

July 1982 \$2.50

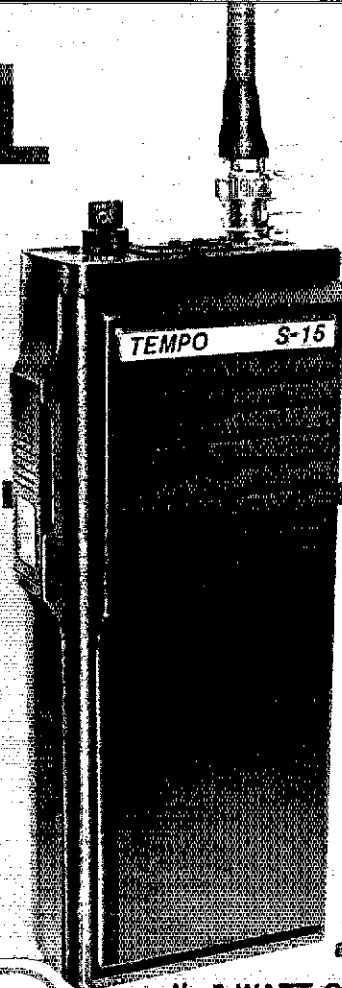
QST

devoted entirely to Amateur Radio

1982 National Convention
Cedar Rapids, Iowa



the ALL NEW tempo S-15



more radio ...less money

TEMPO'S ALL NEW S-15 SYNTHESIZED HAND HELD OFFERS IMPORTANT FEATURES AT A PRICE THAT DEFIES COMPARISON.

Compare these features with any other hand held available... the S-15 is the obvious choice

Tempo S-2

Enables you to use 220 MHz repeaters throughout the U.S.. The S-2 is thoroughly field tested and offers a long life of dependable service. A good way to get into 220 MHz operation if you're not on yet and with the addition of a Tempo power amplifier you can build a small base station or a powerful mobile rig. \$289 S-2T...\$319

NEW REDUCED PRICES!

Tempo S-4

The first 440 MHz hand held and still a winner...offers the perfect way to get into an uncrowded band. Check one out at your local Tempo dealer or write Henry Radio. \$289 S-4T...\$319

Boost the power of your hand held or mobile unit with a Tempo solid state power amplifier. A broad range of power outputs available at very affordable prices. Please write for literature.

Tempo M1

Tempo does it again! This time with the world's first and only ALL CHANNEL synthesized hand held marine transceiver. The Tempo M1 operates on all marine channels...both U.S. and international, plus four weather channels. This is a real working tool and a hobby rig with hundreds of uses. It is skillfully engineered and built to provide endless hours of hard use. 1 watt low power—2½ watts high power positions. And the price...LESS THAN \$500.

- * 5 WATT OUTPUT (1 watt low power switchable)
- * "EASY REMOVE" BATTERY PACK
- * 1 HOUR QUICK CHARGE BATTERY SUPPLIED (450 ma/HR)
- * BNC ANTENNA CONNECTOR & FLEX ANTENNA
- * EXTREMELY EASY TO OPERATE
- * PLUG FOR DIRECT 13.8 VOLT OPERATION
- * 3 CHANNEL MEMORY. (1 channel permits non-standard repeater offsets. 200 micro amp memory maintenance (standby)).
- * VERY SMALL AND LIGHT WEIGHT (only 17 ounces)
- * 10 MHz FREQUENCY COVERAGE: 140-150 MHz (150-160 for export customers)
- * AMPLE SPACE FOR PROGRAMMABLE ENCODER
- * SPEAKER/MICROPHONE CONNECTOR
- * ELECTRICALLY TUNED STAGES (receiving sensitivity and output power are constant over entire operating range)
- * LOW PRICE...\$289

S-15 with touch tone pad... \$319

SUPPLIED ACCESSORIES:

Rubber antenna • Standard charger • Ear phone • Instruction manual • 450 ma/HR battery (quick charge type)

OPTIONAL ACCESSORIES:

1 hour quick charger (ACH15) • 16 button touch tone pad (\$15T) • DC cord • Solid state power amplifiers (S-30 & S-80) • Holster (CC15) • Speaker/mike (HM 15)

Available from Tempo dealers and

Henry Radio



2050 S. Bundy Dr., Los Angeles, CA 90025
931 N. Euclid, Anaheim, CA 92801
Butler, Missouri 64730

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HAVE RTTY—WILL TRAVEL



Yes, now you can take it with you! The new **HAL CWR-6850 Telereader** is the smallest RTTY and CW terminal available, complete with CRT display screen. Stay active with your RTTY and CW friends even while traveling. Some of the outstanding features of the CWR-6850 are:

- Send and receive ASCII, Baudot, and Morse code
- RTTY and Morse demodulators are built-in
- RTTY speeds of 45, 50, 57, 74, 110, and 300 baud
- High or Low RTTY tones
- Send and receive CW at 3 to 40 wpm
- Built-in 5 inch green CRT display
- Four page video screen display
- Six programmable HERE IS messages
- Pretype up to 15 lines of text
- External keyboard included
- Runs on +12 VDC @ 1.7 Amperes
- Small size (12.75" × 5" × 11.5")

Write or call for more details. See the CWR-6850 at your favorite HAL dealer.



HAL COMMUNICATIONS CORP.

BOX 365

URBANA, ILLINOIS 61801

217-367-7373

IC-740

Extensive Versatility for the Serious Operator



The IC-740 from ICOM contains all of the most asked-for features, in the most advanced solidstate HF base station on the amateur market...performing to the delight of the most discerning operator.

Study the front panel controls of the ICOM IC-740. You will see that it has all of the functions to give maximum versatility to tailor the receiver and transmitter performance to each individual operator's requirements.

Features of the IC-740 receiver include variable width and continuously adjustable noise blanker, continuous, adjustable speed AGC, adjustable IF shift and variable passband tuning built in. In addition, an adjustable notch filter for maximum receiver performance, along with switchable

receiver preamp, and a selection of SSB and CW filters. Squelch on SSB Receive and all mode capability, including optional FM mode. Split frequency operation with two built-in VFOs for the serious DX'er.

The IC-740 allows maximum transmit flexibility with front panel adjustment of VOX gain and VOX delay along with ICOM's unique synthesized three speed tuning system and rock solid stability with electronic frequency lock. Maximum versatility with 2 VFO's built in as standard, plus 9 memories of frequency selection, one per band, including the new WARC bands.

With 10 independent receiver and 6 transmitter front panel adjustments, the IC-740 operator has full control of his station's operating requirements.

See and operate the versatile and full featured IC-740 at your authorized ICOM dealer.

Options include:

- FM Module
- Marker Module
- Electronic Keyer
- 2 - 9MHz IF Filters for CW
- 3 - 455 kHz Filters for CW
- Internal AC Power Supply

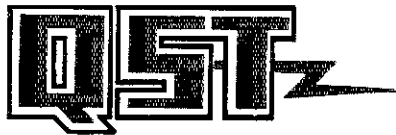
Accessories.

- SM5 Desk Microphone
- UP/DWN Microphone
- Linear Amplifier
- Autobandswitching Mobile Antenna
- Headphones
- External Speaker
- Memory Backup Supply
- Automatic Antenna Tuner



ICOM

The World System



July 1982 *Volume LXVI Number 7*

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THE COVER

The antenna farm at the Rockwell/Collins worldwide communications system will be part of the tour for those attending the ARRL National Convention in Cedar Rapids, Iowa July 23-25, 1982.



