a switch with 13 positions. In the first the filament voltage is read and in the

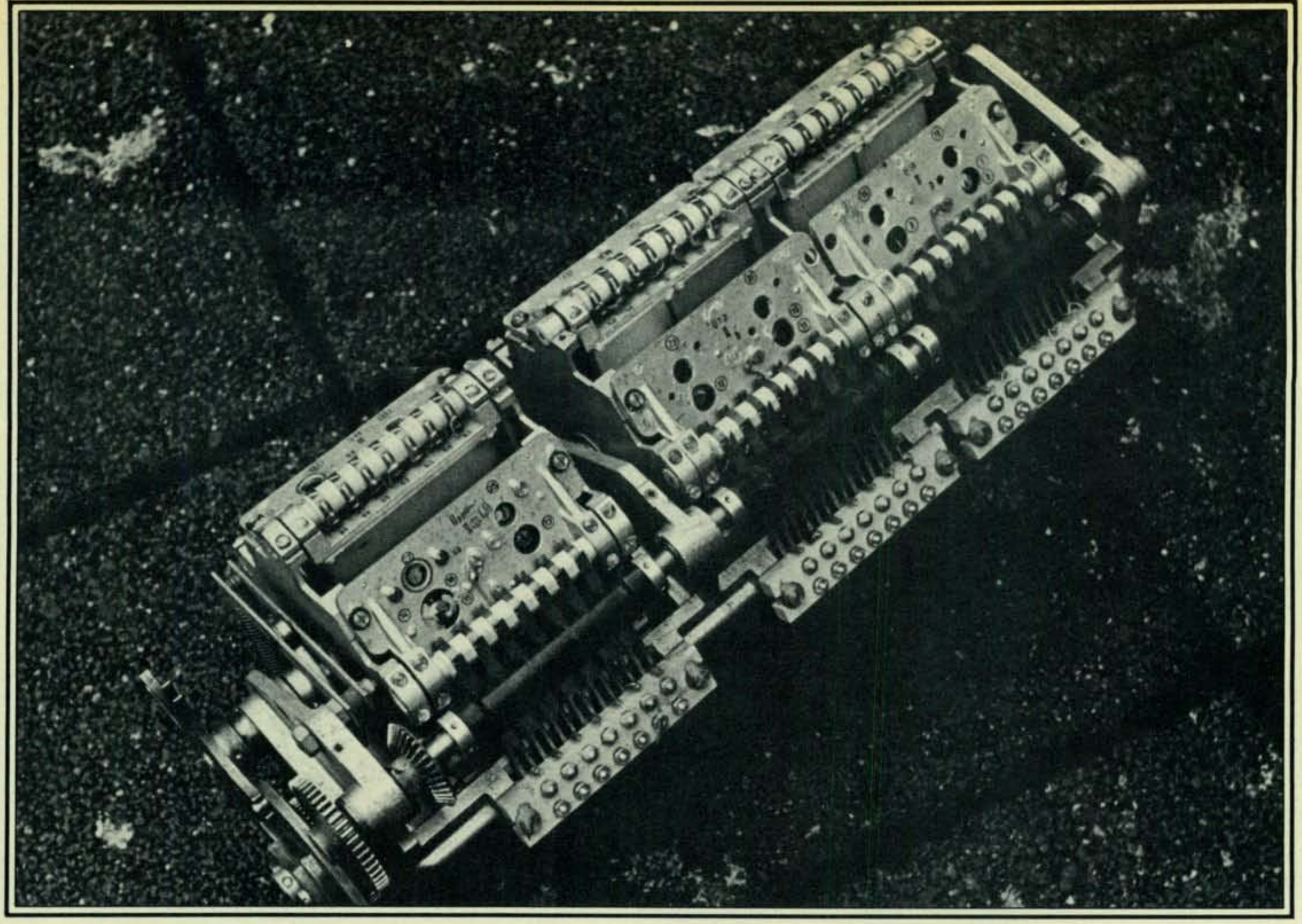


Photo 11- This is the coil turret used in the Kw E a. Nolte the Maltese cross drive at the left and the camshaft at the front that lifts the contact fingers from the turret contacts before the turret is rotated.

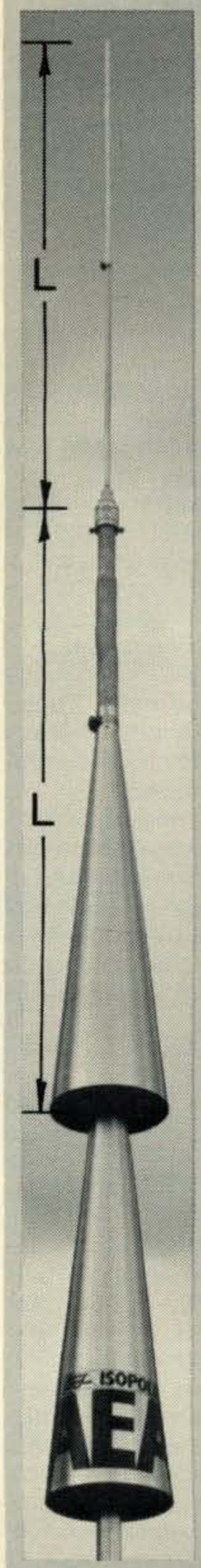
second the anode voltage. The voltages should be within a red or blue sector on the meter face for the two voltages. The remaining 11 switch positions are for metering the anode currents of the 11 tubes in the receiver. A black mark on the meter dial indicates the minimum reading for a serviceable tube.

The frequency dial also carries red markers for frequency checking. The calibration signal for this comes from the 250 kHz crystal in the b.f.o. Harmonics of the b.f.o. signal can be fed to the input of the receiver. For this a pushbutton must be operated that can only be reached when the set is out of its cabinet. In case the dial reading is not ok this can be corrected by rotating green encircled adjustment screws on the coil turret.

It is remarkable that the manual for the set does not contain performance specifications. I have not yet had an opportunity to test the receiver in my own shack. But this is going to happen in the future and I am quite convinced that the radio will come up to my high expectations.

(To Be Continued)

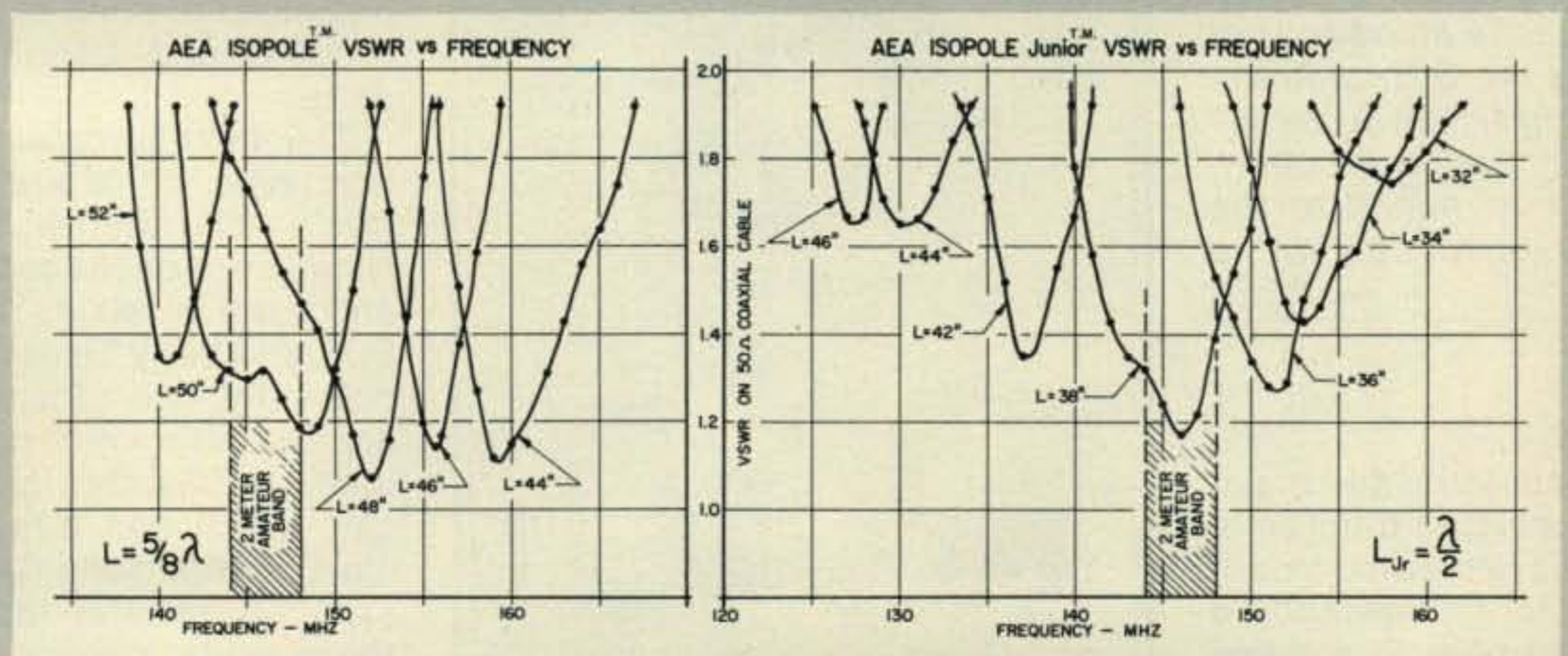
MORE PERFORMANCE FOR YOUR DOLLAR! COMPETITORS KNOW ABOUT THE ISOPOLE™



DO YOU? STUDY THE FACTS . . .

The IsoPole is building a strong reputation for quality in design and superior performance. The IsoPole's acceptance has already compelled another large antenna producer to make a major design modification to his most popular VHF Base Station antenna. Innovative IsoPole conical sleeve decouplers (pat. pend.) offer many **new** design advantages.

All IsoPole antennas yield the **maximum gain attainable** for their respective lengths and a zero degree angle of radiation. Exceptional decoupling results in simple tuning and a significant reduction in TVI potential. Cones offer greater efficiency over obsolete radials which radiate in the horizontal plane and present an unsightly bird's roost with an inevitable "fallout zone" below. The IsoPoles have the broadest frequency coverage of any comparable VHF base station antenna. This means no loss of power output from one end of the band to the other, when used with SWR protected solid state transceivers. **Typical SWR is 1.4 to 1 or better across the entire band!**

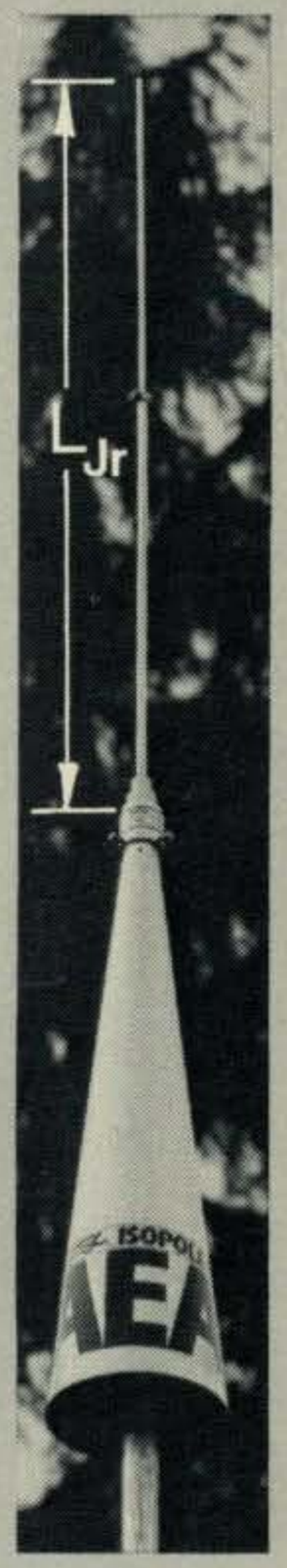


Outstanding mechanical design makes the IsoPole the only logical *choice* for a VHF base station antenna. A standard 50 Ohm SO-239 connector is recessed within the base sleeve (fully weather protected). With the IsoPole, you will not experience aggravating deviation in SWR with changes in weather. The impedance matching network is weather sealed and designed for maximum legal power. The insulating material offers superb strength and dielectric properties plus excellent long-term ultra-violet resistance. All mounting hardware is stainless steel. The decoupling cones and radiating elements are made of corrosion resistant aluminum alloys. The aerodynamic cones are the only appreciable wind load and are attached directly to the support (a standard TV mast which is **not supplied**)

Operating on MARS or CAP? The IsoPole and IsoPole Jr. antennas will typically operate at least ± 2 MHz outside the respective ham band without re-tuning. However, by simple length adjustment, the IsoPoles can be tuned over a wider range outside the ham bands.

Our competitors have reacted to the IsoPole, maybe you should too! Order your IsoPole or IsoPole Jr. today from your favorite Amateur Radio Distributor. For more information on other exciting AEA products, contact Advanced Electronic Applications, Inc., P.O. Box 2160, Lynnwood, WA 98036. Call 206/775-7373

ISOPOLE 144
$49.95
ISOPOLE 220
$44.95
MAST NOT SUPPLIED



ISOPOLE 144JR
ISOPOLE 220JR
$39.95
MAST NOT SUPPLIED

AEA Brings you the Breakthrough!

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE OR OBLIGATION.

CIRCLE 75 ON READER SERVICE CARD

How much do you really know about the Nicads that power your HT? If you're like most of us, not a heck of a lot. K4TWJ fills us in on the proper care, handling, and expectant life span of the Nicad.

Understanding And Using The Nicad Battery

BY DAVE INGRAM*, K4TWJ

The Dayton Hamvention is once more upon us as this issue is published. In fact, many of you who read this will have picked up this issue at the Convention. Well, if this year is like the rest, there will be 6 to 7 tons of Nicad batteries firing up those thousands of HTs which saturate the O'Hara Arena with r.f. The following article is designed not only to maximize your operating time, but also to minimize the replacement costs for Nicads due to their misuse. —K2EEK

Today's Nicads are produced in a wide variety of sizes and shapes to fit an equally wide variety of applications. A full understanding of these units permits their use to maximum benefit.

The increasing popularity and mass applications for Nickel Cadmium cells and battery packs have created a definite and vital need for understanding the operational parameters of these little energy units. This situation will become quite evident during upcoming months and years, particularly if manufacturers continue leaving specific techniques for effectively using and recharging Nicads primarily to the individual. While the "general purpose" method of fully discharging a battery pack and then fully recharging it for a specified maximum period of time assures creditable long-term performance from a pack, that method doesn't necessarily coincide with every amateur's form of operation. As a result, some amateurs experience everything from short-lived battery packs due to continuous overcharging to almost depleted packs precisely when the units and their associated talkies are most needed. This article will attempt to rectify that situation by presenting a number of facts and methods of visualizing a Nicad pack's capabilities, which will mate with a variety of personal applications. The concept visualized will be similar to that of a refillable energy storage tank, which can be used on a dependable basis time and time again merely by realizing capacity, contents, and rate of use. When employing these techniques, the amateur merely remembers to replace slightly more energy than he uses to overcome electrical and chemical losses.

*Eastwood Village No. 1201 South, Rt. 11 Box 499, Birmingham, AL 35210.

Nicads Used in Hand-Held Units

The most common and popular Nicads used in hand-held talkies are the AA or penlight size cells or packages of cells rated at 450 milliampere hours (maH). While a group of individual cells was usually employed in early talkies, recent units such as the Kenwood, Yaesu, etc., boast complete packages of such cells which are distributed and handled as complete units.

The next popular Nicads used in hand-held units are the N or "pint size" cells rated at 250 maH. These Nicads are packaged in various ways and used in talkies such as the Icom FDK and early Tempo's.

Finally, two other types of Nicads are available which can be used in various handies. One is a 500 maH AA Nicad which can directly replace 450 maH counterparts. The other is a AAA size cell rated at 180 maH. Although these units haven't yet appeared in smaller size handies, they are used in super-thin and small pocket scanners such as the Bearcat.

It should be realized that the trend toward complete battery packs is gaining momentum, and this move makes rapid accessing of individual cells somewhat impractical. The consequential solution to long-term life from such battery packs thus revolves around properly using, rather than abusing, them. Naturally, the most logical solution (and the one for which complete battery packs are primarily intended) involves carrying a fully charged spare battery pack and swapping the two precisely when the "in use" pack is depleted. While continued use of a depleted pack will "reverse" and destroy cells in a pack, it also proves worthless for true communications and merely creates irritation for others. Consider the Nicad pack totally depleted at such times, and you'll preserve the unit for many more charge/discharge cycles.

Fully Charged 450 maH Nicad Pack
(Loading of pack at 450 ma)

30 minutes = 225 ma used from pack
15 minutes = 112.5 ma used from pack
7.5 minutes = 56 ma used from pack
3.75 minutes = 28 ma used from pack
1.8 minutes = 14 ma used from pack

Fully Charged 450 maH Nicad Pack
(Loading of pack at 50 ma)

9 hours = 450 ma used from pack
4 hours = 200 ma used from pack
2 hours = 100 ma used from pack
1 hour = 50 ma used from pack
30 minutes = 25 ma used from pack

Fig. 1- Approximate currents used from a 450 maH Nicad pack during various amounts of receive and transmit periods.

Mating MAH's And Rig Currents

As previously mentioned, the Nickel Cadmium cell or battery pack can be considered as an energy storage tank capable of delivering its rated output until its internal quantity of milliamperes is depleted. A fully charged 450 maH Nicad pack, or example, can deliver 22.5 ma for 20 hours, 45 ma for 10 hours, or 450 ma for 1 hour before being depleted. Likewise, a half-charged 250 maH Nicad pack (125 ma) can deliver 22.5 ma for 5.5 hours or 450 ma for 18 minutes before being depleted. The energy drained from a Nicad pack is also cumulative, but easily calculated; that is, a fully charged 450 maH pack can deliver approximately 22 ma for 6 hours (132 ma used), 60 ma for 2 hours (120 ma used), and 450 ma for 7.5 minutes (56 ma used) before draining the pack to 450 minus 308, or 142 ma of remaining energy. Don't drag out a calculator to precisely get those values; calculate in your mind so you can visualize the action while using a hand-held talkie. 20 ma × 6 hours = 130 ma (remember 130), 60 ma × 2 hours = 120 ma (now remember 250), and 7.5 minutes is ¼ of 30 minutes (which is 225 ma), or aproximately 50 ma. Finally, 50 plus 250 equals 300 ma used. Additional "visualizations" relating to this concept are shown in figure 1. Assuming we now desire to recharge the hypothetical 450 maH Nicad pack under consideration, we need to replace between 320 and 360 milliamperes. If a charging rate of 45 ma is used, 7 or 8 hours charge is needed. If a charge rate of 100 ma is used, 3½ hours is sufficient (again, calculate mentally to make this enjoyable rather than complex).

If the habit of partially discharging and recharging the Nicad pack is continued on a daily basis, two considerations should be realized: 1) Avoid continued overcharging of the pack to prevent premature cell failures, and 2) fully discharge the Nicad pack (as indicated by the talkie's battery monitoring technique) once or twice a month to prevent the pack from developing a "memory." Nicads are prone to "remembering" their point of recharge over a period of time, resulting in an early "totally depleted condition" at that time. The occasional "fully discharging" scheme removes this memory and maintains Nicads at their maximum efficiency. If only one battery pack is used with a handie, the "fully depleting" scheme merely involves using the handie or leaving it receiving signals at the home QTH where a "backup" rig stands ready for immediate use *precisely* when the pack reaches discharge. After a little practice, you can hit this point within an hour, and plan that hour to perfectly fit your lifestyle (you'll also begin noticing a "pattern" of ma's per day or hours of use with the handie).

There are three specific current ratings associated with hand-held talkies: 1) receiver squelched (minimum current used), 2) receiver operational (average current used), and 3) transmitter energized (maximum current used). These ratings directly determine the handie's period of use between Nicad battery pack charges. As an example, we will investigate the Yaesu FT207R synthesized handie using its advertised current ratings. The unit draws 38 ma squelched, 70 ma receive, and 910 ma transmit (high power). The Yaesu's associated battery pack is rated at 450 maH. Using the information previously described in this article, an operating pattern can thus be visualized. During a hypothetical hour's use, the receiver may be squelched 10 minutes (estimate, in rounded figures and allowing for mistakes in mental calculation as you move around, 10 ma used from battery pack). Assume, also in this hypothetical example, the receiver is operational for 45 minutes of the hour (again estimate ¾ of 70 to acquire an approximate figure of 55 ma used). Finally, assume the total "key down" transmitting time during this hour totals 5 minutes (Estimate 1/12 of 900 ma as approximately 40 ma. Your figures will only be estimates, but that's sufficient.) Now tally currents: 55, 10, and 40 equals 105 ma used. Approximately 3 more hours of similar operation can be acquired before the Nicad pack approaches depletion. If the previous mental calculations seem difficult to master, "round" figures to personal visualization schemes as necessary (multiples of 5 or 10, for example). Remember, the purpose of this concept

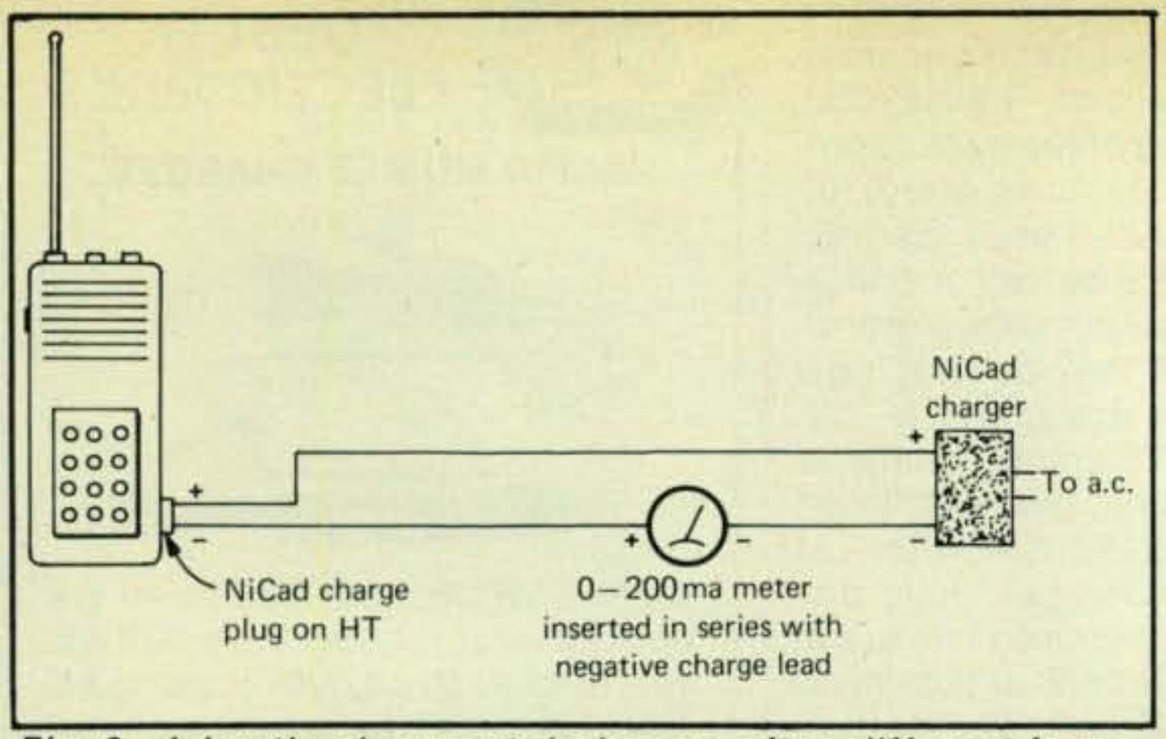


Fig. 2– Advertised current drains are often different from those experienced during actual use. This current monitoring technique can be used for initially checking those parameters.

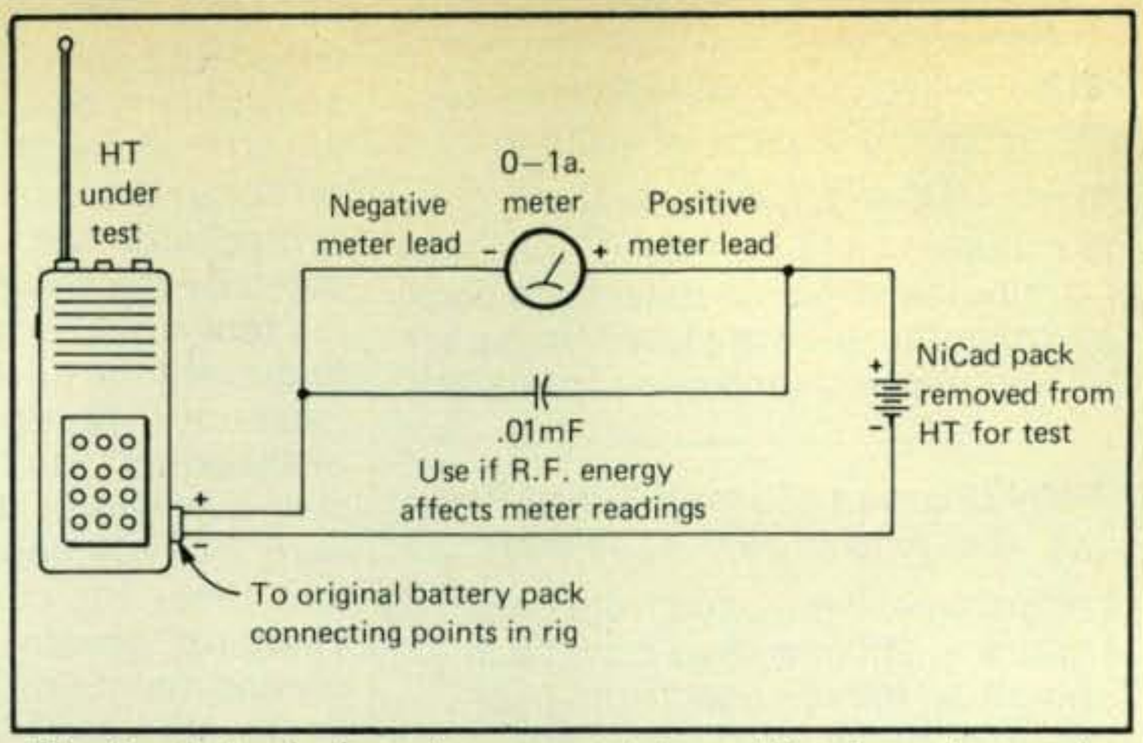
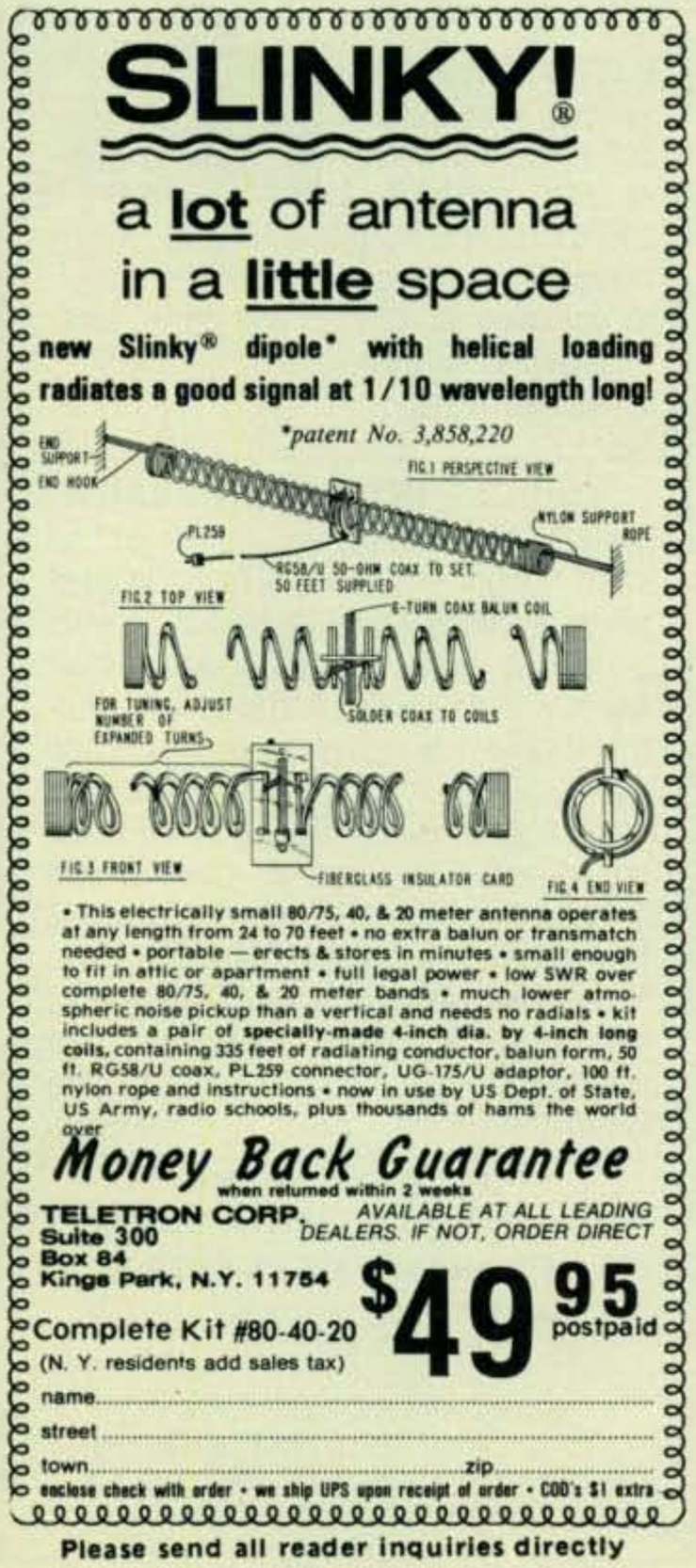


Fig. 3– Actual charging current to a Nicad pack can be checked by temporarily installing a milliampere meter in series with one leg of the unit's a.c. charger.



is enjoyable activities rather than any form of work.

Finally, we will run a brief operating comparison between the Icom IC2-AT and the Yaesu FT207R handies to determine which has the longest battery life. We will use a criteria of 45 minutes receive and 15 minutes transmit to symbolize "heavy use," such as in an emergency situation. The Icom draws 30 ma receive; during a 45 minute period this will equal 25 ma (approximate, approximate!). During transmit, the Icom draws 400 ma. During a 15 minute period, this will equal 100 ma. Since the Icom's standard Nicad pack is rated at 250 maH, two hour's "heavy use" is possible.

The Yaesu draws 70 ma receive; during a 45 minute period, this will equal approximately 55 ma. During transmit, the Yaesu draws 910 ma. This will equal 225 ma during a 15 minute period. Tallying times, the Yaesu thus requires roughly 280 ma per hour's "heavy use." A 450 ma pack will be depleted in approximately 1 hour and 50 minutes time. The Icom and the Yaesu handies thus evolve as almost equal in power consumption, although one's battery pack is capable of nearly twice the other's capacity. While a "heavy duty" battery pack could be employed with the Icom, it would merely shift the "depletion time" to a later period. The need to calculate remaining available currents and occasionally erase its memory would still exist. Likewise, the availability and exchanging second battery pack with either handie would double operating times. Assuming the depleted battery pack removed from the handie was rapid charged, continuous operations would be possible.

Rejuvenating Dead Nicads

As time continues and life progresses for a Nicad pack, the inevitable finally happens: a cell discharges, reverses polarity, and shorts. This short circuit places heavy demands on other cells, producing brief and unreliable life. Under these circumstances the "dead" cell can be located with a v.o.m. In addition to indicating a complete lack of voltage, the bad cell may actually exhibit a low internal resistance when measured with an ohmmeter. Two alternatives are now available to the user: 1) replace the defective cell with a new equivalent or 2) attempt a "rejuvenation" by directing a heavy burst of current into the cell for less than a second's time. If successful, the current "zapping" burns away the cell's internal short. Cell "zapping" is usually accomplished by applying between 5 and 12 amperes of charge current for one or two half-second periods in a positive to positive/negative to negative manner. An "around shack" 13 or 15 volt power supply can usually be used for this "zapping." Assuming the short is eliminated, the cell can then be fully recharged and reused. Don't go overboard on "zapping"—use only enough total energy to remove the short. If three "zaps" are unsuccessful, the cell is probably beyond help.

Conclusion

Reviewing the general information presented in this article, we can surmise that Nicad batteries are effective and dependable power sources that can be used for a substantial period of time under normal care. The technique of "rounding" current figures for mental calculations and remembering how much current has been used from a pack can be mastered in a short period by any serious handie user. The overall result is truly enjoyable operation from a small hand-held transceiver. We sincerely hope the information presented in this article will help you more effectively understand Nicads and provide you with long and harmonious life from these items.

2K *Classic*

A new edition of the world's most famous linear amplifier

The 2K Classic represents the culmination of fifteen years experience in developing, manufacturing and improving the 2K series. It remains as always a "workhorse", engineered and built to loaf along at full legal power for days or weeks without rest. A look inside shows why! No expense has been spared to make the 2K a truly "Classic" Amateur amplifier. Heavy duty, top quality components along with its rugged construction assures you of trouble free operation. The 2K Classic offers engineering and features second to none. It will put your signal on the air with greater strength and clarity than you ever dreamed possible. The 2K Classic operates on all amateur bands, 80 through 15 meters (export models include 10 meters).

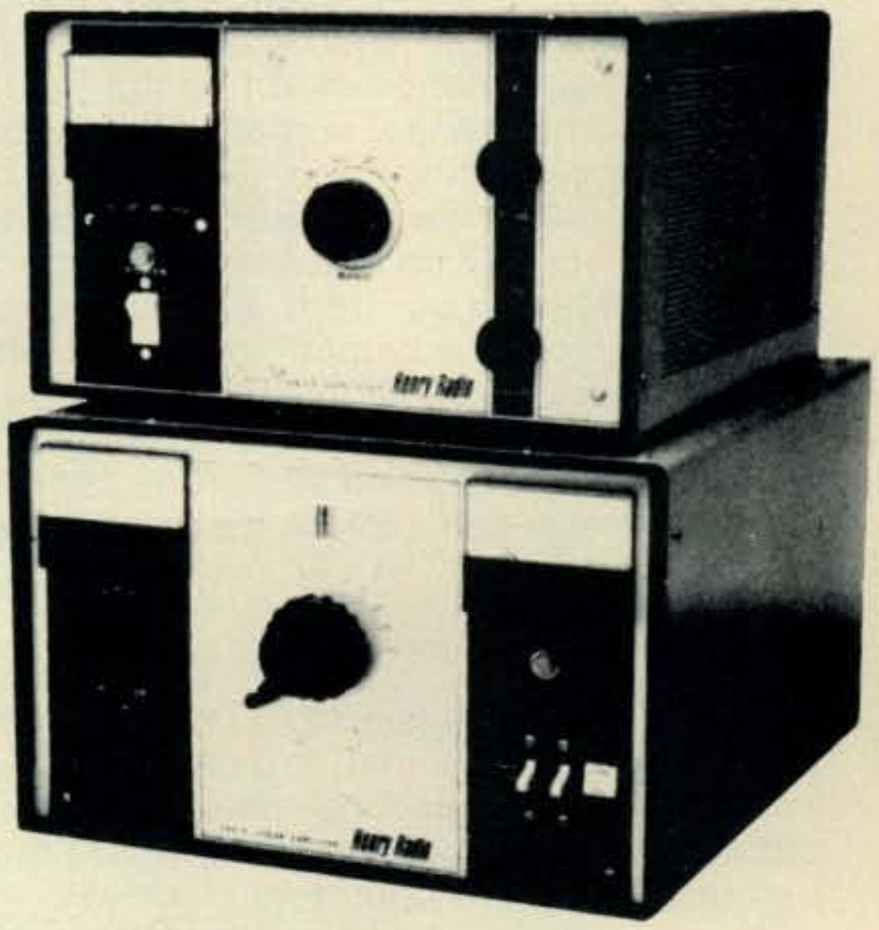
Features:

- Two rugged Eimac 3-500Z grounded grid triodes
- Pi-L plate circuit with silver plated tank coil
- Resonant cathode pi input circuit
- Maximum legal input on all modes
- Price: $1195.00

The **1KD-5** **...Another fine member of the famous Henry Radio family of superior amplifiers. And we're still convinced that it's the world's finest linear in its class. The 1KD-5 was designed for the amateur who wants the quality and dependability of the 2KD-5 and 2K-4, who may prefer the smaller size, lighter weight and lower price and who will settle for a little less power. But make no mistake, the 1KD-5 is no slouch. Its 1200 watt PEP input (700 watt PEP nominal output) along with its superb operating characteristics will still punch out clean powerful signals...signals you'll be proud of. Compare its specifications, its features and its fine components and we're sure you will agree that the 1KD-5 is a superb value at only $695.**

The **2KD-5** **We have been suggesting that you look inside any amplifier before you buy it. We hope that you will. If you "lift the lid" on a 2KD-5 you will see only the highest quality, heavy duty components and careful workmanship...attributes that promise a long life of continous operation in any mode at full legal power. The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, and 15 meter amateur bands. It operates with two Eimac 3-500Z glass envelope triodes and a Pi-L plate circuit with a rotary silver plated tank coil. Price $945.**

And don't forget the rest of the Henry family of amateur amplifiers...the Tempo 2002 high power VHF amplifier and the broad line of top quality solid state amplifiers. Henry Radio also offers the 3K-A and 4K-Ultra superb high power H.F. amplifiers and a broad line of commercial FCC type accepted amplifiers for two way FM communications covering the range to 500 MHz.



★ ★

Announcing!

A brand new "super" linear...the 3K Classic! Designed for the most critical Amateur Radio operator...the individual who wants and appreciates owning the finest. Available in spring 1981. *F.C.C. approval pending*

★ ★

HENRY RADIO 53 YEARS OF SERVICE

2050 S. Bundy Dr., Los Angeles, CA 90025 (213) 820-1234
931 N. Euclid, Anaheim, CA 92801 (714) 772-9200
Butler, Missouri 64730 (816) 679-3127

TOLL FREE ORDER NUMBER: (800) 421-6631
For all states except California.
Calif. residents please call collect on our regular numbers.

Henry Radio

Prices subject to change without notice

CIRCLE 31 ON READER SERVICE CARD

Can't draw a straight line? Well, you certainly can type one. Here's your chance to become a recognized artist in your own time when you take up the creative art of RTTY graphics.

RTTY Artwork

The "Keys" To Becoming An Artist

BY JOHN EDWARDS*, KI2U

Let's face it: Amateur radio and art are two fields usually not associated with each other. Sure, there's always the fellow who eschews the prepackaged designs from QSL manufacturers and decides to tackle the artwork by himself. But outside of that, there's really little relationship between the two endeavors. Right? Wrong!

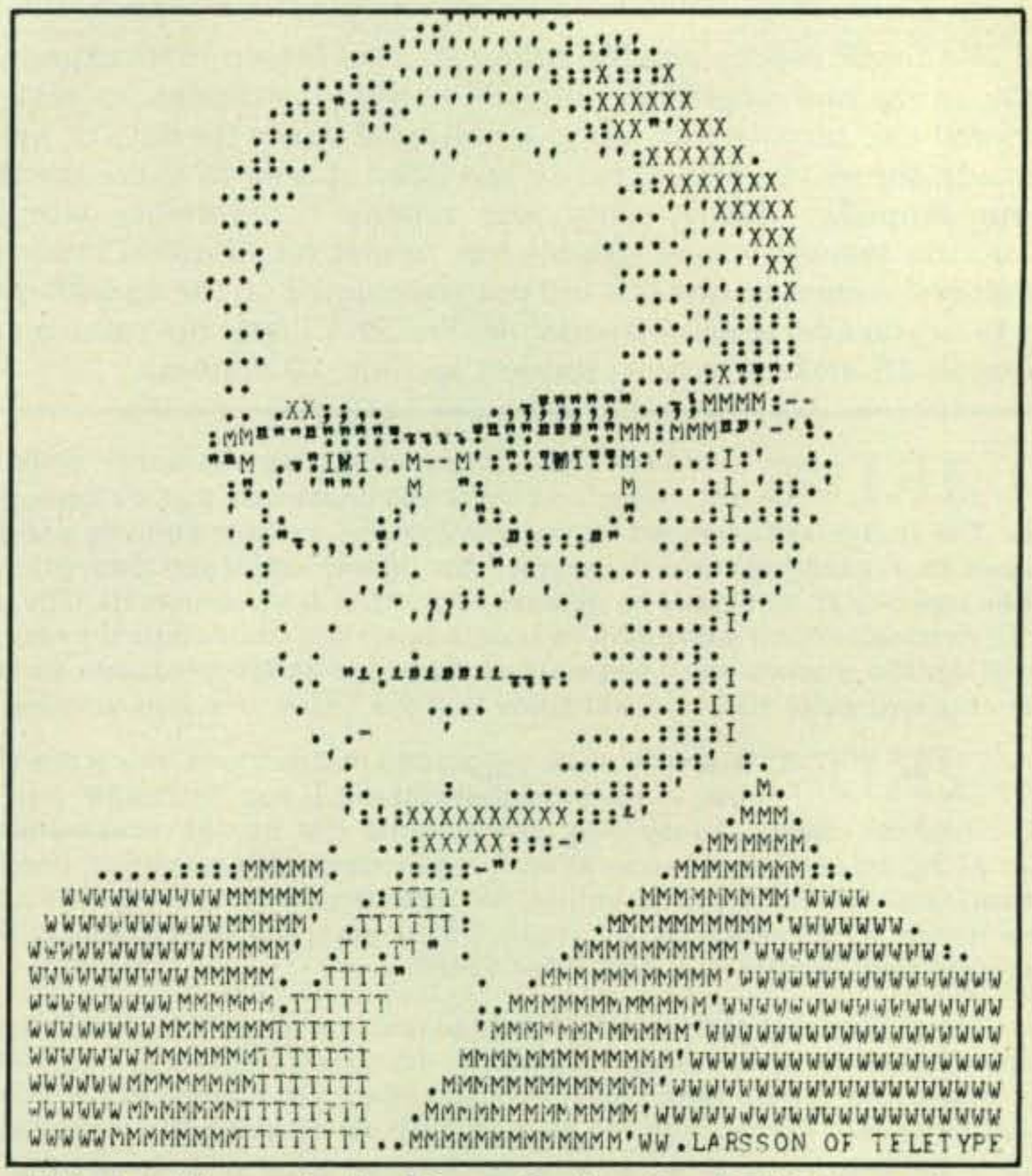
If you've tuned across the RTTY frequencies for more than a few days, no doubt you've stumbled across a signal or two that seem to be utter garbage. You know, no matter how you tune the signal—170 or 850 Hz shift, normal or reverse sense, all the different Baudot and ASCII speeds—no matter what you do, your printer or video display spews gibberish. Since the FCC forbids cryptic codes, you realize that something must be going on, only you're not sure what.

Yet, as you allow the seemingly nonsensical print to continue, you notice that the information isn't junk. The jumble is forming a pattern, and soon, after a few lines are printed, a *picture* is beginning to form! What we're talking about, of course, is RTTY art—a pastime for many green keyers that seems to border on addiction. It's a hobby within a sub-hobby and one of the few ways an amateur radio operator can express his or her artistic talents over the air.

Basics

For those of you new to RTTY art, a short history lesson is in order. This fascinating pursuit got its start back in the early days of landline news service Teletype. The apocryphal story about the first RTTY picture revolves around lonely TTY operators stuck with the night shift on Christmas Eve—a traditionally slow news time. To kill the long, bleak hours, one of these operators started typing little pictures of Christmas trees made out of Xs and shipped the pictures around the net. Soon, other operators took the cue, and pictures of increasing elaboration were sent whenever there wasn't traffic to move, Christmastime or not.

Whether this little tale is true is of little importance. The fact is that when Teletype hit the amateur airwaves, RTTY pictures soon followed. Today, there are literally thousands of pictures for the RTTY art enthusiast to reproduce on his or her home machine. Some stations own so many RTTY picture tapes that just transmitting a list of them can take well over an hour—even at 100 w.p.m.! But getting started in RTTY art, whether you have a mechanical or electronic RTTY system, is really very simple. All it takes is a little patience and a smattering of the aforementioned artistic skill.



This familiar portrait of Barry Goldwater, K7UGA was done by "Larsson of Teletype."