Contents

Technical

- 11 **Equalize Your Microphone and Be Heard!** *Bob Heil, K9EID*
- 14 **Antenna Matching, Remotely — Some Thoughts** *Doug DeMaw, W1FB*
- 17 **K6BSU Touch Keyer** *Floyd E. Carter, K6BSU*
- 20 **WARC and LF on the TR-7** *Robert K. Morrow, Jr., WB6GTM*
- 23 **Keying Improvements to the ICOM IC-730** *Don McClure, KB2Z*
- 28 **The KC2FR QRM Fighter** *David Jagerman, KC2FR*
- 31 **A New, More Versatile Transmatch** *Claude L. Frantz, F5FC/DJØOT*
- 43 **Technical Correspondence**

Beginner's Bench

- 34 **Build a 40-M Cubic Incher** *Dennis Monticelli, AE6C*

General

- 45 **Amateur Radio Sputniks** *Bernie Glassmeyer, W9KDR*
- 48 **China: Active Once Again** *Richard L. Baldwin, W1RU*

Operating

- 73 **Rules, 1982 ARRL UHF Contest**
- 74 **Results, Ninth Annual ARRL 10-Meter Contest**
Mark Wilson, AA2Z and Bill Jennings, K1WJ
- 79 **An Emergency Communicator's Checklist**
- 82 **Ham Radio Horoscope**

Organizational and Regulatory

- 9 **We Win One on the Hill**
- 51 **League Members to Choose Board Representatives**
- 55 **More About Soviet Hams**
- 58 **Moved and Seconded**
- 59 **Auxillary Stations**

Departments

| | | | |
|--------------------------------|-----|------------------------|--------|
| Canadian NewsFronts | 54 | New Books | 13, 27 |
| Circuit Board Etching Patterns | 39 | New Products | 42 |
| Club Corner | 66 | The New Frontier | 50 |
| Coming Conventions | 71 | Next Month in QST | 19 |
| Contest Corral | 84 | Operating News | 82 |
| Correspondence | 56 | OSCAR/RADIO Operating | |
| Feedback | 44 | Schedule | 83 |
| FM/RPT | 60 | Product Review | 40 |
| Hamfest Calendar | 70 | Public Service | 79 |
| Happenings | 51 | QSL Corner | 63 |
| Hints and Kinks | 37 | Section Activities | 85 |
| How's DX? | 61 | Silent Keys | 67 |
| Index of Advertisers | 166 | Special Events | 72 |
| International News | 55 | Washington Mailbox | 59 |
| In Training | 67 | The World Above 50 MHz | 68 |
| It Seems to Us | 9 | YL News and Views | 65 |
| League Lines | 10 | 50 and 25 Years Ago | 66 |

It's Time To SANTEC up

It's time for you to get the best of the excitement of full-feature synthesized handheld operations, and SANTEC technology hands you the up-to-the-minute radio whose time has come. Here are just four great reasons why you should SANTEC up:

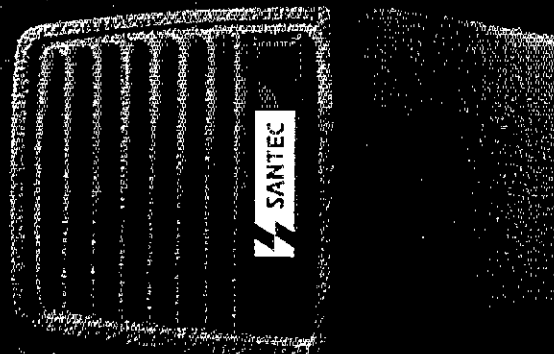
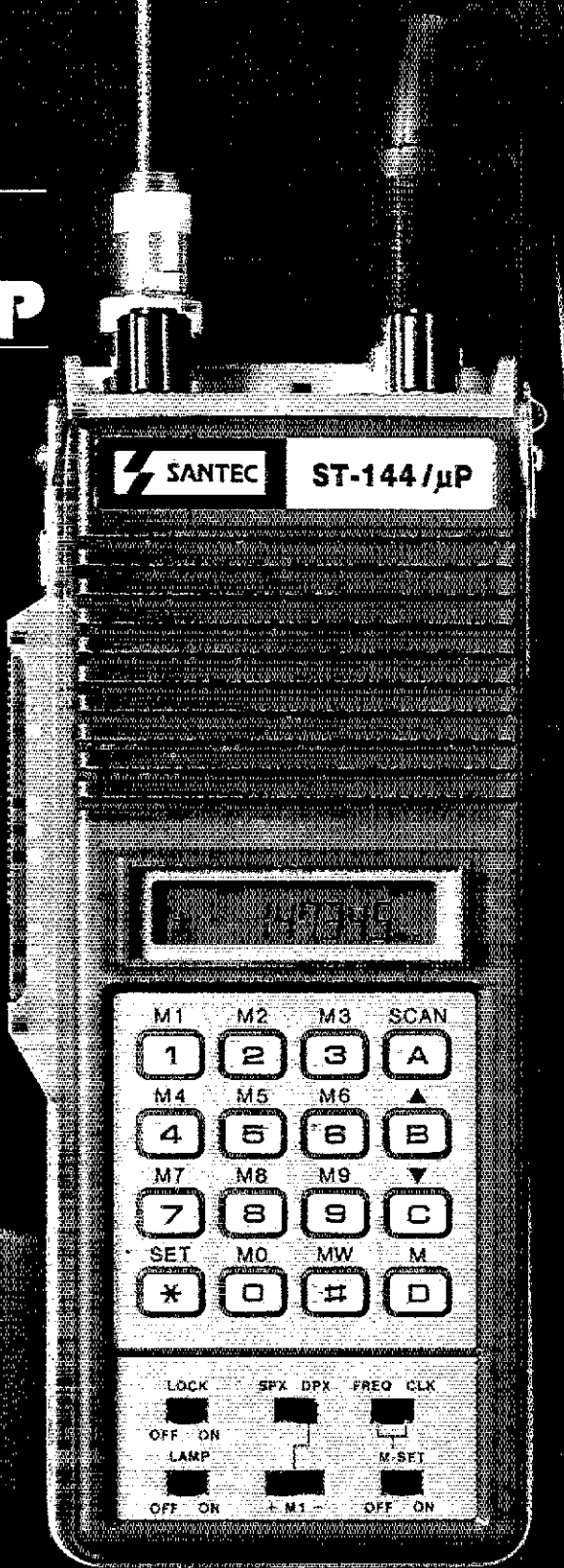
■ **Memory channels store standard repeater offsets or simplex.** Easily programmed and instantly recalled, each memory frequency comes up with its own offset (plus or minus 600 kHz) or in the simplex mode as originally entered.

■ **Less than 10 ma drain in receive** means more standby time for SANTEC owners. The ST-144/μP saves its power.

■ **High power output when you need it.** You can choose to transmit at 0.1W, 1.0W, or even 3.5W (all nominal), and your SANTEC can reach out through all types of operating conditions.

■ **Outstandingly good warranty and service.** Your SANTEC comes with the back up that doesn't back down in 90 days: a full two year extended service period, which no one else can match, in addition to the regular 90 day limited warranty for parts and labor.

When it's time to compare features and value, nothing else stands up with SANTEC. Now that it's time for you to get the best, it's time to SANTEC up.



Shown with optional SM-1 speaker microphone.

Accessories for SANTEC Handheld Radios

- clockwise from upper left
- Leather Case (ST-LC)
- Base Charger & Power Supply (ST-SBC)
- Remote Speaker (MS-S05)
- Mobile Charger (ST-MC)
- Speaker Microphone (SM-1)

The ST-144 μP is approved under FCC Part 15



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All stated specifications are subject to change without notice or obligation

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CUSHCRAFT HF MULTIBAND CONTEST WINNING ANTENNAS

AV-3

3 BAND VERTICAL
10-15-20 METERS
Only 14 ft., 4.26 m. height
Low priced
Easy to use

AV-5

5 BAND VERTICAL
10-15-20-40-80 METERS
Self-supporting
25 ft., 7.4 m. height
Capacitive X-hat



WITH ADD-ON KIT
4 BAND YAGI
10-15-20-30/40 METERS

NEW 30 METER
WARC BAND WITH
A3 OR A4



3 BAND YAGI
10-15-20 METERS



3 BAND VERTICAL
10-15-20 METERS
No radials
Remote tuning
Better than average
performance
22 ft., 6.7 m. height

The world renowned Cushcraft HF Multiband antennas are chosen time after time for DX-peditions to far corners of the globe. Their excellent gain, outstanding radiation pattern, 2kw power rating, easy assembly, and high strength-clean profile aluminum construction enable the adventurous DX-er to travel further and make more contacts.

For your home QTH, DX-pedition, field day, or contest select a high performance Cushcraft antenna available through dealers worldwide.

A3
Broadband, excellent gain and f/b ratio, 2 kw power rating direct 50 Ω feed, Boom 14 ft., 4.26 m., longest element 28 ft., 8.5 m., weight 27 lbs., 12.9 kg., turn radius 15.5 ft., 4.7 m., mast dia. 1 1/4 in. to 2 in., 3.18 cm. to 5.08 cm., material 6063-T832 seamless aluminum.

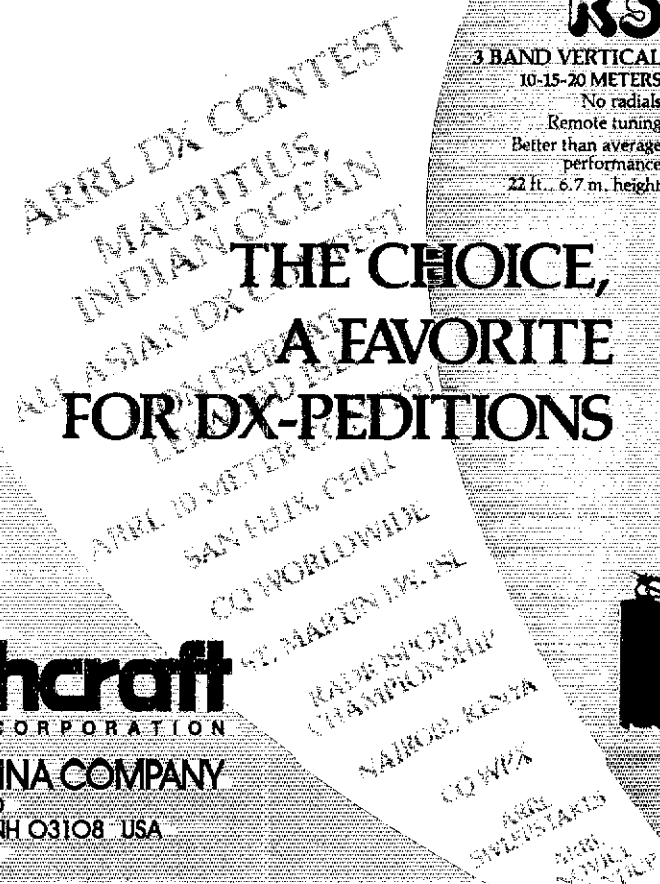
A4
Broadband, excellent gain and f/b ratio, 2 kw power rating, direct 50 Ω feed, boom 18 ft., 5.48 m., longest element 32 ft., 9.7 m., weight 37 lbs., 16.8 kg., turn radius 18 ft., 5.48 m., mast dia. 1 1/4" to 2 in., 3.18 to 5.08 cm., material 6063-T832 seamless aluminum.



cushcraft
CORPORATION

THE ANTENNA COMPANY
PO. Box 4680
Manchester, NH 03108 USA
TELEX 953050

THE CHOICE,
A FAVORITE
FOR DX-PEDITIONS



NEW

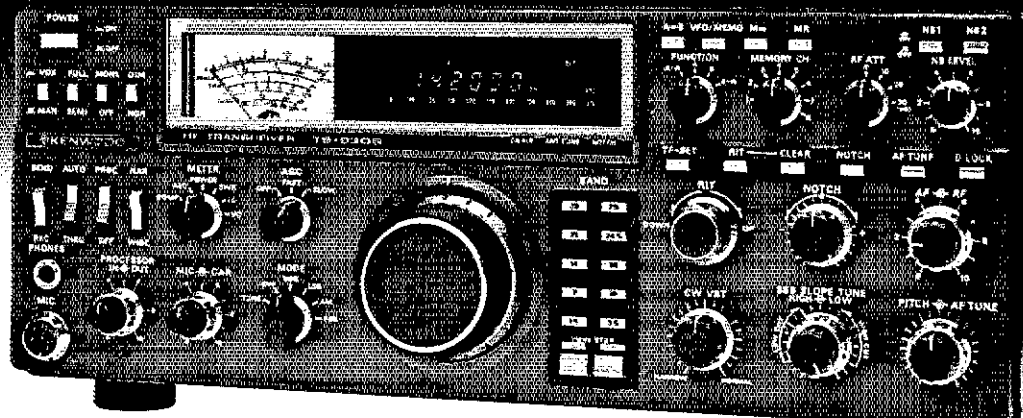
TS-930S

"DX-traordinary"...
superior dynamic range,
auto. antenna tuner,
QSK, dual NB, 2 VFO's,
general coverage receiver.

A superlative, high-performance, all solid-state HF transceiver, that covers all Amateur HF bands, and incorporates a 150 kHz to 30 MHz general coverage receiver having an excellent dynamic range.

TS-930S FEATURES:

- 160-10 Meters, with 150 kHz—30 MHz general coverage receiver. Covers all Amateur frequencies, plus WARC, on SSB, CW, FSK, and AM. Incorporates general coverage receiver.
- Excellent receiver dynamic range. Typical two-tone dynamic range, 100 dB (20 meters 500 Hz CW bandwidth).
- All solid-state 28 volt operated final amplifier. Lowest IM distortion. Power input 250 W on



SSB/CW/FSK, 80 W on AM. SWR/ Power meter.

- Available with AT-930 automatic antenna tuner built-in, or as an option. Covers Amateur bands 80-10 meters, including WARC bands.
- CW full break-in. CMOS logic IC, plus reed relay. Switchable to semi break-in.
- Dual digital VFO's, 10-Hz steps, includes band information.
- Eight memory channels. Stores frequency and band data. Internal battery memory back-up, est. 1 yr. life. (Battery not Kenwood supplied.)
- Dual mode noise blander ("pulse" or "woodpecker"). NB-1, with threshold control, for "pulse" noise. NB-2 for "woodpecker"

- SSB IF slope tuning, allows independent adjustment of the low and/or high frequency slopes of the IF passband.
- CW VBT and pitch control. Variable bandwidth tuning tunes out interfering signals. CW pitch control shifts IF passband and beat frequency. "Narrow-Wide" filter switch.
- IF notch filter 100 kHz, deep, sharp, better than -40 dB.
- Tuneable, peak-type audio filter for CW.
- AC power supply built-in. 120, 220, or 240 VAC, switch selected. (Operates on AC only.)
- Fluorescent tube digital display, with analog type sub-scale, in 20-kHz steps.
- RF speech processor provides

higher average "talk-power".

- One year limited warranty.
- Other features: SSB monitor circuit, 3-step RF attenuator, VOX, and 100-kHz marker.

Optional Accessories:

- AT-930 Automatic antenna tuner.
- SP-930 External speaker with selectable audio filters.
- YG-455C-1 (500 Hz) or YG-455CN-1 (250 Hz) plug-in CW filters for 455 kHz IF.
- YK-88C-1 (500 Hz) CW plug-in filter for 8.83 MHz IF.
- YK-88A-1 (6 kHz) AM plug-in filter for 8.83 MHz IF.
- MC-60 (S8) Deluxe desk microphone, with UP/DOWN switch

TR-7730

Dyna-"mite"...
miniaturized,
5 memories, memory/
band scan.

The TR-7730 is an incredibly compact, reasonably priced, 25 watt, 2 meter FM mobile transceiver, with five memories, memory scan, automatic band scan, plus other convenient operating features. It is available with a 16-key autopatch UP/DOWN microphone, (MC-46), or with a basic UP/DOWN microphone.

TR-7730 FEATURES:

- Dimensions: 5-3/4 W x 2 H x 7-3/4 D, inches. Weighs 3.3 lbs.
- Extended frequency coverage, 143.900-148.995 MHz, in 5 or 10-kHz steps.