From Concept To Print

Finding a suitable subject for your first RTTY art effort should prove easy. Magazine covers, newspaper photos,

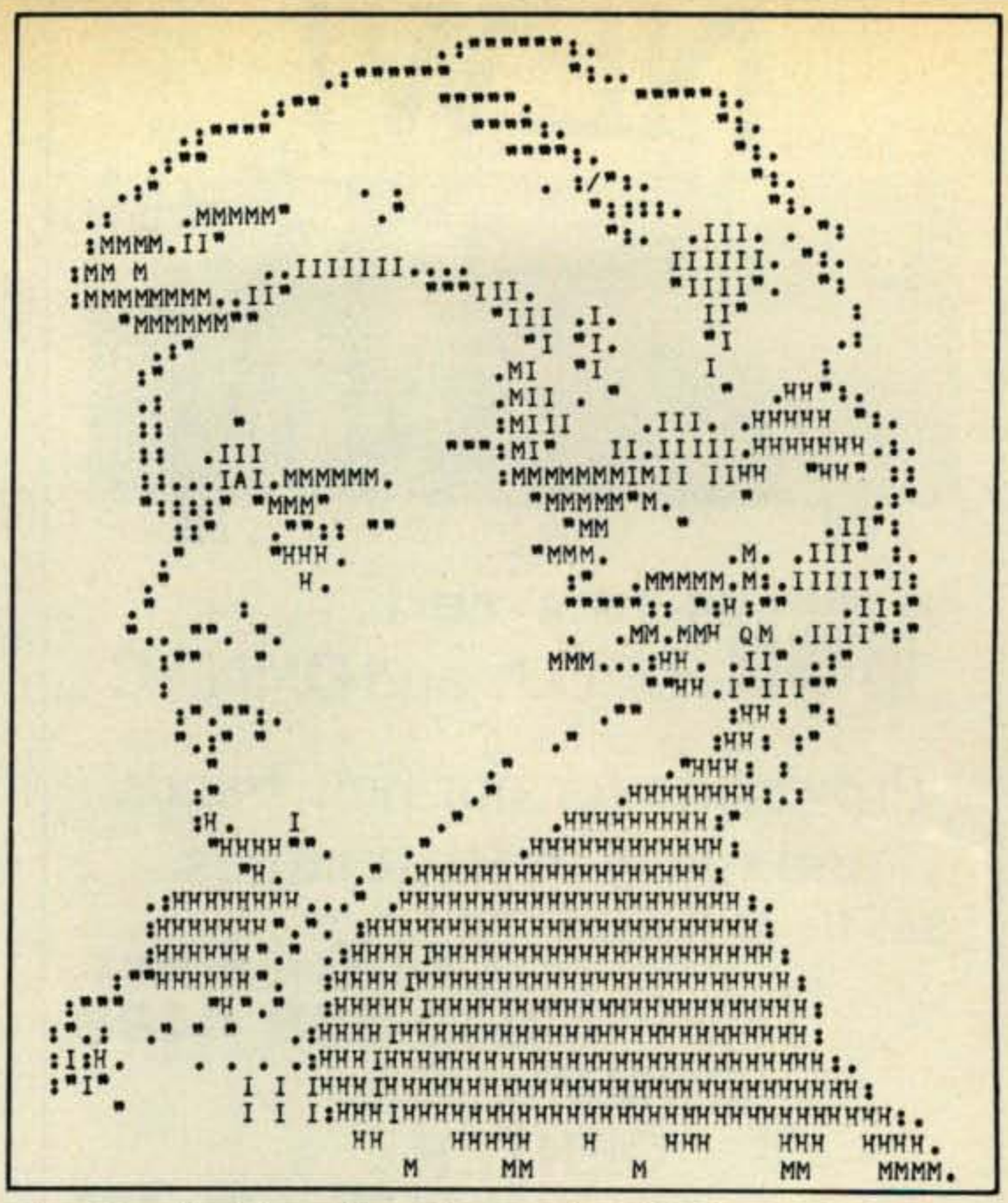
*78-56 86th St., Glendale, N.Y. 11385

and even your own original drawings, all provide excellent material. The traditional way of generating RTTY art requires access to a mechanical printer and reperforator. (We'll cover the topic of creating art with an electronic RTTY system later.)

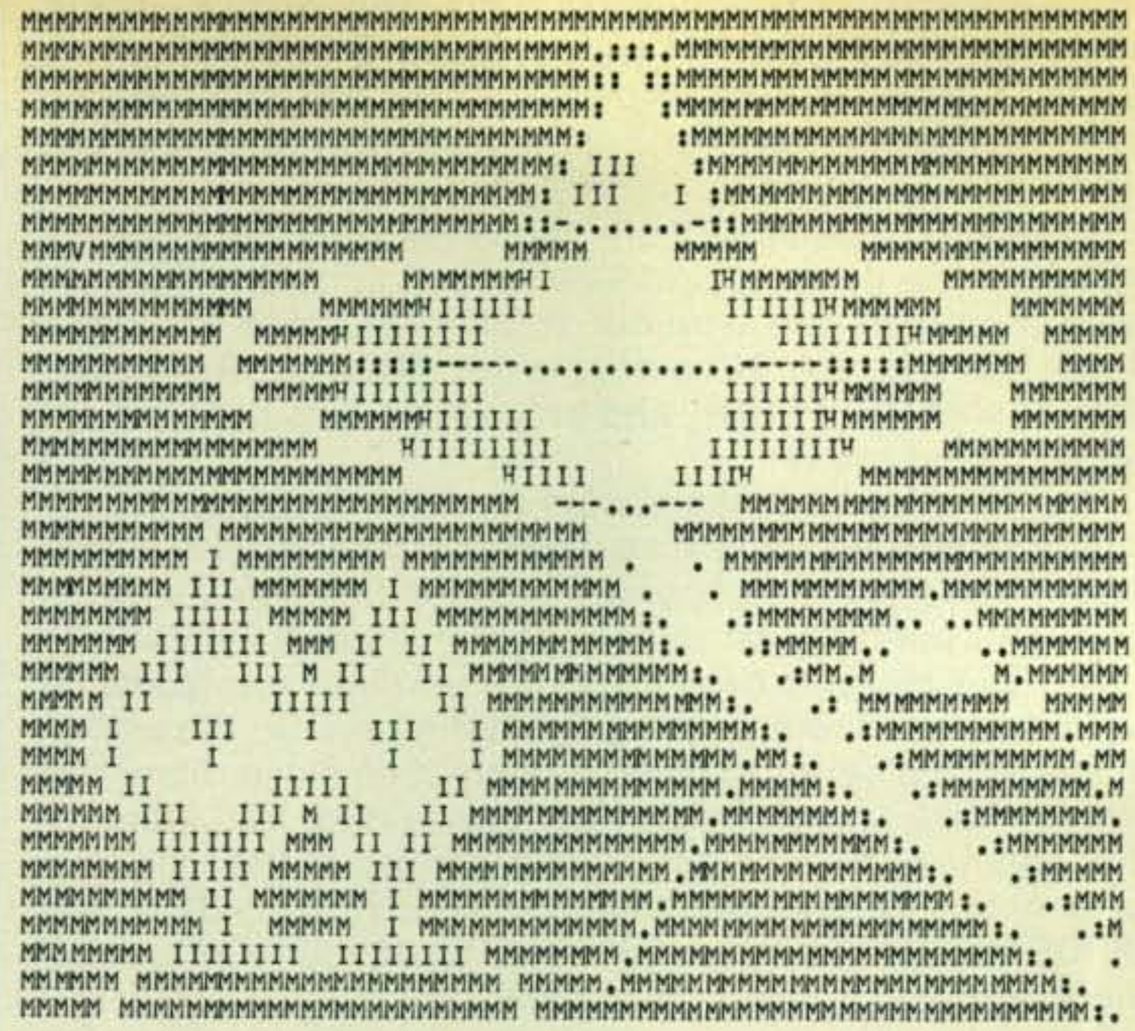
Take the original artwork you've selected and tape or glue it to the paper feeding into your machine. Next, activate the reperf and type out 20 or 30 **BLANKS** to form a leader for the tape. Hit a couple of **CARRIAGE RETURN**s, five or six **LINE FEED**s, and proceed to *type over* the artwork in your printer.

As you can see in the accompanying illustrations, various alphabet letters furnish different shading characteristics. W, M, and X are generally used for darker areas, while H, I, and punctuation supply lighter shades. Some intricate RTTY pictures even use overlines (lines printed twice without a line feed) to give extra definition. On the whole, however, it's better to avoid this practice since many machines have an automatic line feed feature that can ultimately make a mess out of your picture at the receiving end. Also, on some machines you'll find that the **BELL** and **APOSTROPHE** keys are reversed. So if you must use an apostrophe, it's also a good idea to throw in a bell at the same time. This way, your picture will be compatible with both machine types, although it may make your shack sound like New Year's Eve in a bell tower.

At the bottom of your creation, be sure to center a title and sign your name and callsign in the lower right-hand corner. Follow this up with another five or six line feeds and a long series of blanks as a protective end-leader. Finally, take your finished picture and examine it from a distance of four or five feet. Does it look good? Hope so. But don't be too disappointed if your first effort isn't completely satisfactory. After all, great artists aren't make overnight!



For the doubly cultured, we offer Wolfgang Amadeus Mozart (1756–1791) as originated by Lee, WA5EHA. This piece was "relayed" to Manny, WB8OGB, who sent it on to Ken, WA4MNT, who sent it up to John and finally on to CQ.



VE2QO's work entitled "U.F.O." was a 1975 RTTY Art Contest entry.

Electronic Systems

Generating RTTY art on one of the microcomputer-based RTTY systems creates some extra problems—and expenses. Since you'll want a permanent copy of your completed artwork, a printer is an absolute necessity. Of course, new computer printers can cost as much as an entire RTTY system, so this avenue may be out of the question for the less well-heeled RTTY user. If possible, you may consider purchasing an old read-only (keyboardless) Baudot printer. Prices for these units are low (under $100), and since nearly all RTTY pictures are currently Baudot formatted, you won't even have to do any conversion work (although you may have to obtain a separate demodulator, depending on your specific setup).

If for one reason or another you can't accommodate one of these units, you'll have to content yourself with viewing the action on your video display. This is a dismal prospect at best, since most larger pictures won't fit on a conventional display's screen, and virtually all general purpose displays use white-on-black lettering, thereby presenting a negative picture image. Still, it's better than nothing.

Once you get past the display hurdle, however, the picture brightens considerably (pun intended!). Editing of pictures is simplified and storage is easily maintained on cassettes, putting an end to the miles of paper tape that always seems so attractive to cats, puppies, and little children.

RTTY art—is it for you? Who knows, the amateur bands may hold within them dozens of untapped Rembrandts. Or, if band conditions drop out and pictures scramble, Picassos.

MFJ Super Keyboards

5 MODES: *CW, Baudot, ASCII, memory keyer, Morse code practice.* ***TWO MODELS: MFJ-496, $339.95.*** *256 character buffer, 256 character message memory, automatic messages, serial numbering, repeat/delay.* ***MFJ-494, $279.95.*** *50 character buffer, 30 character memory, automatic messages.*

MFJ brings you a pair of 5 Mode Super Keyboards that gives you more features per dollar than any other keyboard available. You can send CW, Baudot, ASCII. Use it as a memory keyer and for MORSE code practice.

You get text buffer, programmable and automatic message memories, error deletion, buffer preload, buffer hold, plus much more.

MODE 1: CW

The 256 character (50 for 494) **text buffer** makes sending perfect CW effortless even if you "hunt and peck."

You can preload a message into the buffer and transmit when ready. For break-in, you can stop the buffer, send comments on key paddles and then resume sending the buffer content.

Delete errors by backspacing.

A meter gives buffer remaining or speed. Two characters before buffer full the meter lights up red and the sidetone changes pitch.

Four programmable message memories (2 for 494) give a total of 256 characters (30 for 494). Each message starts after one ends for no wasted memory. Delete errors by backspacing.

To use the **automatic messages,** type your call into message A. Then by pressing the CQ button you send CQ CQ DE (message A).

The other automatic messages work the same way: CQ TEST DE, DE, QRZ.

Special keys for KN, SK, BT, AS, AA and AR.

A lot of thought has gone into human engineering these MFJ Super Keyboards.

For example, you press only a one or two key sequence to execute any command.

All controls and keys are positioned logically and labeled clearly for instant recognition.

Pots are used for speed, volume, tone, and weight because they are more human oriented than keystroke sequences and they remember your settings when power is off.

Weight control makes your signal distinctive to penetrate QRM.

MODE 2 & 3 (RTTY): BAUDOT & ASCII

5 level Baudot is transmitted at 60 WPM. Both RTTY and CW ID are provided.

Carriage return, line feed, and "LTRS" are sent automatically on the first space after 63 characters on a line. This gives unbroken words at the receiving end and frees you from sending the carriage return. After 70 characters the function is initiated without a space.

All up and down shift is done automatically. A downshift occurs on every space to quickly clear garbled reception.

The buffer, programmable and automatic messages, backspace delete and PTT control (keys your rig) are included.

The ASCII mode includes all the features of Baudot. Transmission speed is 110 baud. Both upper and lower case are generated.

MODE 4: MEMORY KEYER

Plug in a paddle to use it as a deluxe full feature memory keyer with automatic and programmable memories, iambic operation, dot-dash memories, and all the features of the CW mode.

MODE 5: MORSE CODE PRACTICE

There are two Morse code practice modes. Mode 1: random length groups of random characters. Mode 2: pseudo random 5 character groups in 8 separate repeatable lists (with answers).

Insert space between characters and groups to form high speed characters at slower speed for easy character recognition.

Select alphabetic or alphanumeric plus punctuation. You can even pause and then resume.

MORE FEATURES

Automatic incrementing serial number from 0 to 999 can be inserted into buffer or message memory for contests.

Repeat function allows repetition of any message memory with 1 to 99 seconds delay. Lets you call CQ and repeat until answered.

Two key lockout operation prevents lost characters during typing speed bursts.

Clock option (496 only) send time in CW, Baudot, ASCII. 24 hour format.

Set CW sending speed before or while sending.

Tune switch with LED keys transmitter for tuning. Tune key provides continuous dots to save finals. Built-in sidetone and speaker.

PTT (push-to-talk) output keys transmitter for Baudot and ASCII modes.

Reliable solid state keying for CW: grid block, cathode, solid state transmitters (-300V, 10 ma Max, +300V, 100 ma Max). TTL and open collector outputs for RTTY and ASCII.

Fully shielded. RF proof. All aluminum cabinet. Black bottom, eggshell white top. 12"Dx7"Wx1¼"H (front) x3½"H (back). Red LED indicates on.

9-12 VDC or 110 VAC with optional adapter.

MFJ-494 is like MFJ-496 less sequencial numbering, repeat/delay functions. Has 50 character buffer, 30 character message memory. Clock option not available for MFJ-494.

Every single unit is tested for performance and inspected for quality. Solid American construction.

OPTIONS

MFJ-53 AFSK PLUG-IN MODULE. 170 and 850 Hz shift. Output plugs into mic or phone patch jack for FSK with SSB rigs and AFSK with FM or AM rigs. $39.95 (+ $3).

MFJ-54 LOOP KEYING PLUG-IN MODULE. 300V, 60 ma loop keying circuit drives your RTTY printer. Opto-isolated. TTL input for your computer to drive your printer. $29.95 (+ $3).

MFJ-61 CLOCK MODULE (MFJ-496 only). Press key to send time in CW, Baudot or ASCII. 24 hour format. $29.95 (+ $3).

110 VAC ADAPTER. $7.95 (+ $3).

BENCHER IAMBIC PADDLE. $42.95 (+ $4).

A PERSONAL TEST

Give the MFJ-496 or MFJ-494 Super Keyboard a personal test right in your own ham shack.

Order one from MFJ and try it — no obligation. See how easy it is to operate and how much more enjoyable CW and RTTY can be. If not delighted, return it within 30 days for refund (less shipping). One year unconditional guarantee.

To order, call toll free 800-647-1800. Charge VISA, MC, or mail check or money order for **$339.95** for MFJ-496, **$279.95** for MFJ-494, **$39.95** for MFJ-53 AFSK module, **$29.95** for MFJ-54 Loop Keying module, **$29.95** for MFJ-61 Clock module, **$7.95** for the 110 VAC adapter and **$42.95** for Bencher Paddle. Include $5.00 shipping and handling per order or as indicated in parentheses if items are ordered separately.

Why not really enjoy CW and RTTY? Order your MFJ Super Keyboard at no obligation today.

TO ORDER OR FOR YOUR NEAREST DEALER
CALL TOLL FREE 800-647-1800

Call 601-323-5869 for technical information, order/repair status. Also call 601-323-5869 outside continental USA and in Mississippi.

Write for FREE catalog, over 80 products

MFJ ENTERPRISES, INCORPORATED
Box 494, Mississippi State, MS 39762

CIRCLE 11 ON READER SERVICE CARD

Here's a neat and easy task for your computer/printer to do. In one quick move, you can blend two interests while producing your own QSL cards. Just remind the XYL how much money you can save by rolling your own.

A 39 Step BASIC Program = Computer QSL Cards

BY PHIL ANDERSON*, W0XI

We recently obtained a business computer at work and, of course, lots of ideas for its use surfaced. One computer and twenty people equal forty program ideas! Or is it that ten radio amateurs equal ten opinions?

In any event, QSL printing came to mind. The only feasibility question was whether or not there were any appropriate forms available for our IBM/34 printer. Checking with several computer supply vendors, we established that 4 × 6 inch index cards could be purchased one-up or two-up. Two-up means that two cards are side by side on each form. In addition, the cards were thick enough for postal use.

*3005 W. 19th St., Lawrence, Kansas 66044

```
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
R   22                                                      R
R   FROM:                                                   R
R   RADIO STATION WOXI                          STAMP       R
R   OP  PHIL ANDERSON                                       R
R   QTH 3005 W 19TH ST                                      R
R       LAWRENCE KS                                         R
R       66044                                               R
R                                                           R
R   DATE  ----------                                        R
R   GMT   ----------                                        R
R                                       TO RADIO STATION:   R
R   MHZ   ----------                                        R
R   MODE  ----------                                        R
R   RST   ----------          ----------------             R
R                                                           R
R   RIG   ----------          ----------------             R
R   PSE QSL --------          ----------------             R
R   COMMENT---------                                       R
R   ----------------                                        R
R                                                           R
R                                                           R
RYR_KANTRONICS_INC_1202E23RDST_LAWRENCE_KANSAS_66044_YR
```

Fig. 1- A computer generated QSL card.

About The Author

Phil Anderson, an Extra-Class amateur, holds call sign W0XI. Phil has been licensed since the late fifties, holding calls KN0HSB, WA0GTZ, WB2MVW, WD0BSW, and finally W0XI. He's interested in QRP, computer aspects of amateur radio, DX-ing equipment design, and likes to operate c.w. Phil is co-founder and President of Kantronics Inc.

With the power of the S/34 available and BASIC installed, we had the potential to print an endless variety of QSLs. One design I chose is shown in fig. 1, and the BASIC program described in this article prints this format.

The QSL is bordered by the letters R and Y. An RYRYRYRY string pattern is, of course, the optimum character pattern used for testing RTTY operations. Call sign, name, and QTH are located at the upper left, and QSO information such as date, GMT, RST, etc., is placed at the lower left.

An unexpected plus was discovered in writing the QSL program: It was found that the QSLs could be indexed as they were printed. Note that the example shows the number 22 in the upper left corner.

Now, let's take a look at the 39 step BASIC program listing. There are two main sections: data input and QSL print. Statements 40 through 100 collect call sign, name, and address, and statements 130 through 340 print each QSL. Statement 100 asks the operator for the number of QSLs to print and that number is then generated by the program loop created at statement 110.

Let's play computer by stepping through the program to see how this all happens. First, we load the program off disc storage and then type RUN to start program execution. Statement 30 then clears the screen and statement 40 via the computer terminal screen asks us for a call sign. Once we type in your call and hit re-

a monthly feature by
IRWIN MATH, WA2NDM

Math's Notes

A LOOK AT THE TECHNICAL SIDE OF THINGS

With all of the talk about amateur TV, video games, etc., we thought that it would be a good idea to discuss an interesting integrated circuit that has not seen much application in the amateur service. This chip is the LM1889 TV modulator.

Contained in its 18 pin DIP package is a complete video modulator which accepts composite video and audio and produces an r.f. carrier at channel 3 or 4. The chip contains a sound subcarrier oscillator, chroma subcarrier oscillator (for color signals), and two r.f. oscillators and modulators. By proper application, video and audio information from TV cameras, video tape records, computer character generators, and the like, can be easily displayed on a black and white or color TV set. Furthermore, by mixing the r.f. output with a fixed oscillator-multiplier chain, a complete wide-band commercial quality TV signal can be produced at the frequencies normally used for amateur work.

Using the LM1889 is fairly simple. Fig. 1 shows the most basic hookup of the chip as a monochromatic modulator. This circuit makes an ideal interface from a computer-type character generator to a TV set.

All components used in fig. 1 are standard. For best stability the 75 pf capacitor should be a DM or silver mica type and the coil, L1, a high-quality slug-tuned unit with a range that encompasses .08 microHenry. An acceptable substitute would be 2½ turns of #8 on a ½-inch diameter ceramic slug-tuned form. After the circuit is built, connect the r.f. output to a TV set and adjust L until the picture is received on either channel 3 or 4.

A somewhat more elaborate circuit for the LM1889 is shown in fig. 2. Here both audio and video (color included) are mixed to form a composite signal that can be received by any common TV set. The circuit is straightforward and should pose no construction problems. Keep in mind that the r.f. section (pins 8 and 9) is at 60–70 MHz and wiring should take this into account. The 56 pf and 82 pf capacitors should be DM or silver mica types and L1, the same as in fig. 1.

Alignment of this circuit is the same as fig. 1 for r.f. Once a picture is receiv-

5 Melville Lane, Great Neck, N.Y. 11023

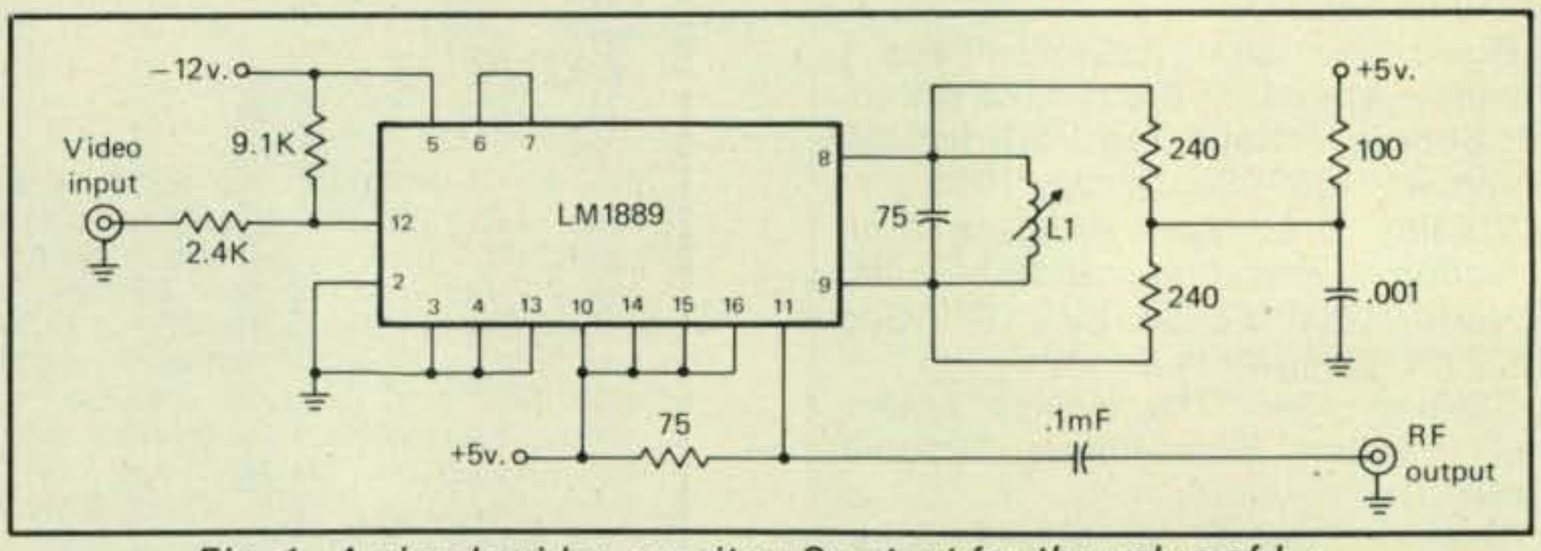


Fig. 1– A simple video monitor. See text for the value of L_1.

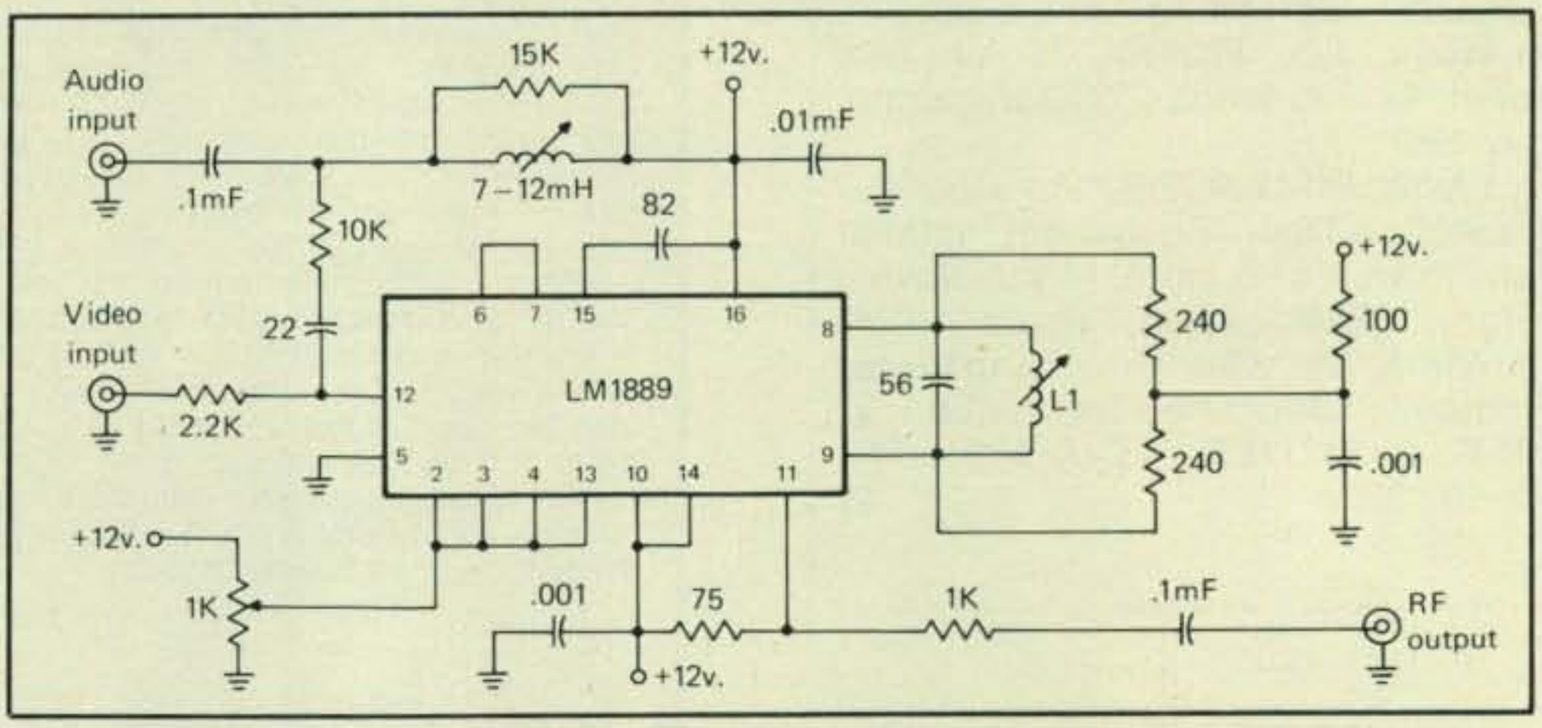


Fig. 2– An audio/video modulator. All capacitance values are in pf except where noted.

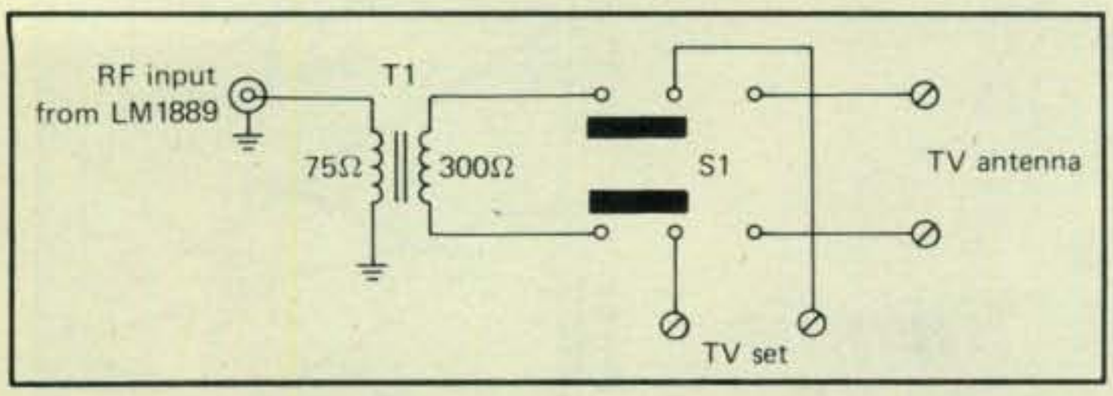
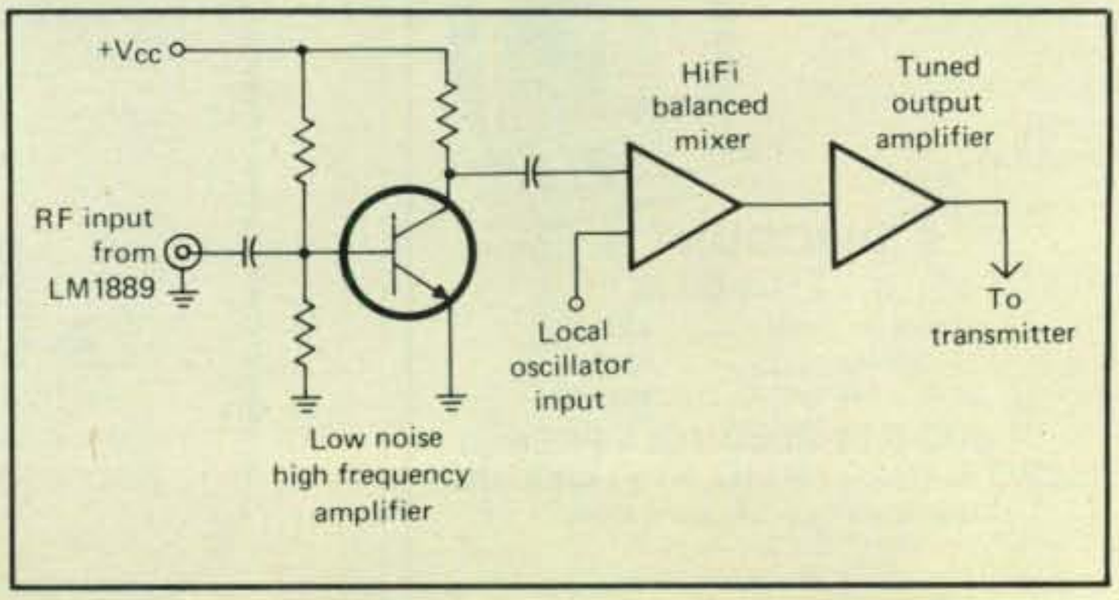


Fig. 3 (above)– An r.f. switch for coupling the LM1889 to a standard TV set. See text for details on T_1.Fig. 4 (right)– A scheme for mixing ch. 3 or 4 video signal with a crystal controlled local oscillator for use at amateur frequencies.



ed, the 1K potentiometer should be adjusted for best overall color and the 7–12 microHenry slug-tuned coil for best overall sound. These are easy adjustments, however, and should pose no problems.

If you use the LM1889 in this manner, you will have a low-power transmitter with an r.f. output of 5–10 millivolts. For use with TV sets this is fine and connections to the antenna terminals will suffice. The incorporation of a slide switch as shown in fig. 3 is recommended so that output from the modulator will not be applied to the TV antenna, possibly radiating an interfering signal to neighbors. The switch should be a common d.p.p.t. slide switch and, for proper matching, T1 should be a 75 ohm to 300 ohm matching transformer which is readily available at most electronic supply houses or stores. The unit should be built in a small minibox for shielding purposes.

If you now feel that you would like to be able to use the composite signal produced by the LM1889 in an amateur TV installation, the output of the circuit of fig. 1 or 2 must be further processed. Fig. 4 shows one scheme of doing this.

The r.f. output of the LM1889 is mixed with the output of a crystal-controlled oscillator to produce an output at the ultimate transmitting frequency. By the use of a balanced mixer and properly tuned amplifier, this conversion is not too difficult to implement and results in a high-quality signal, quite similar to commercial standard signals.

Details are left out of this as we have not actually gone this far, but if you are involved in amateur TV at this level, the job should be within your capabilities.

The LM1889 is manufactured by National Semiconductor, 2900 Semiconductor Dr., Santa Clara, CA 95015, and you should write to them for full particulars pertaining to the chip.

Best of luck with the circuits if you work with them.

73, Irwin, WA2NDM

a monthly feature by
ADRIAN WEISS, K8EEG

QRP

THE ART OF VERY LOW POWER OPERATING

The Ultimate Achievement—DXCC Milliwatt #3, #4

The upsurge in the sunspot cycle since 1977 has increased the ease with which QRP operators have been able to accumulate DX contacts. There has been a phenomenal increase in the number of operators qualifying for the DXCC QRPp Trophy during 1980. In our last report in the March 1979 issue of *CQ* 12 operators had won the 5-watt output trophy. Between February 1980 and February 1981, 16 more have been added to the list, more than doubling the total! The interesting feature here is that the DXCC QRPp Trophy award for working 100 ARRL DXCC-list countries and presenting QSL verifications produced only 12 successful applicants during the first decade of its existence, and then in the eleventh year, a veritable explosion. Two factors seem to be operative in the increase: (1) worldwide QRP activity has increased greatly, with a greater number of QRP operators working toward the "top" DX award; and (2) conditions have improved tremendously. The 16 latest applicants, however, garnered their totals, for the most part, over a two to three year period of operation. The improved conditions undoubtedly were beneficial, but the point simply is that, good conditions or otherwise, winning the DXCC QRPp Trophy is a very difficult task, requiring not only extraordinary skill, but also an almost unlimited degree of patience and perseverance.

The Low Power DXCC Honor Roll

The operators who appear on the accompanying DXCC QRPp Honor Roll represent a special segment of the world's elite amateur radio operators. Undoubtedly, there are many top operators who do not appear on the list. What makes those on the list a very special group is their approach to working DX. They contemplate what is a difficult task at best, and voluntarily sacrifice a 20-40 dB power advantage and attempt the "impossible" in direct competition with other top-flight operators who choose to retain that power advantage. That these low power operators succeed, it seems to me, elevates them ever so slightly in stature above the QRO operators who move into the 300+ country level on the ARRL DXCC Honor Roll while depending upon their KW's to snag the "rare one." An operator's appearance on the Low Power DXCC Honor Roll is a very special honor indeed, and a testimony to the consummate expertise necessary for the achievement.

These periodic reports probably leave some question as to the actual difficulty of qualifying for DXCC QRPp. After all, it is possible to put together a list of 100 countries that are relatively easy to work because of distance and activity in that country. Perhaps I should clarify this matter. In going over the stacks of QSL cards that must accompany each application, I am often astounded by the number of "rare" countries and once-in-a-lifetime DXpeditions whose QSL cards are in the stacks. I am an experienced QRP DX'er myself and worked about 130 countries back in the bottom of the sunspot cycle, and so I'm familiar with the challenge represented by the 15 kHz wide wolfpacks that accompany the appearance of a "rare" one. I find myself exclaiming, "He worked *that* one? Some operator!" I find myself growing envious and thinking that I'd trade my Argonaut for the thrill of working some of those "rare" stations. It is tough enough to work such stations when running a KW, judging from the pride exhibited by the QRO boys after they manage to make such a contact after 10 minutes of calling. Just think of the difficulty of doing it with 30 dB less power! I wonder how the QRO boys feel when the rare DX station sends "QRZ QRP STN ONLY," and have to stand-by while the QRP operator occupies the stage. The only thing I can imagine feeling in such a situation is embarassment, but to each his own. The point is: Those on the Low Power DXCC Honor Roll all have worked their share of the rare DX stations, and the award indeed represents an achievement of the highest order of difficulty.

DXCC Milliwatt—The Elite Corps

While the DXCC QRPp list has experienced an explosion, the same is not true of the DXCC Milliwatt list. In fact, it seems that the effort to work 100 countries while not exceeding one (1) watt r.f. output is in precarious balance with Nature's power vs. distance threshold. DXCC Milliwatt is the supreme challenge of an operator's knowledge and skill. Only four operators have succeeded in this quest during the past ten years. The DXCC Milliwatt List does represent, without qualification, the elite corps of radio amateur operators. There is no accomplishment anywhere in amateur radio to compare with theirs. Again, these operators also work their share of the rare ones. Theirs is the ultimate achievement!

W8ILC was the first operator in history to qualify for DXCC Milliwatt six years after it was offered by *The Milliwatt*. At present, W8ILC stands at 278 confirmed with under one-watt output. Next, GM3OXX joined W8ILC on the list about a year-and-a-half later. The third operator to qualify is Christopher J. Page, G4BUE, and the fourth is Margaret H. Williams, KI4W. *The Milliwatt* and *CQ*, as well as the fraternity of QRP operators the world over, I am sure, offer their heartiest congratulations to G4BUE and KI4W for their achievement. As a glance at the Low Power Honor Roll will indicate, G4BUE qualified for DXCC QRPp Trophy #8 in November, 1978. He picks up the story at that point:

"On the 9th of December, 1978, two things occurred at the shack of G4BUE. First thing in the morning, my 100 QSL's and approval of my application for DXCC QRPp arrived in the

*83 Surburban Estates, Vermillion, SD 57069

post. At 0952Z on the same day, I worked SM0AJU on 28 MHz with an input of one watt towards the DXCC Milliwatt award. This QSO turned out to be the earliest one on my application for DXCC Milliwatt, dated December 7, 1979. Actually I started towards DXCC Milliwatt on November 18, 1978, and by December 9, 1978, I had worked a total of 18 countries with an input of one watt. Although the DXCC Milliwatt rules allow a power of one watt *output* to be used, I wanted to work the 100 countries whilst using an *input* power of one watt, and hence an output power of somewhere around 500 mw. In other words, I was using milliwatts for the DXCC Miliwatt, which I thought was appropriate.

"I continued working countries with one watt input through the summer of 1979, trying to achieve the 100 confirmed within a 12 month period. The 100th country was worked on August 10, 1979 in the shape of A4XGC, well within the 12-month goal, but would the QSL cards come as quickly? I had to wait until December 7, 1979, to receive the 100th QSL card, by which time I had worked 128 countries with the one watt.

"Of the 100 QSOs, it is interesting to note that 38 of them were made with s.s.b. and 62 on c.w. 81 were made on either 28 or 21 MHz, which must be a sign of the times in relation to the sunspot cycle. Amongst the 128 countries worked were several which stick in my mind, such as working KL7 on 14 MHz s.s.b., and the DXpedition to Manihiki (ZK1MB) on 21 MHz c.w. DXpeditions were of great assistance once the ability to get through the pile-up whilst using one watt was accomplished. My thanks to the following DXpeditions which made the feat easier: WA1SQB/HC8, KP4AM/D, SV1W/A, DA1WA/HB0, SV1KP/9, JD1ALM/JD1, N2KA/SV5, ZK1MB, C31NA, OK3TAB/D2A, FG0DDV/FS7, OH2DP/OH0, VP5PX, VP2SZ, VP2ML, ZB2G, ZF1SV, and 6W8EX.

"The equipment used throughout the whole project was my faithful Ten-Tec Argonaut with the voltage to the final amplifier reduced from the standard 12 volts to 4.5 volts and the current adjusted for 235 ma. This is a much more efficient method of running the Argonaut at the one watt input level and below. The antenna is a four element triband beam on a 35 foot tower, and inverted Vee's at 30 feet for the l.f. bands. My current project *(as of December 1979—Ed.)* is the DXCC 200 QRPp Trophy, and at the moment 187 countries have been worked with an input of 5 watts. Other projects are WAZ, WAS, and the new 5-Band WAZ (100 zones) certificates—all on 5 watts QRP."

Our commendations to G4BUE for accomplishing the DXCC Milliwatt in just under one year! That is truly remarkable. Chris seems to work in year-long periods. His application for DXCC 200 QRPp was approved on December 31, 1980! I'm looking forward to an application for DXCC 200 Milliwatt at the end of 1981! In addition, Chris has been experimenting with super-low powers of under 1 milliwatt, and to date, has worked UL7LAW, N8II, and W4OO with an *input power of 750 microwatts*, OH2BQS with an input of *500 microwatts*, and UK2GDZ with an input of *250 microwatts*. These contacts are utterly incredible, to say the least. Assuming a 50% efficiency figure (test measured by G4BUE), an input of 750 microwatts would produce an output of just 375 uw, while the 250 uw input would result in a 125 uw output. This represents a −9 dBm r.f. output. Considering that the range of modern receiver sensitivity is on the order of −127 dBm (.1 uv) to −107 dBm (luv), G4BUE's −9 dBm signal could tolerate a maximum of 118 dB path loss in the UK2GDZ contact! Hopefully Chris will provide us with a much more detailed report about his microwatt DX experiments.

The fourth winner of the coveted DXCC Milliwatt Trophy, Margaret H. Williams, KI4W, is a quite diversified and accomplished person as well as a top-flight QRP operator. It is difficult to know where to begin in describing her! Her profession is teaching at Northside High School in Norfolk, VA, where she conducts classes in Electricity/Electronics and other sciences, depending on curriculum needs, and for extra-curricular contributions, she heads a student electronics club at the school where, she notes, "Some of the members are working on their amateur radio licenses. Incidentally, the ones working for the licenses are girls; the boys are into experimenting and constructing projects." A cardiac arrest in late winter forced her into inactivity for several weeks, but at last writing, Margaret was dedicating her summer to pursuing another of her avid interests—fishing. Her 16 foot McKee Craft vessel provides the perfect place for soaking up the sun on lovely Chesapeake Bay and other local waters. Recuperation plans included that particular activity as well as the more active relaxation of fishing, of which she notes, "I am particularly fond of fresh water fishing, primarily for large mouth bass, and have quite a collection of rods and reels to fit any occasion. Only recently have I found the thrill of the fly rod. What a delight to see the ichthyological Miss America dance on her tail when she hits the bug that has just been cast from my Shakespeare graphite fly rod!" I don't know much about the subject, but my

impression is that a fly rod is a "QRP" fishing rod, isn't it?

Margaret served in the Air Force from the beginning of the Korean War, and went through officer candidate school in 1953 at Lackland AFB, and currently holds the rank of Lt. Colonel, USAFR. Her interest in radio began in the mid-1930's when a family friend became terminally ill and set up a radio station beside his bed. She notes, "I simply couldn't imagine talking with Florida . . . golly, that was *so far away*." She began in amateur radio after WWII with the call WN4FTJ. She has been quite active since then, and served in an official capacity with the Y.L.R.L. organization as well as other groups. One gets the impression that Margaret "went Air Force" because airplanes were involved, and one of the disappointments of her health condition is that she can no longer fly. She remarks, "I am a commercially licensed pilot, but due to this rather serious health condition, I am no longer allowed to fly—'grounded' they call it. But my heart is still in the cockpit, where I have had some delightful, terrifying, and humorous experiences." The timing of the arrival of DXCC Milliwatt Trophy #4 could not have been planned better. Margaret recalls, "The trophy was just wonderful, and it brought a great lift to me. A friend picked up my mail and brought it to me at the hospital, and when the trophy arrived, it was admired by the entire staff who came to my room. Few if any of them knew what it represented, but they admired it none the less!" We know what it represents, though! At the time her 100th QSL arrived, she had worked 129 countries with under one-watt output from the TenTec Triton backed off to that output level. Margaret provides the following information about her quest for the ultimate achievement:

"I carefully watch the propagation charts and follow WWV reports on conditions so that I won't waste my time on a poor band. When the 8Z4A operation was on a few months ago, I knew there would be no chance of me working him through the pile-ups, so I 'smelled around' and found out where and when he would be up on 10 meters, checked the charts to see how good the band would be, and then one morning just at sunrise, I waited. Before long I heard a station tuning up and give a 'QRZ.' I made my call, and sure enough, the reply was, 'KI4W, you are 5-9. Thank you and 73, this is 8Z4A.' I had done it! Later the HK0BKX operation was on 40 meter c.w., and again it was cat-and-mouse. I heard him several mornings around daylight but had no luck at all getting through the pile-up. So I waited, and then got up early on a day when propagation was supposed to be good toward the south, tuned his frequency, and sure enough, I got him on my first call.

"I think that the key to QRP operation is (1) a clean station, (2) a good antenna system well-grounded and with a low s.w.r., (3) understanding the capabilities of your transmitter and antennas in relation to band conditions, (4) knowing when and where to look and being prepared for action, and (5) being patient. I know that on c.w. a good clean signal and sharp, well-formed letters are a *must*. It doesn't hurt to add "QRP" after your call either. I have really enjoyed QRP operation, and certainly do not intend to stop it after winning DXCC Milliwatt. It is *the* way to go, and if *everyone* would cut down on the power, the bands would be a much more pleasant place to operate!

"In closing, I especially want to extend my thanks to those DX stations on the 10 meter DX Net who give special calls for 'QRP stations only.' Those considerate DX stations deserve the praise of every QRP operator in the world!"

Job well done, Margaret! I would advise newcomers to QRP DX work to very carefully read the above comments and absorb the attitude of persistence, attention to detail, and patience that Margaret described in her own operation. And I would like to second her praise for those DX operators who corroborate with QRP operators in producing successful QRP contacts under all conditions. Every successful QRP DX contact is a credit to the skill of not just the QRP operator, but the "other guy" as well! Oftentimes, the successful contact is evidence of the "other guy's" supreme operating skill needed in copying a weak QRP station in the midst of KW's.

We will continue our coverage of the winners of DXCC QRPp Trophies #13-28 in a coming issue. In the meantime, those of you who have been working toward either of these awards and have become a bit discouraged, remember, *persistence* is the key, and if what you are doing isn't producing the results you expect, read up on propagation and antennas, check out DX operating handbooks and articles. In the upcoming *CQ-Milliwatt QRP Handbook*, we will cover these subjects in depth. Until next month.

73, Ade, W0RSP

DXCC Milliwatt Trophy—1 Watt

#1	W8ILC	6/78	s.s.b. #1
#2	GM3OXX	12/78	c.w.
#3	G4BUE	12/79	
#4	KI4W	2/80	

DXCC 200 Milliwatt Plaque—1 Watt

#1	W8ILC	4/80	s.s.b. #1 (278)

DXCC QRPp Trophy—5 Watts

#1	K4OCE	12/71	
#2	W2GRR	6/75	
#3	K8MFO	2/76	
#4	W6PQZ	4/76	s.s.b. #1
#5	K2KUR/N2AA	5/76	
#6	OA8V	5/77	
#7	WA6SOV	7/77	
#8	G4BUE	11/78	
#9	OE1ZGA	3/79	
#10	WA2JOC	3/79	
#11	WB8IGU	7/79	
#12	VE1BQQ	11/79	
#13	W6YVK	2/80	s.s.b. #2
#14	K4RUG	3/80	s.s.b. #3
#15	W1PWK	3/80	
#16	WA2JOC	3/80	s.s.b. #4 (#1 both modes)
#17	VE5JQ	3/80	
#18	N0AJZ	4/80	s.s.b. #5
#19	K0CDJ	5/80	
#20	OK1DKW	6/80	c.w.
#21	SM5CCT	6/80	
#22	SM0GMG	7/80	c.w.
#23	WA4LOF	7/80	
#24	KH6HC	7/80	c.w.
#25	GM3RFR	8/80	s.s.b.#6
#26	K4TWJ	9/80	
#27	K8DU/WB8TKZ	9/80	
#28	K1MNR	1/81	

DXCC 200 QRPp—5 Watts

#1	N2AA	12/78
#2	G4BUE	12/80

a regular feature by

THEODORE J. COHEN, N4XX

dateline... Washington, D.C.

THE INS AND OUTS OF THE WASHINGTON SCENE

Interference To Amateur Operations Reaches Critical Levels

According to Jeffrey Young, Enforcement Division, Field Operations Bureau, FCC, the number of complaints received by the Commission on deliberate interference by amateurs to the operations of other amateurs is rising at an alarming rate. The problem has now become so bad that it is a matter of discussion at all levels within the Commission. A rise in the number of Congressional inquiries to the FCC in this matter suggests that the Congress, too, is becoming concerned about the lack of self-enforcement within the amateur service.

According to Young, almost 35% of the amateur-related interference complaints filed with the Commission involve amateur-to-amateur interference. "In fiscal year 1980," said Young, "we received almost 1500 such complaints."

So bad is the malicious interference problem that the FOB is now in the process of formulating a new enforcement program for the amateur service. Specifically, the Bureau is developing new approaches to the amateur jamming problem which will be used to prevent further decay in the self-policing aspects of the service. Under consideration are revisions to the procedures used for obtaining evidence of deliberateness; the imposition of more severe sanctions is also being discussed.

Young Interviewed By CQ

Readers of this column should, by now, be familiar with Jeffrey B. Young, a member of the Enforcement Division, FOB, FCC. As Chief of the Investigations Branch, Jeff has long provided your editor with timely information on activities in Washington. Before assuming his new job as Chief of the FOB's Inspections Branch, Jeff agreed to be interviewed by *CQ* on some of the current issues facing the Field Operations Bureau. The interview is contained in this issue, and we believe that it will make interesting reading for all amateurs.

*8603 Conover Place, Alexandria, VA 22308

Technological Battle Between Police And Speeders Escalates

According to an article in *The Wall Street Journal*, Iowa police are complaining that transmitters operating in the 10 GHz band are being used to jam the radar devices they use for speed determinations. One of the devices cited, Speedo-1, is made by Speed-O-Matic of Harbor City, CA, and operates on a frequency of 10.525 GHz.

The manufacturer of Speedo-1 claims that the device was intended for tracking the speed of race cars, skiers, and golfballs. He claims that the device's signals are not strong enough to affect police radar units.

John A. Reed, an electronic engineer with the Technical Standards Branch, Office of Science and Technology, FCC, agrees. But according to Reed, "It is possible that after-market modifications to the Speed-O-Matic device may be responsible for the alleged interference to the police radar systems." It is also possible that the police radar units, themselves, may contribute to the problem by virtue of their design.

While the Speed-O-Matic unit operates above the 10 GHz amateur band (10.0–10.5 GHz), a number of other transmitters sold to the public are known to operate at 10.495. These units operate sufficiently close to the police radar band (10.5–10.55 GHz) as to raise questions regarding their intended function.

The marketing of 10 GHz units to the public, and the use of these devices in the 10 GHz amateur band, may have a serious effect on the amateur service. Specifically, it may result in the imposition of type-acceptance restrictions on all equipment used in this band.

Commissioner Brown Resigns Seat On FCC

FCC Commissioner Tyrone Brown announced his resignation from the Commission in a letter he sent to President Carter in early 1981. His resignation was effective on January 31, 1981, at which time Mr. Brown indicated that he planned to return to private law practice in Washington, D.C.

According to *The Washington Post*, the resignation may give President Reagan three seats on the Commission to fill quickly. The term of James Quello (a Democrat) expired in 1980, but he continues to sit on the Commission until a replacement is named. Then, too, Chairman Charles Ferris (also a Democrat) is expected to resign as a member of the Commission once the President names a new chairman.

It should be noted that the President can only name one Republican to fill the vacant slots. The other seats would have to be filled by Democrats or independents. Regardless, the composition of the Commission is expected to undergo marked change, for the Republicans will now hold the four-to-three majority previously held by the Democrats, and the Democrats or independents named to the Commission will almost certainly be more conservative than were Messrs. Brown and Ferris.

CCIR Study Group 8E Continues Work On Amateur-Related Matters

Under the direction of Frank L. Rose, CCIR Study Group 8E continues to prepare papers on amateur-related technical matters which the ITU will use as the basis for its deliberations on frequency allocations and other matters. According to Rose, "The amateur service must avoid anything that even hints of being self-serving. The posture must be one of showing how the amateur service can help without doing any 'flag waving.' We must also avoid giving the service 'tasks.' To do this in the CCIR forum can result in restrictions being placed on the service which will destroy its unique character.

Rose also noted that the amateur service is listed as having a "secondary" allocation in the new 10.1 MHz band. As such, the amateur service:

1. shall not cause harmful interference to stations of primary or permitted services to which frequencies are already assigned or to which frequencies may be assigned at a later date;
2. cannot claim protection from harmful interference from stations of a primary or permitted service to which frequencies are assigned or may be assigned at a later date;
3. can claim protection, however, from harmful interference from stations of the same or other secondary services to which frequencies may be assigned at a later date.

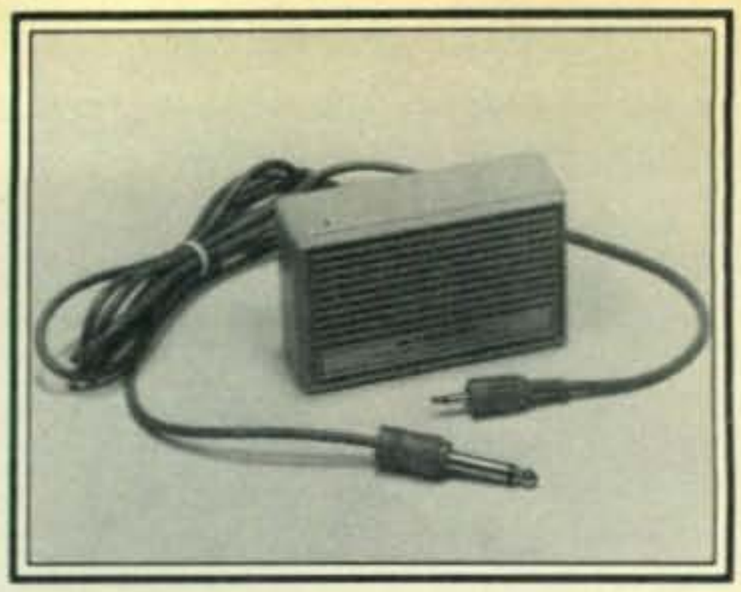
Rose invited papers on how the amateur service can prevent harmful interference to primary and permitted operations in the 10.1 MHz band.

Amateurs wishing to work with CCIR Study Group 8E are encouraged to contact Frank L. Rose, FCC, Washington, D.C. 20554 (202-653-8121). ■

Want to make a good piece of equipment better? For a few bucks and a few minutes investment you can add another dimension to the ever-popular HW-8.

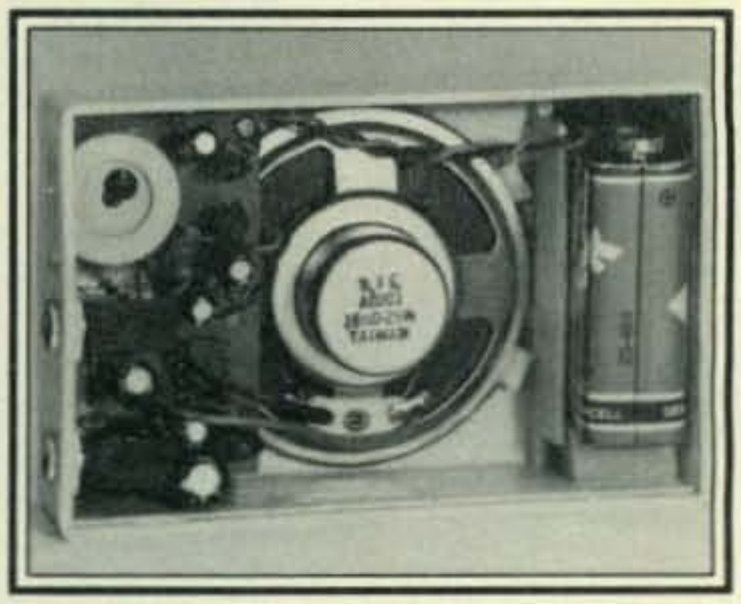
Add A Speaker/Amplifier To Your HW-8

BY HY SIEGEL*, K9CCN



The Archer Mini-Amplifier/Speaker (Radio Shack No. 277-1008) and patch cord (Radio Shack No. 42-2433).

The Archer Mini-Amplifier/Speaker simply plugs into your HW-8 to give you an instant speaker.



The compact speaker/amplifier is powered by a 9-volt battery and has a self-contained speaker.

Heathkit's HW-8 is perhaps one of the most enjoyable pieces of amateur gear I have had since my Novice station, which consisted of a home-brew transmitter and Heathkit AR-3 receiver. The little rig combines effective simplicity with the kind of compact portability that has always delighted me. It seems equally at home in the Novice shack as well as in that of the seasoned QRP "pro."

It has, for me, only one flaw—I don't like wearing headphones! Of course, this is a personal preference (one that I know is shared by many other amateurs, although I am aware that many die-hard brass-pounders wouldn't have it any other way. Certainly, wearing cans has advantages over using a speaker, particularly in noisy surroundings. Avid DXers and contest operators usually prefer them for the aid they give in focusing attention. But for those of us who are "weekend" brass-pounders, primarily interested in a casual c.w. QSO, it's sometimes desirable to have a choice available, rather than being restricted just to headphones.

There are occasions when a speaker provides a definite advantage for the purpose at hand. Consider an exhibit of amateur radio; watching an operator wearing headphones has much less impact on an audience of potential amateurs than if they are able to hear the sounds of the QSO underway.

Adding a speaker to the HW-8 can be done easily and inexpensively using the Archer Mini-Amplifier/Speaker (#277-1008) sold by Radio Shack for $11.95. This palm-sized unit operates on a self-contained 9-volt battery. It has an on-off/volume control and a jack for an earphone or external speaker if you don't like the sound of the internal speaker. According to Radio Shack's catalog description, the Archer Mini-Amplifier/Speaker uses a high-gain integrated circuit amplifier and delivers an output of 200 mW. Sensitivity is given as 1 mV; frequency response, 100–10,000 Hz. The size of the unit is 2½" × 3-7/8" × 1¾".

To use the speaker/amplifier, all that's needed is a patch cord with a ¼" phone plug on one end to plug into the HW-8's headphone jack, and a 1/8" mini-plug on the other end that connects to the speaker/amplifier's input jack. If you're in a hurry, exceptionally lazy (like me), or have no "junk box," Radio Shack has a ready-made patch cord of this type available (#42-2433, $2.89).

Operation is easy. Simply make the plug-in connections, adjust the speaker/amplifier and HW-8 volume controls to a comfortable level, and you're on the air.

**6237 Dovenshire Terr., Fort Worth, Texas 76112*

AGL Electronics

DALLAS, TEXAS
15 miles from South Fork Ranch

YOUR FULL SERVICE DEALER

The Price Is Right, The Class Is Extra . . .

AGL Electronics deals only in Ham equipment of the highest quality at the best prices available, and the service and attention are Extra Class. Our entire staff holds Extra Class Amateur licenses, and they've all been dealing in Ham equipment for years.

Just look at our antenna prices! The price is right at AGL.

TONNA F9FT ANTENNAS

4 element 2M	$ 21.95
16 element 2M	$ 55.00

HY-GAIN ANTENNAS

TH6DXX	$ 237.00
TH5DX	$ 201.00
TH3MK3	$ 178.00
TH2MK3	$ 118.84
TH3JR	$ 137.00
105BA	$ 98.00
155BA	$ 150.00
205BA	$ 237.00
204BA	$ 188.00
402BA	$ 172.00
DB1015A	$ 127.00
18AVT	$ 83.00
14AVQ	$ 49.00
18HT	$ 275.00
BN86	$ 13.00

HY-GAIN CRANK-UP TOWERS

HG-52SS ..... $ 777.50
52 ft. self supporting. 9 sq. ft. at 50 mph.
Nested height: 20½ ft.

HG-50MT2 ..... $ 669.00
50 ft. side supported. 6 sq. ft. at 50 mph.
Nested height: 20½ ft.

HG-54HD $1513.00
54 ft. self supporting. 16 sq. ft. at 60 mph.
Nested height: 21 ft.

HG-70HD $2187.00
70 ft. self supporting. 16 sq. ft. at 60 mph.
Nested height: 23 ft.

CUSHCRAFT ANTENNAS

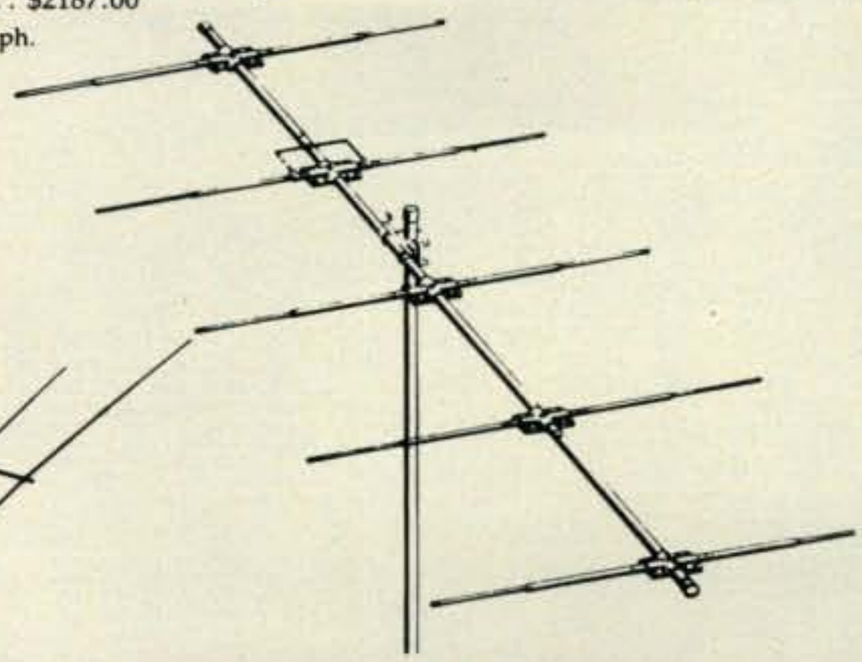
20-3CD	$ 165.00
20-4CD	$ 240.00
15-3CD	$ 83.00
10-3CD	$ 59.00
10-4CD	$ 75.00
ATV-4	$ 85.00
ATV-5	$ 90.00
ARX-2B	$ 34.00
ARX-450	$ 38.00
A-147-11	$ 34.00
32-19 Boomer	$ 75.00

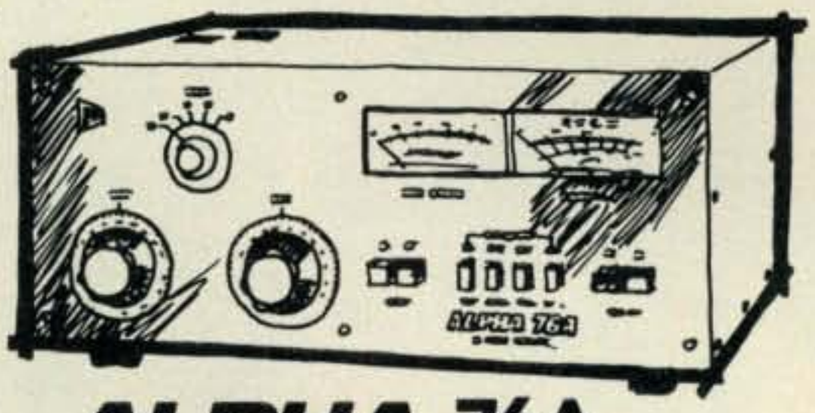
ROHN TOWERS & ACCESSORIES

25G Section	$ 37.50
45G Section	83.75
HDBX48	$ 305.00
Self supporting tower	
HBX56	$ 335.00
Self supporting tower	
3/16 EHS guy wire, 500 ft	$ 54.00
3/16 CCM cable clamp	$ .29
3/8 Turnbuckle, eye & eye	$ 5.39
M200H 10 ft. H.D. galv. mast	$ 35.00

ROTATORS

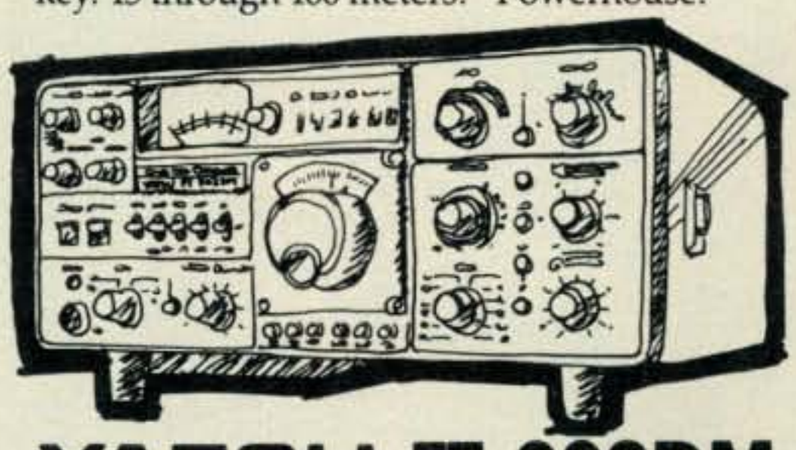
CDE Ham IV	$ 169.00
CDE Tailtwister	$ 239.00
HY-GAIN HDR300	$ 395.00





ALPHA 76A

The high frequency linear amplifier with true continuous duty. 2+KW PEP. 1 KW Locked-key. 15 through 160 meters. "Powerhouse."



YAESU FT-902DM

Improved with new ring diode mixer. The competitive edge in competition grade all-mode HF/VHF/UHF. (And the new dial turns in the right direction.)

All towers require prepayment by cashier's check or money order. All other advertised specials will receive a 2.5% Discount if order is accompanied by cashier's check or money order.

All Hy-Gain towers are drop shipped direct from the factory to save you money. You get free freight on Rohn Tower orders over $1500.00 and freight paid on all Rohn Tower foldover towers. All others F.O.B. Dallas. 10% higher west of the Rockies, unless shipped from Dallas: slightly higher if drop shipped.

Please call for more prices and information. Whether you talk to Gordon, N5AU, Bill, K5FUV, or Mike, KG5F, you'll get a bigger signal for less.

AGL Electronics, We'll do it right.

For quick shipment, call today: 800-527-3418

Store Hours Monday through Friday: Eastern 10-7, Central 9-6, Mountain 8-5, Pacific 7-4

Retail Store: 13929 N. Central Expressway, Suite 419, Dallas, Texas 75234, (214) 699-1081
Mail Order: 705 N. Bowser, # 106, Richardson, Texas 75081. Please! No Personal Checks on Mail Orders.

AGL Electronics is located only in Dallas and has never been associated with any other dealer.

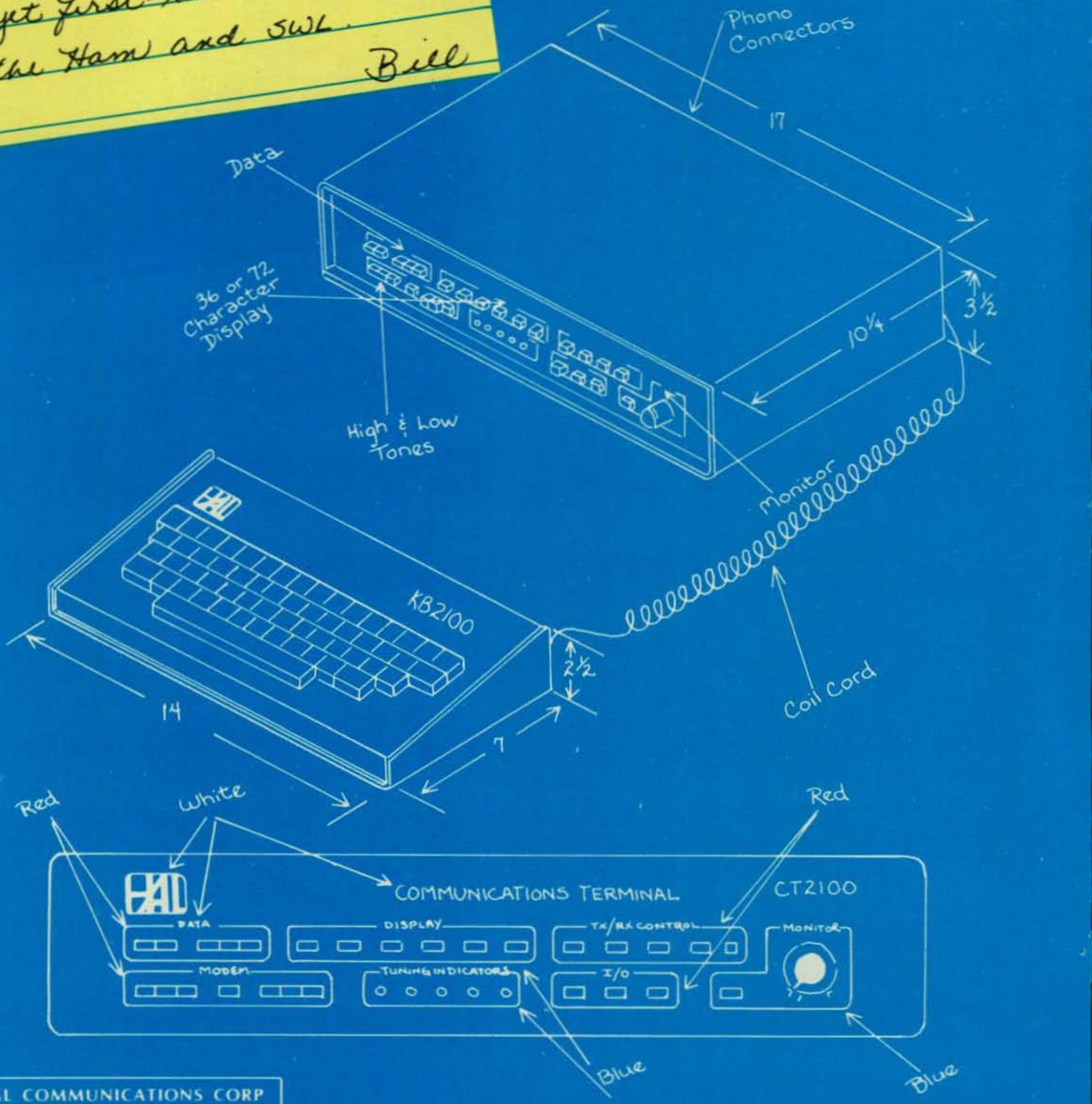
CIRCLE 1 ON READER SERVICE CARD

Ken -

Here's the answer to our customers' demands for inexpensive, convenient, yet first-rate RTTY for the Ham and SWL.

Bill

To be shown first at the Dayton Hamvention



HAL COMMUNICATIONS CORP	
NEW PRODUCTS	
DATE: 1-26-81	SCALE: ½
DRN BY: GWH APP BY: PTT	No: B1251

The CT2100 Commun

Specifications:

* Two cabinets - basic CT2100 plus separate KB2100 keyboard.
* RTTY and Morse demodulators and video circuits included in CT2100.
* Small keyboard size; connects with one "coil-cord" for popular "lap operation".
* Streamlined CT2100 cabinet is attractive and small - may also be rack mounted.
* Satin finish black vinyl front panel with multicolor graphics.
* 26 control switches; red for "primary" and blue for "secondary" controls
* 16 rear panel connectors - standard phono connectors.
* On-screen tuning indicator, LED indicators, and external scope connections.
* LED indicators for mark, space, cw tune, RTTY tune, audio overload, and KOS.
* CT2100 demodulates, decodes, and displays received Morse and Baudot or ASCII RTTY.
* CT2100 with KB2100 transmits and receives Morse, Baudot, or ASCII.
* Morse receive circuit tracks speed and minor frequency variations; 5 to 100 wpm.
* Morse transmit 5 to 100 wpm; key negative or positive key lines.
* Baudot or ASCII data rates of 45, 50, 57, 74, 100, 110, 150, 300, 600 or 1200 baud.
* Internal RTTY demodulator for both "high" and "low" RTTY tones plus two sets of modem tones (1070/1270 Hz or 1200/2200 Hz). Narrow shift CW ID included.
* All three RTTY shifts (170/425/850 Hz) for both "high" and "low" tones.
* Input/output connections for audio, tape recorder, RTTY loop, or RTTY RS232 data.
* RTTY mark-hold autostart, normal/reverse, full or half duplex, KOS transmit control.
* Large character (36 per line) or standard display (72 characters per line).
* White characters on black screen or reverse video.
* Two pages of receive display.
* Split screen for transmit buffer - pretype WHILE receiving.
* Two user-programmable 32 character HERE IS messages.
* Eight non-volatile 250 character EPROM stored brag-tape and HERE IS messages.
* Serial printer output prints all received text, Morse, Baudot, or ASCII.
* Built-in 120/220 50/60 Hz power supply.
* Receive-only users need only the CT2100 - add the KB2100 for transmitting later.

* LOW COST!

CT2100 Receive Only Communications Terminal	$845.00
KB2100 Transmit Option Keyboard	$175.00
ESM914/TR930 TV Monitor - 9"	$169.00

ications: Terminal

HAL COMMUNICATIONS CORP.
Box 365
Urbana, Illinois 61801
217-367-7373

There is no need to discard most code practice oscillators once you have learned the code. With a one weekend project most such units can be turned into fine electronic keyers. This article illustrates how a typical code practice oscillator was converted.

From Code Practice Oscillator To Keyer

BY JOHN SCHULTZ*, W4FA

Many new licensees have acquired the Heath HD-1416 Code Oscillators, since they make attractive purchases if bought along with the Heath Novice Course. The oscillator is a smartly styled little unit with built-in speaker and runs off a 9-volt battery. It has a front panel volume control and an internally adjustable tone control. The circuitry is simply that of a two-transistor oscillator and a single-transistor audio amplifier. The current drain of the circuit is quite low and the battery will last a long time.

Once you have gotten a license, the unit does not have to be discarded. It can be used as a sidetone oscillator if keyed along with a transmitter. This is true only for grid-block keyed-type transmitters where the open key voltage does not exceed 400 volts.

However, in looking at the unit after the XYL completed her Novice course, it occurred to me that the HD-1416 could be turned into a dandy little electronic keyer. The size of the unit was small, an extra control and jack could be added to the front panel without any drilling, the sidetone oscillator, as such, already existed, etc. By finding some suitable CMOS keyer circuit that would run off the 9-volt battery used in the unit, you would have a complete keyer at a low cost.

After exploring quite a few possibilities for keyer circuitry and particularly keeping in mind that the circuitry must run off a single 9-volt transistor radio type battery, it was finally decided to use the Curtis 8044 keyer chip. This IC is a 16-pin package that incorporates all the circuitry, except for external resistors and capacitors plus a few

Fig. 3

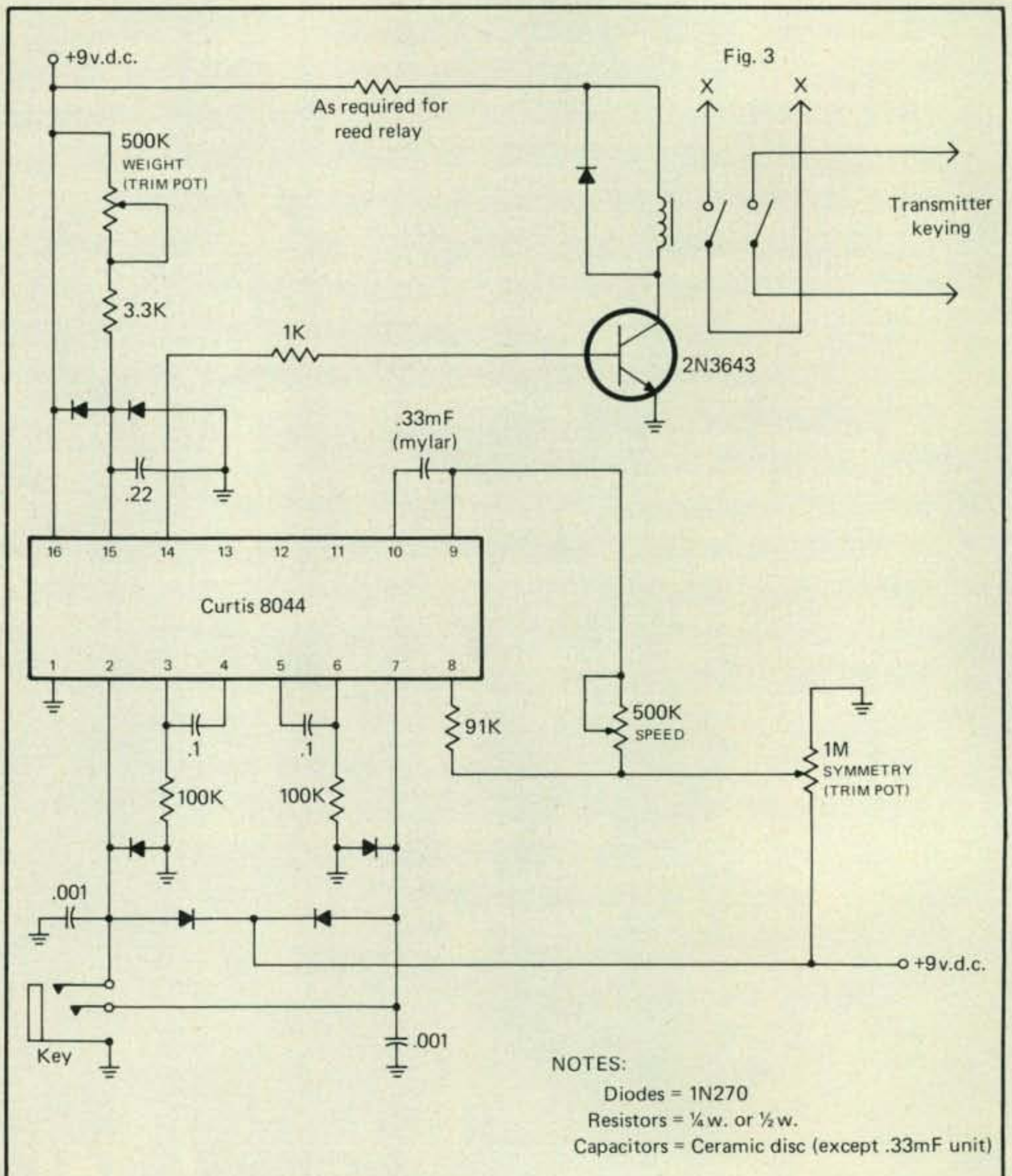
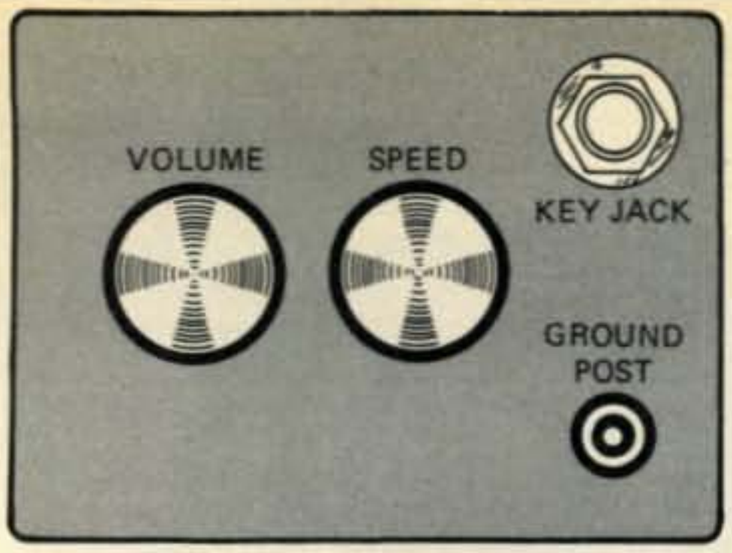


Fig. 1- Complete diagram of the single IC keyer. No particular reed relay is specified. Any surplus unit having a 5 or 6 volt coil with several hundred ohms coil resistance can be used.

*c/o CQ Magazine



NOTES:
1. Volume knob and Ground Post original parts.
2. Speed knob and Key Jack are added parts.

Fig. 2– Existing front panel holes are used to add the key jack and speed control. If one wants to do the front panel up nicely, it should be removed, repainted and lettered with transfer type lettering.

diodes, to build a complete keyer. It uses the CMOS logic form and will run off a 9-volt battery. But, it certainly doesn't lack for features. It has a dot memory, dash memory, variable weighting, self-completing dots and dashes, and allows either single lever paddle, "regular" keying, or twin lever paddle "squeeze" keying. The IC is not inexpensive ($15.00), but it has many features and very few external components are required. Also, for the newcomer, it has the advantage that a bunch of separate IC's are not involved. Trouble-shooting logic circuits when something goes wrong often requires some good test equipment. With the Curtis unit, as long as you get the external components placed properly, nothing can go wrong. A word might also be mentioned about the "squeeze" keying feature, since some newcomers may not be acquainted with it. This keying technique makes use of a twin lever paddle. When the dot paddle is pressed, a continuous string of dots is generated. When the dash paddle is pressed, a continuous string of dashes is produced. However, when both paddles are pressed, an alternating string of dots and dashes is produced. The string will start off with a dot or dash depending upon which paddle is pressed first. Also in squeeze keying the dot memory helps in that a quick tap on the dot paddle will insert a dot in a string of dashes being produced by pressing on the dash paddle. The description of the paddle action, however, does not really convey how much less effort is required to send many letters or calls, such as "CQ," as compared to single lever paddle keying. So even if you don't use this capability of the keyer immediately, you will very likely tend to use it in the future.

The diagram of the Curtis 8044 as used in the Heath HD-1416 is shown in fig. 1. This is basically one of the standard circuits that is described in the manual that you receive with the 8044. The exception is that pins 11, 12, and 13 are not used (they control a sidetone monitor built into the 8044). The 8044 output, pin 14, drives a 2N3643 switch which in turn keys a reed relay. One section of the relay is used to key a transmitter and the other arm is used to key the HD-1416 circuit.

The "speed" potentiometer is mounted on the front panel in the space formerly occupied by the phone jack. A three circuit phone jack is used for leads to a key and is mounted where the upper terminal post was located. The lower, ground terminal post was left in place mainly because it holds the internal HD-1416 PC board in place. You could, of course, remove it and replace it with some small hardware painted to match the front panel for cosmetic reasons. The layout is shown in fig. 2.

The Heath HD-1416 Code Practice Oscillator before it was converted. It looks basically the same after conversion since it was not necessary to drill any additional holes for controls, etc., in the front panel.

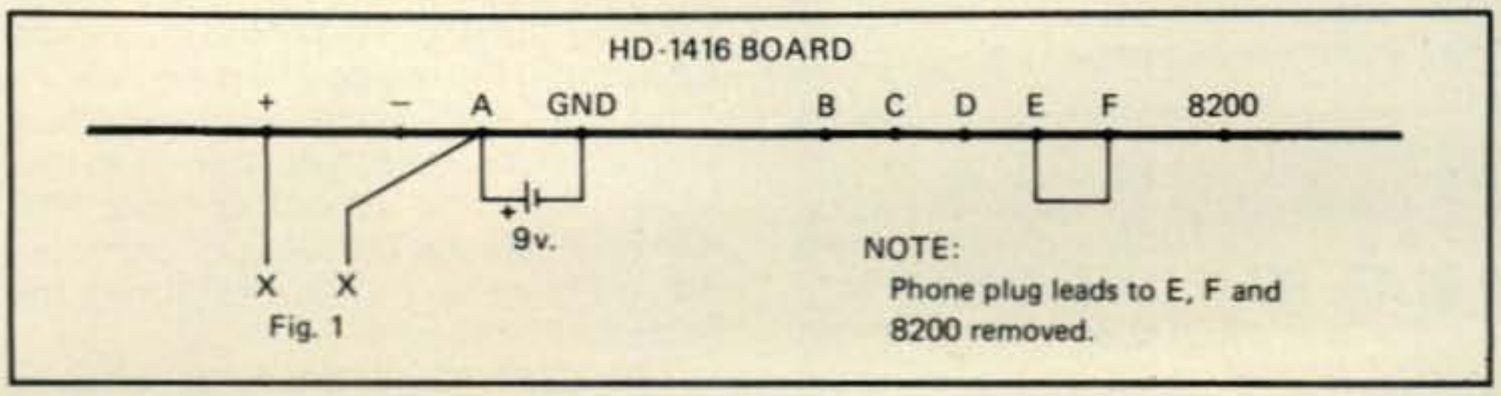


Fig. 1

Fig. 3– Simple wiring connections to the HD-1416 board which are removed for building the keyer.

The 8044 circuitry itself was mounted on a small piece of perforated board stock measuring about 4 × 6 cm and placed in the HD-1416 above the battery holder. It can be securely kept in place by a combination of a spade lug from one of the front panel mounted potentiometers going to the ground lead on the board and a bit of back-to-back carpet tape between the board and the battery holder.

The 8044 comes with a socket and it should definitely be used. All the components should be carefully mounted and wired and finally the 8044 plugged in its socket. Being a CMOS device, it should be handled to avoid unnecessary exposure to static charges. No particular layout is required for the components, and lead lengths will of necessity be kept short using the small-size perforated board stock. By studying fig. 1, one can see how most components can be very tightly grouped around the 8044. Two trim-type potentiometers are used, one for symmetry and one for weight. The symmetry potentiometer requires a one-time adjustment. With the speed control at midrange, the weight control is at minimum and when producing dots, the symmetry potentiometer is adjusted so the keyer output as seen on an oscilloscope has an equal dot to space ratio. If you don't have the equipment to do this, don't worry about it. At slow speeds the setting can also be estimated. The weight potentiometer was set for the usual 1 to 3 dot-to-dash length ratio. Some operators like to vary this ratio a bit and feel that different ratios help under QRM conditions. You could mount a weight potentiometer on the rear grill of the enclosure, if desired. But, usually, like the tone-control potentiometer, once you find a setting you are comfortable with, you will tend not to use such controls. There is no on/off switch since both the drain of the 8044 and the HD-1416 circuit during standby are negligible. Some very simple wiring jumpers are required on the HD-1416 PC board and are shown in fig. 3. The reed relay contacts now simply key the positive lead to the HD-1416 circuitry. The keying lead from the reed relay should, of course, be shielded, and it is simply routed from the relay pins out through the rear grill of the HD-1416.

The 8044 circuit seems to be inherently insensitive to r.f. feedback, but probably situations will arise where the problem will be encountered. In such a case, ferrite beads inserted in both keying leads (to pins 2 and 7) should help. Also, use ferrite beads and small bypass capacitors at the keying terminal of the reed relay. The HD-1416 enclosure is mostly plastic, except for the front panel. However, a good order of shielding is easily provided by putting household aluminum foil around the inside of the enclosure.

All in all, with moderate expenditure and a bit of care, you can turn the HD-1416 into an attractive keyer that will have all the features of commercial units selling at several times the price.

The 8044 IC is available directly from Curtis Electro Devices, Box 4090, Mountain View, CA 94040. CQ

Results Of The 1980 CAN-AM Contest

BY YURI BLANAROVICH*, VE3BMV CANADX CONTEST CHAIRMAN

Considering the "secrecy" with which the CAN-AM Contest is run, we can say that 1980 was another good year. First we had a lack of publicity when *QST* failed to publish the 1979 rules, and then there was the lost envelope with the 1979 results and 1980 rules at *CQ*. To top it all, we managed to collide with the WAE phone contest and a number of state QSO parties. Hopefully, we will have all these problems rectified this year with a significant increase in participation and a much tougher fight for our beautiful certificates and trophies. *CQ* kindly agreed to publish our results and rules on a regular basis, so we hope to provide the excellent contest with rules, nice certificates, and trophies in the usual spirit of *CQ* Contests.

Our contest committee is trying and succeeding in doing a good job with the organization of the contest. Results and awards are out fast, and we provide handy forms that make logging a true pleasure. The rules are more or less settled and tried out in the fire with very favorable comments. Once we settle for a permanent slot on the contest calendar, there should not be any more QRM from other popular contests.

1980 brought some interesting results. In our combined category, where we add phone and CW scores together, the Canadian winner is CZ6OU (ex VE3AKG), who managed to get it with only his phone score, and takes the Canadian Champion Combined Trophy. K6LL/7 worked hard on both modes, repeating his last year's triumph. He takes the American Champion Combined trophy. This is also the first time in the combined category that an American scored more points than a Canadian.

In the multi-operator category, where we also include single operator stations operated by a "guest" operator, the overall winner is W7NI, also for the first time edging out the Canadian VE7ZZZ by a hefty margin. The competition in this category was tough and most interesting. The top three places on phone were taken by Americans—W7NI, AG7M, and W7ZR. The CW category was taken by VE6ZT, with VE3NNN and W7NI following. VE3NNN is the first effort of the father-son club contest station of VE3KZ and VE3MFT.

The single operator phone category brought the Canadian Phone Trophy to the runner-up, XJ5UF (next eligible after CZ6OU). This prevented Doug, XJ5UF, from getting the Canadian CW Trophy, which goes to the runner-up, VE2WA. A noticeable drop in the Canadian participation on phone lowered the scores. CW produced more entries and better scores on the average.

K6LL/7 repeated his last year's performance and took U.S. high on phone, with the American Phone Trophy going to W5JW. WN4KKN "Novice" in the contest proved that a short call sign is not always necessary to win. He topped the CW category and wins the American CW Trophy, very closely followed by N7ZZ and K6LL/7.

The Club competition was topped by the "mysterious" The Other Club, who with a number of multi-operator entries managed to pile up a record score of over 2 million points and takes the Club Trophy. A reminder, that to be eligible for the Club Trophy, the club officer has to submit a list of the stations participating in the club's effort.

Congratulations to all the trophy and certificate winners, and many thanks to all who participated and especially to those who sent their logs. Our plaques are of high quality and quite attractive. The certificates have an old map of North America as a background and are a nice addition to the shack.

For the last time we have awarded the subscription to the CANAD-x newsletter LONG SKIP for one year to the five U.S. stations.