- 25 watts RF output power, with HI/LOW power switch.
- Five memories. Simplex or repeater operation, with transmit offset switch. The 5th memory stores receive and transmit frequencies independently, for non-standard splits. Memory back-up terminal on rear panel.
- Memory scan, plus automatic band scan. Locks on busy channel, resumes when signals disappear, or when scan switch is pressed. Scan HOLD

- or PTT switch on microphone cancels scan.
- UP/DOWN manual scan on microphone, either version.
- Four digit LED frequency display.
- S/RF bar meter. LED indicators for BUSY, ON-AIR, REPEATER operation.
- Tone switch for internal tone encoder (not Kenwood supplied).
- Offset switch ± 600 kHz, or simplex. Fifth memory for non-standard offset.

Optional Accessories:

- MC-46 16-key autopatch UP/DOWN microphone.
- SP-40 Compact mobile speaker.
- KPS-7 Fixed station power supply.



TR-8400

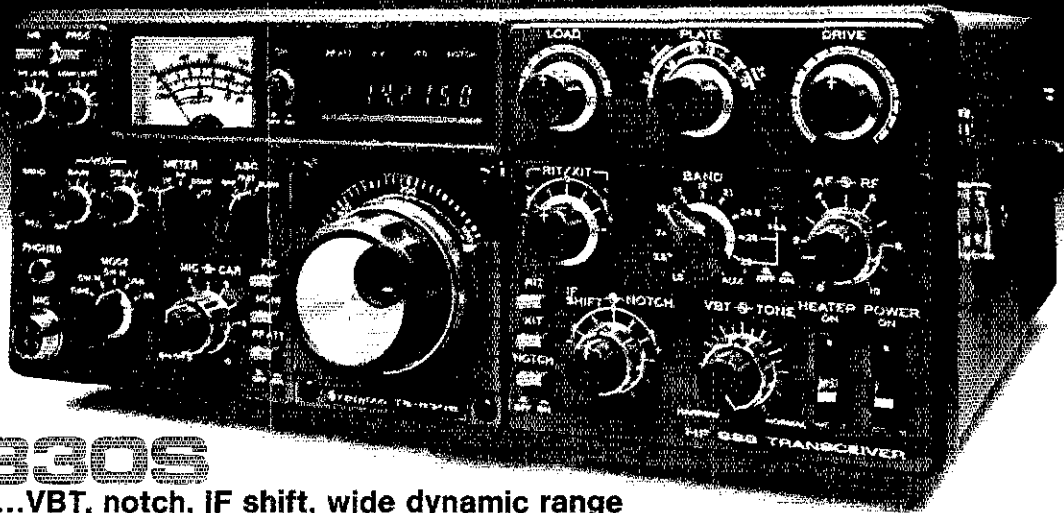
Synthesized 70-cm FM mobile rig

- Covers 440-450 MHz, in 25-kHz steps, with two VFO.
- Transmit offset switch for ± 5 MHz. Non-standard offset uses fifth memory.
- HI/LOW power switch selects 10 or 1 watt RF output.
- Similar to TR-7730 in other features, including five memories, memory scan, automatic band scan, UP/DOWN manual scan, four digit display, S/RF bar meter, LED indicators, tone switch, and same optional accessories.
- Basic UP/DOWN microphone supplied with unit.



KENWOOD

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



TS-830S

"Top-notch"...VBT, notch, IF shift, wide dynamic range

The TS-830S has every conceivable operating feature built-in for 160-10 meters (including the three new bands). It 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.

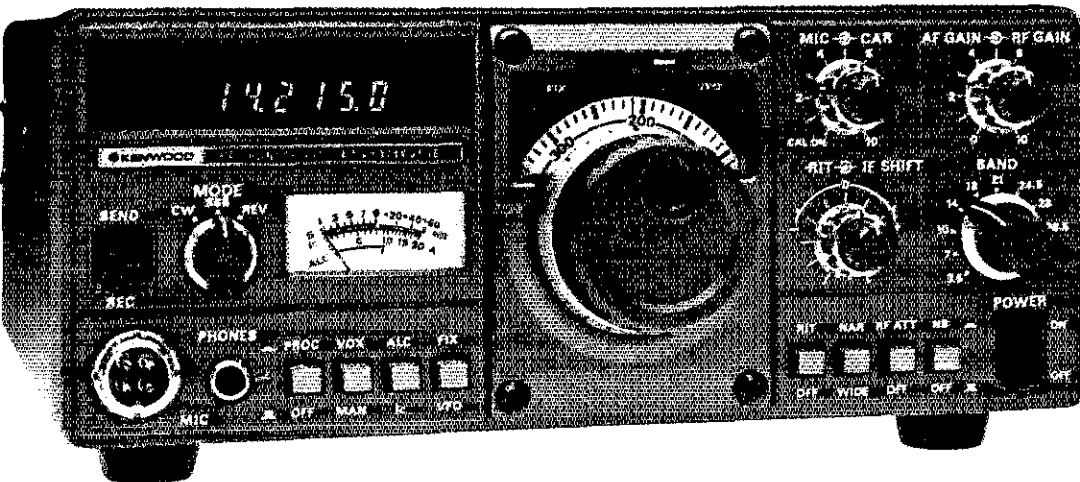
TS-830S FEATURES:

- LSB, USB, and CW on 160-10 meters, including the new 10, 18, and 24-MHz bands. Receives WWV on 10 MHz.

- Wide receiver dynamic range, Junction FETs in the balanced mixer, MOSFET RF amplifier at low level, and dual resonator for each band.
- Variable bandwidth tuning (VBT). Varies IF filter passband width.
- Notch filter high-Q active circuit in 455-kHz second IF.
- IF shift (passband tuning).
- Noise-blanker threshold level control.
- Built-in digital display, (fluorescent tube), with analog dial.
- 6146B final with RF negative feedback. Runs 220 W PEP (SSB)/180 W DC (CW) input on all bands.
- Built-in RF speech processor.
- Narrow/wide filter selection on CW.
- SSB monitor circuit.
- RIT and XIT (transmitter incremental tuning).

Optional accessories:

- SP-230 external speaker.
- VFO-230 external digital VFO with five memories, digital display.
- VFO-240 external analog VFO.
- AT-230 antenna tuner.
- YG-455C (500 Hz) or YG-455CN (250 Hz) CW filter for 455 kHz IF.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filter for 8.83 MHz IF.
- KB-1 deluxe heavyweight knob.



TS-130SE

"Small talk"...IF shift, Processor, N/W switch, affordable.

A compact, all solid-state HF SSB/CW transceiver for mobile or fixed base station, covering 3.5 to 29.7 MHz.

TS-130SE FEATURES:

- 80-10 meters including the new 10, 18, and 24 MHz bands. Receives WWV on 10 MHz.
- TS-130SE runs 200 W PEP/160 W DC input on 80-15 meters, 160 W PEP/140 W DC on 12 and 10 meters. TS-130V version at 25 W PEP/20 W DC, all bands, also available.

- Digital display, built-in.
- IF shift circuit.
- Speech Processor, built-in.
- Narrow/wide filter selection on CW and SSB with optional filters.
- Automatic SSB mode selection (LSB on 40 meters and below, USB on 30 meters and up). SSB reverse switch provided.
- RF attenuator, built-in.
- Final amplifier protection circuit assures maximum reliability.
- Output power is reduced if abnormal operating conditions occur. For very severe operations, optional cooling fan, FA-4, is available. TS-130S, with FA-4 installed, also available.
- Effective noise blanker.
- Dimensions: 3-3/4 H x 9-1/2 W x 11-9/16 D (inches). Weight: 12.3 lbs.
- Other features: VOX, CW semi break-in with sidetone, one fixed channel, and 25 kHz marker.

Optional DFC-230 Digital Frequency Controller

Frequency control in 20-Hz steps with UP/DOWN microphone (supplied with DFC-230). Four memories and digital display. (Also operates with TS-120S, TS530S, and TS-830S.)

Optional accessories:

- PS-30 matching power supply (TS-130SE).
- KPS-21 power supply (TS-130SE).
- PS-20 power supply (TS-130V).
- SP-120 external speaker.
- VFO-120 remote VFO.
- FA-4 fan unit (TS-130SE).
- YK-88C (500 Hz) and YK-88CN (270 Hz) CW filters.
- YK-88SN (1.8 kHz) narrow SSB filter.
- AT-130 antenna tuner.
- MB-100 mobile mounting bracket.