We have received many compliments on the contest rules, the organization, and the forms. We hope that more and more contestors will find out about CAN-AM and give it a try. We hope that the contest will increase in popularity and hopefully we will see more "big guns" as well as "little pistols" in it. We intend to keep the Single Band and QRP categories.

With the contest's timing, it should be a good warm-up for the "HAM Ra-

TROPHY WINNERS

Canadian Champion Combined	John Sluymer, CZ6OU
American Champion Combined	David Hachadorian, K6LL/7
Canadian Phone Trophy	Doug Freestone, XJ5UF
American Phone Trophy	Jack Webb, W5JW
Canadian CW Trophy	Graham Williams, VE2WA
American CW Trophy	Trey Garlough, WN4KKZ
Canadian Multi-Op Champion	Prince George CC, VE7ZZZ
American Multi-Op Champion	Stan Griffiths, W7NI
Club Competition	The Other Club (Wash. B.C.)

Box 292, Don Mills, Ontario, Canada M3C 2S2

CLUB COMPETITION

The Other Club	2098043
Ontario Contest Club	1488489
N. Alberta CC	1248444
S. Florida DX C	575120
Halifax ARC	469902
Minneapolis ARC	395715
Fraser Valley DX Club	252285
Kettle Moraine RA	199215
Kansas City DX Assn	167498
Mad River RC	102008
West Allis RAC	73973

Free 1 year LONG SKIP subscription:
W4OVU, K6HNZ, W7ZR, KØJW, WAØLKL.

dio Olympics"—the CQ WW DX Contests. We also hope that it will grow into a true Canadian-American national championship, where excellent operators will have an opportunity to work each other and compete in the contest.

We would like to extend our invitation to all of you to participate in the 1981 CAN-AM contest, and hope to see you all in the pile-ups!

Our special thanks to the Canadian DX Association for sponsoring the Trophies and certificates, to Martin, VE3MR, for help with the "paperwork," and to the Ontario Contest Club members for doing the rest of it.

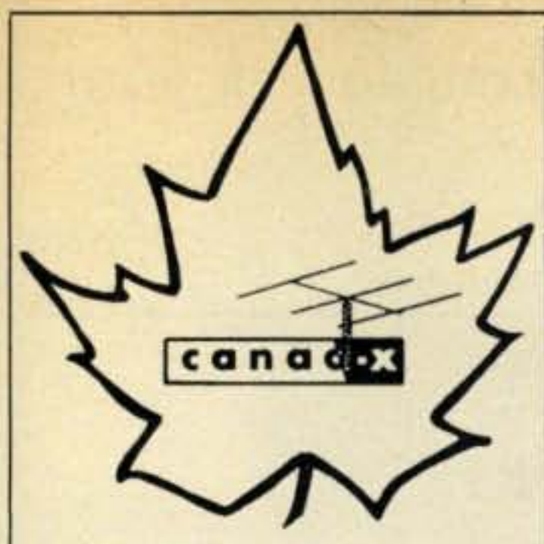
Contest QRM

Can-Am has potential to be one of the better contests, but not if it's scheduled on same date as WAE—VE1CCC. Bad cold and sore throat were not conducive to a phone contest—VO1AW. I discovered late in the contest that my 80m ant. was shorted! Had a great time—VE7UBC. First entry for the NNN contest club. Really rotten condx—VE3NNN. . . .thanks for organizing great contest—VE2CUA. Was Vermont invited this year? Can we return to 0000Z in 1981?—K1IXZ. Great way to work towards 5BWAS—WB2THN. I wish 10m would open for the contest instead of for an hour after. FB contest—WB3EKV. No big 10m opening this year—K6LL/7. Must have been a holiday in Canada as the VEs were scarce!—WB6TKK/7. What happened to 10 and 15 m? Stone dead here. Got frustrated and went QRT for last 3 hours—KB8EC.

Good contest, very nicely set up—N9AUZ. WAE phone and other state QSO parties seem to hurt participation—N9EZ. Like to know how we YL's did in this contest?? I only worked one YL!—KB9PC. Good test, next year will try full effort, lost my 40 and 20m ant and top tower section this month so QRT mainly—WA9BWY. Try again next year. My balanced feedline to my dipole decided to divorce itself from the rest of the dipole. This marriage was saved by the warmth of the soldering iron on a cold wet Sunday morning—KB9DZ.

Terrible band conditions here on 15 and 10 during phone test—WAØLKL. Most enjoyable contest, look forward to it each year. As a transplant, I enjoy contact with "back home"—WBØRJJ. Thanks for allowing monoband entries, most of my contesting is limited to 40m CW—N8MK. Lost my finals before the contest—NØAFW. Hope that QRP category will be included in the future contest—KAØDGR. Will try again from new QTH in Wash. next year—AG7M.

Would like to find more contest activity in US and especially in Canada. Where were the Canad-x people?—VE2WA. Proper fashion to celebrate one's birthday with the Can-am. Plus keeps you awake for cake—VE2HY. Fun contest and well run. Maybe one of these years I will be able to put in the full weekend—VE1UG. Multiplier hunting was fun. 160m was super—VE3NNN. Contest needs more publicity. Sept. issue of *CQ* is not soon enough! But we enjoyed it. See you next year!—VE7ZZZ. Great contest but need more activity—VE3UOT. My favorite contest!—WA4RRB. Missed Texas! Activity seemed to be way down—K5ZD. Lots of activity and fun—N5CII. Very good activity on CW this year—AA6EE. Finally got KL7 to call me and he was in Oregon—N7ZZ. One of the better contests, enjoyed it—W7TC. Had fun trying out mobile home as an antenna on 40 and 80m. Had around 100 QSOs on it from coast to coast, so guess the home radiates, most amazing, no TVI or blinking lights with 500W out—W7JYW. Love 20 hr format. Long enough for fun, short enough to be easy on body—KB8EC. I was impressed with the activity and results on 160m this year—K8MR. Where were VE8 and VY1 stations?—N9EZ.



SINGLE OPERATOR TOP TEN

CANADIANS		AMERICANS	
PHONE			
CZ6OU	684369	K6LL/7	499752
XJ5UF	154368	W5JW	363267
VE1CCC	145152	K4KUZ	283518
VE1AIH	107502	K6HNZ	247095
VE3IKW	71022	WA@LKL	182257
VO1AE	42525	KB5FU	162893
VE7IQ	26772	W4OVU	126888
XJ5ADA	17640	KB8EC	126351
VE3DOU	17019	WB3EKV	109312
VE2HY	9954	WD8KKF	80740
CW			
XJ5UF	374891	WN4KKN	333960
VE2WA	246268	N7ZZ	325638
VE1AIH	232638	K6LL/7	321750
VE3DZV	213940	W5JW	287048
VE2HY	207900	N4ZZ	259570
VE3DAP	174384	K@JW	250770
VE1AXT	138621	WA@LKL	213458
VE1UG	129762	KB8EC	189000
VE3ATD	102951	WB@LFY	167498
VE3DDU	62928	WB1HIH	159874
COMBINED			
CZ6OU	684369	K6LL/7	821502
XJ5UF	529259	W5JW	650315
VE1AIH	340140	WA@LKL	395715
VE2WA	249535	WN4KKN	333960
VE2HY	217854	N4ZZ	333095
VE3DZV	213940	K4KUZ	328831
VE3DAP	174384	KB8EC	315351
VE1CCC	145152	K@JW	250770
VE1AXT	138621	WB@LFY	167498
VE1UG	129762	WB1HIH	159874

MULTI OPERATOR TOP SIX

PHONE		CW	
W7NI	583024	VE6ZT	564075
AG7M	387594	VE3NNN	401280
W7ZR	387324	W7NI	387343
VE7ZZZ	338832	VE7ZZZ	288036
VE1CFB	307952	VE3UOT	198528
VE7UBC	252285	VE1CFB	193704
COMBINED			
W7NI	970367	VE6ZT	564075
VE7ZZZ	626868	VE1CFB	501656
VE3NNN	619432	AG7M	387594

Scores listed in the following order: Call, area, score, QSOs, multipliers, bold listings indicate certificate winners.

CANADIANS - PHONE

SINGLE OPERATOR, ALL BAND

CZ6OU	**AT**	**684369**	**1278**	**189**
XJ5UF	**SK**	**154368**	**454**	**128**
VE1CCC	**NB**	**145152**	**399**	**128**
VE1AIH	**NS**	**107502**	**303**	**123**
VE3IKW	**ON**	**71022**	**225**	**114**
VO1AE	**NF**	**42525**	**236**	**63**
VE7IQ	**BC**	**26772**	**136**	**69**
VE3DOU	ON	17019	103	61
VE2HY	**PQ**	**9954**	**83**	**42**
VE2WA	PQ	3267	43	27
VO1AW	NF	520	16	13

SINGLE BAND

XJ5ADA	**14**	**SK**	**17640**	**154**	**40**
VE3ETE	**7**	**ON**	**8399**	**80**	**37**

MULTI OPERATOR

VE7ZZZ	**BC**	**338832**	**743**	**156**
VE1CFB	**PE**	**307952**	**697**	**152**
VE7UBC	BC	252285	713	121
VE3NNN	**ON**	**218152**	**525**	**148**
VE3TIA	ON	82814	309	94
VE2CUA	**PQ**	**32940**	**209**	**54**
VY1AU	**YU**	**29078**	**160**	**67**

AMERICANS - PHONE

SINGLE OPERATOR, ALL BAND

K1IXZ	**ME**	**52266**	**268**	**93**
K1KI	**CT**	**2**	**1**	**1**
WB2THN	**NY**	**23556**	**138**	**78**
WB3EKV	**PA**	**109312**	**390**	**128**
N3AHA	**DE**	**63008**	**338**	**88**
W3ICM	**MD**	**5502**	**56**	**42**
WA3YTI	PA	4512	64	32
K4KUZ	**FL**	**283518**	**783**	**171**
W4OVU	FL	126888	442	136
N4ZZ	**TN**	**73525**	**401**	**85**
WA4YUU	**SC**	**10808**	**86**	**56**
W5JW	**NM**	**363267**	**946**	**181**
KB5FU	**TX**	**162893**	**551**	**137**
WB9RKS/5	**AR**	**24072**	**158**	**68**
WA5IYX	TX	22630	136	73
KØVGB/5	AR	16185	109	65
K6HNZ	**CA**	**247095**	**677**	**171**
W6CHV	CA	22444	130	78
K6LL/7	**AZ**	**499752**	**1214**	**198**
VE7ZZ/W7	**WA**	**32120**	**167**	**88**
WB6TKK/7	WA	14602	143	49
KB7HG	WA	3472	53	31
K7MYH	**WY**	**2691**	**52**	**23**
KB8EC	**MI**	**126351**	**426**	**139**
WD8KKF	**OH**	**80740**	**344**	**110**
AA8S	OH	22849	146	73
WD8CSG	**WV**	**4864**	**46**	**38**
WD9FVE	**IL**	**67184**	**293**	**104**
N9AUZ	IL	39071	199	87
N9EZ	**WI**	**30264**	**168**	**78**
AG9S	**IN**	**23258**	**185**	**58**
WD9DBC	IL	22152	142	71
N9ACD	IN	16165	117	61
N9HR	WI	13872	119	51
K9IAC	WI	12948	113	52
WB9GZP	WI	12324	102	52
KB9PC	IL	11128	94	52
WA9BWY	IN	6156	70	38
WB9HGS	WI	6020	76	35
W9HE	WI	5880	62	40
KB9CI	WI	3090	45	30
W9YCV	WI	2940	44	28
N9KS	WI	1925	35	25
WD9CLP	WI	1870	39	21
KB9Q	WI	1755	29	27
W9QWM	IL	1330	30	19
KB9DZ	WI	1188	27	18
K9GDF	WI	12	3	2
WA@LKL	**MN**	**182257**	**575**	**151**
WD@FGY	**IA**	**55091**	**281**	**89**
AI@Z	IA	10480	131	40
WB@RJJ	**NE**	**9828**	**77**	**54**
KA@D	IA	8319	78	47
W@CAQ	**ND**	**3270**	**46**	**30**
K1TMM/@	MN	1620	35	20
NL7D	**AK**	**1206**	**30**	**18**

SINGLE BAND

N8MK	**7**	**MI**	**5070**	**76**	**30**

QRP

WA2KSM	**21**	**NY**	**90**	**7**	**6**

N@AFW	**MN**	**201314**	**517**	**191**
WA@VBW	**IA**	**11269**	**82**	**59**
N2GC	**NY**	**3069**	**39**	**33**
KA@DGR	**KS**	**650**	**21**	**13**

MULTI OPERATOR

W7NI	**OR**	**583024**	**1387**	**207**
AG7M	OR	387594	1020	183
W7ZR	OR	387324	1093	174
K@NW	**CO**	**52728**	**315**	**78**
K5TM	**TX**	**15576**	**106**	**66**

CANADIANS - CW

SINGLE OPERATOR, ALL BAND

XJ5UF	**SK**	**374891**	**686**	**197**
VE2WA	**PQ**	**246268**	**427**	**193**
VE1AIH	**NS**	**232638**	**429**	**191**
VE3DZV	**ON**	**213940**	**404**	**190**
VE2HY	PQ	207900	448	165
VE3DAP	ON	174384	367	173
VE1AXT	**NB**	**138621**	**308**	**161**
VE1UG	NS	129762	336	149
VE3ATD	ON	102951	305	123
VE3DDU	ON	62928	200	114
VO1AW	**NF**	**60830**	**199**	**110**
VE3JCV	ON	39200	154	98
VE3BZR	ON	30000	142	75
XJ5AAD	SK	21828	114	68
VE3MCL	ON	18112	101	64
VE5ZU	SK	17622	97	66
VE3DXY	ON	13524	95	49
VE3EZU	ON	10800	76	54
VO1KO	NF	8040	82	40
VE3MCN	ON	928	20	16

SINGLE BAND

VE1AWS	**14**	**NS**	**2900**	**55**	**26**

QRP

VE4RF	**MB**	**22046**	**110**	**73**
VE3BMV	**ON**	**6834**	**73**	**34**

MULTI OPERATOR

VE6ZT	**AT**	**564075**	**807**	**249**
VE3NNN	**ON**	**401280**	**597**	**240**
VE7ZZZ	**BC**	**288036**	**543**	**189**
VE3UOT	ON	198528	408	176
VE1CFB	**PE**	**193704**	**402**	**172**
VE3MKZ	ON	40500	171	90
VE3TIA	ON	3468	37	34

AMERICANS - CW

SINGLE OPERATOR, ALL BAND

WB1HIH	**MA**	**159874**	**428**	**169**
W1CNU	**CT**	**11742**	**92**	**57**
W1VH	CT	8007	68	51
K2GBH	**NY**	**133713**	**333**	**179**
W2FTY	NY	32524	152	94
AF2L	**NJ**	**23946**	**138**	**78**
WB2THN	NY	10884	89	56
W2EZ	NY	8844	92	44
AD8J/3	**PA**	**92856**	**281**	**146**
KA3BTG	PA	6090	66	42
W3ICM	**MD**	**592**	**18**	**16**
WN4KKN	**AL**	**333960**	**596**	**253**
N4ZZ	**TN**	**259570**	**575**	**202**
WA4RRB	**FL**	**119401**	**392**	**139**
K4BAM	**GA**	**59125**	**210**	**125**
K4KUZ	FL	45313	174	113
W4FZG	**VA**	**40040**	**168**	**104**
K3JXO/4	VA	28200	131	94
AA4U	GA	23572	132	83
K4BAI	GA	20646	118	74
W5JW	**NM**	**287048**	**605**	**212**
K5ZD	**TX**	**78120**	**248**	**140**
KØVGB	**AR**	**52210**	**200**	**115**
N5CII	**OK**	**2430**	**38**	**27**
W5NR	TX	1088	23	16
WA@DXZ/5	**MS**	**80**	**6**	**5**
K6MO	**CA**	**19106**	**100**	**82**
AA6EE	CA	12400	124	89
N7ZZ	**WA**	**325638**	**642**	**229**
K6LL/7	**AZ**	**321750**	**651**	**225**
W7TC	**OR**	**138852**	**365**	**171**
W7JYW	**MT**	**137942**	**367**	**167**
K7MYH	**WY**	**12078**	**90**	**61**
KB8EC	**MI**	**189000**	**446**	**189**
K8MR	**OH**	**102008**	**277**	**164**
WD8DQP	OH	58917	216	123
WD8KKF	OH	8360	67	55
KA8HQL	OH	6622	66	43
W8EAO	OH	828	21	18
WD9DBC	**IL**	**104850**	**305**	**150**
W9HE	**WI**	**87406**	**282**	**137**
K9GDF	WI	77312	270	128
N9EZ	WI	69760	238	128
WB9GZP	WI	16549	108	67
AK9N	IL	9632	77	56
WB9HGS	WI	6090	75	42
W9REC	IL	3420	49	30
N9HR	WI	3230	42	34
KA9EAT	IL	2550	36	30
K@JW	**CO**	**250770**	**576**	**195**
WA@LKL	**MN**	**213458**	**498**	**193**
WB@LFY	**MO**	**167498**	**419**	**178**
WD@FGY	**IA**	**108618**	**378**	**127**
WB@UCP	IA	30600	148	90

SINGLE BAND

W7TO	**1.8**	**WY**	**442**	**16**	**13**

QRP

N2GC	**NY**	**27262**	**140**	**86**
WA4EFE	**VA**	**11041**	**80**	**61**
KØTBB	**MO**	**9078**	**76**	**51**
WB9HPV	**IL**	**2175**	**35**	**25**

MULTI OPERATOR

W7NI	**OR**	**387343**	**689**	**253**

Multi operator stations operated by: VE7ZZZ (+VE7DUS, VE7VX, VE7AV, VE7ENF, VE7ENI, VE7SK); VE1CFB (VE1BPW, BPY, BPX, BUW, AMA, EO, LI, AWU, APU, BCE, AUZ); VE7UBC (VE7CXC); VE3NNN (VE3KZ, MFT); VE3TIA (VE3IOW, IUV, IWI, VO1LX); VE2CUA (VE2DUB, EWQ, GDJ, DFH); VY1AU (+VY1BQ); W7NI (+AI7B, K5MM); AG7M (+W7WHB, AK7Q, KA7FPP); W7ZR (+W7EJ); KØNW (+WBØSSL, WA@BLQ); K5TM (K5ZD)

VE6ZT (VE6UD, OU); VE3NNN (VE3KZ, MFT); VE7ZZZ (VE7ENF, ENI, SK); VE3UOT (VE1BCZ); VE1CFB (VE1EO, BPW, AMA, BUW); VE3MKZ (+Craig); VE3TIA (VE3IDW); W7NI (K5MM)

a monthly feature by

A. EDWARD HOPPER, W2GT

Awards

NEWS OF CERTIFICATE AND AWARD COLLECTING

The May "Story of The Month" as told by Tom is:

Thomas A. Ross, K9GTQ
All Counties #250 9-20-79

"I was weaned into electronics in about the fourth grade by sticking a pair of pliers into a hot lamp socket! At 15 years I was building a variety of crystal sets and by 17 was into solid state with a home-made broadcast band pocket receiver (CK722 transistors) which kept me abreast of the Top 40 Hits while I studied in school.

"Graduated high school in 1954 and worked as a construction lineman with the original installation of a community cable TV system.

"January 1955 at 18, I attended DeVry Technical Institute in Chicago and graduated in March of '56 and earned my Radiotelephone Second Class license at the Chicago FCC office. Back home, I worked at the local Montgomery Ward store service department, primarily in electronics, but serviced everything sold by the company.

"I entered the Army in February '57 with basic training at Fort Leonard Wood, Missouri. Then to Fort Gordon, Georgia where they had a special school; then assigned to Fort Huachuca, Arizona for 18 months at the Army's Electronic Proving Grounds. Then 13 months in Korea at Camp Casey where I repaired radios for the 7th M.P. Company, 7th Infantry Division.

"Came home, worked in radio-TV service and sales for awhile and in the spring of '61 I started working for the State of Wisconsin on a highway marking crew. In August of '62 I transferred my state employment to the Department of Natural Resources as a Communications Technician with the Bureau of Engineering. Along with the long 'title' came a demanding, but varied vocation, involving everything from a basic magneto (open wire) telephone system, to the present-day, modern, solid state electronics products found in today's 2-way f.m. radio systems.

P.O. Box 73, Rochelle Park, N.J. 07662

Mateiro, CT1TZ, and Tom, K9GTQ, taken at QTH of Dorothy, WB9RCY.

My present service territory covers the Wisconsin counties of Iron, Price, Taylor, Marathon, Lincoln, Oneida, Vilas, Florence, Forest, Langlade, Menominee, and Shawano.

"I was first licensed as KN9GTQ in June 1961. I later got Ray, W9RHT, to help me, and I passed the Conditional License test. I was later 'Grandfathered' to General, and passed the Advanced test in September '78.

"I married my YL, Jolene, in August '62 and we moved into our 'shack' the same month I began my present job. Following a couple of apartment moves, we designed, built, and moved into our present 'shack' in November 1967.

"I began County Hunting in May of 1968 on 3.943 CHC Net, 3.925 ICHN, and among other things won a trophy for over 1000 hours as Net Control on 3.943. I had over 1600 hours logged when I got the trophy, #3 and #1 to an OM.

"My first County Hunter eyeball was with Tip, W4QBM/9 (aka, WB9BAD) in Marathon County, Wisconsin. He and I made several trips around northern Wisconsin putting out counties, where I worked my first DX from a mobile who was Cleto, I1RCD.

"Another extensive trip was in Minnesota with Dick, WA0DCQ. We broke a fan belt, got a parking ticket in a state campground, and blew power supply transistors just following our last county run, so we called the trip 'successful'!

"If I tried to list all the helping hams met enroute to working 'em *All*, I'd surely leave out someone. Instead I acknowledge all the help I got from the net operators on 3.925, 3.943, and 14336.

"Becoming a Charter Member of MARAC (C 75) at Knoxville, TN in 1970, mobile trips, the maxi-conventions, the mini-conventions (especially the 5th Midwest at Wausau), and the impromptu eyeballs (wherever and whenever they happened) are all cherished memories of County Hunting.

"The most anxious half hour was getting that 'last one.' Charlie, CT1BY, riding with Dorothy, WB9RCY, and Wayne, N9WA, was 5 by 9 when I realized how close they were to Thurston and Wayne counties in Nebraska. I asked, and Dorothy responded that they were only about 30 miles away, and yes, they'd go get it for me.

"They broke the net from the county line and I couldn't hear them! With much difficulty a 2 by 2 was heard and QSL'd by Charlie. A bit of County Hunting history was made at 2100Z on the 15th of July 1979, as that contact was not only my last one, but was also the first time a DX operator gave out a last county to finish USA-CA for a stateside operator while mobile in this

Paul, WA6CPP, answering some of his mail.

Star View Systems

H & R COMMUNICATIONS, INC.

Route 3, Box 103G - Pocahontas, Arkansas 72455

Introduces the

MODEL 12K SYSTEM . . .

A complete home satellite receiving system that you can assemble yourself as a week-end project.

Why spend $7,000 to $10,000. Why pay someone else to install it. Do it yourself in a week-end and save.

ONLY **$3,795.00**

UPS SHIPPABLE

50 Channels

KIT CONTAINS

- 12′ Antenna
- AZ/EL Mount
- 24 Channel Receiver
- 120° LNA
- Feed Horn
- All Miscellaneous Cable and Connectors Needed
- Everything You Need
- No Special Tools Needed
- Complete Antenna Weight Only 125 Pounds

See Your Local Star View Dealer or Call

800-643-0102 or 501-647-2291

Dealer Inquiries Invited

CIRCLE 131 ON READER SERVICE COUPON

country! Five days later enroute to an eyeball with him, Charlie also gave me my last Wisconsin county (Jackson) on 20 meters!

"I'll be found on 3.943 and 14336 working contacts for my pet projects and endorsements, and net operations permitting, will run USA-CA All #250 and Lincoln County, Wisconsin.

"When I'm not operating, I'll be monitoring and doing MRC's/QSLing for CT1TZ, CT1RTA, and F5FJ via the W6CCM Bureau!

"Speaking of CT1TZ, Mat became a proud papa October 10, 1980, and thus his haming will be cut some due to the new arrival, Justion Miguel.

"I've been very busy with a new 2 meter repeater on 146.13/73. I am owner/sponsor/technical committee, et al, and having much fun with it. All the updates will probably keep me busy for another year."

Ingmar Larsson, SM5-3583, USA-CA-500 #1573 finally after 15 years and 5 receivers!

Awards Issued

"Orv" Johnson, VE3BFJ, waited until he had them All and acquired USA-CA-500 through All Counties endorsed All S.S.B., All 20, All Mobiles.

"Rundy" Rundlett, K4ZA, after many many interruptions, sent for USA-CA-1000 through All Counties endorsed All S.S.B. He had received USA-CA-500 in October 1965. I had the good fortune to work Rundy back in August 1958 when he was signing W3ZA/3W in Vietnam, which was very rare at that time.

John Alexander, W8GZF, added USA-CA-2500 to his nice collection.

Paul Hultquist, WB0SEQ, claimed USA-CA-500 through USA-CA-2500.

Dean Cowden, W0CJG, also added USA-CA-2500 to his nice collection.

"Red" Robert, W5VGF/6, requested USA-CA-1500 endorsed All A-1.

John Kray, KA2CNG, obtained USA-CA-1000 endorsed Mixed.

Bill Aab, WB1BZQ, applied for USA-CA-500 and 1000 endorsed All S.S.B.

Dean Streetman, W4DGX, gained USA-CA-1000 endorsed Mixed.

Dietmar Knorr, DL7OK, won USA-CA-1000 endorsed All S.S.B.

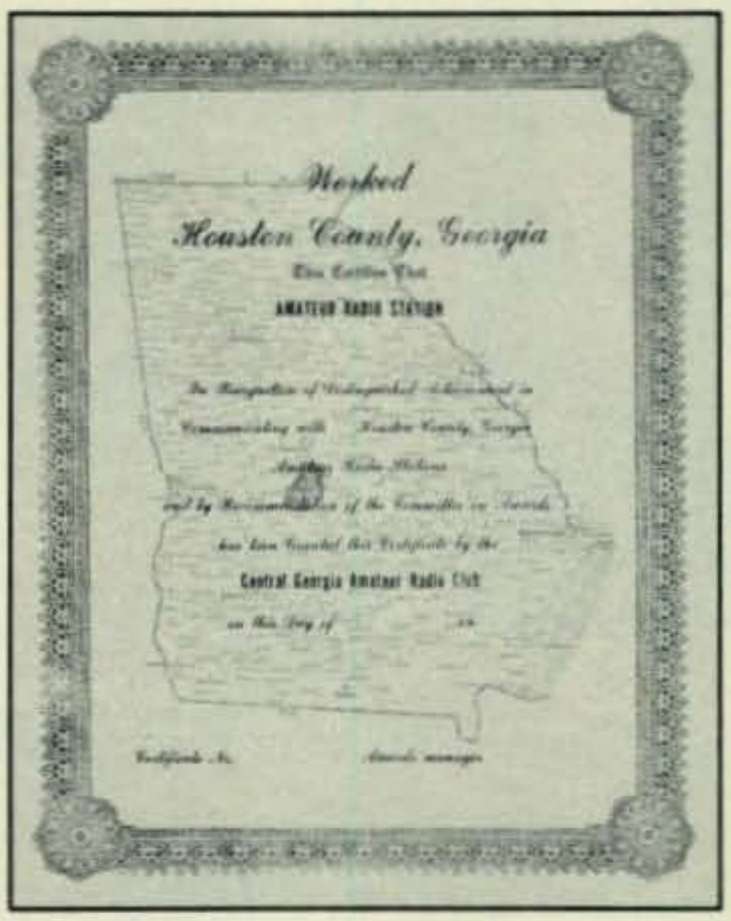
Special Honor Roll
All Counties

#310 Orville Johnson, VE3BFJ 1-8-81.
#311 Lyman M. Bundlett, K4ZA 1-31-81.

USA-CA-500 Certificates, endorsed All A-1, go to:
Kazuo Kawano, JA1ILN.
Don Olofsson, SM5ACQ.

USA-CA-500 Certificates, endorsed Mixed, go to:
Kuno Huber, DL1BS.
Lloyd Brown, W0CON.
HerbertSchastok,I1UNO(DL1AZ). Herb is connected with the UN.
Mario Bosetti, IN3BRM.
The Nagoya University Radio Club, JA2YKA.
Ingmar Larsson, SM5-3583 (#1 to SWL in Sweden).

USA-CA-500 Certificates, endorsed All S.S.B. owed to:
Fredy Gabba, I1HAG.
Hans-Christian Schuett, DL9XN.
Stephen Cole, GW4BLE (#3 Award to Wales).



The Worked Houston County Georgia Award.

Awards

The Worked Houston County Georgia Award: This new Award is sponsored by the Central Georgia Amateur Radio Club of Warner Robins, Georgia.

1. U.S. stations are required to contact five (5) amateur stations in Houston County. Stations in Houston County need ten (10) contacts with other amateur stations in Houston County.

2. DX stations are required to contact three (3) amateur stations in Houston County, Georgia.

3. Contacts must be made February 14, 1981 or later and on the 10 through 160 meter amateur bands. Endorsements for single band, single mode, etc., will be honored on request.

4. Fee for the award is $1.00 plus two (2) first class stamps for U.S. stations. DX stations please send four (4) IRCs.

5. Send fee and list of claimed contacts (no QSL cards) with complete log information to: Awards Manager, Manuel Matta, WD4ENO, 619 American Boulevard, Warner Robins, Georgia 31093, U.S.A. (Thanks to Dennis, WD4DVZ, for the information.)

Upper Chesapeake Bay Award.

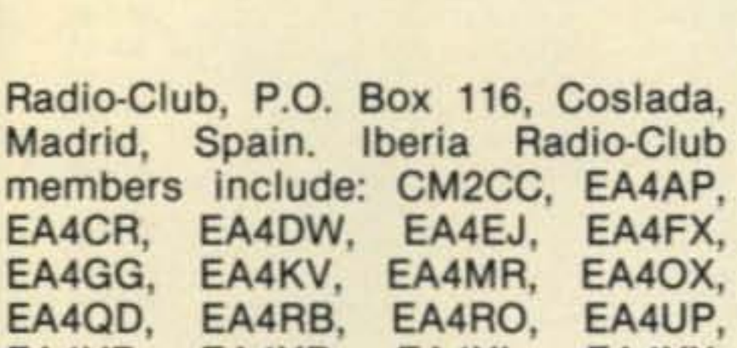
Upper Chesapeake Bay Award: Available to any regular licensed radio amateur operating in authorized amateur bands for two way radio exchange of *call sign* and *signal report* with a member of the Chesapeake Bay Radio Association. DX stations (any stations outside the contiguous 48 states) need three contacts. HF stations within the 48 need five contacts. VHF & UHF stations (50 MHz and up) need ten contacts. Send log data including station called, date, time (UTC/GMT/Z), frequency, and $1.00 (free to DX). Send to: Chesapeake Bay Radio Association, Inc., P.O. Box 357, Perryville, Maryland 21903. (Thanks to Louis, W3IHT, for this data.)

Iberia Award: The Iberia Radio-Club of Iberia Airlines of Spain is pleased to offer this Award to licensed amateurs (and SWLs) anywhere in the world. Required: Confirmed 14 two-way c.w., s.s.b., a.m., f.m., RTTY, or SSTV contacts with 14 stations to form the phrase *Iberia Airlines* with the last letter of the call sign (i.e., FA4XI for the letter "I"; W3YB for "B"; etc.). The 14 stations should be in 14 different countries (ARRL) and one or more should be Spanish stations. All Iberia Radio-Club members may be worked and used for *any one* of the 14 letters. For VHF/UHF the QSOs may be in one country. Contacts after January 1, 1979 are valid. Decisions of the Iberia *Radio-Club about interpretation of the* rules shall be final. Send log data certified by your radio club, your own QSL, and $2.00 or 5 IRCs to: Iberia

USA-CA Honor Roll

3000		1500		500	
VE3BFJ	335	VE3BFJ	509	VE3BFJ	1561
K4ZA	336	WB0SEQ	510	JA1ILN	1562
		W5VGF/6	511	WB0SEQ	1563
2500		K4ZA	512	DL1BS	1564
VE3BFJ	396			W0CON	1565
W8GZF	397			WB1BZQ	1566
WB0SEQ	398	**1000**		I1HAG	1567
W0CJG	399	VE3BFJ	645	I1UNO	1568
K4ZA	400	KA2CNG	646	SM5ACQ	1569
		WB0SEQ	647	IN3BRN	1570
2000		WB1BZQ	648	JA2YKA	1571
VE3BFJ	450	W4DGX	649	DL9XN	1572
WB0SEQ	451	DL7OK	650	SM5-3583	1573
K4ZA	452	K4ZA	651	GW4BLE	1574

Radio-Club, P.O. Box 116, Coslada, Madrid, Spain. Iberia Radio-Club members include: CM2CC, EA4AP, EA4CR, EA4DW, EA4EJ, EA4FX, EA4GG, EA4KV, EA4MR, EA4OX, EA4QD, EA4RB, EA4RO, EA4UP, EA4VP, EA4YB, EA4YL, EA4YX, EA4ZP, EA4AHB, EA4AID, EA4AAE, EA4AOF, EA4AGH, EA4AJO, EA4ABT, EA4AJT, EA4AFX, EA4AFY, EA4AGY, EA4AIZ, EA5PX, EA5QO, EA6HV, EA7AZ, EA8FN, EA8KL, EA8NJ, EA8UT, EC2AW, OA4AV, and TI2IRE.



The 100 CCXX Award.

The 100 CCXX Award: This Award is issued by "220 Notes" (a Chicago-area VHF newsletter) to promote activity on 220 MHz and prove that there are, indeed, hams on that band. Rules are quite simple: Make 100 contacts, via repeater or simplex, on 220 and record the station, operator's name, repeater used (if any), and date/time. Log sheets provided by "220 Notes" make it very easy. Request log sheets *(send S.A.S.E.) from* 100 CCXX Administrator, Greg Pietrucha, WB9SNZ, 2216 N. Kildare, Chicago, Illinois 60639. The cost of the Award is the usual $1.00. (What does 100 CCXX mean? Well, 100 is obvious, and CCXX is 220 in the Roman numerals we've all forgotten. Hi!) Thanks to Julian, W9IWI, Editor, "220 Notes," for this information.

The Swiss Bear Award: This Award is sponsored by The New Bern Amateur Radio Club and will be issued for working 3 different amateur stations in the New Bern area within the period of October 23, 1980 and October 23, 1981. Extracts from logs for QSOs during this period, along with an s.a.s.e. or in the case of DX stations, two IRCs, should be sent to: New Bern Amateur Radio Club, Inc., P.O. Box 2483, New Bern, NC 28560. (The Black Bear is the symbol of both Berne, Switzerland and New Bern, North Carolina. New Bern, the first capital of North Carolina, was settled in 1710 by Baron Christopher DeGraffenreid of Berne, Switzerland.) Thanks to Welma, K4RYJ, for this information.

The Swiss Bear Award.

Notes

An error sneaked into my data on *The Amateur Awards Directory Of The World*. The cost is $7.50 or 30 IRCs to Garry V. Hammond, VE3GCO, 5 McLaren Avenue, Listowel, Ontario, Canada N4W 3K1.

Mail continues to come asking about the Awards Directory that K6BX (now deceased) used to sell. Finally I have news. By the time you read this, Vance LePierre, W5IJU, 2618 McGregor Blvd., Fernandina Beach, Florida 32034, will have *The International Awards Directory* for sale at $8.00. He plans to update it every 6 months and will inform each person who has ordered the original.

Paul Schuett, WA6CPP, (All Counties #299) has taken over some of the Awards that were issued by K6BX, and with the help of K6YK they hope that some reliable clubs will be willing to take over some of the many State Awards. Paul also has the CHC records (of K6BX), and while the supply lasts, he will gladly issue CHC's 10-K & 20-K Awards for log data & S.A.S.E., no money required.

Sad to report the passing of Bill Wallace, K7JJ, All Counties #273.

Two items of interest left out of Tom, K9GTQ's, story are:

1. When All Counties #200 was issued, he remarked to his interested family, "I'll probably get #250."
2. If you look on page 934 of the '81 Callbook, you will find Tom listed as #1 atop that page.

Now available from B & B Shop, 1348 Pinewood Dr., Woodbury, MN 55125:

1. The County Hunter's log sheets—100 for $5.25 or 500 for $15.00.
2. The 3rd Edition of the County Hunter Directory at $5.00.
3. The 7th Edition of the County Hunters Handbook at $2.50.
4. County Hunter Reply Cards at 500/$8.75, 1000/$17.25, etc.

How was your month?

73, Ed, W2GT

MHz electronics

Toll Free Number
800-528-0180
(For orders only)

1900 MHz to 2500 MHz DOWN CONVERTER
This receiver is tunable a range of 1900 to 2500 mc and is intended for amateur radio use. The local oscillator is voltage controlled (i.e) making the i-f range approximately 54 to 88 mc (Channels 2 to 7).

PC BOARD WITH DATA	$19.99
PC BOARD WITH CHIP CAPACITORS 13	$44.99
PC BOARD WITH ALL PARTS FOR ASSEMBLY	$69.99
PC BOARD WITH ALL PARTS FOR ASSEMBLY PLUS 2N6603	$89.99
PC BOARD ASSEMBLED AND TESTED	$99.99
PC BOARD WITH ALL PARTS FOR ASSEMBLY, POWER SUPPLY AND ANTENNA	$159.99
POWER SUPPLY ASSEMBLED AND TESTED	$49.99
YAGI ANTENNA 4' LONG APPROX. 20 TO 23 dB GAIN	$59.99
YAGI ANTENNA 4' WITH TYPE (N, BNC, SMA Connector)	$64.99
2300 MHz DOWN CONVERTER	
Includes converter mounted in antenna, power supply, Plus 90 DAY WARRANTY	$259.99
OPTION #1 MRF902 in front end. (7 dB noise figure)	$299.99
OPTION #2 2N6603 in front end. (5 dB noise figure)	$359.99
2300 MHz DOWN CONVERTER ONLY	
10 dB Noise Figure 23 dB gain in box with N conn. Input F conn. Output	$149.99
7 dB Noise Figure 23 dB gain in box with N conn. Input F conn. Output	$169.99
5 dB Noise Figure 23 dB gain in box with SMA conn. Input F conn. Output	$189 99
PC BOARD FOR 5 dB UNIT WITH DATA	$35.00
PC BOARD FOR 5 dB UNIT WITH ALL PARTS FOR ASSEMBLY	$139.99
DATA IS INCLUDED WITH KITS OR MAY BE PURCHASED SEPARATELY	$15.00

Shipping and Handling Cost:
Receiver Kits and $1.50, Power Supply add $2.00, Antenna add $5.00, Option 1/2 add $3.00, For complete system add $7.50.

HOWARD/COLEMAN TVRO CIRCUIT BOARDS

DUAL CONVERSION BOARD $25.00
This board provides conversion from the 3.7-4.2 band first to 900 MHz where gain and bandpass filtering are provided and, second, to 70 MHz. The board contains both local oscillators, one fixed and the other variable, and the second mixer. Construction is greatly simplified by the use of Hybrid IC amplifiers for the gain stages. Bare boards cost $25 and it is estimated that parts for construction will cost $270. (Note: The two Avantek VTO's account for $225 of this cost.)

47 pF CHIP CAPACITORS $6.00
For use with dual conversion board. Consists of 6-47 pF.

70 MHz IF BOARD $25.00
This circuit provides about 43 dB gain with 50 ohm input and output impedance. It is designed to drive the HOWARD/COLEMAN TVRO Demodulator. The on-board band pass filter can be tuned for bandwidths between 20 and 35 MHz with a passband ripple of less than ½ dB. Hybrid ICs are used for the gain stages. Bare boards cost $25. It is estimated that parts for construction will cost less than $40.

.01 pF CHIP CAPACITORS $7.00
For use with 70 MHz IF Board. Consists of 7-.01 pF.

DEMODULATOR BOARD $40.00
This circuit takes the 70 MHz center frequency satellite TV signals in the 10 to 200 millivolt range, detects them using a phase locked loop, deemphasizes and filters the result and amplifies the result to produce standard NTSC video. Other outputs include the audio subcarrier, a DC voltage proportional to the strength of the 70 MHz signal, and AFC voltage centered at about 2 volts DC. The bare board cost $40 and total parts cost less than $30.

SINGLE AUDIO $15.00
This circuit recovers the audio signals from the 6.8 MHz frequency. The Miller 9051 coils are tuned to pass the 6.8 MHz subcarrier and the Miller 9052 coil tunes for recovery of the audio.

DUAL AUDIO $25.00
Duplicate of the single audio but also covers the 6.2 range.

DC CONTROL $15.00
This circuit controls the VTO's, AFC and the S Meter.

TERMS:
WE REGRET WE NO LONGER ACCEPT BANK CARDS.

PLEASE SEND POSTAL MONEY ORDER, CERTIFIED CHECK, CASHIER'S CHECK OR MONEY ORDER.
PRICES SUBJECT TO CHANGE WITHOUT NOTICE. ALL RETURNS ON ORDERS SUBJECT TO PRIOR APPROVAL BY MANAGEMENT.
ALL CHECKS AND MONEY ORDERS IN US FUNDS ONLY.

ALL ORDERS SENT FIRST CLASS OR UPS.

ALL PARTS PRIME AND GUARANTEED.

WE WILL ACCEPT COD ORDERS FOR $25.00 OR OVER, ADD $2.50 FOR COD CHARGE.

PLEASE INCLUDE $2.50 MINIMUM FOR SHIPPING OR CALL FOR CHARGES.

WE ALSO ARE LOOKING FOR NEW AND USED TUBES, TEST EQUIPMENT, COMPONENETS ETC.

WE ALSO SWAP OR TRADE.

FOR CATALOG SEE JANUARY, 1980, *73* Magazine, 10 Pages.

(602) 242-8916
2111 W. Camelback
Phoenix, Arizona 85015

CIRCLE 80 ON READER SERVICE CARD

MHz electronics

Toll Free Number
800-528-0180
(For orders only)

FAIRCHILD VHF AND UHF PRESCALER CHIPS

95H90DC	350 MHz Prescaler Divide by 10/11	$9.50
95H91DC	350 MHz Prescaler Divide by 5/6	9.50
11C90DC	650 MHz Prescaler Divide by 10/11	16.50
11C91DC	650 MHz Prescaler Divide by 5/6	16.50
11C83DC	1 GHz Divide by 248/256 Prescaler	29.90
11C70DC	600 MHz Flip/Flop with reset	12.30
11C58DC	ECL VCM	4.53
11C44DC/MC4044	Phase Frequency Detector	3.82
11C24DC/MC4024	Dual TTL VCM	3.82
11C06DC	UHF Prescaler 750 MHz D Type Flip/Flop	12.30
11C05DC	1 GHz Counter Divide by 4	50.00
11C01FC	High Speed Dual 5-4 input NO/NOR Gate	15.40

MUFFIN FANS

Size 4.68" × 4.68" × 1.50" — $8.99

TRW BROADBAND AMPLIFIER MODEL CA615B

Frequency response 40 MHz to 300 MHz
Gain: 300 MHz 16 dB Min., 17.5 dB Max.
50 MHz 0 to − 1 dB from 300 MHz
Voltage: 24 volts dc at 220 ma max. — $19.99

CARBIDE — CIRCUIT BOARD DRILL BITS FOR PC BOARDS

Size: 35, 42, 47, 49, 51, 52	$2.15
Size: 53, 54, 55, 56, 57, 58, 59, 61, 63, 64, 65	1.85
Size: 66	1.90
Size: 1.25 mm, 1.45 mm	2.00
Size: 3.20 mm	3.58

CRYSTAL FILTERS: TYCO 001-19880 same as 2194F

10.7 MHz Narrow Band Crystal Filter
3 dB bandwidth 15 kHz min. 20 dB bandwidth 60 kHz min. 40 dB bandwidth 150 kHz min.
Ultimate 50 dB: Insertion loss 1.0 dB max. Ripple 1.0 dB max. Ct. 0 + / − 5 pf 3600 ohms. — $5.95

MURATA CERAMIC FILTERS

Models: SFD-455D 455 kHz	$3.00
SFB-455D 455 kHz	2.00
CFM-455E 455 kHz	7.95
SFE-10.7 10.7 MHz	5.95

TEST EQUIPMENT — HEWLETT PACKARD — TEKTRONIX — ETC.

Hewlett Packard:

491C	TWT Amplifier 2 to 4 Gc 1 watt 30 dB gain	$1150.00
608C	10 mc to 480 mc .1 uV to.5V into 50 ohms Signal Generator	500.00
608D	10 to 420 mc .1 uV to.5V into 50 ohms Signal Generator	500.00
612A	450 to 1230 mc .1 uV to .5V into 50 ohms Signal Generator	750.00
614A	900 to 2100 mc. Signal Generator	500.00
616A	1.8 to 4.2 Gc Signal Generator	400.00
616B	1.8 to 4.2 Gc Signal Generator	500.00
618A	3.8 to 7.2 Gc Signal Generator	400.00
618B	3.8 to 7.2 Gc Signal Generator	500.00
620A	7 to 11 Gc Signal Generator	500.00
623B	Microwave Test Set	900.00
626A	10 Gc to 15 Gc Signal Generator	2500.00
695A	12.4 to 18 Gc Sweep Generator	900.00

Alltech:

473	225 to 400 mc AM/FM Signal Generator	750.00

Singer:

MF5/VR-4	Universal Spectrum Analyzer with 1 kHz to 27.5 mc Plug In	1200.00

Keltek:

XR630-100	TWT Amplifier 8 to 12.4 Gc 100 watts 40 dB gain	9200.00

Polarad:
2038/2436/1102A
Calibrated Display with an SSB Analysis Module and a 10 to 40 mc Single Tone Synthesizer — 1500.00

RF TRANSISTORS

TYPE	PRICE	TYPE	PRICE	TYPE	PRICE
2N1561	$15.00	2N5590	$8.15	MM1550	$10.00
2N1562	15.00	2N5591	11.85	MM1552	50.00
2N1692	15.00	2N5637	22.15	MM1553	56.50
2N1693	15.00	2N5641	6.00	MM1601	5.50
2N2632	45.00	2N5642	10.05	MM1602/2N5842	7.50
2N2857JAN	2.52	2N5643	15.82	MM1607	8.65
2N2876	12.35	2N6545	12.38	MM1661	15.00
2N2880	25.00	2N5764	27.00	MM1669	17.50
2N2927	7.00	2N5842	8.78	MM1943	3.00
2N2947	18.35	2N5849	21.29	MM2605	3.00
2N2948	15.50	2N5862	51.91	MM2608	5.00
2N2949	3.90	2N5913	3.25	MM8006	2.23
2N2950	5.00	2N5922	10.00	MMCM918	20.00
2N3287	4.30	2N5942	46.00	MMT72	1.17
2N3294	1.15	2N5944	8.92	MMT74	1.17
2N3301	1.04	2N5945	12.38	MMT2857	2.63
2N3302	1.05	2N5946	14.69	MRF237	2.95
2N3304	1.48	2N6080	7.74	MRF245	33.30
2N3307	12.60	2N6081	10.05	MRF247	33.30
2N3309	3.90	2N6082	11.30	MRF304	43.45
2N3375	9.32	2N6083	13.23	MRF420	20.00
2N3553	1.57	2N6084	14.66	MRF421	31.38
2N3755	7.20	2N6094	7.15	MRF422	44.14
2N3818	6.00	2N6095	11.77	MRF426	10.24
2N3866	1.09	2N6096	20.77	MRF450	11.85
2N3866JAN	2.80	2N6097	29.54	MRF450A	11.85
2N3866JANTX	4.49	2N6136	20.15	MRF454	21.83
2N3924	3.34	2N6166	38.60	MRF458	20.68
2N3927	12.10	2N6439	45.77	MRF472	2.50
2N3950	26.86	2N6459/PT9795	18.00	MRF502	1.08
2N4072	1.80	2N6603	12.00	MRF504	6.95
2N4135	2.00	2N6604	12.00	MRF509	4.90
2N4261	14.60	A50-12	25.00	MRF511	8.15
2N4427	1.20	BFR90	5.00	MRF901	5.00
2N4957	3.62	BLY568C	25.00	MRF5177	21.62
2N4958	2.92	BLY568CF	25.00	MRF8004	1.60
2N4959	2.23	CD3495	15.00	PT4186B	3.00
2N4976	19.00	HEP76/S3014	4.95	PT4571A	1.50
2N5090	12.31	HEPS3002	11.30	PT4612	5.00
2N5108	4.03	HEPS3003	29.88	PT4628	5.00
2N5109	1.66	HEPS3005	9.95	PT4640	5.00
2N5160	3.49	HEPS3006	19.90	PT8659	10.72
2N5179	1.05	HEPS3007	24.95	PT9784	24.30
2N5184	2.00	HEPS3010	11.34	PT9790	41.70
2N5216	47.50	HEPS5026	2.56	SD1043	5.00
2N5583	4.55	HP35831E/		SD1116	3.00
2N5589	6.82	HXTR5104	50.00	SD1118	5.00
		MM1500	32.20	SD1119	3.00
				TRWMRA2023-1.5	42.50
				40281	10.90
				40282	11.90
				40290	2.48

We can supply any value chip capacitors you may need.

PRICES

1 to 10	$1.49
11 - 50	1.29
51 - 100	.89
101 - 1,000	.69
1,001 up	.49

CHIP CAPACITORS

1pf	27pf	220pf	1200pf
1.5pf	33pf	240pf	1500pf
2.2pf	39pf	270pf	1800pf
2.7pf	47pf	300pf	2200pf
3.3pf	56pf	330pf	2700pf
3.9pf	68pf	360pf	3300pf
4.7pf	82pf	390pf	3900pf
5.6pf	100pf	430pf	4700pf
6.8pf	110pf	470pf	5600pf
8.2pf	120pf	510pf	6800pf
10pf	130pf	560pf	8200pf
12pf	150pf	620pf	.010mf
15pf	160pf	680pf	.012mf
18pf	180pf	820pf	.015mf
22pf	200pf	1000pf	.018mf

HAMLIN SOLID STATE RELAYS:

120vac at 40 Amps.
Input Voltage 3 to 32vdc.
240 vac at 40 Amps.
Input Voltage 3 to 32 vdc.

YOUR CHOICE $4.99

ATLAS CRYSTAL FILTERS FOR ATLAS HAM GEAR

5.52-2.7/8
5.595-2.7/8/U
5.595-.500/4/CW
5.595-2.7LSB
5.595-2.7USB
5.645-2.7/8
9.0USB/CW

YOUR CHOICE $24.95

See Us At Dayton

CIRCLE 87 ON READER SERVICE COUPON

MICROWAVE COMPONENTS

ARRA

2416	Variable Attenuator	$ 50.00
3614-60	Variable Attenuator 0 to 60dB	75.00
KU520A	Variable Attenuator 18 to 26.5 GHz	100.00
4684-20C	Variable Attenuator 0 to 180dB	100.00
6684-20F	Variable Attenuator 0 to 180dB	100.00

General Microwave

Directional Coupler 2 to 4GHz 20dB Type N		75.00

Hewlett Packard

H487B	100 ohms Neg. Thermistor Mount (NEW)	150.00
H487B	100 ohms Neg. Thermistor Mount (USED)	100.00
477B	200 ohms Neg. Thermistor Mount (USED)	100.00
X487A	100 ohms Neg. Thermistor Mount (USED)	100.00
X487B	100 ohms Neg. Thermistor Mount (USED)	125.00
J468A	100 ohms Neg. Thermistor Mount (USED)	150.00
478A	200 ohms Neg. Thermistor Mount (USED)	150.00
J382	5.85 to 8.2 GHz Variable Attenuator 0 to 50dB	250.00
X382A	8.2 to 12.4 GHz Variable Attenuator 0 to 50dB	250.00
NK292A	Waveguide Adapter	65.00
8436A	Bandpass Filter 8 to 12.4 GHz	75.00
8471A	RF Detector	50.00
H532A	7.05 to 10 GHz Frequency Meter	300.00
G532A	3.95 to 5.85 GHz Frequency Meter	300.00
J532A	5.85 to 8.2 GHz Frequency Meter	300.00
809A	Carriage with a 444A Slotted Line Untuned Detector Probe and 809B Coaxial Slotted Section 2.6 to 18 GHz	175.00
X347A	8.2 to 12.4 GHz Noise Source	500.00
S347A	2.6 to 3.95 GHz Noise Source	600.00
G347A	3.95 to 5.85 GHz Noise Source	500.00
J347A	5.85 to 8.2 GHz Noise Source	500.00
H347A	7.05 to 10 GHz Noise Source	540.00
349A	400 to 4000 MHz Noise Source	310.00
P532A	12.4 to 18 GHz Frequency Meter	400.00
M532A	Frequency Meter	500.00
P382A	0-50dB Attenuator	520.00
355C	.5 watts 50 DC to 1000 Mc Attenuator	132.50
NK292A	Adapter	100.00
3503	Microwave Switch	100.00
33001C	PIN Absorption Modulator	295.00
11660A	Tracking Generator Shunt	50.00
11048C	Feed Thru Termination	25.00
10100B	Feed Thru Termination	25.00
H421A	7.05 to 10 GHz Crystal Detector	75.00
H421A	7.05 to 10 GHz Crystal Detector Matched Pair	200.00

Merrimac

AU-26A/	801162 Variable Attenuator	100.00

Microlab/FXR

X638S	Horn 8.2 - 12.4 GHz	60.00
601-818	X to N Adapter 8.2 - 12.4 GHz	35.00
Y610D	Coupler	75.00

Narda

4013C-10/	22540A Directional Coupler 2 to 4 GHz 10db Type SMA	90.00
4014-10/	22538 Directional Coupler 3.85 to 8 GHz 10dB Type SMA	90.00
4014C-6/	22876 Directional Coupler 3.85 to 8 GHz 6dB Type SMA	90.00
4015C-10/	22539 Directional Coupler 7.4 to 12 GHz 10dB Type SMA	95.00
4015C-30/	23105 Directional Coupler 7 to 12.4 GHz 30dB Type SMA	95.00
3044-20	Directional Coupler 4 to 8 GHz 20dB Type N	125.00
3040-20	Direcitonal Coupler 240 to 500 MC 20dB Type N	125.00
3043-20/	22006 Directional Coupler 1.7 to 4 GHz 20dB Type N	125.00
3003-10/	22011 Directional Coupler 2 to 4 GHz 10dB Type N	75.00
3003-30/	22012 Directional Coupler 2 to 4 GHz 30dB Type N	75.00
3043-30/	22007 Directional Coupler 1.7 to 3.5 GHz 30dB Type N	125.00
22574	Directional Coupler 2 to 4 GHz 10dB Type N	125.00
3033	Coaxial Hybrid 2 to 4 GHz 3dB Type N	125.00
3032	Coaxial Hybrid 950 to 2 GHz 3 dB Type N	125.00
784/	22380 Variable Attenuator 1 to 90dB 2 to 2.5 GHz Type SMA	550.00
22377	Waveguide to Type N Adapter	35.00
720-6	Fixed Attenuator 8.2 to 14.4 GHz 6 dB	50.00
3503	Waveguide	25.00

PRD

U101	12.4 to 18 GHz Variable Attenuator 0 to 60dB	300.00
X101	8.2 to 12.4 GHz Variable Attenuator 0 to 60dB	200.00
C101	Variable Attenuator 0 to 60dB	200.00
205A/367	Slotted Line with Type N Adapter	100.00
195B	8.2 to 12.4 GHz Variable Attenuator 0 to 50dB	100.00
185BS1	7.05 to 10 GHz Variable Attenuator 0 to 40dB	100.00
196C	8.2 to 12.4 GHz Variable Attenuator 0 to 45dB	100.00
170B	3.95 to 5.85 GHz Variable Attenuator 0 to 45dB	100.00
588A	Frequency Meter 5.3 to 6.7 GHz	100.00
140A,C,D,E	Fixed Attenuators	25.00
109J,1	Fixed Attenuators	25.00
WEINSCHEL ENG.	2692 Variable Attenuator +30 to 60dB	100.00

COMPUTER I.C. SPECIALS

MEMORY	DESCRIPTION	PRICE
2708	1K x 8 EPROM	$ 5.00
2716/2516	2K x 8 EPROM 5Volt Single Supply	15.00
2114/9114	1K x 4 Static RAM 450ns	6.99
2114L2	1K x 4 Static RAM 250ns	8.99
2114L3	1K x 4 Static RAM 350ns	7.99
4027	4K x 1 Dynamic RAM	2.99
10 For $20.00		
100 For $100.00		
4060/2107	4K x 1 Dynamic RAM	3.99
4050/9050	4K x 1 Dynamic RAM	3.99
2111A-2/8111	256 x 4 Static RAM	3.99
2112A-2	256 x 4 Static RAM	3.99
2115AL-2	1K x 1 Static RAM 55ns	4.99
6104-3/4104	4K x 1 Static RAM 320ns	14.99
7141-2	4K x 1 Static RAM 200ns	14.99
MCM6641L20	4K x 2 Static RAM 200ns	14.99
9131	1K x 1 Static RAM 300ns	10.99

C.P.U.'s ECT.

MC6800L	Microprocessor	13.80
MCM6810AP	128 x 8 Static RAM 450ns	3.99
MCM68A10P	128 x 8 Static RAM 360ns	4.99
MCM68B10P	128 x 8 Static RAM 250ns	5.99
MC6820P	PIA	8.99
MC6820L	PIA	9.99
MC6821P	PIA	8.99
MC68B21P	PIA	9.99
MCM6830L7	Mikbug	14.99
MC6840P	PTM	8.99
MC6845P	CRT Controller	29.50
MC6845L	CRT Controller	33.00
MC6850L	ACIA	10.99
MC6852P	SSDA	5.99
MC6852L	SSDA	11.99
MC6854P	ADLC	22.00
MC6860CJCS	0-600 BPS Modem	29.00
MC6862L	2400 BPS Modem	14.99
MK3850N-3	F8 Microprocessor	9.99
MK3852P	F8 Memory Interface	16.99
MK3852N	F8 Memory Interface	9.99
MK3854N	F8 Direct Memory Access	9.99
8008-1	Microprocessor	4.99
8080A	Microprocessor	8.99
Z80CPU	Microprocessor	14.99
6520	PIA	7.99
6530	Support For 6500 series	15.99
2650	Microprocessor	10.99
TMS1000NL	Four Bit Microprocessor	9.99
TMS4024NC	9 x 64 Digital Storage Buffer (FIFO)	9.99
TMS6011NC	UART	9.99
MC14411	Bit Rate Generator	11.99
AY5-4007D	Four Digit Counter/Display Drivers	8.99
AY5-9200	Repertory Dialler	9.99
AY5-9100	Push Button Telephone Diallers	7.99
AY5-2376	Keyboard Encoder	19.99
AY3-8500	TV Game Chip	5.99
TR1402A	UART	9.99
PR1472B	UART	9.99
PT1482B	UART	9.99
8257	DMA Controller	9.99
8251	Communication Interface	9.99
8228	System Controller & Bus Driver	5.00
8212	8 Bit Input/Output Port	5.00
MC14410CP	2 of 8 Tone Encoder	9.99
MC14412	Low Speed Modem	14.99
MC14408	Binary to Phone Pulse Converter	12.99
MC14409	Binary to Phone Pulse Converter	12.99
MC1488L	RS232 Driver	1.00
MC1489L	RS232 Receiver	1.00
MC1405L	A/D Converter Subsystem	9.00
MC1406L	6 Bit D/A Converter	7.50
MC1408/6/7/8	8 Bit D/A Converter	4.50
MC1330P	Low Level Video Detector	1.50
MC1349/50	Video IF Amplifier	1.17
MC1733L	LM733 OP Amplifier	2.40
LM560	Phase Lock Loop	10.00
LM562	Phase Lock Loop	10.00
LM565	Phase Lock Loop	2.50
LM567	Phase Lock Loop	2.50

MHz electronics

Toll Free Number
800-528-0180
(For orders only)

See Us At Dayton

(602) 242-8916

2111 W. Camelback
Phoenix, Arizona 85015

a monthly feature by
HUGH CASSIDY, WA6AUD

DX

NEWS OF COMMUNICATIONS AROUND THE WORLD

I must go down to the shack again,
For the call of the running list
Is a wild call and a clear call
And I fear that I'll be missed . . .

Sometimes it may be difficult to explain the obvious, especially when a conception of the visible facts varies. Recently we had a QRP type trotting up the hill to question us. This was a newer DXer, one often suspected by the grey-haired DXers as being a bit long on knowledge but short on understanding. We braced ourselves.

"It's this way," the QRPer explained, getting right to the point. "Every time I visit Sam I come away confused. I go seeking DX information and he tells me these strange things. This time he told me that among the really true-blue DXers there are signs and signals only known to them, and that they use these signals to recognize each other and to pass messages and information. Is that true?"

"I dunno,"we mumbled, not exactly truthful, but often a mumble can be subject to interpretations. We had heard a bit about these things, but we also knew that DX looks one way when one is at the hundred-country mark and somewhat different when one has the three-hundred sticker. DXCC is often equated with longevity, and the top DXers are often the old DXers. There has to be a reason for this.

The QRP type was not giving up easily. "If there are such signals, why can't I learn them?" he demanded. "Sam also says that senior citizens have signals that a younger person may see but seldom understands. What's this all about?"

On the matters relating to DXing, the years might teach that mostly it is a movable feast. A DXer with a hundred countries on the wall has yet to know the sad days of longing that come with the Honor Roll plaque. It is then that one learns the patience that comes with waiting for a new one when you have worked most everything going. Then you must sit through the numb days hoping that some of the long silent ones will be heard again. Oh, to hear again an XU or ZA! Or maybe even to hear Maria Theresa again!

77 Coleman Dr., San Rafael, CA 94901

Here is the antenna in the shadow of the lighthouse on Abu Ail. This was the scene of the action for the J2Ø/A activity last year. Note the generators scattered in the foreground. (tnx DJ9ZB)

"Perhaps you're not ready to understand," we mildly suggested, and we had an indignant DXer on our hands. He was bristling. So we had to make a try at explaining, hoping that we could get him off his track by pointing at things on a parallel trace.

"This senior citizen bit," we said, "what did Sam tell you about them?" The solution to our problem was soon evident.

It was a simple story; Sam had advised the QRP type that often one finds the senior types giving signals though they may not be recognized by the uninitiated.

"It's the smile," the QRPer told us. "Sam says that when you see them with a smile turned down at the corners, it's just like they are holding up their hands for recognition. And Sam says that you will most often find that smile on elderly tourists, definitely in those tour groups where most all of them give the signal. And at supermarkets. Sam says you will surely find them flashing their signal when they stand at the check-out stands. Sam says he suspects it is part of a national campaign; they have to get special check-out lines for senior citizens. What do you think about all of that?"

At this point we weren't doing as much thinking as we were doing looking for a route out of the swamps. "Do you really believe all that Sam told you about the senior citizens and their turned-down smiles?" we asked, and the QRPer shrugged.

"I don't know about that," he said. "Mostly I was thinking of what he was saying about those big gun DXers having special signals. But I have seen those senior citizens with their turned-down smiles. Sam says that they get the instructions when they are issued their Golden Discount cards. 'The Golden Card for the golden years,' they say."

The QRPer stopped for a moment and then continued. "Maybe there is something to it. It does sound logical and, come to think of it, down in the city I've seen the tourists, and those older ones all seem to show that smile."

At this point we laid a hand on the arm of the QRPer and looked him straight in the eye. We were not going to talk about the DX signals; only the deserving know about them. But most everyone knows about senior citizens, and in this area one could hardly be doubtful.

"How is it," we asked most earnestly, "that you are ready to believe what Sam told you about the senior types and their turned-down corners smiles but are skeptical about the DXers and their signals? Don't you believe?"

The reply was slow in coming. "Maybe it's that I can understand about the senior citizens," he said, "because I think I've seen the signals. It's those DX signals that boggle me. I never thought that such things existed . . . and why can't I learn the signals?"

We smiled. This one would be downhill all the way. "Maybe you're not yet ready to understand," we said, "and knowledge without understanding is nothing. As one learns to know and recognize the senior citizen signals when one needs to know them, one will also learn to recognize the DX signals. That is when the true understanding will come."

We could see that we were getting our point across; the furrows across the brow of the QRPer were deeper.

The WAZ Program

10 M Phone

107 ..... DL6IQ
108 ..... KE2C
109 ..... WD5HQW
110 ..... DA1QR
111 ..... K7TRG
112 ..... K1RAW
113 ..... W8MTC
114 ..... JA7MGP
115 ..... WD9DEE

15 M Phone

77 ..... JR3CVJ
78 ..... JA1FVE
79 ..... JH4IFF
80 ..... W3AP
81 ..... N6AW

20 M Phone

349 ..... W7GQM

40 M Phone

5 ..... SM4CAN

15 M C.W.

44 ..... W3AP
45 ..... AA4M

20 M C.W.

131 ..... WA7RQS
132 ..... SP7KTE
133 ..... SP8FNA

All Band WAZ

S.S.B.

2122 ..... WD8DXG
2123 ..... K8WD
2124 ..... KA5ASD
2125 ..... WB3CQN
2126 ..... N9AMF
2127 ..... WB4KJZ
2128 ..... WB9HIP
2129 ..... AC0A
2130 ..... WB5OFN
2131 ..... WB2CVL
2132 ..... AK5B
2133 ..... W1HSP
2134 ..... 6W8AR
2135 ..... N4VG
2136 ..... AJ6O
2137 ..... VE3AZU
2138 ..... OE3ALW
2139 ..... WB3JNX
2140 ..... K7RDH
2141 ..... JY5ZM
2142 ..... EA1VG
2143 ..... I1ZQD
2144 ..... EA7TV
2145 ..... DF6EX
2146 ..... DK3EG
2147 ..... DK1IP
2148 ..... W6YVK
2149 ..... SV0BC
2150 ..... AG1K
2151 ..... A9GX
2152 ..... FG0DYM/FS7

C.W. and Phone

5038 ..... JH2JBT
5039 ..... WN4KKN
5040 ..... AJ6V
5041 ..... K4ITV
5042 ..... DL2BM
5043 ..... OH3KL
5044 ..... G3EFS
5045 ..... DL9VR
5046 ..... DK4HD
5047 ..... DJ6SA
5048 ..... HA9RE
5049 ..... N8AQV
5050 ..... JH1MTR
5051 ..... K2FW
5052 ..... N6JM
5053 ..... OH5PT
5054 ..... W7SFF
5055 ..... W0ZD/1
5056 ..... LA9BM
5057 ..... K2BSM
5058 ..... SP9PRO
5059 ..... SP2FWC
5060 ..... KB7KQ
5061 ..... K9TI

Applications and reprints of the latest rules may be obtained by sending a self addressed stamped envelope (30 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the W A Z manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

"Even in this age of enlightenment," we charged onwards, "there are things that one must believe even though they are not understood. And thus it is! The first step in the first lesson in DXing is 'Be a Believer.'"

That did it. The QRPer was soon gone, leaving us to think of how he had shown signs of the knowledge that eventually comes to all true-blue DX-ers. And from this day forward this budding DXer would know that when he saw a senior citizen with the turned-down smile, it was a signal to others and not dyspepsia.

As for the DX signals, they come to all the Deserving. If you are one of these, you have heard the signals. If you have not, believe! Believe, for the DX signals are always heard by the Deserving.

DXCC Rule #12

With action at the January ARRL Board meeting to rush in where the archangels have run up the caution flag, you should know by now that Rule 12 of the DXCC Rules has been changed by adding two new sub-sections. These are:

B. Credit for contacts with individuals who have displayed continued poor operating ethics may be disallowed by action of the ARRL Awards Committee.

C. For (A) and (B) above, operating includes confirmation procedures.

Most of the heat that led to these additions was engendered by a couple of trips to the Pacific to some medium- to low-grade DX spots by an individual who was quite explicit in his QSLing instructions . . . "send money!" Nothing else was considered sufficient to warrant a card. The move towards action was definitely helped by the irritation over this tactic; the fact that some of the operations were not from the desperately needed countries may have helped some make up their minds.

The WPX Program

Mixed

892	YU1DZ	900	EA5ACA
893	WB3DCT	901	WA3FWA
894	JA9NLE	902	WD8KKF
895	KB0FZ	903	KQ4M
896	K0CY	904	HA9RT
897	WB7QEL	905	JA0GCI
898	DK9MC	906	WA1IFS
899	KA1CAN		

S.S.B.

1361	W3NB	1369	JK1GOO
1362	W5LBT	1370	DF1EG
1363	W1JR	1371	WN3KER
1364	KG4KK	1372	VE5ADA
1365	WD9HWY	1373	DM3TYI
1366	WD9DCL	1374	DJ0VW
1367	W1HSP	1375	VK5NVW
1368	JH6JTE	1376	K4CKS

C. W.

2054	VE2PT	2058	JA1AZS
2055	W1JR	2059	VK5NVV
2056	WA6VJP	2060	JA7UFZ
2057	K2QF		

Endorsements

Mixed: 400 WB3DCT, JA9NLE, K0CY, KA1CAN, KQ4M, HA9RT, JA0GCI. 500 DK9MC, WD8KKF, K9BQL. 550 KB8EC, AC6V. 600 EA5ACA, W1HSP. 650 PA0TO, WD9DCL, K2QF, WA2IFS. 700 W6YMH, WB8ZRL, OE1KJW. 800 WB8AAX. 850 YU1DZ, KB0FZ, W2HAZ, KL7AF. 950 VE7DP. 1000 W4BV. 1050 K9BG. 1100 W1JR, KF2O. 1650 W4BQY.

S.S.B: 300 WD9HWY, W1HSP, JH6JTE, DF1EG, VE5ADA, DM3TYI, DJ0VW, VK5NVW. 350 KG4KK, WB9TDR, W5LBT. 400 YU5XAF, HM1SX, WN3KER. 450 W6YMH, WD9DCL, JK1GOO, AG4L, JH5FQO, K4CKS. 500 N0AJZ, W0ULU. 550 W3NB, AC2J. 600 IT9YSW, PA0RRS, WB8ZRL, K8PYD. 700 VK3SM, W1JR, JA3WBK. 900 WD8MGQ.

C.W.: 300 VE2PT, WA6VJP, JA1AZS, VK5NVV, JA7UFZ, 350 KA7T. 400 K4AMC. 450 JA7ARM, WD9DCL, WA2EYA. 500 K2QF, K8PYD. 550 KA3A, WA3GNW. 600 OE1KJW. 650 WB8AAX. 700 KF2O. 750 SM6AYM. 800 K2OLG. 950 W1JR, VE1MF. 1300 W3ARK. 1450 WA2HZR.

10 meters:	K2VV, WN4KKN, I2DMK.
15 meters:	PA0RRS.
20 meters:	WB8YQX.
40 meters:	OE1KJW.
80 meters:	OE1KJW, AE5B, WA3ZMY.
Asia:	N4YB, PA0RRS, HM1SX, DK9MC, KF2O, AE5B, JK1GOO, WA2IFS.
Europe:	WD9IIC, DK9MC, WN4KKN, KB8EC, WA2IFS.
No. America:	PA0RRS, KG4KK.
So. America:	W2HAZ.

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 U.S.A.

5BWAZ #5

Al Hix, W8AH, picked up 5 Band Worked All Zones this last December, this award undoubtedly being one of the real tough ones to corner. Al lives in Charleston, West Virginia, and an examination of his photo in this column shows that he was able to gain 5BWAZ with a station setup that some DXers certainly would consider modest.

Al was originally licensed back in 1936 as W8PQQ and still retains that callsign. A graduate of West Virginia University with a degree in electrical engineering, he worked as a control system design engineer with a major chemical company. A retired Lt. Colonel in the Army Signal Corps, Al also hold a Ist Class Radio Telephone ticket as well as a 2nd Class Radiotelegraph license.

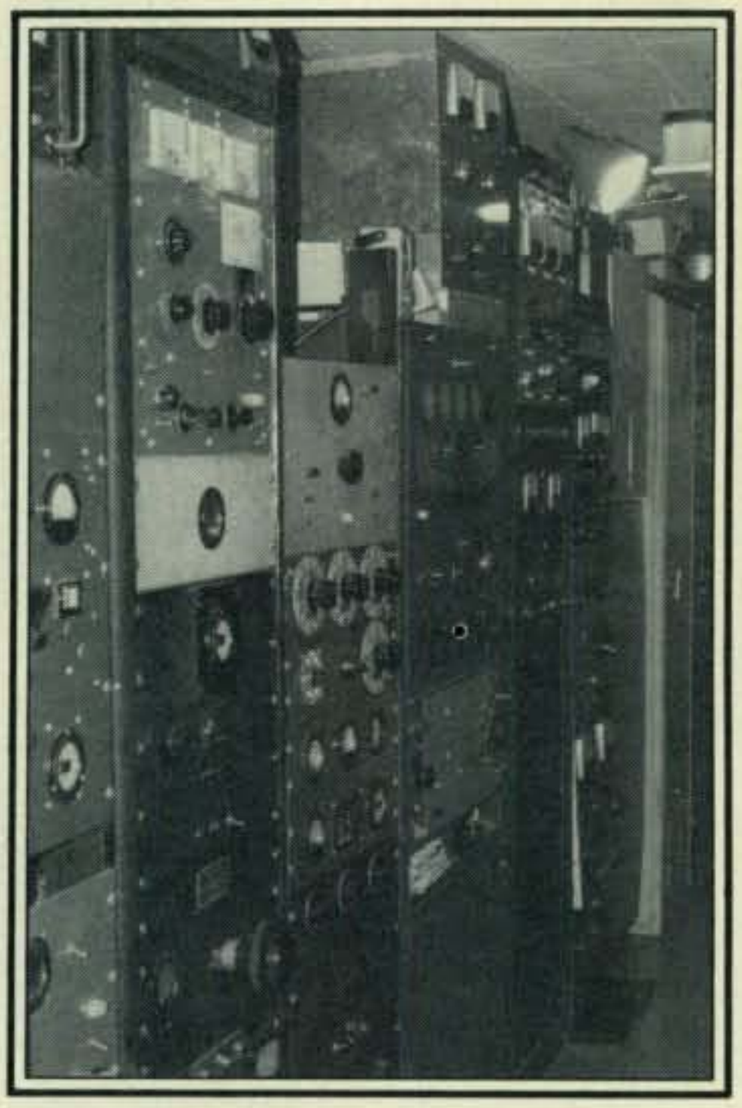
Al works all the bands from 1.8 MHz through 432 MHz, using c.w., s.s.b., Slow-Scan TV, and OSCAR. He has held a number of DX calls including F7AR, PX1AR, 3A2AC, ON8VO, ON8VO/LX, plus a few more. Al holds DXCC No. 17, this coming after WW II when they started DXCC anew, and he shows on the Honor Roll for mixed, s.s.b. and c.w. Al has the first North American plaque for Radio World's "Worked 100 Nations."

In ARRL activities Al has been a mainstay in West Virginia for years, serving as SCM for six years and as Assistant Director for nine years. He did a tour as Army MARS Director for the state of West Virginia and among other things holds 225 amateur awards. He is also President of the West Virginia DX Association.

Antennas? For 1.8 and 3.5 MHz he uses phased HY-Tower verticals. On 7 MHz it is a 4-element KLM Yagi; for 14 MHz it is a 4-element widespaced Telrex Yagi; on 21 MHz he swings a 5-element widespaced Telrex Yagi; and for 10 meters another 5-element widespaced Telrex Yagi. For 6 meters he goes to a 6-element Yagi, and on 2 meters it is two phased 11-element Yagis, 40-element colinear array, and finally, for 432 MHz a 17.3 dB gain crossed Yagi.

After you've worked them all, what do you say? Al says that he considers 5BWAZ the most difficult and the most challenging goal in all of the amateur operations. Considering the work to gain just a single WAZ, one has to agree. It takes a top DXer to achieve 5BWAZ.

Al Hix, W8AH, at the operating position that brought him 5BWAZ #5. Al, an electrical engineer in civilian life, says that he considers the 5BWAZ the most challenging award available to radio amateurs. Al has also signed F7AR, PX1AR, 3A2AC, ON8VO, ON8VO-LX.



The amplifier racks for W8AH. There are KW amplifiers on all bands. Al was the winner of CQ's trophy for being the first W-station to work 300 countries.

Some DX Notes

Alan Leith, VE3FRA, is publishing the "DX Report" in VE-land, the first issue of this bi-weekly DX bulletin having been issued in early February.

A long time editor of the Canadian *Long Skip* (Canad-x) for the society up there, Alan is now independent on his new project. It might be noted that he has been an even longer time DXer. If interested, his address is 10 Fairrington Crescent, St. Catherines L2N 5W3, Canada.

All of this is being mentioned in the belief that the best way to keep up with fast-breaking DX news is through the DX bulletins, all of which have been noted previously and will be noted again before long. You might also check the various information sources such as W6TI at 14002 at 0200 Mondays and Westlink.

Heard. February found most sources of DX information poised and prepared for the expected VK9NS Heard Island operation. Back in March 1954 *CQ* had an extensive article on the Australian Antarctic Islands including Heard and a few others. It may be interesting reading for those who would like to learn more about these remote spots; it may be more interesting to note that a quarter century ago there were year-round operators on Heard.

PP2ZDD. If the accompanying photo shows someone you might have seen along New York's Madison Avenue, you are right. It's Dick Dorrance, W2LEJ, now signing PP2ZDD from Goiania in Goias Province in Brasil. And right in the center is Bill Leonard, W2SKE, President of CBS News and a director of the Associated Press. On the left is the XYL of PP2ZDD, and on the right can be seen the tail of the plane they flew into Brasilia to meet W2SKE.

Dick, PP2ZDD, says that it must be a

At the airport in Brasilia, some W2s get together. On the right is Dick Dorrance, ex-W2LEJ and now signing PP2ZDD from Goiania. On the left is the XYL of PP2ZDD while in the middle is W2SKE, Bill Leonard, president of CBS News.

coincidence that he ended up with a callsign that included his initials. He is active, and QSLs are being handled by Dewitt Jones, W4BAA, Box 1, Captiva, Florida 33924.

Cards for FC0FOC and FC0GAJ were reported by DJ3TF to be in hand from the printers and would be distributed early in the year. If you have not received yours by now you might follow up with a note to Wolfgang. As they are planning a number of efforts around the Mediterranean and south-

CQ DX Awards Program

S.S.B.

970	K5JU	979	WB0OQV
971	AE5B	980	KM6K
972	AF5M	981	K8IQB
973	DF1EG	982	WD4NDX
974	DL3HC	983	K9IML
975	WA3OID	984	G4GED
976	KE5J	985	KA8T
977	W9MYG	986	WN3KER
978	WD8KKF		

C.W.

477	VE1ACK	481	K3STM
478	KA4CZO	482	W9MYG
479	EA8RL	483	W4BV
480	DL3HC	484	WA4GHO

S.S.B. Endorsements

310	W3NKM/318	200	WD8KKF/214
310	K6JG/315	200	K9TI/201
300	W2SUA/303	150	WD9DEE/199
275	AE5B/285	150	W9MYG/195
275	W8IMZ/282	150	K8IQB/182
275	KA8T/282	28MHz	AE5B
250	KB5FU/251	28MHz	K9TI
250	WD4IHV/250	28MHz	KM6K
250	KB5DN/250	28MHz	KB5DN
200	WN3KER/239	28MHz	WD8KKF
200	AF5M/220	3.5/7MHz	AE5B

C.W. Endorsements

310	K6JG/311	200	WA4GHO/202
275	W4BV/275	200	WB5PBA/220
200	WD4IHV/202		

The total number of active countries as of deadline was 318. The basic award fee is now $4 for CQ subscribers and $10 for non-subscribers. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement fee for stickers is $1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, 911 Rio St. Johns Dr., Jacksonville, Fla. 32211 U.S.A.

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsements involving the issuance of a sticker is $1.00. The basic award fee is now $4 for *CQ* subscribers and $10.00 for non-subscribers. Please attach your latest *CQ* mailing label to qualify for the $4.00 rate.

C.W.

W6PT	318	DL7AA	314	K9MM	309	WA8DXA	294	K3FN	283
ON4QX	317	W3GRS	314	W4BQY	307	W1NG	293	W1WLW	276
K6EC	315	N6AV	312	W2GT	304	W4OEL	292	JH1VRQ	275
W9DWQ	315	K4CEB	311	DL3RK	299	DJ7CX	287	W4BV	275
N4PN	315	K6JG	311	N6FX	298	JA1GTF	285		
W6ID	314	N6CW	309	N4MM	295	SM3EVR	284		

S.S.B.

WA2RAU	318	W4UG	316	OE2EGL	312	DL6KG	303	YU2RTW	288
W6EUF	318	K6EC	316	I5WT	312	N2SS	302	AI8S	287
W9DWQ	317	VE2WY	316	W3GG	312	K8PYD	302	AE5B	285
DL9OH	317	I0ZV	315	ZL1AGO	312	VK2VC	302	N5FG	284
K8DYZ	317	F9RM	315	DK2BL	312	W6FET	301	K9HQM	284
W3NKM	317	K6YRA	315	W0SD	311	W0SR	300	JA5PUL	284
W6REH	317	W4SSU	315	YV5AIP	311	W2CC	300	I8LEL	283
XE1AE	317	K6JG	315	W6RKP	310	HP1JC	300	K1UO	282
W4EEE	317	K9LKA	315	K6XP	310	WA4WTG	300	W8IMZ	282
W2TP	317	DJ9ZB	315	K5OVC	310	OK1MP	300	KA8T	282
I0AMU	317	ZL3NS	314	W8ILC	310	XE1J	299	W6DN	281
K6WR	317	VE3GMT	314	N4MM	309	K1UO	299	N3RL	281
K2FL	317	K4MQG	314	K8LJG	309	WA4JTI	296	W2FGY	280
W9JT	317	SM6CWK	314	K9RF	309	I6PLN	295	WD8MGQ	278
WA2EOQ	317	I8YRK	314	I3LLD	309	DJ7CX	294	K3MWV	277
W9QLD	317	I4ZSQ	314	OE3WWB	309	VE3FJE	293	W4BQY	277
ZS6LW	317	SM6CKS	313	W9SS	308	K5DUT	293	WA4LOF	277
VE3MR	316	OZ3SK	313	N6AV	308	K9BWQ	293	WA6TOO	276
TI2HP	316	EA4LH	313	W0SFU	307	W1NG	292	XE1CI	276
W3GRS	316	N4WF	313	W0YDB	306	JH1VRQ	291	WA4TLI	276
VE3MJ	316	YV1KZ	313	XE1KS	305	W7OM	291	W8ILC/QRPp	275
I8AA	316	K9MM	313	LU1BAR/W3	305	LA7JO	291	WA0TKJ	275
W9KRU	316	F2MO	313	YV5DFI	304	ZL1BIL	291	K9UAA	275
I8KDB	316	W4DPS	312	N6AW	304	I0MBX	289	WA4DAN	275
W3AZD	316	W6YMV	312	W2SUA	304	G4CHP	289	I5BDE	275
W3CWG	316								

ern Europe, it may be best to keep up with their QSLing.

There is a report the permission for an Albania operation may be forthcoming, or even a reality by now. The report indicates that the operation, if it comes off, would be low power and strictly crystal control. Hold on! Everything will come eventually. Look at all the operations that have surfaced during the last year. If you think that DX will run out of excitement, prepare to be disappointed. The Albania hope is aimed at mid-summer. You'll have a bit of a chance to work up your enthusiasm.

There are a number of amateurs whose enthusiasm for work must always draw admiration, these being the volunteers for QSL duties. Always a help to the "popular" DX station with overstuffed logs, those needing assistance will find the following ready to volunteer:

Bill J. Carter, KM5R
902 Pinecrest Drive
Richardson, Texas 75080

Neil W. Zimmerman, W7MAF
1815 17th Avenue South
Great Falls, Montana 59405

Roland Guard, W6TWT
Box 61541
Sunnyvale, Calif. 94088

And a final note. We are always looking for photos of recent DX operations, overseas DX types, or even home-grown DX Big Guns. We are ecstatic over items of DX interest, more so over those with long lead time limits. Things are going to happen three or four months down range and not three or four days or weeks. We have a long lead time.

QSL Information

The correct route for EI9CB is via WA1UVX, Box 490, Danvers, Mass. 01923. This corrects a previous listing. W4BAA has the logs for three no longer active stations—9L1JM, H44CD, and ZK1CW.

AH2E-to N9AVY
C5ACO-to W2TK
ED5CSE-to EA5TX
EI9CB-to WA1UVX
FC0FOC-to DJ3TF
FC0GAJ-to DF7RT
FG0FOK-to Yasme
HM0U-to JA6HNK
KC6MW-to JR1AIB
LA1RR/ST0-to LA1RR
PP2ZDD-to W4BAA
TI0HE-to TI2FAG
T30AT-to G3XZF
VP1MPW-to AH2E
ZB2G-to K2FJ
ZL3AFH/A-to ZL2HE
4M3AZC-to YV3AJ
WD5FTP/5N4-to WB5ZAM
9V1UR-to K5BLV
9V1UQ-to K5BLV
9X5AB-to ON8RA
WP2ABZ/C6A, NP2AF, WP2ABZ, VP2VGF, VP5GCM, All to Gary Mitchell, Box F3486, Freeport, Bahamas Islands.

73, Hugh, WA6AUD

K8BG now presents a BASIC program to help us memorize item pairs, such as call letter prefixes for a list of countries.

INTRODUCTION TO BASIC

A Computer Programming Language

Part XVII—Using BASIC To Solve A Particular Problem

BY BUZZ GORSKY*, K8BG

In installment 13 (*CQ*, January 1981) I mentioned the problem of deciding how to use BASIC (or any other programming language) to solve a particular task. That issue is so important that we will revisit it in this and the next installment. Here we will consider a program that is intended to provide drill on item pairs that someone wants to memorize. For example, suppose that you wished to memorize in which call area a given state is located, or the call letter prefix for a list of countries, or a list of English words and their translation in another language or . . . . You can probably come up with several examples. We will look at the evolution of two programs for this sort of task. The first is specific for a particular job, while the second is more general and will permit many uses with the same essential core program.

First let's decide on the details of what the program is to do. Let's agree that the program is to display on the screen either a call prefix or the name of a country and permit the user to enter the corresponding country or prefix. If the entry is correct, the machine will indicate that it is and proceed to another example. If it is not correct, the machine will blank the screen and show the correct pair. We want the machine to pick a particular country or prefix at random from a list, and we want the machine to decide randomly whether it will show a prefix or a country.

For this first program we will use a simple approach and let **READ** and **DATA** statements be used to obtain the prefix and country data. We will store the prefix-country pairs in DATA statements and then read through the list of pairs with a READ statement. A **FOR-NEXT** loop will be used to read to a particular pair and the index for the loop can be chosen at random to provide for random selection of a pair from the list. We will use **INPUT** statements to permit the user to enter responses and **IF** comparisons to see if the response is correct. **PRINT** statements will be used for display and we will use a **PRINT CHR$(23)** statement before the PRINTS so that all of the display will be in large characters. (As usual, this is for the TRS 80 Level II.)

Take a look at Listing 1 before you read any further and see if you can follow *what* the program is doing based on the description to this point. Then you can read the program description which follows to see if you have it pegged correctly.

The first few lines begin with **REM** and so are non-executable remarks intended for the human user. In line 120 the **RANDOM** command sets things up to obtain more nearly random numbers with the **RND** statements which will follow. We also set **FH$** and **SH$** and **NW** to the proper string and numerical values. **FH** stands for first heading and **SH** for second heading while **NW** is for number of word pairs. In line 130 the screen is blanked with the **CLS** and things are set for large print. The **RESTORE** re-establishes the data pointer at the beginning of the first DATA statement in the program. The first time through this is not required, but the program will loop through line 130 often and the **RESTORE** will be required. Otherwise the READ statements would get to the end of data and the machine would give an **OUT OF DATA** message.

In line 140 we really get to work in earnest. X is set to RND(2). RND picks an integer between 1 and the value in parentheses. Here then X can get the value of either 1 or 2. Then based on that we will display either a prefix or a country name. Y is then set to RND(NW) which is a number chosen between 1 and the value of NW, which is 10 in this case. This number will be the index for the FOR-NEXT loop and hence the number of the word pair which will be displayed.