KENWOOD

TRIO-KENWOOD COMMUNICATIONS
111 West Walnut, Compton, California 90220

NEW

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Reports Invited: The ARRL Board of Directors (see list at left) determines the policies of ARRL. The 16 divisions of the League are further arranged into 73 administrative "sections," each headed by an elected Section Communications Manager. Your SCM welcomes reports of club and individual activity. ARRL Field Organization appointments are available covering a wide range of amateur radio operating interests. Whatever your license class, your SCM has an appointment available. Check with your SCM (below) for further information. Section boundaries are defined in the booklet *Operating an Amateur Radio Station*, free to members.

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Montana

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Nevada

Pacific

Sacramento Valley

San Francisco

San Joaquin Valley

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North Carolina

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"It Seems to Us..."

The American Radio Relay League, Inc., is a noncommercial association of radio amateurs, bonded for the promotion of interest in Amateur Radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in Amateur Radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisites, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at Newington, Connecticut 06111.

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We Win One on the Hill

Amateur Radio has been doing well on Capitol Hill. Last fall, the Senate passed a bill, S. 929, introduced by Barry Goldwater, K7UGA, to amend the Communications Act of 1934 in several important respects. As reported in League Lines last month, a bill in the House of Representatives containing essentially the same provisions cleared the House Telecommunications Subcommittee on May 5. Further good news came on June 2, as the bill, known as H.R. 5008 or the "Communications Technical Amendments Act of 1982," sailed through the House Committee on Energy and Commerce without opposition. Committee action was seen as the last major hurdle; barring a major legislative crisis which might delay things, favorable action by the full House seemed virtually assured as this issue went to press. Following reconciliation of the House and Senate versions of the legislation, a process that is already well underway, the only remaining step would be the affixing of the President's signature. It may be a bit too soon to break out the champagne, but it is *not* too soon to feel mighty good about the progress we've made!

S. 929 and H.R. 5008 are the culmination of years of effort by the League and by several members of Congress to obtain much-needed revisions to the Communications Act. The bills contain several important provisions:

1) FCC would be given authority to regulate the susceptibility of electronic equipment to radio frequency interference, authority which is needed in order to stem the flow of electronic devices which cannot function normally in the presence of rf energy. Sustained effort to convince industry to address this growing problem on a voluntary basis has met with little success; even conservative legislators such as Senator Goldwater, who generally oppose government intervention in the marketplace, feel frustrated at industry's unwillingness to come to grips with the RFI problem.

2) The Amateur Service would be exempted from the "secrecy of communications" provisions of Section 605 of the Communications Act, thus clearing the way for stepped-up voluntary monitoring of rules compliance in the amateur bands.

3) FCC would be authorized to use volunteers in monitoring for rules violations. The volunteers would be able to issue advisory notices to apparent violators and to convey information to Commission personnel, but would not be authorized to take enforcement action themselves. Budget cuts mean that unless the FCC can make effective use of volunteers, FCC enforcement efforts will be limited in the future to only the most serious cases.

4) FCC would be authorized to use volunteers in preparing and administering amateur license examinations. This is not a return to the old by-mail exam system that was abandoned a few years ago; rather, it is a necessary response to the effects of budget cuts on the Commission's ability to prepare and supervise exams. Already, the opportunities for amateurs and prospective hams to take exams for the Technician and higher license grades are becoming increasingly rare. The legislation is also needed in order to legitimize

the present Novice exam program.

5) The term of amateur station licenses, now limited to five years, could be made 10 years to reduce the administrative burden on the Commission and its licensees.

While the adoption of this legislation will mark the end of a long battle, it also will mark a beginning. On the RFI front, the focus will shift to the FCC, where regulations responding to the will of Congress must be developed and implemented, unless industry ends its foot-dragging and produces meaningful standards of its own. On the use of volunteers for monitoring and for administering exams, we can expect early FCC action because there is considerable support within the Commission for the objectives of the legislation. The most important question is whether the amateur community is ready and willing to accept the considerable responsibility it is about to be given.

Volunteer-administered exams represent a major challenge. Aside from the tremendous amount of work involved, some amateurs are concerned that the use of volunteers will destroy the integrity of the amateur exam program. Certainly, the FCC rules which implement the new approach will have to be much tighter than the old by-mail system. The ARRL proposal, discussed in April "Happenings" and June "In Training," places a high priority on the integrity of the program. Even so, success will depend upon how seriously the individual volunteers take their responsibilities.

Monitoring represents a similar challenge. Amateur "self-policing" often is cited as evidence that we are a responsible — perhaps the most responsible — community of radio users. Can we live up to our reputation? Let's hope so, because the FCC is increasingly unable to solve our problems for us.

Where protecting the future of Amateur Radio is concerned, it boils down to this: If we, the amateur community, won't do it, no one will. — *David Sumner, K1ZZ*

Do as we say, not as we do . . .

. . . is the message being sent by the U.S. government on radio-spectrum allocations matters. Permission for U.S. hams to use their hard-won bands at 10, 18 and 24 MHz awaits ratification of the WARC-79 agreements, while at the same time the Voice of America is using frequencies that aren't even permitted under those agreements! A new VOA transmission to Latin America is on 7400 kHz, a frequency not allocated to broadcasting and used throughout Central and South America for point-to-point, low-power telephony communication to rural areas. Latin American opposition to broadcasting in this band is well known to anyone who attended WARC-79. Other new VOA transmissions use bands earmarked for use by broadcasting only *after* a specialized WARC later in the decade to plan their use. At WARC-79, the U.S. said this specialized WARC might be unable to develop an adequate plan for hf broadcasting and reserved the right "to take the necessary steps" if this came to pass. The conference is years away, but "the necessary steps" already seem to have been taken. — *K1ZZ*

League Lines...

The end of a long battle is in sight. For the past decade ARRL has been pushing to get the Communications Act amended so as to give the FCC authority to regulate the RFI susceptibility of receive-only devices. The U.S. House of Representatives Committee on Energy and Transportation recently passed H.R. 5008, including the RFI-susceptibility provisions hams have worked so hard to get. See "It Seems to Us ..." on page 9 of this issue.

The newest Soviet Amateur Radio satellite, ISKRA 2, was launched by two Soviet cosmonauts from the SALYUT 7 Space Station on May 17, 1982. ISKRA 2 signals may be heard on 29.580 MHz with the call sign RK02. Orbital parameters are: Inclination 51 degrees, period 91.01 minutes and increment 23.22 degrees. AMSAT and WIAW bulletins will provide updated orbital information. For details on the Soviet amateur satellite program up to the launch of ISKRA 2, see the article beginning on page 45.

The latest Ariane launch schedule is: L5 (first operational launch) with MARECS B and SIRO 3 satellites, September 10, 1982; L6 with EXOSAT satellite sometime during November 1982, and L7 with ECS 1 and AMSAT Phase III-B for January 1983.

The ARRL has filed a petition for rulemaking with FCC requesting that amateurs be allowed to use the teleprinter code known as AMTOR. See June 1981 QST, page 25, for details about this method of error-free RTTY communication. The League's petition has not yet been assigned a rulemaking number by the FCC. Details will appear in a future issue of QST in "Happenings."

The new ARRL Dakota Division vice director is Howard Mark, W0OZC, who has been appointed by ARRL President Clark to fill the vacancy created when Tod Olson, K0TO, succeeded to director. (See May 1982 QST, page 54.) Details about our new ARRL Dakota Division Vice Director will appear in a future issue of "Happenings."

Canadian radio amateurs are now authorized to operate in the new WARC band, 10.1 to 10.15 MHz. Amateur Radio Operator Certificate holders may use A1 emission only, and Amateur Radio Operator Advanced Certificate holders may use A1 and F1 emissions only. No telephony operation is permitted. This allocation is exclusively amateur in Canada, but it is secondary from an international standpoint. This means that the DOC expects Canadian amateurs to stay clear of foreign commercial stations that still use this band.