*712 Hillside Drive, Carlisle, PA 17013

Listing 1

```
100 REM CALL AREA DRILL PROGRAM BY BUZZ GORSKY, K8BG
110 REM FH$ IS THE PHRASE TO USE WITH THE FIRST ITEM, SH$ WITH THE SECOND. NW IS THE NUMBER OF PAIRS
    IN THE DATA SET
120 RANDOM:FH$ = "PREFIX---":SH$ = "COUNTRY---":NW = 10
130 CLS:PRINTCHR$(23):RESTORE
140 X = RND(2):Y = RND(NW)
150 FOR I = 1 TO Y: READ F$,S$:NEXT:IF X = 2 THEN 190
160 PRINT FH$; F$:PRINT SH$;:INPUT Z$
170 IF Z$ = S$ THEN PRINT:PRINT"THAT'S CORRECT";F$;"--";S$ ELSE CLS:PRINTCHR$(23):PRINT"THE CORRECT
    RESPONSE IS":PRINT:PRINTF$;"--";S$
180 PRINT:PRINT:INPUT Z$:GOTO130
190 PRINT SH$;S$:PRINT FH$;:INPUT Z$
200 IF Z$ = F$ THEN PRINT:PRINT"THAT'S CORRECT";F$;"--";S$ ELSE CLS:PRINTCHR$(23):PRINT:PRINT:PRINT
    "THE CORRECT RESPONSE IS-----":PRINT:PRINT F$;"--";S$
210 PRINT:PRINT:INPUTZ$:GOTO130
220 REM PAIRS OF ITEMS ARE ENTERED IN AS MANY DATA STATEMENTS AS REQUIRED
230 REM HERE FOR EXAMPLE G IS THE PREFIX FOR UNITED KINGDOM AND F IS THE PREFIX FOR FRANCE
240 DATA ZL,NEW ZEALAND, G,UNITED KINGDOM, F,FRANCE, YU,YUGOSLAVIA, PZ,SURINAM, 4X4,ISRAEL,
    VK,AUSTRALIA, JA,JAPAN, HB,SWITZERLAND, LA,NORWAY
```

Listing 2

```
5 RANDOM:CLEAR 2000:DEFSTR P,C
10 CLS:PRINT "ENTER 1 TO ENTER DATA":PRINT "ENTER 2 TO SAVE DATA":PRINT "ENTER 3 TO DRILL":INPUT
    "ENTER 4 TO ADD DATA";I
20 RANDOM: ON I GOTO 30,50,130,300
30 CLS:INPUT "RECORDER READY";X:INPUT# – 1,NW,FH$,SH$
40 FOR I=1 TO NW STEP 5:INPUT# – 1,P(I + 0),C(I + 0),P(I + 1),C(I + 1),P(I + 2),C(I + 2),P(I + 3),C(I + 3),P(I + 4),C(I + 4):
    NEXT:GOTO 10
50 CLS:INPUT "RECORDER READY";X:PRINT# – 1,NW,FH$,SH$
60 For I = 1 TO NW STEPS:PRINT# – 1,P(I + 0),C(I + 0),P(I + 1),C(I + 1),P(I + 2),C(I + 2),P(I + 3),C(I + 3),P(I + 4),C(I + 4):NEXT
    :GOTO 10
100 REM CALL AREA DRILL PROGRAM BY BUZZ GORSKY, K8BG
110 REM FH$ IS THE PHRASE TO USE WITH THE FIRST ITEM, SH$ WITH THE SECOND. NW IS THE NUMBER OF PAIRS
    IN THE DATA SET
130 CLS:PRINTCHR$(23)
140 X = RND(2):Y = RND(NW)
150 F$ = C(Y):S$ = P(Y):IF X = 2 THEN 190
160 PRINT FH$;F$:PRINT SH$;:INPUT Z$
170 IF Z$ = S$ THEN GOSUB 400ELSE GOSUB 450
180 Z$ = "":PRINT:PRINT:INPUT Z$:IF Z$ = "@" THEN 10 ELSE 130
190 PRINT SH$;S$:PRINT FH$;:INPUT Z$
200 IF Z$ = F$ THEN GOSUB 400 ELSE GOSUB 450
210 PRINT:PRINT:INPUTZ$:GOTO130
220 REM PAIRS OF ITEMS ARE ENTERED IN AS MANY DATA STATEMENTS AS REQUIRED
230 REM HERE FOR EXAMPLE G IS THE PREFIX FOR UNITED KINGDOM AND F IS THE PREFIX FOR FRANCE
240 DATA ZL,NEW ZEALAND, G,UNITED KINGDOM, F,FRANCE, YU,YUGOSLAVIA, PZ,SURINAM, 4X4,ISRAEL,
    VK,AUSTRALIA, JA,JAPAN, HB,SWITZERLAND, LA,NORWAY
300 CLS:REM ROUTINE TO ENTER NEW PREFIX-COUNTRY PAIRS
310 INPUT "ENTER FIRST ITEM OF PAIR ('NONE' IF DONE)";X$
320 IF X$ = "NONE" THEN 350 ELSE NW = NW + 1:C(NW) = X$
330 INPUT "ENTER SECOND ITEM IN PAIR";P(NW):GOTO 310
350 INPUT "ENTER FIRST HEADING";FH$
360 INPUT "ENTER SECOND HEADING";SH$:GOTO 10
400 Z$ = "THAT'S CORRECT":PRINT:PRINT:PRINT Z$:PRINT F$;"--";S$
410 RETURN
450 Z$ = "THE CORRECT RESPONSE IS":CLS:PRINT CHR$(23):PRINT:PRINT:PRINT Z$:PRINT F$;"--";S$
460 RETURN
```

In line 150 we have the **FOR** statement where we take I from 1 up to Y. In the loop we READ F$ and S$ from the DATA statement in line 240. There you will notice the first item is ZL and the next NEW ZEALAND. After that comes G, UNITED KINGDOM, and so on with a call prefix followed immediately by the country to which it corresponds. As we go through the FOR-NEXT loop in 150 then we keep reading pairs of data. The prefixes are read as values of F$ and the countries are read as values of S$. Each time through the loop what is read before is lost, so when we finally READ through Y times, the value of F$ and S$ will be the Yth members of the data list. If Y is 5, F$ will be PZ, and S$ will be SURINAM. Then if X has been assigned a value of 2 we go to line 190, and if not (i.e., if X has a value of 1) we go ahead with the next line, 160. Here we print FH$ followed by F$. The semicolon after FH$ tells the machine to print the two strings right next to each other without leaving any blank space. We then print SH$ and follow that with an INPUT statement. Why is there a semicolon after the SH$? Just as in the

other printing, the semicolon keeps the screen display routine at the same place so that the question-mark prompt of the INPUT statement will display right after the SH$. Try taking the semicolon out and see how the display is altered. The INPUT lets the user enter the Z$ for his response.

In 170 if Z$, the entered response, is identical to S$, the second entry from the DATA statement, then the machine will PRINT the statement **THAT'S CORRECT** and right next to it the prefix, two dashes and the country name. This provides a bit of positive reinforcement for the user. On the other hand, if the entry was not correct, the machine will clear the screen (to take away that wrong pair from staring you in the face), and it will show the correct pair. The extra PRINT statements in this line cause a blank line to be printed and so spread things out a bit on the screen. You should experiment leaving out some of these, putting in extra PRINTS, and putting in and taking out some of the semicolons. You could also try some PRINT @ statements to control where things are printed. There are lots of ways to get the job done.

Once we've established the rightness or wrongness of the response and printed the correct material, we print a few blank lines, then there is the INPUT statement in line 180. That is there to halt progress of the program. As soon as **ENTER** is pushed the program will continue, looping back to line 130 to begin again.

In line 150 if X had been 2 we would have gone to 190. Here we have the same routines as located at line 160 except that here the SH$ and S$ are displayed and the user must enter the material which corresponds to the first item in the pair—the call prefix.

So up to this point we have a fairly simple program which will perform the task set out. However, in order to use the program one has to enter statements such as line 120 to establish the headings and the number of pairs, and there must be an appropriate DATA statement to house the information. Wouldn't it be nice to have a program that someone could use *without* the necessity of mucking around in the program?

Listing 2 has just such a program. Much is still the same but we have now gotten away from the DATA statements and have expanded things a great deal. This program is written to permit someone to make a list of items, put them on tape, and then read in that tape whenever desired to drill on it. The tape will store the number of pairs, the headings, and the actual data pairs. So with this program you could make separate tapes for each of the lists of items you would like to use for drill. Notice that the program is almost twice as long! That seems to be fairly common. You will often find that the nucleus of a program is fairly short, but that as you add more options and little things that would "be nice to have," somehow the program begins to take on a monumental look. But fear not, let's see what we've added.

Line 5 does some housekeeping. The RANDOM serves the same function as before. The **CLEAR** sets up 2000 bytes of storage for string manipulations. If you are using a program such as this and get an **"OUT OF STRING SPACE"** message, then increase the value of the number following the CLEAR. The **DEFSTR** sets up P and C variables as strings so that we don't have to type P$ and C$ all the time. In line 10 we clear the screen (with the CLS) and print four options. Notice that the last option is printed in the INPUT statement and in this way the question mark prompt will be on the same line as the last option displayed. Then depending on the value of I the user selects, the program will branch to line 30, 50, 130, or 300.

Line 20 raises a few questions. First why is that RANDOM there? Answer—I forgot to take it out when I decided to put all of the housekeeping things in line 5. This is not uncommon when revising a program. There it would have done no harm, but always beware when doing revisions not to leave behind statements that you intended to edit out. Now, what will happen if the user enters 5? There is no fifth option? Since we have not protected for that, the program will continue with line 30, the next line in the program. We could take care of that with

```
25 IF I>4 OR I<1 THEN 10
```

That statement would cause the program to return to 10 if an incorrect number is entered. Since the **ON I GO TO** statement permits branching to different parts of the program, we can look at these parts individually.

Line 30 has the routine for the first option, data entry from tape. Here we provide a little prompt to stop things and remind the user to set up the recorder. Then we INPUT # – 1 the value of NW, FH$, and SH$. We then have the FOR-NEXT loop which goes from 1 to NW by steps of 5. Each time through we pick up five pairs of data from tape and store these as subscripted variables P and C. Doing things this way takes a bit more typing in the program, but this routine will enter data five times faster than a simple

```
900 FOR I=1 TO NW:
INPUT# – 1,P(I),C(I):NEXT
```

since five items are entered for each sequence rather than one. Once the material has been taken from the tape, we GOTO 10 to return to the list of options.

In line 50 we have the analogous routine to put material onto tape. Note that the INPUT # – 1 and PRINT # – 1 statements must correspond exactly or the program will not work.

In lines 100 through 210 we have the actual drill-program that was presented in listing one. There have been a few changes made though and let's look at them. In line 140 we get a value Y selected randomly based on NW just as in the first program. But now since we are using P(I) and C(I) data arrays rather than READ statements, we can directly set F$ = C(Y) and S$ = P(Y) as is done in line 150. The other change is that we've introduced subroutines and GOSUB statements for presenting correct and incorrect responses. This is just a change of style which is not really required. Also note the clutter—lines 220-240 have nothing to do with this program and should be deleted. Again I have left them in just to show the sort of thing that crops up when you begin to expand a program.

Finally in lines 300-360 we have the routine to add data. In 310 the user can enter the first item of a pair. This is given to X$. If X$ is the word NONE then we go to 350, otherwise NW is increased and the value in X$ is stored in C(NW). Then the user can enter the second item which is stored as P(NW) and we go back to 310 for another pair. In 350 the user gets the chance to enter the headings that the program should print, such as COUNTRY/PREFIX or ENGLISH/FRENCH, depending on what the list is made of. After the headings are entered the program branches back to 10, where the user can enter another option. Presumably the user would elect #2 to save the data list on tape.

This second version of the program permits a user to make data lists, save them on tape, enter them from tape, and drill with them. It is more general and less rigid than the first program, but as you can see it is nearly twice as long.

Next month we'll take a look at another programming task and use some of the DISKBASIC statements to generate a program that will keep track of all those little things you always seem to forget—dates of skeds, when your license is up for renewal, birthdays, and the like.

a monthly feature by
BILL WELSH, W6DDB

Novice

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Low Power Operation

QRP means to reduce power and QRO means to increase the input power to the final r.f. amplifier stage. Naturally, the name of an organization dedicated to promoting low power activity includes QRP; thus, we have the QRP Amateur Radio Club International Incorporated, which is shortened to the QRP club throughout the rest of this article.

The QRP club was formed in 1961 and had issued more than 4700 memberships by the end of 1980. It does not advocate reducing existing amateur radio power levels in any country. It is an international association of amateurs who enjoy substituting operating skills and station improvements in lieu of high power. The QRP club motto is "Power is no substitute for skill." The use of high power can be undesirable and some amateurs enjoy the challenges related to using low power.

The QRP club definition of QRP is 5 watts (10 watts p.e.p. s.s.b.) maximum output from the final r.f. amplifier stage. However, the power limit for QRP club members is 50 watts (100 watts p.e.p. s.s.b.) maximum output from the final r.f. amplifier stage. QRP club literature previously indicated a QRP power limit of 100 watts d.c. (200 watts p.e.p. s.s.b.) input and used the artificial Q signal QRPp to indicate final amplifier input that did not exceed 5 watts d.c. (10 watts p.e.p. s.s.b.). The small letter *p* in this manufactured Q signal was intended to emphasize very low power.

Advantages

QRP operation offers several advantages plus a high degree of personal satisfaction to operators who experience good on-the-air results while running low power. Interference between stations in the same service is greatly reduced by using low power. This reduced interference increases the communications effectiveness of the amateur bands and lessens the possibility of bad feelings on the part of foreign (DX) amateurs who are often restricted to power limits below those of American amateurs. Spurious radiations (harmonics, parasitics, etc.) are minimized at low power, significantly reducing any possibility of interfering with other radio services such as a.m., f.m., and TV broadcasts. In-house interference to audio amplifier, garage door remote control, intercommunication, telephone, and other similar devices is either reduced or eliminated by opening QRP instead of high power. Electric power consumption is reduced at low power, which lowers that utility bill.

This is Greg Crowder, KA4PZY, of Lanett, Alabama. This picture was taken 13 July 1980, the day he received his Novice license. He has already worked 6 of the 10 American callsign zones and 3 countries with a Heath HW-8 transceiver. He thanks John Farmer, K4FJZ, and KY4H for helping him get a good start in amateur radio, and he expects to have upgraded to Technician by the time this picture appears in CQ.

All of the factors stated in the previous paragraph are important, but I do not think they are as significant as the fact that good QRP operation forces an amateur to improve the station and his operating techniques. The antennas have to be efficient, transmission line losses must be minimized, an effective r.f. station ground is required, and above average operating sense must be developed to have highly successful QRP operation. There is no better operator training than QRP-only operation, even if it is just for a relatively short time.

On-the-Air Activities

Informal QRP club QSO (contact) parties are held on the first Sunday of each month. They start at 1500 UTC, Sunday and end 12 hours later at 0300 UTC, Monday. These are not contests and no awards are issued. These QSO parties simply provide opportunities for QRP club members to contact each other and to *ragchew* (chat) with other amateurs who are interested in low power operation.

Formal QRP club contests are held in April and October. The dates, times, and all other facts about these semi-annual contests are printed in major radio publications, as well as in the QRP quarterly newsletter, which is published in January, April, July, and October each year.

There are four QRP club code nets on the air each week. The Sunday net is on 14060 kiloHertz and it starts at 2400 UTC, Sunday evening, local time. The Thursday net is on 3560 kiloHertz and it begins at 0200 UTC, Wednesday evening, local time. The Saturday net is on 7060 or 7040 kiloHertz and it starts at 1500 UTC. Also, Bob Jenks, K7ZVA, runs a net on 7060 or 7040 kiloHertz. This net is called "the 76er" and it starts at 0900 (9 a.m.) Pacific time on Wednesday, Saturday, and Sunday mornings. There are presently no regularly scheduled QRP club voice nets.

The monthly QSO parties, semi-annual contests, and nets help promote interest in QRP operation. Recommended code frequencies are 1810, 3560, 7060 (or 7040), 14060, 21060, 28060, and 50360 (plus or minus 5)

2814 Empire Ave., Burbank, CA 91520

kiloHertz. Recommended voice frequencies are 1810, 3985, 7285, 14285, 21385, 28885, and 50385 (plus or minus 5) kiloHertz. The recommended QRP operating frequencies are 10 kiloHertz above the low end of each Novice band at 3710, 7110, 21110, and 28110 kiloHertz. It is common to hear QRP operators sending CQ (call to all stations) near these suggested frequencies and adding QRP identification to their callsigns, such as WD4LOO/QRP. Many higher power (non-QRP) amateurs make special efforts to contact QRP stations. QRP operation is not unusual on the amateur bands and a few manufacturers have made QRP even more popular by producing excellent low power rigs.

QRP Club Awards Program

The QRP club offers several awards to recognize low power operating achievements. These awards are available for both one-way QRP and two-way QRP. They can be earned as either a QRO (high power) station working QRP (low power) stations, or as a QRP station working either QRO or QRP stations. Each application for a QRP club award must be accompanied by two dollars (cash or check) or ten International Reply Coupons (IRCs). DXCC-QRP, KM/W (possibly), WAC-QRP, and WAS-QRP are available for both one-way QRP and two-way QRP contacts, at 5 watts maximum final r.f. amplifier output power. The only QRP club award that can be earned at the 50 watts average power output (APO) level is QRP-25. There is no limit to the power level of QRO stations contacted by QRP stations working to earn these awards. Wherever QRP is required, output power or known QRP rig must be shown on the material submitted for any QRP club award. Received QSL cards, validated extract of log data, or compliance with the general certificate rule (GCR) is acceptable when applying for QRP club awards; any one of the three suffices. The power output and/or known QRP equipment must be shown on QSL *cards from QRP stations* to clearly indicate their applicability towards QRP awards. QRP membership number and power or equipment data are accepted without QSL cards if this information is transmitted during the contact and is recorded in the log of the receiving station.

The notes preceding the details regarding requirements for earning each QRP club award apply specifically to these awards and they generally apply to most operating awards offered by other amateur radio groups.

Notes:

AOBM. Except for QRP-25, etc., all QRP club awards can be issued to indicate all one band and/or one mode (AOBM) if the application requests such an endorsement and the accompanying material confirms that the requested endorsement has been earned.

Tim Leier, VE5ADL, is a 16-year-old experimental class licensee who makes it easier to work Canada on the 15 meter Novice band. Tim operates a Heath HW-8 QRPp (very low power) transceiver with a dipole antenna strung across an upstairs hallway. He has worked 30 states and 3 countries during his first 3 months on the air, and he has earned a few operating awards, including the Ten American Districts (TAD) award that I issued to him. Tim sends a card to each amateur contacted. If you want to work Swift Current, Saskatchewan, listen for VE5ADL on the 15 meter Novice band between 2300 and 0200 UTC.

GCR. The general certificate rule is accepted when applying for these awards. This means that the award sponsor does not require (and usually does not want) QSL cards to be mailed with applications for certificates. A list is prepared showing all of the required information and the QSL cards are presented to the local person(s) validating this list. The list can be notarized by a Notary Public, but this is seldom done because it requires more effort and involves a Notary fee. It is more common to have the list verified and signed by an amateur radio club official or two other amateurs who hold current General (or higher) class licenses. The applicant is not allowed to validate his/her own award application.

IRC. International Reply Coupons (IRCs) are often referred to as green stamps and amateurs frequently use them in lieu of money at a rate of twenty cents per IRC. IRCs can be purchased at post offices (presently 42 cents each) and they can be directly exchanged for postage in most countries.

Log Data List. Awards can be requested without using received QSL cards. A list of required contacts may be extracted from the applicant's station log. This list must contain all the information that is required to qualify for the award being requested. The listed data can be verified by a radio club officer (other than the applicant) or two amateurs who hold valid General (or higher) class licenses. This list must include the QRP membership number and input power for each QRP station contacted.

Manager. All QRP club award requests should be sent to Hugh F. Aeiker, WA8CNN, 5 Keiffer Drive, St. Albans, West Virginia 25177. Checks should be made out to the QRP ARC International.

Membership List. An annual list of QRP club members is normally available from the Secretary-Treasurer for 50 cents and an s.a.s.e. This list does not include QRP membership numbers or names; it just shows the call signs of members. It is sent to each new member at no extra charge. It is imperative the QRP membership numbers be exchanged on the air during the contact and/or shown on QSL cards.

QSL Cards. Two-way radio contact confirmation (QSL) cards are seldom desired by those who issue operating awards because they are harder to check than a verified list and they normally must be returned to the applicant. If you are going to use QSLs as validation, it is preferable that you send copies of the cards in lieu of the originals. Copies are accepted and they are not returned unless the applicant requests that they be returned and furnishes the required self-addressed and stamped envelope (s.a.s.e.). If you send the actual QSLs, have your outgoing envelope checked at your post office for correct postage and attach the same postage to the s.a.s.e. in which your cards are to be returned. Six QSLs usually weigh about one ounce, but card weights differ a lot and it is best to check mailing weights on an accurate scale. Also, remember that the post office charges more money to deliver non-standard-size mail.

S.a.s.e. A self-addressed and stamped envelope (s.a.s.e.) is required whenever information is requested, QSL cards are to be returned, an endorsement seal is being requested, a membership list is desired, or any information is being sought. It is good to use a return address that is different than your normal mailing address so that material can be delivered if your regular address changes or temporarily becomes unusable (fire, etc.).

Award Facts

The QRP club recently decided to change from input to *average output power* (**AOP**) regarding the issuance of their awards. This change takes effect 1 June 1981. However, if you have already started earning a QRP club award based on the input power system, you are allowed to complete the effort and apply for the award under the old system. Here are brief descriptions of the requirements related to qualifying for QRP club awards:

DXCC-QRP. This award requires proof of contacts with stations in 100 of the countries shown on the current ARRL DXCC application form, while using no more than 5 watts output.

KM/W. The 1000-miles-per-watt award requires transmission or reception of a signal that at least meets the 1000-miles-per-watt requirement that is obtained by dividing the transmitter output power (watts) into the great circle bearing distance between the transmission and reception points. Application must show all related log data, including power output (at one end, or both ends, of the contact), mode, band (or frequency), signal report(s), and both exact geographic locations. This certificate is issued for one band and/or mode and additional certificates can be requested for accomplishing this feat on other bands or modes. This award is available to shortwave listeners, as well as amateurs.

QRP-25. This award requires contacts with at least 25 QRP club members and it is available for both one-way and two-way QRP contacts. It can be earned by QRO stations working QRP club members. This is the only QRP club award that can be achieved at the new QRP club limit of 50 watts output; all others involve no more than 5 watts output. Endorsements are available at contact levels of 50, 100, and each subsequent full hundred point thereafter. There is no charge for these endorsements, but one is required to enclose the usual s.a.s.e. with the sequential list of additional QRP club members contacted. Include contact data plus the callsign and number of each QRP club member worked on the endorsement request list. Retain a copy of previously submitted lists to avoid duplications when requesting endorsements. This award is not issued for all one band and/or mode.

WAC-QRP. This award requires confirmed contacts with all six continents while running 5 watts output, maximum.

WAS-QRP. This award requires confirmed contacts with all 50 American states while running 5 watts output, maximum.

Ron Hornberger, KA9CZQ, of Cairo, Illinois, works as the advertising manager of a newspaper. He has been licensed since December 1978, but he did not start operating until September 1979. His station includes a Heath HW-8 QRP (low power) transceiver and a Hustler 5-BTV antenna. He has 46 states and 2 countries confirmed so far with 427 total contacts. His first DX (long distance) contact was with England. When G3DMJ heard that Ron was running low power and it was his first DX contact, he talked with Ron for 1½ hours. Ron is now a Technician, and he hopes to upgrade to General soon.

Here is a Novice who has decided to run low power (QRP). This is Tom Hemberger, KA9HSD, of Baraboo, Wisconsin. He runs an Argonaut transceiver which has about a two watt output. His antennas are an 80 meter dipole and a vertical for 40, 20, 15, and 10 meters. He uses a Bencher paddle with an electronic keyer. Tom has already contacted amateurs in about 25 states, including Alaska. He is a member of the Yellow Thunder Amateur Radio Club. Photograph courtesy of Jim Romelfanger, K9ZZ.

Membership

QRP club full members are amateurs who do not normally exceed the 50 watt average power output (100 watts s.s.b. p.e.p.) limit. It is understood that full members may sometimes exceed the QRP club limit when handling third-party traffic, emergency messages, or other public service communications. Such important but temporary uses of high power are permitted without endangering QRP club membership.

QRP club associate membership was previously open to amateurs who sometimes exceeded the QRP club power limit during routine operation. Associate members are often amateurs who have a specific QRP interest, such as operating at milliwatt power. Associate members have all QRP club privileges, except that they may not vote in QRP club matters and cannot hold any elected or appointed office in the QRP club. Contacts with associate members count towards QRP club awards if the associate

members were running QRP when they were contacted. All existing associate members are encouraged to retain their QRP club membership for life, but this class of membership is no longer offered to new members.

Family membership is now offered in the QRP club. This is a new class of QRP club membership that just came into existence 1 April 1981.

Dues

QRP club initial dues are $4 and $5 per year, respectively, for American and foreign (DX) full members and associate members. The annual renewal rates for USA and DX amateurs are $3 and $4, respectively. The QRP club initial dues rate for family members is $4 each and the annual renewal rate is $1 each, with the full or associate member paying his separate renewal fee. The initial fee covers a lifetime QRP club membership and a one year subscription to the quarterly QRP club newsletter. The renewal fee covers the newsletter costs each subsequent year. A membership certificate is mailed to each QRP club member and it shows the member's QRP club number.

QRP club membership applications can be requested from Secretary-Treasurer Ed Lappi, WD4LOO, 203 Lynn Drive, Carrboro, North Carolina 27510. The QRP club history data sheet and/or the current membership list can also be requested from Ed. The names and addresses of new members are printed in newsletters. Please remember to enclose an s.a.s.e. whenever you request information from any QRP club official.

Officials

In addition to the Secretary-Treasurer and Awards Manager already listed in this article, the other QRP club officers are listed herein for your information. Harry E. Blomquist, K6JSS, is the Founder and Historian. Thomas W. Davis, K8IF, is the President and Board Chairman. Robert L. Jenks, K7ZVA, is the Vice-President and William W. Dickerson, WA2JOC, is the Contest Chairman. Fielding E. Behrman, K7LNS, is the Publicity Officer and Richard A. Crowell, W4WQW, is the Legal Officer. Peter Spotts, N1ABS, is Editor of the quarterly newsletter. All QRP club officers are also members of the Board of Directors, which also includes Paul Smolarz, WA2HYY, Donald McBride, WA3ZBJ, Robert W. Reynolds, K5VOL, and Robert J. Liggett, KA0O.

Operation

When the Novice maximum input power level was 75 watts and the QRP club limit was 100 watts input, all Novices were eligible to join the QRP club. Now that the maximum is 250 watts, it takes a special type of Novice to operate QRP. I have always run low power and consistently work amateurs throughout our country and all around the world. I hold a few hundred operating awards; most of them were earned in the Novice bands and all were achieved while running less than 100 watts d.c. input to the final r.f. stage. I often use a Ten-Tec Argonaut Transceiver that belongs to one of my sons. This rig runs 5 watts input to the final r.f. amplifier and it has provided me with thousands of contacts. My 10 and 15 meter Novice band QRP operation is usually daytime (weekends and holidays) or early evening. I do not operate on the 40 meter Novice band when it is crowded or when Region I (Europe) shortwave broadcasts are being heard because QRP signals are too easily buried under stronger transmissions. 40 meter Novice band QRP operation is relatively good early and late in the day when the band is relatively quiet, but erratic. 80 meter Novice band QRP operation has been good for me at night. I usually operate 10 until it dies, and then I progressively shift to 15, 80, and (last) 40 meters.

When using low power, select a frequency that is clear, which often involves a lot of searching and listening. It is my opinion that it is better to call CQ (call to all stations) than to answer CQ calls of other stations. When operating QRP, your signal would probably be the weakest one if several amateurs respond to another station's CQ call. It is more productive to call CQ on a clear frequency and to let other stations answer your low power signal.

The high ends of the 10 and 15 meter Novice bands are normally less crowded than the low ends of these bands, making QRP contacts better on these frequencies.

I hope you will try QRP operation at some point in your development as an amateur radio operator. I work about 1000 Novice band QRP contacts each year and I hope to contact you. If I ever find a low cost source of solar cells or panels, I will be operating a lot of solar powered QRP from sunny Southern California. I am a QRP club member.

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 (state which) to *CQ*. A brief description of operating activities and some personal background information are needed with your picture.

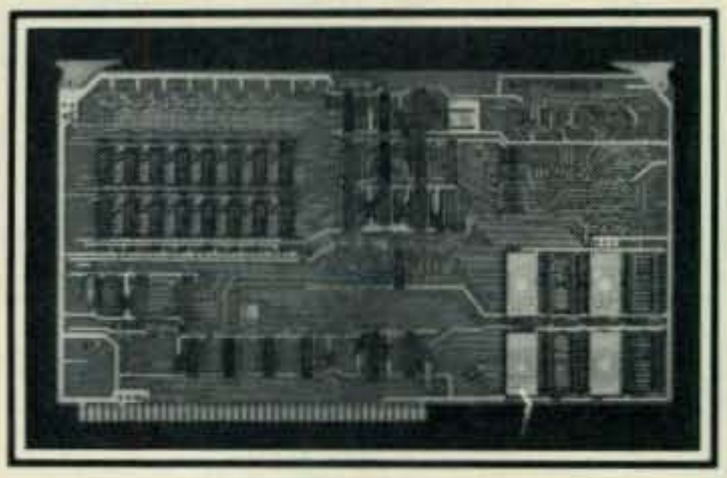
73, Bill, W6DDB

CQ SHOWCASE

UPI Communications ONV Safety Belt

The ONV belt is not only OSHA approved, but its physical concepts afford the user a lightweight belt while still giving full protection. Total weight of the belt is about 3 lbs. as compared to some 10-12 lbs for the ordinary safety belt.

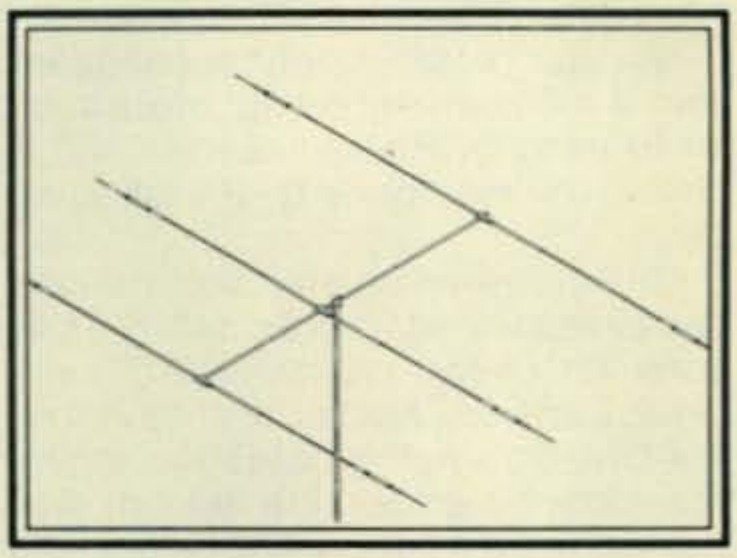
Price is $39.95 for the belt and $9.95 for the tool pouch, plus $3 postage and handling. For more information, contact UPI Communication Systems, Inc., P.O. Box 902, Saddle Brook, NJ 07662, or circle number 106 on the reader service coupon.



Hal Communications Message Storage Option

The MSO 3100 Message Storage Option adds mass storage to the HAL DS3100 ASR terminal. Relatively long messages may be stored or replayed at will. The MSO 3100 adds approximately 450 lines of memory for message storage and retrieval. Messages can be written, recalled, or relayed through the DS3100 keyboard or by other users through the WRU feature of the DS3100. Control is accomplished through a series of commands which the user sends to the MSO 3100. Messages are stored in variable length files with user-assigned file names and passwords for file protection if desired.

Other features include automatic TX/RX relay control, auxiliary equipment control commands, CW ID, and user help messages for added convenience. The MSO 3100 is particularly suited to composing and sending brag tapes and for automatic traffic handling. The MSO 3100 is factory installed and tested in your DS3100 ASR. For more information, contact Hal Communications Corp., Box 365, Urbana, IL 61801, or circle number 104 on the reader service coupon.



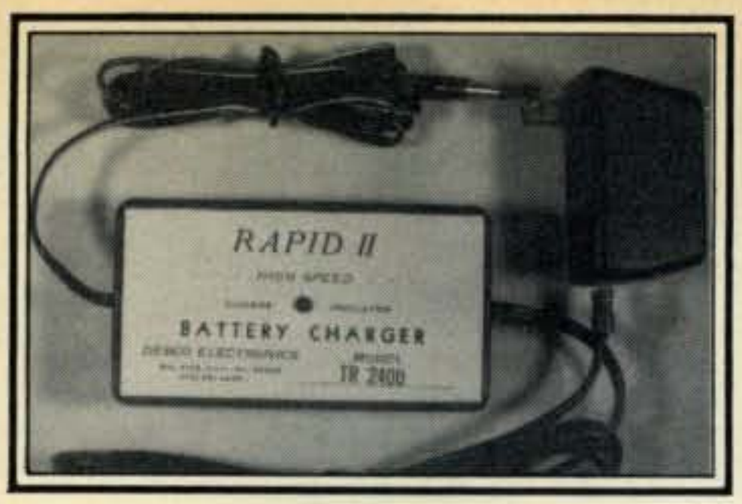
Hustler Amateur Tribander

Hustler has announced a 3-TBA triband beam antenna for 10, 15, and 20 meter operation. With a boom length of only 14 feet and longest element of 24 feet 2 inches, the 3-TBA is the smallest full-featured tribander available today. Specifications include 8 dB forward gain with front to back ratio of up to 28 dB on all three bands. Power rated at 1 kilowatt c.w. and feed point impedance is 50 ohms. Wind surface is 5.7 sq. feet. Weight is 40 lbs.

Boom and elements are constructed of high strength aluminum and supplied with stainless steel hardware. The 3-TBA has a suggested list price of $269.95. For more information contact Hustler Inc., 3275 North "B" Avenue, Kissimmee, FL 32741, or circle number 107 on the reader service coupon.

Debco AC Rapid II Battery Charger

The AC Rapid II Battery Charger charges batteries while you use the radio in 2 to 3 hours off 110 v.a.c. Input of the charger is supplied with UL approved power supply transformer and output is supplied with the appropri-



ate charging jack. No adjustments are necessary. It is a "linear" type charger and not a pulsating type. Charging rate of the battery charger is approximately 225 ma that cuts back to 0-20 ma depending on battery condition. The unit will not overcharge batteries.

Models currently available for the Kenwood TR2400, Yaesu FT207R, Santec HT1200, Tempo S1, S2, S5, Wilson MKII and Wilson MKIV. Other manufacturers also available. Price is $44.95 plus 5% shipping, handling, and insurance. For more information, contact Debco Electronics, P.O. Box 9169, Cincinnati, OH 45209, or circle number 102 on the reader service coupon.

M & M Electronics MSB-1 Audio Filter

The MSB-1 Audio Filter consists of four basic filters arranged to provide the maximum in flexibility and effectiveness during s.s.b., c.w., or RTTY reception. The fixed highpass filter, tunable notch filter, six and eight pole tunable lowpass filters are engaged at all times. The tunable bandpass filter can be switched in for further shaping of the audio. This means that all three tunable filters can be engaged at the same time and tuned independently.

The MSB-1 Audio Filter sells for $84.95. For more information, contact M & M Electronics, Inc., P.O. Box 1206, Brewton, AL 36426, or circle number 105 on the reader service coupon.

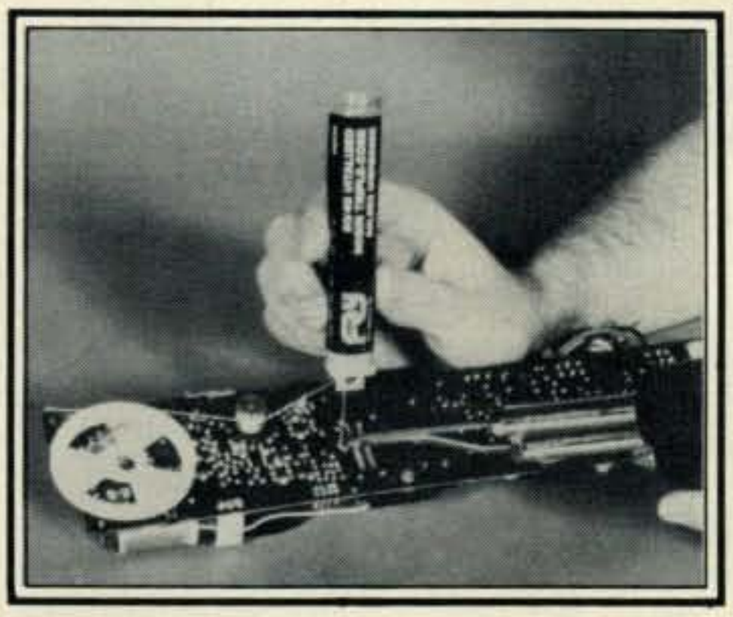
Triplett 80 MHz Universal Counter

Bill Schiffrin, distributor/Sales Manager of Masin-Esco, the local Triplett representative, has furnished us with this latest information on the Model 7000, 5 Hz to 80 MHz Universal Counter, which utilizes an exclusive microprocessor controlled reciprocal counting scheme to offer sophisticated frequency, period, and event measurements. High resolution frequency measurement, plus totalize (event) counting to 1 billion and elapsed time measurement from 100 μS to 100 hours is offered.

The auto-ranging feature permits a single color-coded selection knob for six operating modes. The unit is 10"W × 3¾"H × 9¼" D, and is housed in a tan, high-impact thermoplastic case with carrying handle. For more information, contact Triplett Corp., One Triplett Drive, Bluffton, OH 45817, or circle number 109 on the reader service coupon.

Fry Metals Solder Repair Kits

Fry Solder Repair Kits feature triple core solder dispensers that assure continuous flux flow while soldering fine wires and other connections. They are offered in both 60% tin/40% lead, and 40/60 combination rosin dispensers. Also included is a pre-mixed solder cream dispenser tube. Used with a soldering iron or gun, the kits come with application information and are for electrical wiring, antennas, speaker leads, appliances, TV's, and radios.



Fry Solder Repair Kits range in price from $1.30 ea. to $4.50. For more information contact, Fry Metals, Inc., 50 Sims Avenue, Providence, RI 02909, or circle number 108 on the reader service coupon.

a monthly feature by
FRANK ANZALONE, W1WY

Contest Calendar

NEWS/VIEWS OF ON-THE-AIR COMPETITION

The subject of Al Dorhoffer's Editorial in last month's issue was going to be my topic in this month's column. However, Al did such an outstanding and thorough job that anything I could add would be superfluous.

What he didn't mention was that this whole controversy was started by members of the operating crew of a world-record holding station before the results of the 1980 Contest were finalized, and even before claimed scores were published.

It has been estimated that *CQ* shells out over $15,000 to make this Contest possible each year. Ten times that amount would be a conservative figure if the Committee members were compensated in dollars and cents for the countless man hours they devote in checking logs and computing the final results. However, outside of the Directors, committee members receive no monetary compensation, only a mention in the results story each year. Small thanks indeed for the sacrifice of their time.

I have been connected with the *CQ* Contest Programs for over 25 years, and I can say that it has been the dedication of these hard-working volunteers that has made our World Wide DX Contest NUMBER ONE in the world. From approximately 1000 entries in 1955, we now total better than 5000, so we must be doing something right. An honest administration of the Contest has in no small way contributed to its success.

Mistakes have been made; we're not infallible. But to suggest that the *CQ* Contest is in disrepute because of deliberate alterations in log checking is hard to take.

I am sure that a vast majority of our contest operators are more appreciative of the time devoted by our hard working volunteers to make this Contest available each year for your operating pleasure.

73 for this time, Frank, W1WY

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

Apr.	25	Utah QSO Party
May	1-10	Tin Plate QSL Card
May	2-3	USS Croaker Expedition
May	2-3	Mt. Clemens Operation
May	2-3	Alexander Volta RTTY
May	2-3	County Hunters SSB
May	9	World Telecomm. Phone
†May	9-10	USSR "CQ-M" Contest
May	10	"Corona" 10 Meter RTTY
May	9-10	Rocky Mt. QSO Party
May	16	World Telecomm. C.W.
May	16-17	Florida QSO Party
May	16-18	Mass. QSO Party
May	16-18	Michigan QSO Party
May	**30-31**	**CQ WW WPX CW Contest**
Jun.	6-7	N. Y. State QSO Party
Jun.	13-14	ARRL VHF Contest
Jun.	20-21	All Asian Phone Contest
Jun.	27-28	ARRL Field Day
Jun.	27-28	Millwatt Field Day
July	4-5	Venezuelan Phone Contest
July	25-26	Venezuelan CW Contest
Aug.	8-9	European CW Contest
Aug.	22-23	All Asian CW Contest
Aug.	22-23	Ohio QSO Party
Sep.	12-13	European Phone Contest
Sep.	26-27	Delta QSO Party

† Not Official

Utah QSO Party

0000 to 2400 GMT Saturday, April 25

I believe this is a new one sponsored by the Utah DX Association and organized by the Utah A.R.C.

Exchange: RS(T) and QTH. County for Utah, state, VE province, or countries for DX.

Scoring: Three points per each QSO, 5 points if it's with a Novice or Tech (Utah N/T score 5 points for each QSO).

Final Score: Utah—Total QSO points × (states + provinces + DX countries) worked on each band.

Frequencies: C.W.—1810 and 60 kHz up from bottom of each band. S.S.B.—3980, 7280, 14280, 21380, 28110. Novice—3710, 7110, 21110, 28110.

Awards: To the top winners in each state, VE province, and DX country, top three Utah winners, top Novice in each state, and 3 Novice winners in Utah.

Include a large s.a.s.e. with your entry and mail before May 31st to: Utah DX Assn. c/o Curt Wilbur, K7CU, P.O. Box 27311, Salt Lake City, Utah 84127.

Tin Plate QSL Card

This special event sponsored jointly by the Steelworkers A.R.A. and the Steubenville A.R.C. will be held May 1st through May 10th coinciding with the annual Steel Mark Month.

A multicolor 5 × 8 QSL card made of tin coated steel will be awarded to all stations working hams from the Tin Plate Capital of the World, Weirton, West Virginia. The cards are encased in a clear plastic holder supplied by the National Steel Corporation.

Look for stations calling "CQ Tin Plate" on the low end of the General portion of each band, phone and c.w., 10 through 80 meters. Also check the West Virginia Net each night, 2200Z on 3990 kHz. Six and two meter contacts will also be honored.

Include 30¢ in postage with your QSL card (foreign stations $1.60 in US currency or equivalent in IRC's) and send it to: Tom Hannen, WD8ILA, R.D. #1, Box 161 P, Weirton, WV 26062.

USS Croaker Expedition

1400 Sat. to 1600 UTC Sun., May 2-3

Not a contest, but an unusually interesting activity. The Amateur Radio and Electronic Assn. of New Jersey is making a mini-expedition to Groton, Connecticut and will be operating from the submarine USS Croaker.

The event will commemorate the anniversary of the sub's commission into service during WW II.

WA2SLK, WB2TGM, W0OGJ, and KA2IJM will maintain the following schedule from the sub's radio room.

A special QSL card will be issued to all stations making a contact with the USS Croaker.

Time (UTC)	Band	Freq.
1400-1600	15m phone	21.355-21.375
1600-1800	15m cw	21.035-21.045
1800-2000	15m cw	21.110-21.120
2000-2200	15m phone	21.355-21.375
2200-2400	20m cw	14.035-14.045
0000-0200	80m phone	3.900-3.920
0200-0400	80m cw	3.73-3.75
0400-0600	40m cw	7.035-7.045
0600-0800	40m phone	7.235-7.255
0800-1000	20m phone	14.300-14.320
1000-1200	40m cw	7.130-7.140
1200-1400	15m phone	21.355-21.375
1400-1600	15m cw	21.035-21.045

During the entire operation 2 meter f.m. will be active on both local and simplex frequencies. If you are in the area check in and visit the fellows.

No call was given, but it is assumed that one or each of the above calls may be used.

Contact Charles Burke, WA2SLK, Box 164A, R.D. #1, Georgia Tavern Rd., Farmingdale, NJ 07727 for any additional information.

Mount Clemens Operation

1400-2000Z, Sat.-Sun., May 2-3

Another special event, this one organized by the L'Anse Creuse A.R.C. of Mount Clemens, Mich.

The Club will set up a station and operate from the Train Depot where Tom Edison as a boy had his own telegraph line between the Depot and downtown Mount Clemens.

Operation will be 15 kHz from the bottom of the General phone bands and 40 kHz from the bottom of the General c.w. bands, also 15 kHz from the top of the Novice bands. The call will be W8LC.

A special 8½ × 11 QSL certificate will be available to all stations working W8LC.

Send your QSL and a size 10 or larger s.a.s.e. to L'Anse Creuse A.R.C., W8LC, P.O. Box 72, Utica, Mich. 48087.

(These three events—the Tin Plate QSL, the USS Croaker Expedition, and the Mount Clemens Operation—are not contests and should really appear in Ed Hopper, W2GT's column. Sorry Eddie, but time did not permit me to get this to you in time—Frank.)

Alexander Volta RTTY

1200-1200Z, Sat.-Sun., May 2-3

The SSB & RTTY Club of Como and the Associazione Radioamatori Italiani organized this contest to honor the Italian discoverer of electricity, Alessandro Volta.

Both single and multi-operator on all bands, 10 through 80 meters. Also SWL category.

Exchange: RST, QSO no., and zone (CQ).

Points: Contacts between stations in same zone, but not same country, 2 points. All other contacts with stations in other zones are scored in accordance with the Exchange Point Table. Contacts on 10 and 80 are worth double.

Multiplier: Each DXCC country and each USA, VE, and VK call district worked on each band.

Final Score: Total exchange points × total multiplier from each band × total number of QSO's.

Scoring for SWL's is based on stations and messages reported.

Awards: To the top stations in each class in each country and each district in the USA, VE, and VK.

Use a separate log sheet for each band and include a summary sheet with all the essential information.

Logs must be received by June 20th and go to: G. Vulpetti, I2VTT, P.O. Box 37, I-22063 Cantu, Italy.

DARC "Corona" 10M RTTY

1100 to 1700Z, Sunday, May 10

This is the second of a series of four contests that will be held this year. The next ones will be held on September 26th and November 8th.

Check the March Calendar for details.

Logs go to: Klaus K. Zielske, DF7FB, P.O. Box 1147, D-6455 Erlensee, West Germany.

County Hunters S.S.B.

Three Periods (GMT)
0001 to 0800 Saturday, May 2
1200 Sat. May 2 to 0800 Sun. May 3
1200 to 2400 Sunday, April 13

This is the 9th annual contest sponsored by Mobile Amateur Radio Awards Club to increase activity for the County Awards program.

Emphasis is on mobile operation. Fixed stations may work other fixed stations but once only regardless of the band. Mobiles may be worked for each county or band change. Mobiles contacted on a county line count as one contact but two multipliers.

Exchange: Signal report, county and state, country for DX stations. (Mixed mode contacts permitted provided one station is on s.s.b.)

Points: Contacts with a fixed W/K or VE, 1 point. If it's a DX station, 5 points (KH6 & KL7 are DX). Contacts with a mobile, 15 points. (The portable designation has been dropped and portables will be considered as fixed stations.)

Multiplier: Each U.S. county and each VE station worked.

Final Score: Total QSO points times (counties + VE stations) worked.

Frequencies: 3920-3940, 7220-7240, 14275-14295, 21375-21395, 28625-28650. And there is a "Mobile Window" as follows: 3925-3935, 7225-7235, 14280-14290. This space has been set aside for working mobiles only.

Awards: Certificates to the Top 10 fixed and mobile stations in the U.S. and in Canada, and to the highest scoring station in each DX country. There are four plaques: overall winning U.S. or Canadian, DX station, and 1st and 2nd place mobiles. Only single operator stations are eligible.

It is suggested you write to W0QWS for detailed rules and log and summary sheets. Include a large s.a.s.e.

All entries must be received by June 1st and go to: John Ferguson, W0QWS, 3820 Stonewall Ct., Independence, MO 64055.

USSR "CQ - M" Contest

Starts: 2100 GMT Saturday, May 9
Ends: 2100 GMT Sunday, May 10

No official announcement was received this year. Following is the format used last year and hope its okay.

Do not limit your operation to working the USSR only. It's a worldwide type contest same as our *CQ WW*. Contact may be made on c.w. or s.s.b., 3.5 through 28 MHz. The same station may be worked on each band but not both modes for QSO and multiplier credit. Contacts via Oscar count as an extra band when made on 144 to 2 MHz.

Classes: (A) Single operator, single band. (B) Single operator, all band. (C) Multi-operator, single transmitter, all band. (D) S.W.L.

Exchange: RS(T) plus a 3 figure QSO number. The USSR stations RS(T) plus the number of their region (oblast).

Points: Contacts between stations on the same continent 1 point, different continents 3 points. Own country may be worked for multiplier credit but no QSO points.

Multiplier: Is determined by the number of countries worked on *each band*. The USSR "R-150-S" list is the standard, which essentially is the same as our DXCC plus the following additions: Oblasts 002, 013, 014, 056, 084-5-6-7-8-9, 090-1-2-3-4-5-6-7-8, 159 and UA1 Novaya Zemlya, UA0 Kuril Is., UA0 New Siberian Is.

Final Score: Total QSO points from all bands times the country/oblast multiplier from each band.

The s.w.l.'s get 1 point for reporting one station exchange, 3 points if both stations and their exchange.

Awards: For foreign station winners. Class (B) and (C) a Trophy donated by the USSR *Radio* magazine. Class (A) and (D) special medals and badges. And badges to everyone contacting at least 10 USSR stations.

Contest contacts may be credited for USSR awards in lieu of QSL cards if the request is made with your entry. R-150-S, R-100-0, W-100-U, R-15-R, R-6-K, R-10-R.

Mailing deadline is July 1st to: Krenkel Central Radio Club, "CQ-M" Contest Committee, P.O. Box 88, Moscow, USSR.

World Telecomm. Contest

Phone: 0000-2400 GMT. Sat., May 9
C.W.: 0000-2400 GMT Sat., May 16

This activity is sponsored by the L.A.B.R.E. to commemorate "World Telecommunications Day" (May 17th).

It's a world wide contest, the object being to contact as many stations as possible in other ITU Zones. Scoring will be based on all-band operation. Single operator and multi-operator, phone and c.w.

Exchange: RS(T) plus your ITU Zone number.

Scoring: QSO points as follows. Between stations in (1) same country, 0 points (but okay for multiplier); (2) dif-

ferent country, same Zone, 1 point; (3) different Zone, same continent, 3 points; (4) different Zone, different continent, 5 points.

Final Score: Total QSO points multiplied by different ITU Zones worked. The same station may be worked on each band for QSO points but Zones are counted only once.

Awards: Diplomas to the highest scorers, single and multi-operator, in each country. Gold, silver, and bronze medals to the top three world single operators. A silver plate to the top multi-operator station. Separate awards for phone and c.w. Additional awards if participation warrants.

The ITU Trophy goes to the country with the highest aggregate single operator scores. The Trophy remains in the possession of the national association of that country affiliated with the IARU, for one year. It is retired by the country winning it 3 times in a 5 year period.

Mail logs before June 30th to: L.A.B.R.E., U.I.T. Contest Co-ordinator, P.O. Box 07-0004, 70.000-Brasilia, Brazil. Include a self-addressed label and IRC's for results.

Rocky Mountain QSO Party

Starts: 1800 GMT Saturday, May 9
Ends: 2400 GMT Sunday, May 10

This year's party is again being sponsored by the Arapaho R.C. of Littleton, Colorado. Stations outside the Rocky Mt. Division will work RM stations only; those within the Division may work anyone. The same station may be worked on each band and mobiles in each county change.

Exchange: RS(T) and state. RM stations, Colorado, New Mexico, Utah, and Wyoming will also include their county.

Novices will identify with /N, Club stations /C, and Mobiles /M in their call.

Scoring: Contacts on phone 1 point, on c.w. 2 points, and Club station QSO's 3 points.

Rocky Mt. stations multiply their total QSO points × (states + RM counties + DX countries) worked (max. of 5 DX mult.).

Outside RM Division, total QSO points × (RM states + RM counties) worked on each band.

Bonus Points: 50 points for working 5 RM Novices. 100 points to RM Mobiles operating from 3 or more counties. And 100 points to Club stations with at least 5 operators (min. 10 QSO's per operator).

Final Score: QSO points × multiplier + bonus points.

Frequencies: C.W.—3560, 7060, 14060, 21060, 28060. S.S.B.—3900, 7270, 14300, 21370, 28570. Novice—3725, 7125, 21125, 28125.

Awards: To the top scorers in each state, each DX country, Novice in each state, and the Top Mobile in each RM state. Club entries will compete for the "Silver Dollar" award.

Submit logs including a large s.a.s.e. no later than June 15th to: Buster Boatman, KAØCLS, 8973 W. Harvard Drive, Lakewood, Colo. 80227.

Florida QSO Party

Saturday, May 16, 1400 to 1900Z
Sunday, May 17, 0001-0500 & 1500-2300Z

This is the 16th annual QSO Party sponsored by *Florida Skip*. This year the Racal-Milgo A.R.C. is running it.

The same station may be worked on each band, phone and c.w. Separate logs are required for each mode. Florida stations may work other in-state stations for QSO points.

Classes: Florida stations are divided into two classes. Class A is portables and mobiles using emergency power running 200 watts or less, inside Florida but outside their own county. Class B is all other single operator stations in Florida.

Exchange: RS(T) and QTH. County for Florida; state, VE province, or country for others.

Scoring: *For Florida*—One point per QSO. Multiply total by sum of states (49), provinces (12), and DX countries (27) worked (max. multiplier of 88).

Out-of-state—Two points for each Florida contact. Multiply total by Florida counties worked (max. of 67).

Frequencies: C.W.—3555, 7055, 14055, 21055, 28055. S.S.B.—3945, 7279, 14319, 21379, 28579, 50.2, 146.52.

Awards: Certificates, both phone and c.w., to the top single operator score in each state, province, DX country, and each Florida county. Five plaques as follows: To the top single operator score in Florida and out-of-state, both on phone and c.w., and to the Florida club with the highest aggregate score.

There is a disqualification clause for excessive dupes or multipliers and other obvious reasons. Disqualified stations or operators will be barred from next year's party.

Phone and c.w. are separate contests and require separate logs. A dupe sheet is required from stations making 200 or more contacts.

Include a summary sheet showing the scoring and other essential details, the usual signed declaration, and your name and address in block letters. Also include a 15¢ stamp (maybe 20¢) for the *Florida Skip* issue with the results.

All entries must be received before June 15th and go to: Florida Skip Contest Committee, P.O. Box 501, Miami Springs, FL 33166.

Massachusetts QSO Party

Starts: 1600 GMT Saturday, May 16
Ends: 0200 GMT Monday, May 18

This year's party is again being sponsored by the Greater New Bedford Contestors (W1FJI, N1AS, and K1KJT).

The same station can be worked on each band and mode. Cross band contacts are not permitted. Massachusetts stations may work each other for QSO and multiplier credit. Mobiles and portables in each county change.

Exchange: RS(T) and QTH. County for Mass.; state or province for others.

Scoring: Two points for each s.s.b. contact; 4 points if it's on c.w.

Mass. stations multiply total QSO points × (states + provinces + Mass. counties) worked for final score.

Out-of-state stations, total QSO points by number of different Mass. counties worked (max. of 14).

Add 50 bonus points to your total score for each of the 3 sponsors worked (once only).

DX contacts count for QSO points only.

Frequencies: C.W.—1810, 3560, 7060, 7120, 14060, 21060, 21150, 28060, 28120. S.S.B.—1820, 3960, 7260, 14290, 21390, 28590, 50.110.

Awards: Certificates to the 1st, 2nd, and 3rd place winners in each Mass. county, and in each state (VE provinces?). Two special awards to the highest aggregate club score in Mass. (min. of 3 logs) and to the Mass. station submitting the all time highest number of QSO's (record now held by K1GSK with 1483 in 1979). Stations working all 3 sponsoring stations will also receive a certificate.

Include a summary sheet with all essential information with your entry. Include 30¢ postage, no envelope, for copy of results and awards.

Mailing deadline is June 30th to: Larry Purcell, N1AS, 146 Armour Street, New Bedford, Mass. 02740.

Michigan QSO Party

Two Periods GMT
1800 Sat. May 16 to 0300 Sun. May 17
1100 Sun. May 17 to 0200 Mon. May 18

This year's party is again sponsored by the Oak Park ARC. The same station may be worked on each band and mode, portable/mobile in each county change. Contacts between Michigan counties are permitted for multiplier credit.

Exchange: RS(T), QSO no., and QTH. County for Mich.; state or country for others.

Scoring: *For Mich.*—One point for phone contacts, 2 points if on c.w., and 5 points if with W8MB. Multiply total by (states + countries + Mich. counties) worked. KH6 and KL7 count as states, VE as a country.

Out-of-state—one point for phone, 2 points on c.w., 5 points if it's with Club station W8MB. Multiply total by Mich. counties worked (max. 83).

VHF scoring same as above but add multiplier from each band for total multiplier. Oscar contacts are worth 5 points. Repeater contacts not allowed.

Frequencies: CW—1810, 3540, 3725, 7035, 7125, 14035, 21035, 21125, 28035, 28125. S.S.B.—1815, 3905, 7280, 14280, 21380, 28580, V.H.F.—50.125 and 145.025.

Awards: Certificates to top single operator scorers in each state, country, and Mich. county. There are also plaques and trophies for high Mich. score, out-of-state, v.h.f., and aggregate club score in Mich.

Party contacts do not count toward the Mich. Achievement Award unless one fact about Mich. is communicated.

A summary sheet is requested, showing the scoring the other pertinent information, and a signed declaration that rules and regulations have been observed.

Results will be mailed to all entries. Mailing deadline is June 30th to: Mark Shaw, K8ED, 3810 Woodman, Troy, Mich. 48084.

Michigan Achievement Award

All contacts with Michigan stations made during Michigan Week, May 16-23, as well as Party QSOs, may be used for this award if the following requirements are fulfilled.

1. Michigan stations—Submit a log with information, name and address of station worked if possible, of 15 or more QSOs with out-of-state or DX stations, with information about Michigan.

2. Out-of-state stations including Canada—Submit a log with information, name and address if possible, of at least 5 Mich. stations worked who related facts about Michigan.

3. DX stations—Work at least one Mich. station, with log information, name and address, and relate fact about Michigan given by the station worked.

4. Only contacts made during Michigan Week, May 16-23, are valid for this award.

Applications for certificates must be postmarked no later than July 1st 1981 and mailed to: Governor William Milliken, Lansing, Mich. 48902.

(Facts about Michigan: State Bird, Robin; Fish, Trout; Flower, Apple Blossom; Tree, White Pine; Stone, Petoskey. Or any local fact.)

CQ WW WPX C.W. Contest

Starts: 0000 GMT Saturday, May 30
Ends: 2400 GMT Sunday, May 31

Just a reminder of our WPX C.W. Contest coming up at the end of this month.

Results of last year's contest indicate that this one has come of age and can now be listed as one of the "Big Ones."

Rules and scoring are exactly the same as for the s.s.b. counterpart run last March. Complete rules can be found in the February 1981 issue of *CQ*, with a follow-up in the March Calendar pointing out a couple of modifications.

This year 15 plaques are being awarded to all areas of the world, and of course a generous supply of attractive certificates (see cover of March *CQ*).

All WPX contest logs are now being processed by Bernie Welch, W8IMZ, and his Committee, so you now have a choice of two addresses.

WPX Contest Director
Bernie Welch, W8IMZ
7735 Redbank Lane
Dayton, Ohio 45424 USA

and

CQ Magazine, WPX Contest
76 N. Broadway
Hicksville, NY 11801 USA

Mailing deadline is July 10th and be sure to indicate C.W. on the envelope.

1980 CQ World Wide DX Contest High Claimed Scores

S.S.B.

The following are S.S.B. high-claimed scores as of January 1, 1981. These are raw scores only, subject to verification.

USA
Single Operator
All Band

K7RI	3,010,860
K1VTM	2,694,282
W1ZM	2,678,325
W2PV	2,612,984
K1AR	2,375,688
W6BH	2,301,200
K5RC	2,291,400
N3BB	2,235,990
W3GRF	2,196,678
N6RO	2,022,720
N1GL/4	1,887,480
N2LT	1,723,722
KB3AG	1,634,290
AA2Z	1,603,440
N2IC	1,602,990
K1DG	1,582,462
K4PI	1,567,959
K6HNZ	1,480,740
N2SS	1,478,016
K6RR	1,441,134
N6AR	1,337,379
K2DM	1,313,500
K5TA	1,307,665
N7TT/2	1,241,768
K8MN	1,239,768
K8GL	1,138,742
K5KLA	1,126,062
W2GD	1,100,190
W2TA	1,014,154
K9BGL	1,009,372

Single Band
1.8 MHz

N7RK	11,200
K5UR	2,324
W4PZV	1,035
AD4U	972

3.8 MHz

N4KE	44,910
AB1A	24,309
W8ZF	19,992
WA4SVO	18,894
W7RK	11,200
K9WZB	10,620

7 MHz

KM4K	45,816
K2IGW	43,092
AD8C	32,153
WB9QPN	32,032
K4JRB	30,750
WA6KKM	30,745
K3UU	30,000

14 MHz

K2HFX	475,924
K9RF	316,480
W8UA	268,280
K0KX	266,000
N4CT	262,240
K0DD	256,795
K1NG	255,816
W6YA	251,856
K1WB	213,856

21 MHz

KM6B	878,128
K9DX	686,070
K6EVR	502,440
W9RE	427,710
W5JW	414,528
W7KHN	400,272
W1NG	367,928
N2PP	349,888
AK0A	286,860
K6XV	279,006

28 MHz

N7DD	759,750
W0YK	665,379
W7ISX	608,495
W5MYA	553,868
W7WA	551,152
K0ZX	509,229
KT4W	490,620
K7HCD	474,938
WB4DWD	463,680
K4RV	457,905
K3KG	439,155
W2IIJ	426,750
K6EWL	424,168
K5TJ	377,953
W6KJ	372,875
KB6OZ	327,736
N4NW	319,740
W8TWA	307,088

Multi-Single

K0UK	4,097,840
K3LR	3,574,664
N4ZC	3,411,725
K8NA	3,353,544
W3BGN	3,280,200
WB2FZO	3,042,200
N1TZ	2,739,083
N4WW	2,690,014
W9DUB	2,327,768
K1RX	2,252,536
N4HB	2,242,654
K8GG	1,803,386
K9KA	1,747,568
WB2ITR	1,737,546
K1RU	1,669,695
K2FL	1,615,860
W0SD	1,606,950
W1YN	1,599,750
K1RQ	1,596,320
K5KG	1,542,024

Multi-Multi

K9XR	6,669,950
W3MM	6,512,046
W3LPL	6,394,514
K3WW	6,393,656
K2UA	6,649,866
N5AU	6,214,088
W4DR	5,564,789
K1CC	5,286,456
AB0I	5,165,225
W6RDF	5,042,072
W3FA	4,694,400
KN6M	4,038,749

DX
Single Operator
All Band

EA8AK	9,017,540
KP2A	5,254,080
N2BA/HI8	5,096,741
YX2AMM	4,907,786
OH6JW	4,591,286
XE2MX	4,193,280
DJ4PT	4,182,321
FO0DX	3,703,203
PA2TMS	3,421,856
AH2E	3,385,836
I6FLD	3,202,850
EA2IA	3,004,068
DK8NG	2,871,176
DJ3HJ	2,686,608
OH1IJ	2,501,870
ED3AZW	2,437,614
8R1K	2,366,378
OH3YI	2,355,780
HA5NP	2,287,200
VE7BTV	2,234,295
VO2CW	2,131,152
YU3EA	2,121,795
5W1DA	1,929,437
JA1ELY	1,909,415
EA1PT	1,526,252
HZ1HZ	1,359,934
DK0SU	1,359,560
CE5CN	1,284,986
VE3ICR	1,284,228
VE7WJ	1,250,565
HB0BOE	1,220,394
OA8AX	1,184,644
EE7TV	1,082,120
ZS6AF	1,064,160
SM0DJZ	1,006,434

Single Band
1.8 MHz

YU3EF	11,385
UC2ACA	9,920
UB5MDA	6,072
VE3BBN	5,564
VE1BNN	5,184

3.8 MHz

4M3AZC	185,007
HI8JAG	90,306
I4AVG	66,598
YU4VBR	53,742
YU3MY	49,421
G3ZGR/VP9	38,016
UQ2GAG	37,524
OR6JG	33,600

7 MHz

SP3DOI	281,970
I6NOA	233,996
CT2CE	173,826
JA2BAY	161,568
UA1DZ	121,680
ZL4BO	109,040

14 MHz

I5NPH	1,084,140
I2VRN	958,210
6D7LCH	936,243
OH8SR	830,088
DL8PC	790,500
YU1NUF	741,244
I1ZEU	704,773
LU4MEE	691,480
G3VPW	659,492

21 MHz

LU7MAL	1,328,544
YU3EY	1,235,675
KG6DX	1,213,940
OH0AM	1,043,178
VP2MPB	871,125
G4CNY/VP9	854,294
VE7IN	780,692
DL8QS	746,320
CX3BBH	706,221
LU5MBL	681,856

28 MHz

KH6XX	1,762,332
I0MGM	1,334,762
I5SDG	1,312,794
I2PJA	1,292,984
4X0U	1,187,200
YU3EW	1,116,065
VP2VDH	1,106,000
UR2QD	1,088,514
YV3BKA	1,086,740
JH1AJT	1,005,822
OK1TA	955,472
4Z4LG	922,054
HA9RU	844,085
EA6ET	809,958
OH3XZ	802,746
VP9AD	759,156
IT9HLO	743,808
YU3FK	737,380

Multi-Single

I4RYC	10,497,585
EI9CB	9,408,087
UK5IAZ	9,159,771
GW6GW	9,047,040
IV3PRK	8,505,891
KC6ZR	7,605,360
UK9AAN	7,302,272
YU7BCD	6,948,924
CZ6ZT	6,641,900
OH2AA	6,419,523
F3TV	6,046,188
FM7AV	5,710,096
HK3AXT	5,649,820
UK2BAS	5,603,223
UK2PCR	5,486,250
R5M	5,441,336
UK2BBB	5,382,980
DJ1BC	5,050,734
UK6APA	4,831,008
HG6V	4,751,919
VE1DXA	4,700,898
KL7Y	4,526,571

Multi-Multi

HD1QRC	19,123,720
ZZ5OW	11,317,500
LZ7A	10,220,756
HB9H	7,223,187
KL7RA	6,411,816
JA3YKC	5,341,520
JA3YBF	5,335,440
KL7R	5,265,600

QRPp

G4BUE	493,884
TG9GI	409,322
SP2FAP	222,148
AI6V	194,040
W8ILC	161,102
AJ7S	145,666

C.W.

The following are the CW high-claimed scores as of February 10, 1981. These are raw scores only, subject to verification.

USA
Single Operator
All Band

W3RJ	3,738,320
K1AR	2,836,610
K1KI	2,675,843
N2LT	2,648,264
K1RU	2,593,940
K9DX	2,533,335
W1KM	2,375,260
K5GA	2,358,892
W2REH	2,280,500
W2VJN	2,099,202
N6RO	2,075,920
K8NZ	1,990,170
W2YV	1,800,395
AE2A	1,786,275
W2IB	1,731,024
AD8P	1,718,496
K2SX	1,636,244
K8GL	1,632,120
WA7NIN	1,615,680
AI9J	1,558,800
N7DF	1,512,848
N6TR	1,509,228
N6AR	1,499,366
AA4S	1,403,600
N1AC	1,398,720
AA2Z	1,387,244
K4PI	1,379,436
W7NI	1,345,005
W6RR/7	1,290,420
N7TT/2	1,286,477

Single Band
1.8 MHz

W8LRL	5,600
AE6U	5,046
N4IN	4,896
K6SE	4,400
AA1K	3,751
K5UR	3,503
W4PZV	3,210
K5NA/2	1,950

3.5 MHz

WB2FZO	141,298
W3MFW	68,773
W1RR	65,487
K3JG	31,042
K8CX	23,590
W6MUR	21,912
N7CW	18,422
AA4AK	16,520

7 MHz

K0RF	291,410
W5WMU	230,272
W5UN	228,172
AI6V	171,600
K7UR	143,565
W8ZF	110,715
K0KR	105,200
W7DAZ	104,976

14 MHz

W5FO	318,622
N4CT	261,690
N4TZ	247,638
N4RG	226,653
W6YA	215,327
N5AU	209,608
K5KG	209,300
W4AAV	180,774
W7MB	156,633
K4OAQ	133,870

21 MHz

W1RM	417,340
N4WW	403,742
N8JW	374,346
K5MR	361,560
K6EWL	332,100
N2WT	313,625
K4RV	307,456
KM5R	297,000
K9QVB	278,244
WA6IQM	256,256

28 MHz

W6PU	474,472
W0ZV	340,864
K1TN	293,009
W0YK	291,648
W8WPC	284,708
W5JW	263,901
K8CX	256,500
W8UVZ	246,340
AF5M	234,865
K6OZL	227,124

Multi-Single

N4AR	3,324,672
W4NL	3,310,590
W3BGN	3,214,862
N1TZ	2,862,980
W7XR	2,308,789
N0NO	2,204,298
W6BA	2,143,650
K6XV	1,635,606
K2FL	1,542,699
N4HB	1,533,652

Multi-Multi

K2UA	8,433,414
K1ZZ	7,787,892
K8LX	7,634,846
N9MM	7,139,474
K3WW	6,794,622
W3FA	6,321,321
W3MM	6,300,394
K9XR	5,727,607
W3GM	5,024,232
K1VV	4,391,068

QRPp

W0KEA	268,576
AJ7S	203,001
N2GC	152,358
WA6POC	125,218
W9PNE	109,611
W5VGX	88,536
KA1EFF	27,332

DX
Single Operator
All Band

9Y4VT	6,116,945
HK3AXT	3,749,214
8P6J	3,344,024
EA2IA	2,931,570
AA6AD/4X	2,904,825
OH2MM	2,597,484
OZ1LO	2,565,780
KH6ND	2,500,160
G3FXB	2,376,829
OH6DX	2,079,382
VE7WJ	1,927,492
DK3BJ	1,890,737
AL7H	1,706,406
HH2VP	1,642,757
XE2MX	1,511,190
JH1EDB	1,478,618
YV1NX	1,385,253
4S7BB	1,352,064
EA8AK	1,294,700
KL7RA	1,290,121
HZ1HZ	1,199,360
JA1IDY	1,097,382
OK2BLG	1,086,624
G4FAM	1,060,380
OK3OM	1,044,012
JA6BZI	1,042,494
SP2FAP	1,035,360
JH1OGC	1,003,674
JA1BWA	1,002,483

Single Band
1.8 MHz

DJ4AX	14,904
YU3TBG	9,660
OK1DIJ	7,831
SP9DH	7,622
EA2OP	7,448
OZ1W	5,016
4X4NJ	4,966
SP5IXI	4,371

3.5 MHz

HI8JAG	107,730
DJ2BW	107,706
EA8RL	88,722
ZL1BQD	85,998
YU4EBL	74,314
KP4KK/DU2	66,732
YU4VBR	55,584
SM4CAN	51,496

7 MHz

CX8BBH	184,254
JA2INO	153,088
4U1UN	119,340
I2VXJ	102,102
G3IGW	98,855
G4CNY	94,860
GW3NYY	94,247
JR1PNX	84,375

14 MHz

VP2KAA	1,244,782
PJ2CC	1,209,022
OH5XT	583,205
K2LE/DU2	521,031
OH6UM	477,978
SM0AJU	425,073
G4BUE	418,912
YV2AS	395,312
YU4GD	386,750
OH5GO	375,998

21 MHz

HD0E	1,147,317
VP2KAC	1,075,407
ZV3CFD	866,160
KV4FZ	833,816
I4IND	701,900
CX7CO	486,069
JH3LPT	465,430
SM5GMG	413,127
ZL1AMO/C	411,714
JA9YBA	389,259

28 MHz

KG6DX	801,990
VP2KAE	603,680
OK1ALW	570,368
4X4UH	554,645
KH6XX	520,650
VE3BMV	504,063
OK2BTI	416,795
OK2RZ	383,642
ZF2DW	360,635
OA4DW	339,192

Multi-Single

RG6G	9,741,699
DL0AA	4,276,344
F3TV	3,295,593
YU4FRS	3,014,892
KH6BZF	2,916,010
CZ6ZT	2,827,572
TG9NX	2,686,270
GB2WW	2,515,667
EA3AKD	2,177,296
SM5AOE	2,087,088
LU1DZ	2,075,736
VE3KKB	1,580,082
LA1H	1,542,996
VE1DXA	1,538,500

Multi-Multi

NP4A	17,692,173
6Y5YL	11,698,260
OH3AA	7,377,184
5Z4MM	5,018,832
JA3YBF	4,705,470
JA3YKC	4,628,520

QRPp

SM5CTT	251,150
HP1XAT	198,951
I4KRF	54,112
DF4RD	36,640
F9YZ	20,424

CQ BOOK SHOP

3 New Book Choices This Month

The Shortwave Propagation Handbook
by G. Jacobs, W3ASK and T.J. Cohen, N4XX
Two leading authorities on propagation have teamed up to produce the definitive book on this subject. Propagation is explained in language the reader can fully understand to produce his own propagation data. 155 pages, paperback, $7.50. Order #C137.

NEW!

Modern Electronic Circuit Manual
by John Markus
3600 circuits from amplifiers to zero voltage reference switches, exhaustively researched and arranged for ease of use. Also included are filters, counters, clippers, circuits, and more. Circuits are fully referenced so further research can be done. 1238 pages, hardcover, $44.50. Order #H160.

Ameco Amateur Radio
Question & Answer Study Guides
Easy-to-understand questions and answers based on the latest FCC study guides, plus sample exams, will help you make sure you're ready to sit for the license tests.
Ameco Amateur Radio General Class Q&A Study Guide, 64 pages, paperback, $1.75. Order #A034.
Ameco Amateur Radio Advanced Class Q&A Study Guide, 64 pages, paperback, $1.75. Order #A035.
Ameco Amateur Radio Extra Class Q&A Study Guide, 64 pages, paperback, $1.50. Order #A036.

CRB Research Series
by Tom Kneitel, K2AES
Directories of scanner frequencies for the VHF aero band (108 to 136 MHz), energy industries and environmental agencies, plus the "top secret" registry of U.S. government radio frequencies. Up-to-date, comprehensive listings of frequencies that would otherwise be hidden from your scanner use.
Energy-Scan, 26 pages, paperback, $5.95. Order #C151.
Air Scan, 26 pages, paperback, $5.95. Order #C152.
The "Top Secret" Registry of U.S. Government Radio Frequencies, 34 pages, paperback, $5.95. Order #C156.

The 10 Meter FM Handbook
by Bob Heil, K9EID
Gives all of the simple details for converting many CB rigs, h.f. transceivers, and commercial gear to operate on 10 meter FM, complete with VHF transverters for use on 6, 2, or 1¼ meters. Also explains the unique systems and propagation characteristics that occur on 10 meter FM. 80 pages, paperback, $4.95. Order #M150.

Federal Frequency Directory: 2-420 MHz Inclusive
by Robert B. Grove
Contains more than 100,000 listings of frequencies, agencies, and locations of active U.S. government communications stations operating in the 2-420 MHz portion of the spectrum. Approximately 260 pages, paperback, $14.95. Order #G136.

Ameco Novice Code and Theory Package
A complete training package containing the 128-page Novice theory course and a 60-minute code cassette, which teaches how to send and receive code up to 8 words per minute, and a 32-page book. Also included are FCC-type code and theory examinations to help even a rank beginner get a ticket fast! $6.95. Order #A024.

NEW!

Electronic Communication (1980 Edition)
by Robert Shrader
The basic practical theory of radio and electronics is presented in a simple step-by-step method. Covers every FCC exam from Novice to Commercial, and is based on the most up-to-date FCC sample exam questions available. Every few pages there is a quiz that tests your comprehension. This is a carefully planned home study program that will help you pass the exams. 783 pages, hardcover, $26.95. Order #H157.

NEW!

From Beverages Thru Oscar—A Bibliography
by Rich Rosen
A complete list of every article that would be of interest to a radio amateur that has been published over the last 65 years. References are from CQ, Ham Radio, 73, QST, proceedings of the IRE and IEEE and Wireless Engineer, and much more. Over 292 magazines are listed with 92 subject areas referenced. Paperback, $27.50. Order #H159.

The Final Exam
by Dick Bash, KL7IHP
Amateur radio license exam manuals proven highly successful in helping hams pass the FCC tests. Material for the books was obtained by interviewing actual applicants for the exams and collecting and researching the questions they had on the exams.
General Class, 118 pages, paperback, $9.95. Order #B153.
Advanced Class, 108 pages, paperback, $9.95. Order #B154.
Extra Class, 108 pages, paperback, $9.95. Order #B155.

The Radio Publications Group—The "Bill Orr Series"
These easy reading classics belong in the library of any active Ham. Loaded with practical how-to information, with tables, charts, and formulas arranged for handy reference.

Beam Antenna Handbook, 200 pages, paperback, $4.95. Order #R143.
Wire Antennas, 192 pages, paperback, $6.95. Order #R144.
Antenna Handbook, 192 pages, paperback, $6.95. Order #R145.
Cubical Quad Antennas, 112 pages, paperback, $4.75. Order #R146.
VHF Handbook, 336 pages, paperback, $5.95. Order #R147.
Better Shortwave Reception, 160 pages, paperback, $4.95. Order #R148.

World Radio TV Handbook 1981
The world's only complete directory of international broadcasting and TV stations—the established, authoritative guide endorsed by the world's leading broadcasting organizations. A comprehensive listing of short-, medium-, and long-wave stations revised and updated to reflect actual conditions. Also includes special features on listening gear, how to adapt older receivers for use today, and DX club activities. 560 pages, paperback, $16.95. Order #B097.

RSGB Radio Communications Handbook
(5th Edition)
First published in 1938, and a favorite ever since, this large and comprehensive guide to the theory and practice of amateur radio takes the reader from the first principles right through to specialized fields such as radio teleprinters, slow-scan television, and amateur radio satellite communications. Two volumes. Expensive, but worth it! Volume 1: 480 pages, hardcover/dust jacket, $23.95. Order #R030-1. Volume 2: 336 pages, hardcover/dust jacket, $21.95. Order #R030-2.

CQ BOOK SHOP
76 North Broadway
Hicksville, NY 11801
Order Date:_____

Name _____
Address _____
City _____
State_____ Zip_____
☐ Check ☐ Master Charge ☐ Visa
Card No._____ Expires_____
X _____
Signature required on all charge orders:

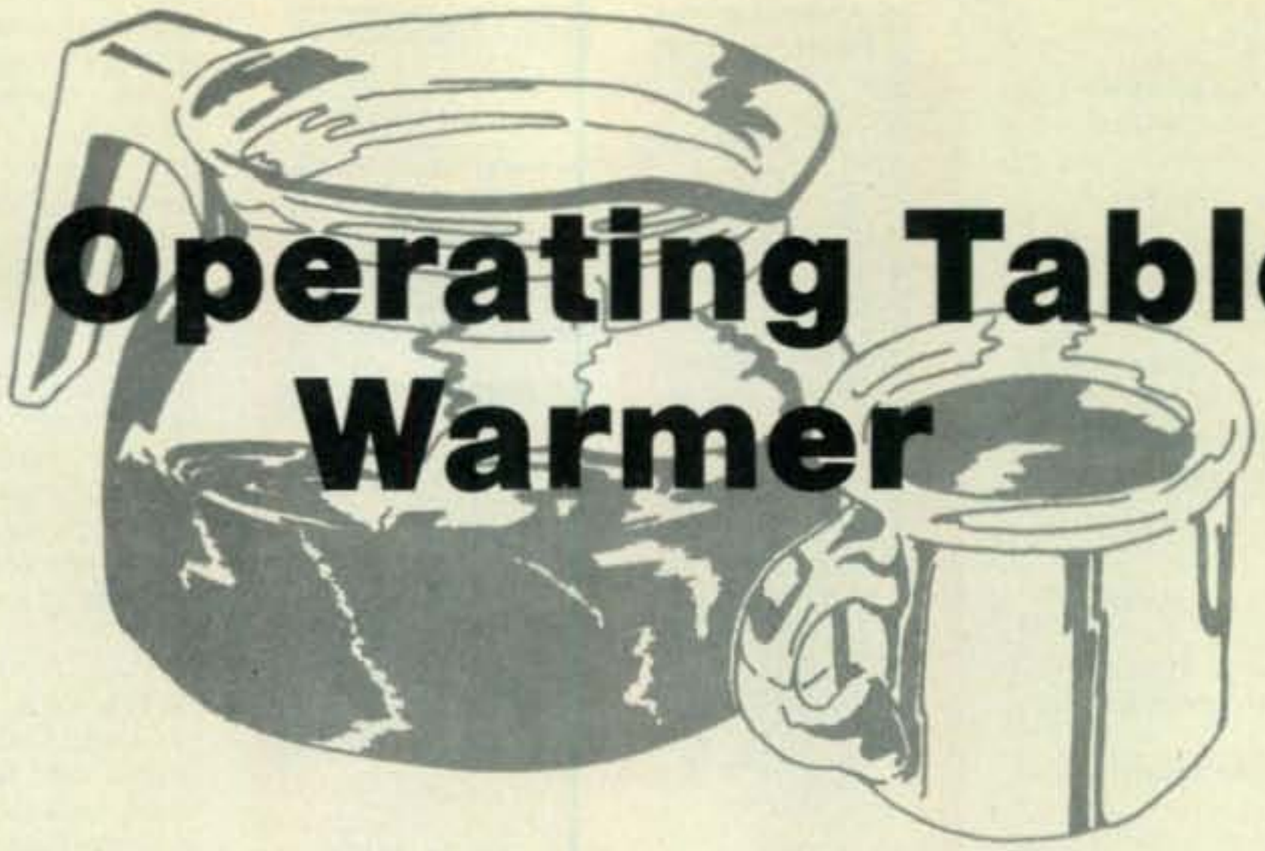
QTY.	ORDER #	TITLE	PRICE	TOTAL

Shipping charges $2.00 per order. Shipping charges waived on orders of $50.00 or more. Books shipped best way. All orders are processed the day they are received, but please allow 30 days for delivery within North America.

Book total	
Shipping Charge	
Grand Total	

Ten cents won't buy a cup of coffee anymore, but ten bucks buys the parts for this op-table coffee-warming ham hotplate.

A $10 Operating Table Cup Warmer



BY MARTIN BRADLEY WEINSTEIN*, W8LBV

It's contest time. Your throat is dry. You and your rig are running hot. But that cup of coffe is as cold as ice, and no matter how hard you try, you can't reach Cora or Mrs. Olsen on 40 meters.

Well, you addicts of the black bean broth, here's a way to keep a cup of whatever cheery and warm. It's as easy as Ohm's law.

The 12.6-volt center-tapped transformer needs a 3-amp rating. You can find what you need at Radio Shack for about five and a half bucks. While you're there, pick up eight of their 10-ohm 10-watt power resistors, a 1 K ¼-watt resistor, 2 LEDs, and a microswitch. As long as you're out shopping, pick up a ceramic tile and an aluminum plate about the same size. You may also need a small hinge, a light spring (one from a ball point pen may do; you'll only need part of it) and a metal box to house it all. Some feet are a nice finishing touch. Oh yeah—pick up a tube of cyanoacrylate adhesive.

Glue the aluminum plate to the ceramic tile and let it dry. Then glue the hinge along one edge. Allowing a ¾-inch margin along the edges, space the power resistors along the bottom of the plate in two rows of four; you may want to angle them. Then glue the resistors to the plate.

Strain relief mount the a.c. power cord to the mounting box. While the tools are out, mount the power transformer and the feet.

Ingenuity time! How you handle this depends on your box. The idea is to let the weight of your coffee cup actuate the microswitch (it's in the primary circuit, so it only needs to be able to handle about 1/3 amp). Depending on the size and weight of the tile, you may need to use a few short sections of spring as a helper.

The aggregate of eight resistors calculates out to 5 ohms for a little over 30 watts of heat. The LEDs act as a pilot to remind you the thing's on and to save you from burned-finger tests.

Before you plug the little devil in, thoroughly check for continuity between any exposed part and the power line, both with the microswitch open and closed. If you find any, you have a potentially lethal situation on your hands. As a double check, even once the first test is passed, probe with a neon line tester to make absolutely certain the gadget is safe.

Then sit back and enjoy a well-earned cup of always hot coffee.

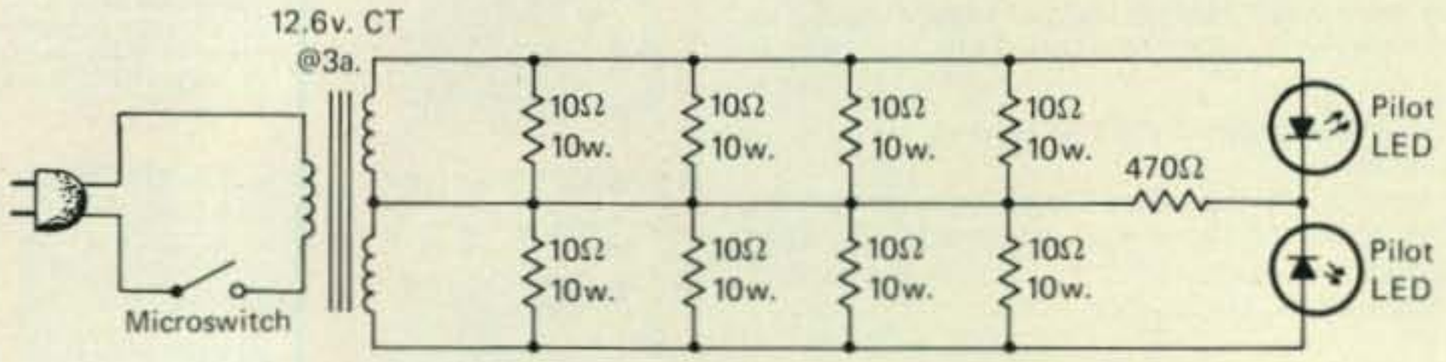


Fig. 1- Circuit of the coffee warmer hotplate.

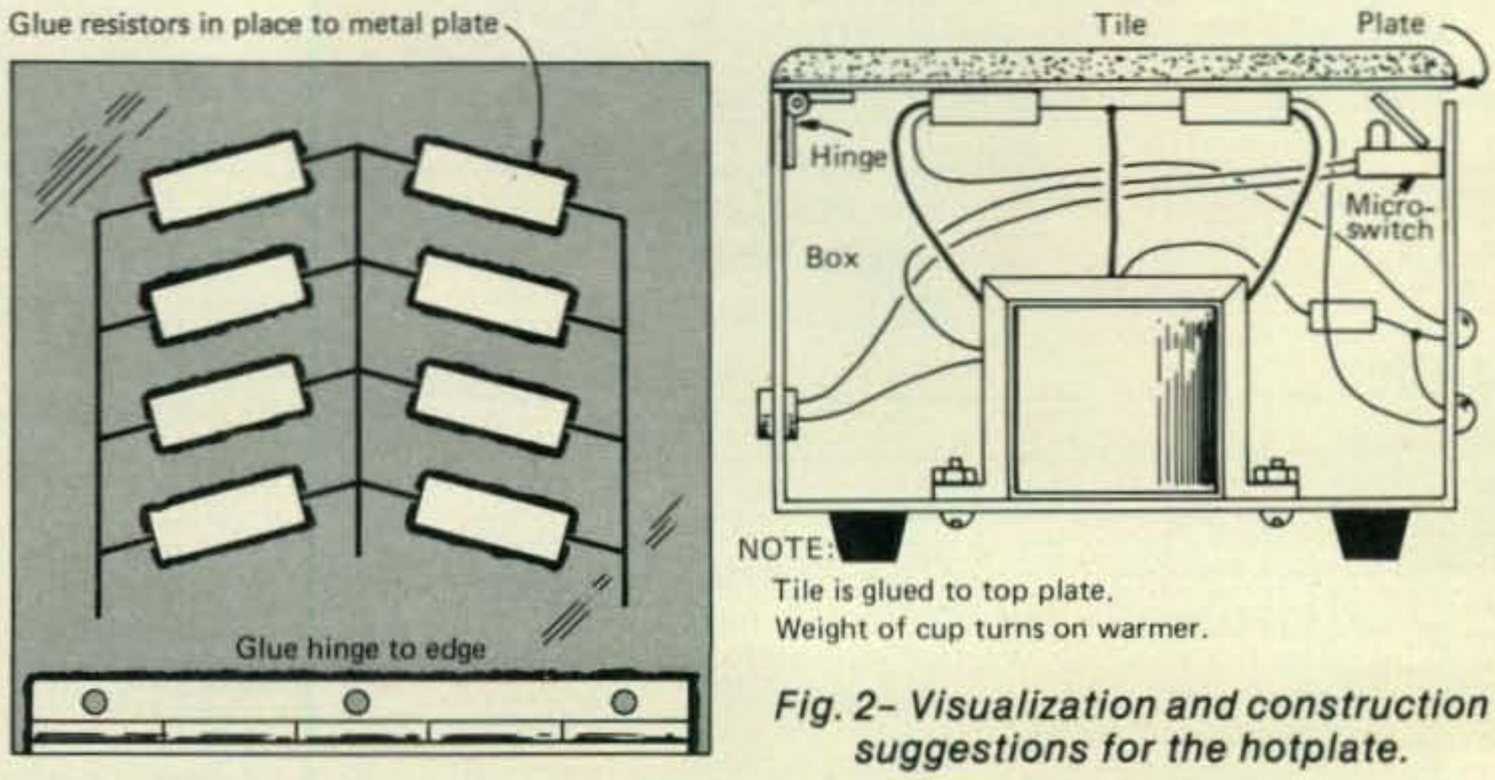


Fig. 2- Visualization and construction suggestions for the hotplate.

*c/o CQ Magazine

Dan's Got It All!