U.S. radio amateurs are not yet permitted to operate on the new 10.1-10.15 MHz WARC band. ARRL is making every effort to obtain immediate access to this band for U.S. amateurs. See "Happenings," June 1982 QST, page 61 and this month's issue, page 52. U.S. amateurs are cautioned against any operation that would bring discredit to the Amateur Radio Service.

The FCC has announced it is closing its Cincinnati, Ohio field office effective July 30. After that date all FCC public service and enforcement for the Cincinnati area will be handled by the Commission's Detroit district office. The closing will not affect the present availability of amateur exams given in the Cincinnati area. Examiners for the Detroit office will still be traveling to Cincinnati every February, June and October.

1983 will be observed as World Communications Year by the United Nations and its communications affiliate, the International Telecommunication Union (ITU). The Year is intended to focus attention on the "telecommunications infrastructures" in the countries of the world, and on accelerating the improvement of communications networks of all kinds in the lesser-developed countries. The U.S. effort is to be coordinated by the National Telecommunications and Information Administration (NTIA). ARRL has already offered the assistance of radio amateurs to the NTIA. Amateurs having suggestions on programs we could carry out during WCY are invited to write Perry Williams, WIUED, at ARRL Hq.

ARRL Hq. is looking for a person to fill the position of Membership Services Assistant. If you have a basic knowledge of FCC regulations and nontechnical facets of Amateur Radio, a General class or higher license, and excellent oral and written communications skills, contact Hal Steinman, K1FHN, Manager of the Membership Services Department.



Equalize Your Microphone and Be Heard!

How does the audio sound at the other end when you are talking? How does your repeater sound? Build this equalizer and be surprised at the improvement!

By Bob Heil,* K9EID

Hams place emphasis on high-power transmitters, large antenna systems and accessories that are aimed at making Amateur Radio signals louder. Few take note of articulation (clear and effective utterance). Good articulation gives the listener the ability to clearly understand each syllable.

Manufacturers say very little about audio-frequency response and distortion levels. The audio section (of a transmitter) should be fairly flat in response — meaning that there are no big peaks or nulls in the overall response pattern — and have less than 0.2% distortion.

Choose the Correct Microphone

Microphones are designed for specific purposes. In the sound-reinforcement and recording-studio industry, a microphone is purchased only after evaluations are made to ensure that a particular one will produce the desired results.

Amateur Radio operators do not usually select a microphone on this basis. Few hams bother to listen to the output of a microphone before purchasing it. Microphones look "sharp," match the color of your transmitter or appeal to your spouse's sense of decor! One fellow recently commented on 40 meters that he purchased a particular microphone because it had a long cable.

A Proper Test

Recording studios have racks of expen-

sive test instruments to help conduct a proper test. But what about you? You only need a good-quality tape recorder and one of your fellow amateur friends. Have him record directly from the speaker of his hf receiver into the line input of the tape recorder while you transmit a signal. Take the tape home and "digest" it. You will hear your station almost as others hear it. It is a simple method for finding out what your station sounds like.

To make the test properly, use three or four microphones that you think will do the job for you. Then select several that you don't think you will like. Using a 2-meter direct-frequency link for coordination, have your friend tape directly from his receiver, making sure to avoid input-overload conditions. If your signal is strong, have him disconnect his receiving antenna, or listen with his dummy load connected.

During the test, try each microphone with your transmitter. Be very careful to document each move, by mentioning each microphone by model, and note the level setting on the tape recording. You then have an accurate reference when listening to the playback.

After the test transmissions, you will want to listen to the results under conditions similar to those of others who will hear your signal. Don't listen to the tape while using a high-quality speaker system. Play the results back through the speaker of your Amateur Radio receiver. When listening, be ready for some surprises! Remember those three microphones you didn't think much of? Chances are, one of

them might be the best of the lot! You will be listening for good articulation in the midrange and sibilance (the high frequency presence of "s" and "t") sounds with low or no distortion. Once you find a microphone that suits you, it's time to start equalizing your system for optimum audio characteristics.

Passive Equalization

Most modern ssb transmitters contain filter networks that limit the response from 300 to 3000 Hz. If you use a microphone that has a wider frequency response, the transmitter may produce a wider signal than is necessary. The lower-frequency audio (under 300 Hz) does nothing to help the receiving-station operator understand the information better. In fact, better articulation is achieved by passively rolling off the microphone response under 300 Hz. This can be accomplished easily by installing a disc-ceramic capacitor, such as a 0.01- μ F unit. The impedance of the microphone and the capacitor value will determine the roll-off frequency.

This capacitor should be installed in series with the "hot" microphone lead. Placing the capacitor across the hot lead to ground will roll off the high frequencies, should you desire to do this. In most cases you will not want to roll off the high-frequency response.

Your end goal is to achieve good articulation without killing any of the natural midrange and low-frequency responses. You will want to roll off the low end, keeping your signal as narrow as

*Heil Sound, 2 Heil Dr., Marissa, IL 62257

The power supply can be a 9-volt battery or a well-filtered ac supply. If care is taken to avoid ground loops and magnetic fields affecting the high level microphone preamplifier, you can build a supply inside the housing.

Construction

The circuit is assembled on a small pc board (Fig. 2).¹ Mount the board, with either the battery or power supply, in a small metal enclosure. Take care to shield every connection to the outside. Use ferrite beads or feedthrough capacitors for each lead that enters the chassis. Subjecting any audio circuit to high levels of rf may cause problems.

An LED connects to the "clip" light circuit of the preamplifier. This circuit has a control, R1, to adjust the light threshold. Overloading the preamplifier will turn on the overload indicator. The light is best set to come on at 6 dB, before hard clipping is observed on an oscilloscope. If you don't have a scope, you may be able to set it by listening to the output of the preamplifier through a small audio amplifier and adjusting it so the light comes on just before distortion occurs.

Adjustment of the two filters is accomplished best by listening to another receiver, or by having a friend record your testing (as discussed earlier). Once the equalizer is set, it shouldn't have to be changed. Many of these units are tucked away behind the rig so that the controls aren't bumped and changed by mistake.

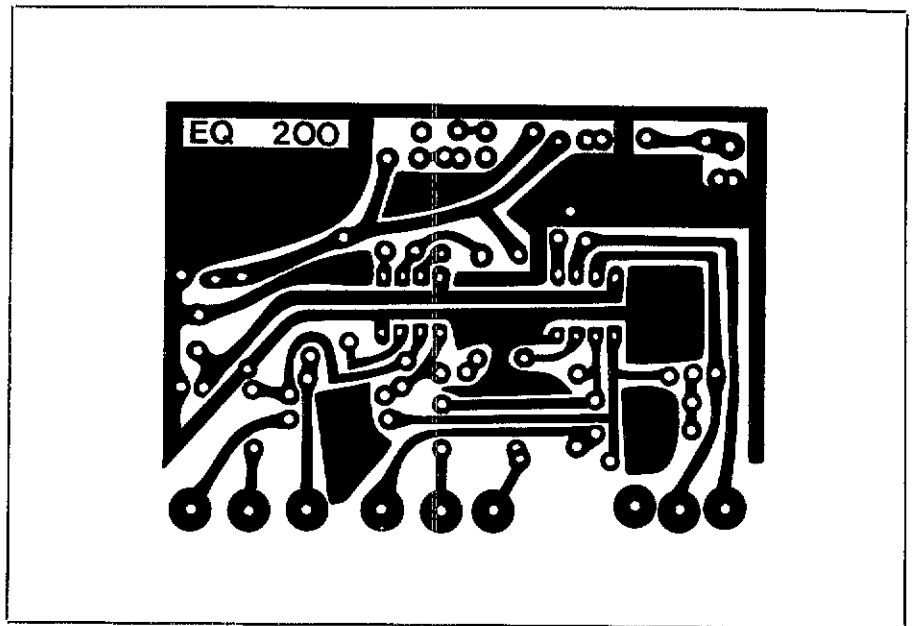
Equalization for Repeater Service

Many repeater systems can be improved by using an audio-filtering system similar to the one described here. A typical repeater system loses some articulation and sibilance because of losses encountered with improper coupling between the receiver and transmitter audio sections. Impedances between the two are often mismatched, further complicating matters. A simple group of variable filters set at 400 and 2500 Hz will aid audio articulation. Of course, once the filter is installed and set for maximum intelligence, it should not have to be adjusted again.

Don't Forget the Microphone

You can play a few "tricks" to enhance the response of some microphones. Again, you will have to rely on the tape recorder test to determine optimum performance, but it will be worth the effort.

One microphone that can be improved is the Kenwood MC-50. If you have one, make a transmission and have it tape recorded by a fellow operator. Then, wrap electrical or masking tape around



Circuit-board etching pattern for the Equalizer. Black represents copper. The pattern is shown at actual size from the foil side of the circuit board. The parts placement diagram for the equalizer was unavailable at the time of publication.

the microphone to cover the long slots in the sides near the cartridge. About three turns will usually cover them sufficiently.

Record the signal again. The difference is remarkable! All low-end rumble should be gone. The midrange will be enhanced. You have equalized the microphone by dampening the back of the cartridge, and not allowing the element to travel as far in the basket by closing the air chamber. The cardboard tube inside a toilet-tissue roll fits perfectly over the end of the MC-50, providing a permanent, simple, but effective, modification. Many other microphones can be dampened in similar ways.

Be Aware of Excess Room Resonance

One of the worst things done to Amateur Radio audio today is placing the microphone in a hard-surfaced room with lots of echo. Some operators crank the gain of the preamplifier up so that they can lie back 3 to 4 feet away, controlling the PTT with their toes! I think this "murders" a good signal. Most communication microphones are designed to be close-talked, using low microphone gain, and thus produce better presence and articulation. The room echo becomes practically nonexistent, while the speech audio comes out on top.

Even in recording studios, where acoustics are nearly perfect, microphones are "worked" very close. Many microphones exhibit a proximity effect: The closer you talk into the microphone, the more low and mid frequencies it produces, in relationship to the high-frequency response. When you back off

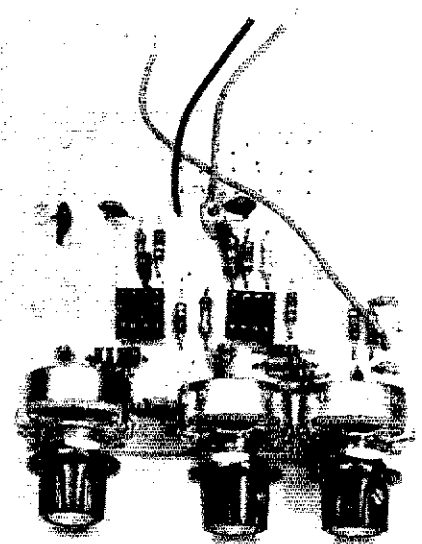


Fig. 2 — Equalizer board before mounting it in the W1AW/R 2-meter repeater.

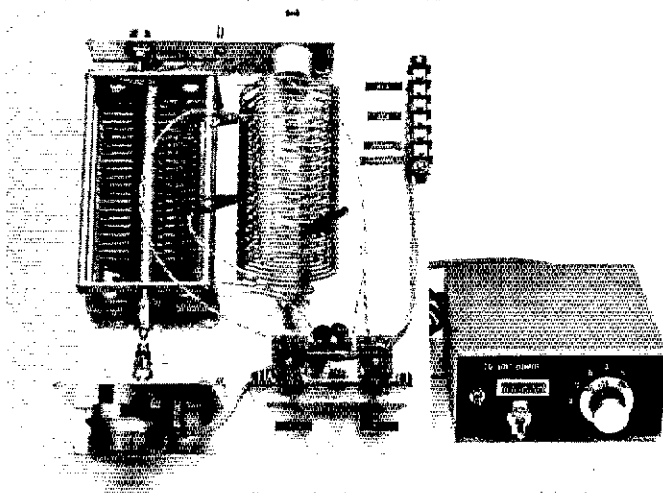
from the microphone, the result is a "thin" sound, as the body of the voice characteristics is lost.

Little things make stations sound big. Proper use of microphones, correct placement, small amounts of equalization and suitable gain settings are some of the most important "little" things. Are you aware of what you sound like, and do you want to make it better? Our bands are becoming more populated. Perhaps crowded bands can be tolerated, all things being equalized.

¹Parts, partial kits and completed units are available from Heil Sound, Box 26, Marissa, IL 62257, tel. 618-295-3000. The ARRL and QST in no way warrant this offer.

Antenna Matching, Remotely — Some Thoughts

Network switching for multiband antennas is no fun out of doors in foul weather. Remote control saves time and keeps you indoors. Here are some design thoughts.



By Doug DeMaw,* W1FB

Remote matching networks too complicated for you? Too much trouble with arcing and flashover at high power? And what about the cost of parts for a remotely controlled matcher? Well, I pondered the same questions during an extended period of practical deployment for the VE2CV Half-Delta Loop antenna.¹ Not only that, I grew weary of dashing out to the back lot in the rain, snow and darkness to change bands and adjust for a VSWR of 1:1. Fall and winter on the East Coast can bring with it some cold, dismal weather. That, plus the time lost in doing a manual adjustment, can leave one less than enthusiastic about hand-operated outdoor tuning systems!

I was in a hurry to correct the annoyance that beset me as winter hustled into Connecticut. I hoped that there were enough components in my workshop to permit the building of a three-band, remotely controlled network that would sustain 600 watts of rf energy. The first try was okay except for occasional flashover of the two control relays when running 1 kW of dc input power. A simple technique was developed to resolve the matter (more on this later), and the system was finalized, then installed in a homemade "dog house" to keep it high and dry. The general approach may be of interest to you if your station requires remote band switching or matching of an antenna for

which the feed point is far removed from the shack.

Network Types

The choice of matching circuits is dependent upon the type of antenna in use — a truism for certain! There is no reason why one could not use any popular L-C network, Omega match, gamma match or whatever, assuming it was appropriate for the type of feed system in use. Wide-range Transmatch circuits like the Ultimate or SPC² are suitable for remote installations, but would require a reversible motor with stops for the rotary inductor (Fig 1). A fixed-value inductor with preselected taps would be a practical substitute for a rotary inductor, however, since the various impedance values for a multiband antenna would not likely change beyond the correction range of the variable capacitors.

My situation called for a simple L-network for which the impedance transformation was up from 50 ohms on 80, 40 and 20 meters. The circuit is shown in Fig. 2. It is used with the Half Delta Loop, but could be employed for slant-wire feed of a tower (a poor man's form of delta matching). The latter is used among some amateurs by isolating the tower guy wires with insulators, but leaving one guy common to the tower, then feeding it at the ground end (Fig. 3). This can be an effective DX antenna for 160 and 80 meters, even when a triband Yagi is atop the tower. It does require a good ground system, such as a fan of buried radials.

The Half-Delta Loop (grounded half-wave loop at f_0) used at W1FB with the L-network provides excellent DX results on

80 meters at f_0 , on 40 meters ($2f$) and at 20 meters ($4f$). Radiation is vertically polarized on all bands and is essentially omnidirectional at f_0 . There is increasing directivity as operation is carried out at progressively higher harmonics. The directivity is in the slope of the slant wire. If a good ground system is used with the loop the angle of radiation will be low, and some gain will prevail at the harmonic frequencies. The half-wave grounded loop is shown in Fig. 4. The maximum-current resonance is not exactly related in terms of the harmonics. Therefore, the feed impedance varies from band to band (90 to 250 ohms in my installation for 3.5 to 14 MHz). The L network was a good choice for obtaining a matched condition to 50-ohm coaxial cable.

L-Network Circuit

Moderate plate spacing for C1 of Fig. 2 is adequate for my installation, owing to the relatively low impedance transformation at the feed point of the loop. A plate spacing of 1/8 inch (3 mm) has been suitable for the output from my SB-221 amplifier. Higher feed impedances will probably require larger plate spacing. This can be calculated if the feed impedance is measured. Then, it's simply a matter of using $E_{rms} = \sqrt{WR}$, where W is the output power of the transmitter and R is the feed impedance in ohms. Thus, 600 watts across 150 ohms would produce an rms voltage of 300. This would equate to a pk-pk ac voltage of 846. The plate spacing should be chosen for 846 volts minimum, thereby allowing for dielectric (air) degradation when the air is damp or

¹Notes appear on page 16.