YAESU

Yaesu 902 DM

ICOM

Icom 720

MIRAGE

B-108

TS-830S

KENWOOD

TR-2400

Also In Stock:

B & W - Telex - CDR - MFJ - Nye -
CushCraft - Bencher - HyGain - Larsen - Amphenol - Cubic - Swan

Dan C. Britt, K4URK

Britt's 2-Way Radio

Sales & Service

2508 Atlanta St., Smyrna, GA 30080
Belmont Hills Shopping Center

(404) 432-8006

CIRCLE 46 ON READER SERVICE COUPON

CUSTOM TRANSFORMERS

HEAVY-DUTY
REPLACEMENT TRANSFORMERS

ALPHA A77D Power Transformer	$210.00
ALPHA A77S Power Transformer	$270.00
BTI LK-2000 Plate Transformer	$145.00
COLLINS 30L-1 Power Transformer	$145.00
COLLINS 30S-1 Plate Transformer	$265.00
COLLINS 516F-2 Power Transformer	$110.00
COLLINS KWS-1 Plate Transformer	$175.00
COLLINS PM-2 Power Transformer	$ 95.00
DENTRON DTR 2000L-B Power Transformer	$145.00
DENTRON MLA 2500 Power Transformer	$135.00
DRAKE L4B Plate Transformer	$165.00
DRAKE L4B Outboard Plate Transformer	$210.00
GONSET GSB-201 or 201 MK IV Power Transformer	$145.00
HALLICRAFTERS HT-32 or HT-37 Power Transformer	$110.00
HEATH HA-10 Warrior Plate Transformer	$130.00
HEATH SB-220 Plate Transformer	$135.00
HEATH SB-220 Outboard Plate Transformer	$195.00
HENRY 2K Plate Transformer	$175.00
HENRY 2K-4 Power Transformer	$175.00
HENRY 3K-A Plate Transformer	$185.00
HENRY 3K-A DC Filter Choke	$ 90.00
JOHNSON Thunderbolt Plate Transformer	$140.00
NATIONAL NCL-2000 Power Transformer	$135.00
SWAN MK II or MK VI Power Transformer	$135.00

OFF-THE-SHELF SPECIALS

PLATE XFMR: 2400 VAC @ 1.5 AMP ICAS, 220/240 VAC Pri., 41 LBS	$165.00
PLATE XFMR: 2400 VAC @ 2.0 AMP CCS, 115/230 VAC Pri., 60 LBS	$215.00
PLATE XFMR: 3000 VAC @ 1.5 AMP CCS, 230 VAC Pri., 60 LBS	$215.00
PLATE XFMR: 3000 VAC @ 3.0 AMP CCS, 230 VAC Pri., 120 LBS	$395.00
PLATE XFMR: 3500 VAC @ 1.0 AMP ICAS, 115/230 VAC Pri., 41 LBS	$165.00
PLATE XFMR: 4000/4600 VAC @ 1.5 AMP ICAS, 230 VAC Pri., 60 LBS	$220.00
PLATE XFMR: 6000 VCT @ 0.8 AMP CCS, 115/230 VAC Pri., 41 LBS	$165.00
FILMT XFMR: 5.0 VCT @ 30 AMP, 115/230 VAC Pri., 9.5 LBS	$ 37.50
FILMT XFMR: 5.0 VCT @ 60 AMP, 110/220 VAC Pri., 13.4 LBS	$ 75.00
FILMT XFMR: 7.5 VCT @ 21 AMP, 105/117 VAC Pri., 9.5 LBS	$ 37.50
FILMT XFMR: 7.5 VCT @ 75 AMP, 115/230 VAC Pri., 20.2 LBS	$ 95.00
FILTER CHOKE: 8.0 HY @ 1.5 AMP DC, 10KV Ins., 41 LBS	$165.00
SWINGING CHOKE: 5-30 HY @ 1.0 AMP DC, 10KV Ins., 23 LBS	$115.00
FILMT. CHOKE: 30 AMP Bi-Filar wound RF filament Choke (1.8-30 MHZ)	$ 12.00

ALL TRANSFORMERS AND CHOKES GUARANTEED FOR 12 MONTHS
Many others also available. Write for free list or quote on any custom transformer, choke, or saturable reactor.

PETER W. DAHL CO. VISA master charge

4007 Fort Blvd., El Paso, Texas 79930 Telephone (915) 566-5365

CIRCLE 20 ON READER SERVICE COUPON

The HD-73 Rotator by Alliance

A precision instrument built to last.

The HD-73 combines Dual-Speed rotation and a single 5-position switch with the clear visibility of a backlit D'Arsonval meter. So you get precise control for fast and fine tuning. And the advanced technology of HD-73 is backed by quality construction. Heavy duty aluminum casings and hardened steel drive gears. Lifetime factory lubrication that withstands -20°F. to 120°F. temperatures. The superior design of the HD-73 mast support bracket, with optional no-slip positive drive, assures perfect in-tower centering with no special tools. Automatic braking minimizes inertia stress. Easy to install, a pleasure to use. The HD-73 is on your wavelength. Write for performance details today.

I want to tune in on HD-73. CQ

☐ Send complete details

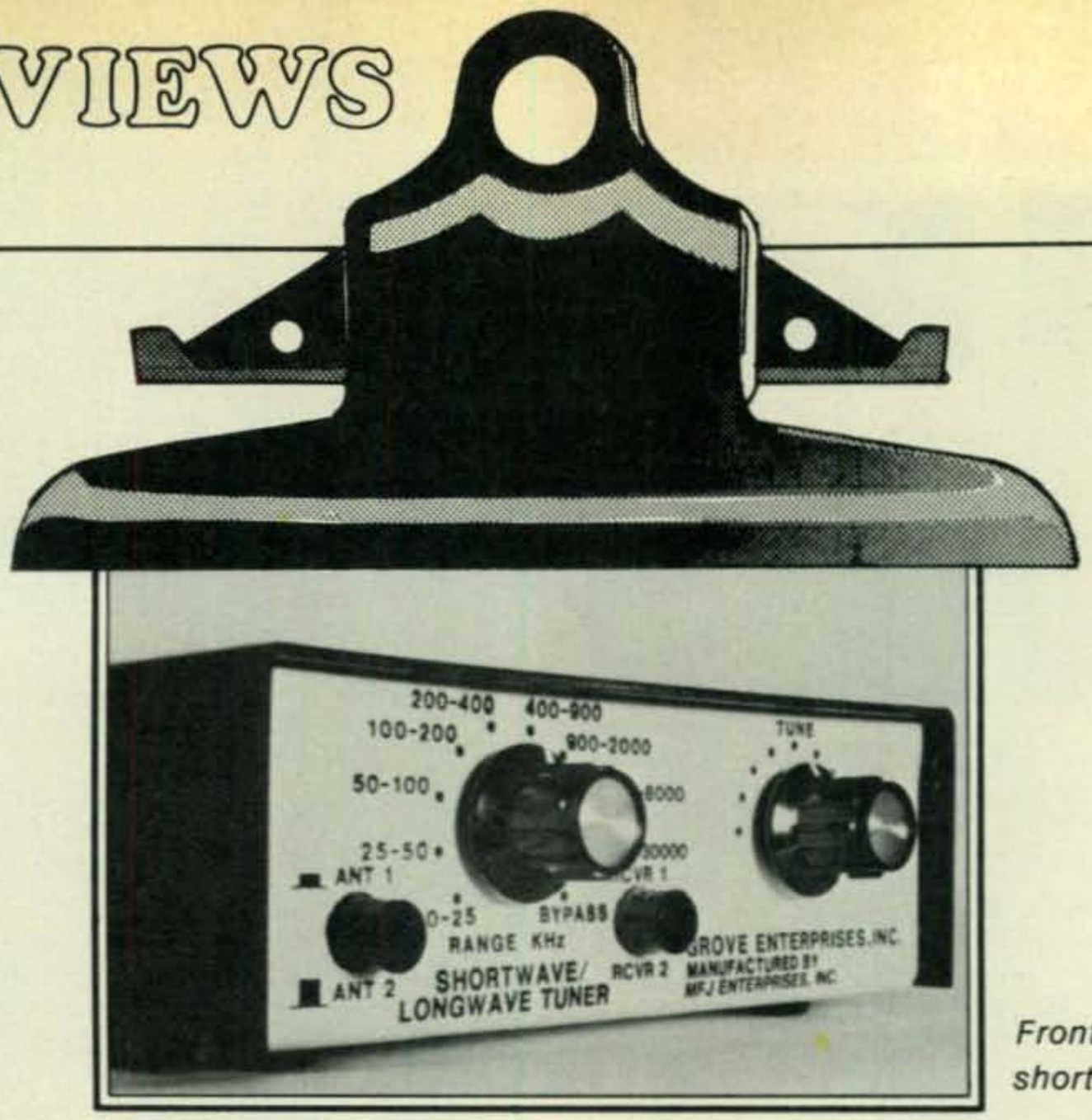
☐ Give me the name of my nearest dealer.

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

The Alliance Manufacturing Company, Inc., Alliance, Ohio 44601



Front view of the Grove shortwave/longwave tuner

The Grove Enterprises Shortwave/Longwave Antenna Tuner

BY DAVID ROMNEY*

With the renewed interest in shortwave listening and VLF monitoring, the new Shortwave/Longwave Tuner from Grove Enterprises should be a welcome addition to the hobbyist's shack.

While there are several receive-only antenna tuners presently on the market, none previously covered the total low frequency spectrum. The Grove Enterprises unit is designed to enhance reception throughout the 10 kHz to 30 MHz range.

Front panel controls allow band selection, tuning, and pushbutton-choice between two receivers and two antennas.

Functionally, the Shortwave/Longwave Tuner is a series-resonant LC circuit, designed to enhance single-signal reception by the proper selection of tuned components. Although the lowest-frequency (highest inductance) resonators are bound to introduce some resistive losses into the antenna line, the improvement in signal strength more than offsets the slight reduction.

Hands On Test

Inserting the Shortwave/Longwave Tuner ahead of our general-coverage receiver, we proceeded to tune it through its range. Following the instructions, we attached a fifty-foot wire antenna to the tuner.

With the tuner switched to its "Bypass" position VLF signals were weak but readable. Then, switching in the tuner, we adjusted the dial to the received frequency. Signals jumped up considerably in signal level, some as much as 30-50 dB!

Using the tuner and wire antenna in conjunction with a Palomar VLF converter connected to a ham receiver, similar results were obtained. Clearly, our formerly-casual manner of radio reception below 1 MHz left a great deal to be desired!

The Grove Enterprises tuner was then tested throughout the shortwave range. Particularly troublesome on most general coverage receivers are images and intermod found on the higher frequencies. The Shortwave/Longwave Tuner greatly improved reception in those ranges by selectively enhancing the frequencies of interest while rejecting out-of-band signals.

Since good r.f. selectivity is frequently a problem on less expensive receivers, the inexpensive tuner provided an excellent alternative to marginal reception without the considerable expense of purchasing a better receiver.

The Grove Shortwave/Longwave Tuner sells for $59.95 and is available from Grove Enterprises, Brasstown, NC 28902.

*c/o CQ Magazine

a monthly feature by

GEORGE JACOBS, W3ASK

Propagation

THE SCIENCE OF PREDICTING RADIO CONDITIONS

The Royal Observatory of Belgium reported a monthly mean sunspot number of 114.4 for January 1981. This was the lowest level of solar activity observed since April 1979.

The reported monthly level for January results in a *12-month smoothed sunspot number* of 153, centered on July 1980. The smoothed sunspot number is used to measure the level of a solar cycle. A smoothed sunspot number of 132 is predicted for May 1981, as the present cycle is expected to continue its slow decline.

Cycle 21 Update

Table I contains the values of smoothed sunspot numbers reported to date for Cycle 21. The cycle began during June 1976 with a smoothed sunspot number of 12. It reached its peak level during December 1979 with a smoothed number of 165.3 and is now on the decline. Cycle 21 is the second highest solar cycle recorded since daily telescopic observations of the sun began during the mid-1700s.

While it is much too early to attempt to predict the minimum for Cycle 21, it is very unlikely that it will occur before 1986.

May Conditions

Generally good-to-excellent propagation conditions are expected during May on the h.f. bands. Expect worldwide DX openings on the *10, 15,* and *20* meter bands during the daylight hours. From sundown to Midnight, the best DX bands should be *20* and *40* meters, with excellent DX possibilities on *15* meters as well towards southern and western areas. Some fairly good DX should also be possible on the *80* meter band. From Midnight to sunrise look for openings to most areas of the world on *20* and *40* meters, with some good DX also possible on *80* meters.

For specific times of DX openings, refer to the *DX Propagation Charts* which appeared in last month's column. This month's column contains a *Short-Skip Propagation Chart* valid for both May and June, as well as charts centered on Alaska and Hawaii. The Short-Skip Chart contains propagation forecasts for openings varying in distance between approximately 50 and 2300 miles. For day-to-day variations expected in propagation conditions during May, see the "Last Minute Forecast" which appears at the beginning of this column.

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for May 1981

Propagation Index	*Expected Signal Quality* (4)	(3)	(2)	(1)
Above Normal: 6, 23	A	A	B	C
High Normal: 2-3, 5, 15-16, 18, 24, 27, 29-30	A	B	C	C-D
Low Normal: 1, 4, 7, 9-10, 13-14, 17, 19, 22, 26, 28, 31	A-B	B-C	C-D	D-E
Below Normal: 8, 11-12, 20-21, 25	B-C	C-D	D-E	E
Disturbed: None	C-E	D-E	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9+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 good-to-fair (B-C) on May 1st;good (B) on the 2nd and 3rd, good-to-fair (B-C) on the 4th, etc.

For updated information, subscribe to bi-weekly MAIL-A-PROP, David D. Meisel, Editor, 54 Westview Crescent, Geneseo, NY 14454.

V.h.f. Ionospheric Openings

Solar activity is still high enough that some F-layer DX openings should be possible on the *6* meter band during the daylight hours. Conditions are best for trans-continental openings, openings between the western states and Hawaii, and openings towards the Caribbean and Central and South America. The best time to look for these openings is from 10 a.m. local time, through the afternoon hours, particularly when conditions are expected to be High Normal, or better.

Sporadic-E ionization is expected to increase considerably during May, and fairly frequent *6* meter short-skip openings should be possible. These are most likely to occur over distances

Smoothed Sunspot Numbers

	1976	1977	1978	1979	1980	1981
January	15	17	61	124	164.6*	(140)
February	13	18	65	131	163*	(138)
March	12	20	70	137	162*	(136)
April	13	22	77	141	159*	(134)
May	13	24	83	147	157*	(132)
June	12	26	89	153	155*	(130)
July	13	29	97	156*	153*	(128)
August	14	33	104	157*	(150)	(126)
September	14	39	108	157*	(148)	(124)
October	13	46	111	159*	(146)	(122)
November	14	52	113	163*	(144)	(120)
December	15	57	118	165.3*	(142)	(118)

Table I- Progress of Solar Cycle 21 observed and predicted.

*Provisional values, subject to slight change.
( ) Predicted values.

of approximately 1000 to 1400 miles. Although, as its name implies, sporadic-E propagation can take place at just about any time of the day or night, the best time to check is between 10 a.m. and 2 p.m., and again between 6 and 10 p.m., local daylight time.

During periods of intense and widespread sporadic-E ionization, two-hop openings considerably beyond 1400 miles may be possible on *6* meters, and short-skip openings between approximately 1200 and 1400 miles may also be possible on *2* meters.

Some trans-equatorial propagation (TE) may be possible during the month on *6* meters, and perhaps on *2* meters as well. TE openings are most likely to occur between 9 and 11 p.m., local daylight time, on long north-south paths that cross the geomagnetic equator at approximately a right angle. TE openings are at best difficult, often accompanied by very weak signals and rapid flutter fading. Such openings favor locations in the southern tier states, but may occasionally be possible further to the north.

The *Eta Aquarids*, a major meteor shower, is expected between May 4 and 6. It should peak on May 5 with a meteor count of approximately 20 an hour. Meteor activity is expected to be intense enough during this shower to support meteor burst short-skip openings on the *6* and *2* meter bands.

Some auroral activity is possible during May, which could produce auroral displays and auroral-type short-skip openings on the v.h.f. bands over relatively widespread areas. Check the "Last Minute Forecast" appearing at the beginning of this column for those days during May that are expected to be Below Normal or Disturbed on the h.f. bands. These are the best days to check for auroral activity on the v.h.f. bands.

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distances column of a particular Meter band (10 through 160 Meters) as shown in the left hand column of the Chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate Meter band column (10 through 40 Meters) for a particular geographical region of the continental USA as shown in the left hand column of the Charts. An * indicates the best time to listen for 80 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of *days* during the month on which the opening is expected to take place, as follows:

(4) Opening should occurr on more than 22 days
(3) " " " between 14 and 22 days
(2) " " " between 7 and 13 days
(1) " " " 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.

3. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M. etc. On the Short-Skip Chart appropriate *daylight time* is used at the *path midpoint*. For example, on a circuit between Maine and Florida, the time shown would be EDT; on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are HST. To convert to daylight time in other USA time zones, *add* 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone, and 6 hours in the EDT zone. *Add* 10 hours to covert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA *subtract* 7 hours in the PDT zone; 6 hours in the MDT zone, 5 hours in the CDT zone and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave length above ground on 40 and 20 meters, and a wave-length 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.

5. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Department of Commerce, Boulder, Colorado, 80302.

CQ Short-Skip Propagation Chart
May & June, 1981
Local Daylight Time at Path Mid-Point
(24-Hour Time System)

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08- 10 (0-1) 10- 14 (0-2) 14- 18 (0-1) 18- 22 (0-2) 22- 00 (0-1)	08- 10 (1-2) 10- 14 (2-3) 14- 18 (1-2) 18- 22 (2) 22- 00 (1) 00- 08 (0-1)	08- 10 (2-0) 10- 14 (3-1) 14- 16 (2-1) 16- 19 (2) 19- 22 (2-0) 22- 08 (1-0)
15	Nil	07 -10 (0-2) 10- 14 (0-3) 14- 18 (0-2) 18- 20 (0-3) 20- 00 (0-2) 00- 07 (0-1)	07- 10 (2) 10- 14 (3) 14- 18 (2-4) 18- 20 (3-4) 20- 22 (2-3) 22- 00 (2) 00- 07 (1)	07- 10 (2-1) 10- 14 (3-2) 14- 16 (4-3) 16- 20 (4) 20- 22 (3-2) 22- 00 (2) 00- 07 (1-0)
20	10- 13 (0-1) 13- 19 (0-2) 19- 01 (0-1)	07- 10 (0-2) 10- 13 (1-3) 13- 19 (2-4) 19- 21 (1-3) 21- 01 (1-2) 01- 07 (0-2)	07- 10 (2-3) 10- 13 (3-4) 13- 19 (4) 19- 21 (3-4) 21- 23 (2-4) 23- 01 (2-3) 01- 07 (2)	07- 10 (3) 10- 16 (4-3) 16- 23 (4) 23- 01 (3-4) 01- 03 (2-3) 03- 07 (2)
40	07- 09 (1-2) 09- 12 (2-4) 12- 20 (3-4) 20- 22 (2-3) 22- 01 (1-2) 01- 07 (0-1)	07- 09 (2-4) 09- 10 (4-3) 10- 16 (4-2) 16- 18 (4-3) 18- 22 (4) 22- 01 (2-3) 01- 07 (1-3)	07- 09 (4-3) 09- 10 (3) 10- 16 (2-1) 16- 18 (3-1) 18- 20 (4-2) 20- 22 (4) 22- 07 (3-4)	08- 10 (3-1) 10- 18 (1-0) 18- 20 (2-1) 20- 22 (4-3) 22- 06 (4) 06- 07 (4-3) 07- 08 (3)
80	08- 11 (4) 11- 19 (4-3) 19- 23 (4) 23- 08 (3-4)	08- 11 (4-1) 11- 17 (3-0) 17- 19 (3-1) 19- 21 (4-2) 21- 06 (4) 06- 08 (4-3)	08- 09 (1) 09- 11 (1-0) 11- 17 (0) 17- 19 (1-0) 19- 21 (2-1) 21- 23 (4-3) 23- 06 (4) 06- 08 (3-2)	08- 09 (1-0) 09- 19 (0) 19- 21 (1-0) 21- 23 (3-2) 23- 04 (4-3) 04- 06 (4-2) 06- 08 (2-1)
160	06- 09 (4-1) 09- 10 (2-0) 10- 19 (1-0) 19- 21 (3-1) 21- 23 (4-2) 23- 06 (4-3)	06- 09 (1) 09- 19 (0) 19- 21 (1-0) 21- 23 (2-1) 23- 01 (3-2) 01- 04 (3) 04- 06 (3-2)	08- 09 (1-0) 09- 21 (0) 21- 23 (1) 23- 01 (2-1) 01- 04 (3-2) 04- 06 (2) 06- 08 (1)	08- 21 (0) 21- 01 (1) 01- 04 (2) 04- 06 (2-1) 06- 07 (1) 07- 08 (1-0)

HAWAII
May & June, 1981
Openings Given In Hawaiian Standard Time

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	15-17 (1)	07-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-15 (1) 15-18 (2) 18-20 (3) 20-22 (4) 22-00 (3) 00-02 (2) 02-04 (3) 04-07 (2)	19-20 (1) 20-23 (3) 23-02 (1) 20-21 (1)* 21-23 (2)* 23-01 (1)*
Central USA	12-15 (1) 15-17 (2) 17-18 (1)	05-07 (1) 07-12 (2) 12-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	08-12 (1) 12-16 (2) 16-18 (2) 18-22 (4) 22-00 (3) 00-02 (2) 02-06 (3) 06-08 (2)	19-20 (1) 20-21 (2) 21-01 (4) 01-02 (2) 02-04 (1) 20-21 (1)* 21-00 (2)* 00-03 (1)*
Western USA	09-12 (1) 12-17 (2) 17-19 (1)	06-08 (1) 08-10 (2) 10-12 (3) 12-17 (4) 17-19 (3) 19-22 (2) 22-00 (1)	06-08 (4) 08-16 (3) 16-22 (4) 22-02 (3) 02-06 (2)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-07 (1) 19-20 (1)* 20-21 (2)* 21-03 (3)* 03-04 (2)* 04-05 (1)*

ALASKA
May & June, 1981
Openings Given in GMT

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	18-20 (1) 20-22 (2) 22-01 (1) 01-03 (2) 03-05 (1)	20-22 (1) 22-02 (2) 02-06 (3) 06-08 (2) 08-10 (1) 10-14 (2) 14-16 (1)	05-10 (1)
Central USA	Nil	18-21 (1) 21-23 (2) 23-01 (1) 01-04 (2)	02-08 (3) 08-14 (2) 14-22 (1) 22-02 (2)	05-07 (1) 07-10 (2) 10-12 (1)
Western USA	00-03 (1)	18-20 (1) 20-23 (2) 23-02 (3) 02-05 (2) 05-07 (1)	02-04 (3) 04-08 (4) 08-14 (3) 14-18 (4) 18-20 (3) 20-02 (2)	04-06 (1) 06-08 (2) 08-12 (3) 12-15 (2) 15-16 (1) 08-12 (1)*

See explanation in "How To Use Short-Skip Charts" in box at the beginning of this column.

* Indicates best time for 80 Meter openings. Openings on 160 Meters are likely to occur during those times when 80 Meter openings are shown with a propagation index of (2), or higher.

Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 2300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

Ham Shop

FREE TO CQ SUBSCRIBERS

Advertising Rates: Non-commercial ads are 10 cents per word including abbreviations and addresses. Commercial and organization ads are 35 cents per word. Minimum charge $1.00. No ad (non subscriber) will be printed unless accompanied by full remittance. Non-commercial ads free to CQ subscribers (maximum 3 lines per month). All ads must be typewritten double spaced. Recent CQ mailing label must accompany ad. **Closing Date:** The 10th day in the third month preceding date of publication. Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of CQ cannot vouch for the merchandise listed therein. Direct all correspondence and ad copy to: CQ Ham Shop, 76 N. Broadway, Hicksville, NY 11801.

SOCIETY OF WIRELESS PIONEERS, INC. (SOWP) Professional R/T operators invited to join our non-profit historical/scientific organization. IFN free or send dollar for sample SPARKS JOURNAL to cover mailing costs. QTH: Box 530, Santa Rosa, CA 95402.

FREE SAMPLE Ham Radio Insider Newsletter! Send large SASE. W5YI; Box #10101-C; Dallas, Texas 75207.

NEED HELP for your Novice or General Ticket? Recorded Audio-visual Theory Instruction. No electronic background required. Free information. Amateur License, P.O. Box 6015, Norfolk, Virginia 23508.

HALLICRAFTERS Service Manuals. Amateur and SWL. Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

QSLs with Class! Unbeatable quality, reasonable price. Samples: 50 cents, refundable. QSLs UNLIMITED, POB 27553, Atlanta, GA 30327.

QSL CARDS: 500/$10. 400-illustration catalogue, free! Bowman, 743 Harvard, St. Louis, MO 63130.

DX LOG: Awards oriented. New. Unique. Free details. SARS, Box 326B, Montoursville, PA 17754.

STATION PLAQUE: Name, call, awards list. Unique, Distinctive. Free details. SARS, Box 326B, Montoursville, PA 17754.

WANTED: Gold plated connector pins, scrap. Paying $1.00 per ounce and up. Ron Guard, W6TWT, 10105 Stern, Cupertino, CA 95014, (408) 252-5067.

FOR SALE: Heath SB-104A, Heath HP-1144A Power Supply, Heath SB-604 Speaker. Entire ham station for sale including all accessories and antenna. Best offer. Norman Scott, P.O. Box 342, Matthews, NC 28105; 704-525-0505 (days), 704-847-0203 (evenings).

SPLIT SCREEN RTTY, Mail-Drop, Word Proc., plus other programs for TRS-80. S.a.s.e. for details. K8BG, 712 Hillside Dr., Carlisle, PA 17013.

MIRROR IN THE LID, Spinning Disc, and other pre-1946 television sets wanted for historical collection. Will pay substantial dollars for R.C.A. TRK-5, #359, or General Electric "HM" series sets. Also looking for pre-war picture tubes such as 12AP4, MW-31-3, and other pre-war T.V. parts and literature. Arnold Chase, 9 Rushleigh Road, West Hartford, Conn. 06117, (203) 521-5280 (collect calls o.k.).

PRINTED CIRCUIT BOARDS from sketch or artwork. Kit projects. Free details, DANOCINTHS, INC. Dept. CQ, Box 261, Westland, MI 48185.

TUBES. Octals, loktals, miniatures, Europeans, obsolete types, etc. List 25¢. P. Warnock, 45 Rothwell, Ottawa, Canada K1J 7G7.

BUILD ANTENNA TUNER from brand new ARC-5 transmitters. Conversion data included. $18.95. Send for Gov't Surplus Catalog, 50¢. G & G Radio, 45 Warren St., New York, NY 10007.

CONFIRMATION MAILER. The reverse QSL! Product review in August '80 issue of Ham Radio. 30 C/M's for $5.50. Bob Zittnan, K9UJA, Box 94973, Schaumburg, IL 60194.

ANTENNA RESTRICTIONS? Don't settle for 2 meters! Rejoin friends and nets with our "NO GIMMICK" highly efficient compact radiator for your particular needs within 3.5 to 29.7 MHz. Free brochure. COM-RAD INDUSTRIES, 1635 West River, Grand Island, NY 14072.

WANT: 1920's radios, horn speakers, test equipment, publications. W6THU, 1545 Raymond, Glendale, CA 91201.

BE FIRST TO KNOW precisely when and where to work all the choice DX. Bi-weekly LI DX Bulletin has: Hot DX News-Time and Frequency of each goodie-QSL Info-Propagation Forecast-and more . . . Send business size SASE for free sample or $10 for 1-year domestic subscription to: Long Island DX Bulletin, PO Box 173, Huntington, NY 11743.

Also Available . . . .
Floor Space: 51" Wide by 30" Deep
$192.50

. . . at last . . . your shack organized!

A beautiful piece of furniture — your XYL will love it!

$164.50 S-F RADIO DESK

Deluxe - Ready to Assemble

Designed with **angled** rear shelf for your viewing comfort and ease of operation.

FINISHES: Walnut or Teak Stain.

Floor Space: 39" Wide by 30" Deep

Additional Information on Request.

Checks, Money Orders, BankAmericard and Master Charge Accepted.

F.O.B. Culver City. (In Calif. Add 6% Sales Tax.)

DEALER INQUIRIES INVITED

S-F Amateur Radio Services

4384 KEYSTONE AVENUE • CULVER CITY, CALIF. 90230 — PHONE (213) 837-4870

CIRCLE 34 ON READER SERVICE COUPON

Just 25¢ Gets You Started In Shortwave

NEWEST EDITION-ONE-STOP SHOPPING FOR SWLS

•RECEIVERS •CONVERTERS • ANTENNAS
•PRESELECTORS •CLOCKS • FILTERS
•HEADPHONES •HANDBOOKS •LISTS

GILFER SHORTWAVE

Dept. CQ 5 , Box 239, Park Ridge NJ 07656

CIRCLE 76 ON READER SERVICE COUPON

MOR-GAIN

1/2-size (75M only 66')

Multi-Band (5, 4, 3 bands) 80/75M thru 10M

Broadbanded - no traps used

Prices start at $68.75

MOR-GAIN

THE MOR-GAIN HD DIPOLES are the most advanced, highest performance multi-band HF dipole antennas available. Patented design provides length one-half of conventional dipoles. 50 ohm feed on all bands, no tuner or balun required. Can be installed as inverted VEE. Thousands in use worldwide. 22 models available including two models engineered for optimum performance for the novice bands. The Mor-Gain HD dipoles N/T series are the only commerical antennas specifically designed to meet the operational requirements of the novice license. Our 1-year warranty is backed by nearly 20 years of HD dipole production experience.

For detailed 5-page brochure, write or phone directly to **MOR-GAIN**, P.O. Box 329C, Leavenworth, Ks. 66048, Tel. (913) 682-3142.

MOR-GAIN

CIRCLE 8 ON READER SERVICE COUPON

16-POLE TR-7 RF CLIPPING

Optimize your TR-7 with: two 16-pole receive positions and the ultimate RF/IF clipping system. Increases talkpower and reduces QRM. 16-pole 1.9-kHz, 1.6-kHz, or normal selectivity as desired. Greatly improved talkpower and intelligibility. Highest processing efficiency. 100% utilization: effective on transmit and receive. No compromises for the operator who demands the best. Model 7-SP Mk II : $400.00. Other models available for T-4Xs and TR-4s.

SHERWOOD MIKE EQUALIZER adds needed clarity and crispness. Especially beneficial for "flat" mikes such as MC-50, 664, electrets, and many others, without harming directional pattern. Compatible with all rigs. Model SE-1: $100.00.

Add $3 shipping per order; $15 overseas air.

Europeans: Please contact Ingoimpex, Postfach 24 49, D-8070, Ingolstadt, West Germany.

Sherwood Engineering Inc.
1268 South Ogden St.
Denver, Colo. 80210
(303) 722-2257

CIRCLE 17 ON READER SERVICE COUPON

SEVERE DUTY CUBICAL QUADS $199.00 & UP

* **Rugged New Cubical Quad Antenna Design.**
* **Reinforced Fiberglass Spreaders**
* **High Strength Spider design of 6061-T6 Aluminum**
* **Components 2, 3 or 4 element models available or**
* **Components such as Spreaders, Spiders, Booms etc. may be purchased separately**

For FREE Six Page Discriptive Brochure and Price sheet, Write or Call:

db+ enterprises

P.O. Box 24 • Pine Valley, N.Y. 14872
Phone 607-739-9875

CIRCLE 44 ON READER SERVICE COUPON

CUSTOM EMBROIDERED EMBLEMS, your design, low minimum, Emblems, Dept 10, Littleton, New Hampshire 03561.

MAKE HAM RADIO FUN! Supplement your learning programs with motivational self-hypnosis cassettes. Tape #3, Learning the Code; Tape #4, Breaking The Speed Barrier; Tape #7, Electronics Theory. Free catalog. For tapes send $10.95 each to GEM OF THE MOUNTAINS PUBLISHING COMPANY, 3307 North 6th Street, Coeur d'Alene, Idaho 83814.

PRINTED CIRCUIT boards. Especially for the beginner. Make them yourself. Proven simplicity. COVAL, Dept CQ5, 2706 Kirby, Champaign, IL 61820.

PASS FCC EXAMS

The Original FCC Tests-Answers exam manual that prepares you at home for FCC First and Second Class Radiotelephone licenses. Newly revised multiple choice exams cover all areas tested on the actual FCC exam. Plus "Self-Study Ability Test". Proven! $12.95 postpaid. (Add $2.00 for first class Air Mail.) Moneyback Guarantee.

COMMAND PRODUCTIONS Radio Engineering Division
P.O. Box 26348-C
San Francisco, CA 94126

CIRCLE 128 ON READER SERVICE CARD

SATELLITE TV . . . HOWARD/COLEMAN TVRO BOARDS . . . Build your own satellite TV receiver. For more information write . . . Robert Coleman, Rt. 3, Box 58-ACQ, Travelers Rest, SC 29690.

WE'RE ROLIN IN CRYSTALS!

2 Meter Crystals — $3.95 each (10 or More — $3.50 each)

We Stock Crystals For:

Clegg	Drake	Icom
Kenwood	Midland	Regency
Standard	Wilson	Yaesu

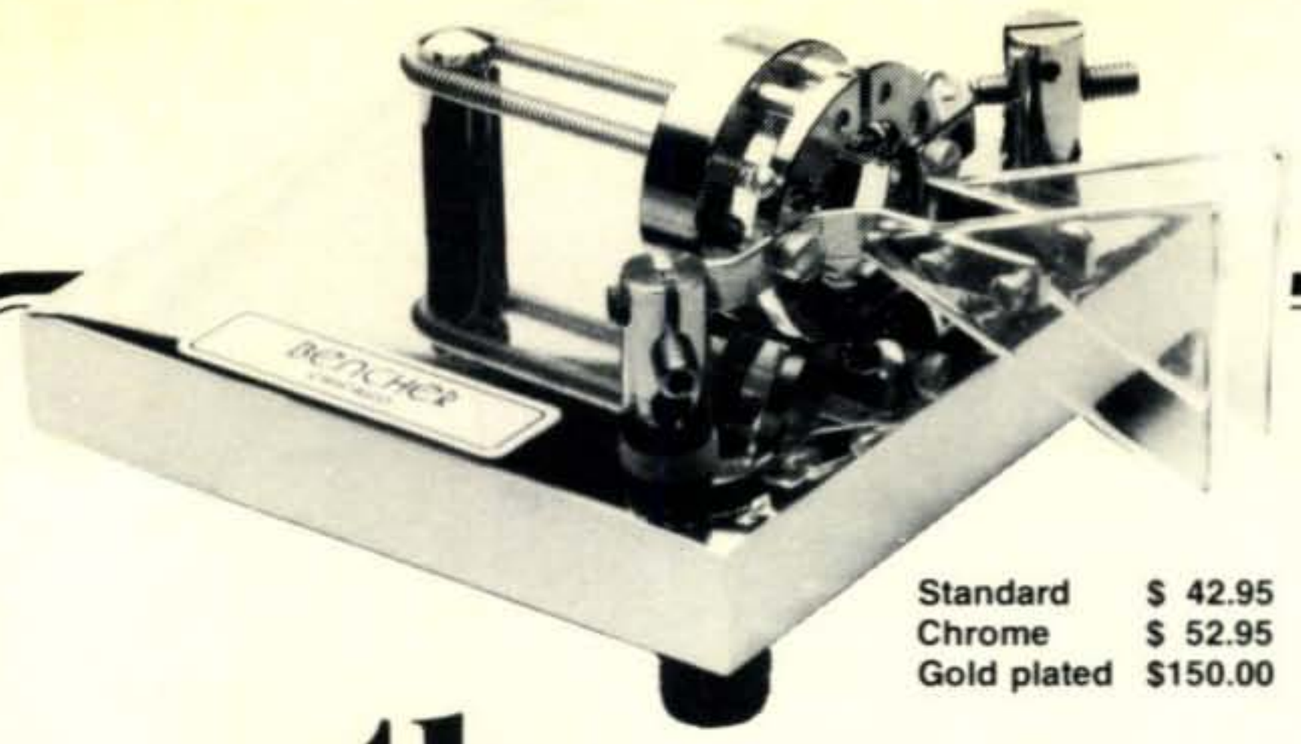
Rolin Distributors
P.O. Box 436, Department C
Dunellen, N.J. 08812
201-469-1219

(We Also Accept Orders For Custom Crystals.)

CIRCLE 45 ON READER SERVICE CARD

ARRL ATLANTIC DIVISION & NY STATE CONVENTION
combined with
Rochester HAMFEST
Bigger than ever
MAY 15-16
Better than ever
Monroe County Fairgrounds and Marriott Inn, near NY Thruway exit 46

For information write:
Hamfest, Box 1388, Rochester, NY 14603
Phone:716-424-1100



Standard	$ 42.95
Chrome	$ 52.95
Gold plated	$150.00

the Ultimate IAMBIC PADDLE

- Full range of adjustment in tension and contact spacing.
- Self-adjusting nylon and steel needle bearings.
- Gold plated solid silver contact points.
- Polished lucite paddles.
- Precision-machined, chrome plated brass frames.
- Standard model has black, textured finish base; deluxe model is chrome plated.
- Heavy steel base; non-skid feet.

WRITE FOR LITERATURE

BENCHER, INC.

333 W. Lake Street, Dept. A
Chicago, Illinois 60606 • (312) 263-1808

At selected dealers or add $2.00 handling. Quotation for overseas postage on request.

CIRCLE 64 ON READER SERVICE CARD

FOR SALE: Tempo-1 with power supply, mint, $300. John, WB1ALB, Naugatuck, CT 06770, telephone 203-729-2121.

KENWOOD TS520S with SP520 speaker $600. New HUSTLER 4BTV Antenna $60. Package deal $650. John E. Smith, West 405 Main, Pullman, WA 99163, (509) 334-3344.

WORLD PRESS RADIOTELETYPE station lists. Over 50 different worldwide press services contained in 3 lists. By time, by frequencies, and ITU combination list. All transmitting in English. 24 hours. Hundreds of confidential and fascinating RTTY news stations in these up to date lists. Utilize your present equipment. Book with lists. $5.00 postpaid. UNIVERSAL ELECTRONICS, 1280 Aida Drive, Reynoldsburg, OH 43068.

THE SUPERMARKET OF ELECTRONICS: Thousands of items for sale or trade each month. Free classified ad with subscription. Only $5.00 to Nuts & Volts, POB 1111-Q, Placentia, CA 92670.

CREATIVE QSL CARDS: Imaginative designs. New and antique type styles. Send $1.00 for catalog and samples. WILKINS CREATIVE PRINTING, P.O. Box 787, Atascadero, CA 93423.

AVAILABLE BEFORE DAYTON HAMFEST: Drake C4 Console, complete, very close to new, $400. Two available. Kenwood TR7800, new at 12-80, $325. Bearcat BC-300, new at 12-80, $310, scanner. K3UKW, Tony Musero, 1609 So. Iseminger St., Phila., PA 215-271-8898.

ANY PHOTOGRAPH on 200 glossy QSL's, $16 (without photo, $13). Stamp brings samples. Albert Zanella, 730 Baker Street, San Francisco, CA 94115.

FOR SALE: YAESU FT-901DM Transceiver, mint condition, original packing, $900. Wm. Shevtchuk, WB2VJF, please call 201-471-3798.

WANNA BE A HAM?? Discover Exciting Amateur Radio with understandable Arpress Novice Preparation Guide . . . Ham It Up!! Free details: Arpress-5C, P.O. Box 342, Lindale, GA 30147.

SALE— Lower than last year's prices! Crystal set kits, include open type crystal detector, Trimm hi-Z headphones, antenna kit, Allied's Radio Builder's Handbook, and instruction book. $23.95. FREE to first 35 kit orders, extra galena crystal. Limited number of Trimm Dependable hi-Z headphones, $5.95. Antenna kits, $4.95. Allied's Handbook, $3.95. Beginner's Crystal set instruction book, $1.95. Prices include shipping. Ohio residents add sales tax. R.A. Russ Co., Box 601, Fairborn, Ohio 45324.

FOR SALE: Yaesu FT-101E Transceiver with cooling fan, perfect condition $250; Heath HG-10 VFO $40; Ten-Tec KR-40 electronic keyer $15; Heath HR-1680 receiver $45; All with manuals, will pay shipping. William Harris, Route 1, Guthrie, KY 42234.

COOL-IT enterprises

DISTRIBUTOR OF INTEGRATED FANS

Cool It with a Mark IV Muffin or Howard 100 CFM fan
120 VAC 50/60 Hz. Check or Money Order $15.00
Feather and Whisper fans also available. 50/60 Hz.
Check or Money Order $20.00
Postpaid Guaranteed

213-A CHARWOOD CIRCLE
ROCHESTER, NEW YORK 14609
PHONE: (716) 482-2555

CIRCLE 65 ON READER SERVICE COUPON

Antenna Baluns

NEW! Quad Transformer.

Matches 3-band quads to single 50 ohm coaxial cable.

Model Q3 $32.50

1 Kw CW, 3 Kw PEP input. For dipoles, inverted Vees, beams, quads. Dependable. Takes temporary overloads in stride. Specify 1:1 or 4:1 ratio.

Model 1K $32.50

2 Kw CW, 6 Kw PEP input. Far more rugged than any other balun made for amateur use. Specify 1:1 or 4:1 ratio.

Model 2K $42.50

2 Kw CW, 6 Kw PEP input. Our heavy duty balun with mounting bracket for 2" mast or boom. Specify 1:1 or 4:1 ratio.

Beam Balun $47.50

Only Palomar Baluns Have All These Features:

- RF toroidal core for highest efficiency.
- Teflon insulated wire.
- Stainless steel hardware. Won't rust.
- Epoxy filled case. Waterproof.
- Wideband 1.7 to 30 MHz.
- White case to reflect the sun.
- Lighting protection built in.

Free brochure sent on request.

How many light weight baluns have you burned out already? Install the balun that will stay up there working year after year.

master charge | VISA

To order, add $3 shipping/handling. California residents add sales tax.

Palomar Engineers

Box 455, Escondido, CA. 92025
Phone: [714] 747-3343

Advertiser's Index

We'd like to see your company listed here too. Contact Jack Gutzeit, W2LZX, our Advertising Manager at 516-681-2922 to work out an advertising program tailored to suit your needs.

Please send all reader inquiries directly.

WARC BANDS FACTORY INSTALLED!

FT-707 is shown with optional FV-707DM VFO & Scanning Microphone

THE FT-707 "WAYFARER"

The introduction of the "WAYFARER" by Yaesu is the beginning of a new era in compact solid state transceivers. The FT-707 "WAYFARER" offers you a full 100 watts output on 80-10 meters and operates SSB, CW, and AM modes. Don't let the small size fool you! Though it is not much larger than a book, this is a full-featured transceiver which is ideally suited for your home station or as a traveling companion for mobile or portable operation.

The receiver offers sensitivity of .25 uV/10 dB SN as well as a degree of selectivity previously unavailable in a package this small. The "WAYFARER" comes equipped with 16 poles of IF filtering, variable bandwidth and optional crystal filters for 600 Hz or 350 Hz. Just look at these additional features:

FT-707 with Standard Features

- Fast/slow AGC selection
- Advanced noise blanker
- Built-in calibrator
- WWV/JJY Band
- Bright Digital Readout
- Fixed crystal position
- Factory-installed WARC bands
- Unique multi-color bar metering—monitors signal strength, power output, and ALC voltage.

FT-707 with Optional FV-707DM & Scanning Microphone

- Choice of 2 rates of scan
- Remote scanning from microphone
- Scans in 10 cycle steps
- Synthesized VFO
- Selection of receiver/transmitter functions from either front panel or external VFO
- "DMS" (Digital Memory Shift)

Impressive as the "WAYFARER" is its versatility can be greatly increased by the addition of the FV-707DM (optional). The FV-707DM, though only one inch high, allows the storage of 13 discrete frequencies and with the use of "DMS" (Digital Memory Shift) each memory can be band-spread 500 KHz. These 500 KHz bands may be remotely scanned from the microphone at the very smooth rate of 10 Hz per step.

The FT-707 "WAYFARER" is a truly unique rig. See it today at your authorized Yaesu Dealer.

YAESU
The radio.

381

YAESU ELECTRONICS CORP., 6851 Walthall Way, Paramount, CA 90723 • (213) 633-4007
YAESU ELECTRONICS Eastern Service Ctr., 9812 Princeton-Glendale Rd., Cincinnati, OH 45246

CIRCLE 136 ON READER SERVICE COUPON

ICOM IC-720A

Multi mode operation includes CW/AM/SSB/RTTY — Normally used side band selected automatically.

Simple to use Dual VFO's standard Data transfer button for marking a frequency of interest and storing it in unused VFO.

Continuously variable power from 10W to full power — speech processor — LDA channeling module included provides auto band changing capability when increasing your power using the IC-2KL broad banded solid state linear.

Broadbanded solid state transceiver operation on the 9 amateur HF bands — Readout of mode in use and VFO — Status LEDs for push button functions.

General coverage receiver from a 0.1KHz to 29.999.9MHz — Split VFO operation — Frequency memorized in standby VFO.

Use of RF/ALC switch in conjunction with the internal top hatch cover switches allows monitoring relative RF Out, SWR, collector current and ALC.

The ICOM HF System. We Have You Covered.

HF/VHF/UHF AMATEUR AND MARINE COMMUNICATION EQUIPMENT

ICOM

ICOM AMERICA, INCORPORATED

Sales Service Centers located at:

2112 116th Avenue NE
Bellevue, WA 98004
Phone (206) 454-8155

3331 Towerwood Dr., Suite 307
Dallas, TX 75234
Phone (214) 620-2780

All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. CIRCLE 3 ON READER SERVICE CARD