*QST Senior Technical Editor

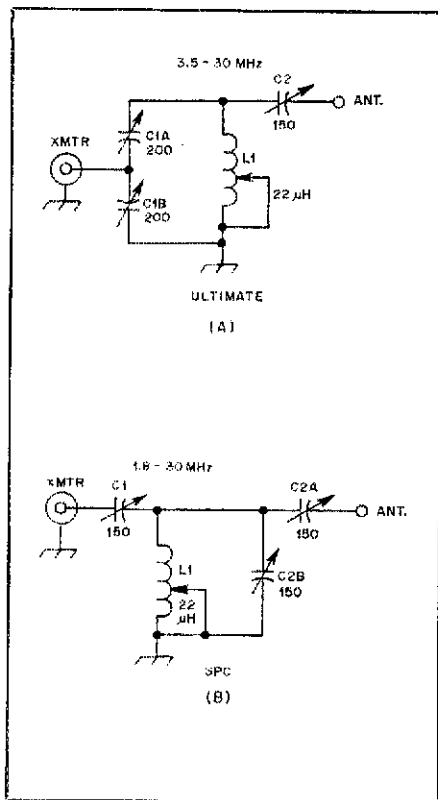


Fig. 1 — Basic circuit of the Ultimate Transmatch (A) and the SPC network (B).

polluted. Dust accumulations must also be considered. Most manufacturers of variable capacitors provide voltage ratings for the various plate spacings. If in doubt, consider that dry, clean air has a dielectric factor of 1 at 1 MHz. The breakdown voltage is 240 per mil (0.001 inch).³

Relays K1 and K2 of Fig. 2 were used because they happened to be on hand. Intuitively, one might prefer fancy, expensive antenna relays with steatite insulation. But, by "floating" the plastic-insulated relays at K1 and K2, the arc-over problem mentioned earlier was solved. The rf voltage no longer has a path to ground because of the toroidal chokes in the field-coil leads of the relays. The contact area of the relays must be able to sustain the rf current without losses, heating and subsequent heating damage. Again, if the feed impedance and rf power are known, we can determine the current rating for the relay contacts. This is obtained from

$$I = \sqrt{\frac{W}{R}} \quad (\text{Eq. 1})$$

where I is in amperes, W is in watts and R is in ohms. Hence, if the antenna impedance is 150 ohms and the power is 600 watts, the maximum rf current through the contacts will be 2A. Always allow

some leeway for this rating. A set of 5-A contacts should suffice for the example.

My relays are 24-V dc types. The mechanism for rotating C1 is a geared-down clock motor (surplus) that provides a 1-rpm speed. It requires 24 V ac for operation. I found this convenient because the motor voltage is taken off the 24-volt power transformer ahead of the rectifier diodes, and the relays are operated from the resultant dc voltage. The shortfall of using the clock motor is that it is not a reversible type. This means that if I adjust C1 past the setting that yields a VSWR of 1:1, I must wait nearly one minute before the capacitor is back to the setting I desire. A reversible motor is recommended if you are an impatient person! Check the surplus stores and flea markets for sources of clock motors, but look for a robust one. If possible, adjust the tensioning springs or bearings of C1 for minimum practical torque to lighten the load on the motor.

Power Supply

Fig. 5 contains the circuit diagram of the power supply for the tuning network. I modified an existing unit that I had built for controlling a remote coax switch at the top of my tower. Hence, there are some

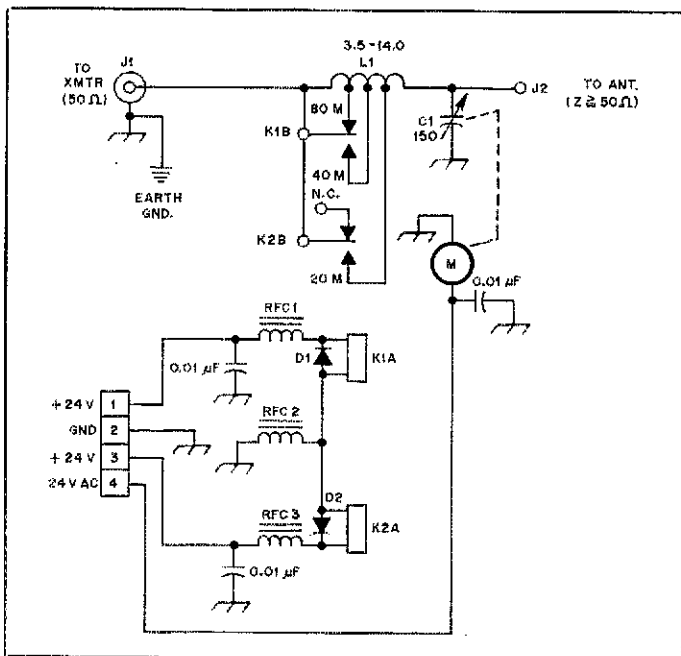


Fig. 2 — Schematic diagram of the L network used with the Half-Delta Loop. It is suitable for use with other types of antennas as well.

- C1 — Transmitting variable rated for developed rf voltage (see text).
- D1, D2 — Small-signal silicon diode, 1N914 or equiv.
- J1 — Chassis-mount coaxial connector (SO-239).
- J2 — Steatite feedthrough bushing.
- K1, K2 — 24-V dc relay, spdt type (J. W. Miller Co. 1W6 suitable). A 2W6 was used at W1FB, with the extra spdt contacts wired in parallel with the first set on each unit.
- L1 — Section of 2-1/2 in. diameter Miniductor stock to yield 18-20 μH of inductance. Home-made coil on low-loss form also suitable.
- M — 1-rpm motor (see text).
- RFC1, RFC2, RFC3 — 10 turns no. 20 insulated wire wound on stacked Amidon FT50-43 ferrite toroid cores. Use two cores for each choke.

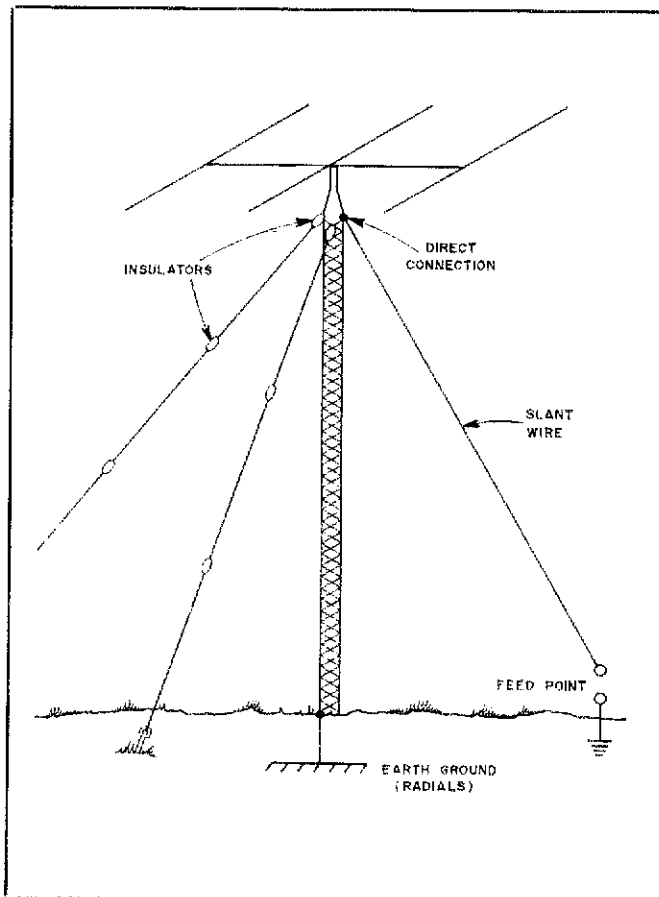


Fig. 3 — Example of slant-wire feed of a tower that contains a triband Yagi. One guy wire is used for feeding the tower. The remaining guys are insulated from the tower.

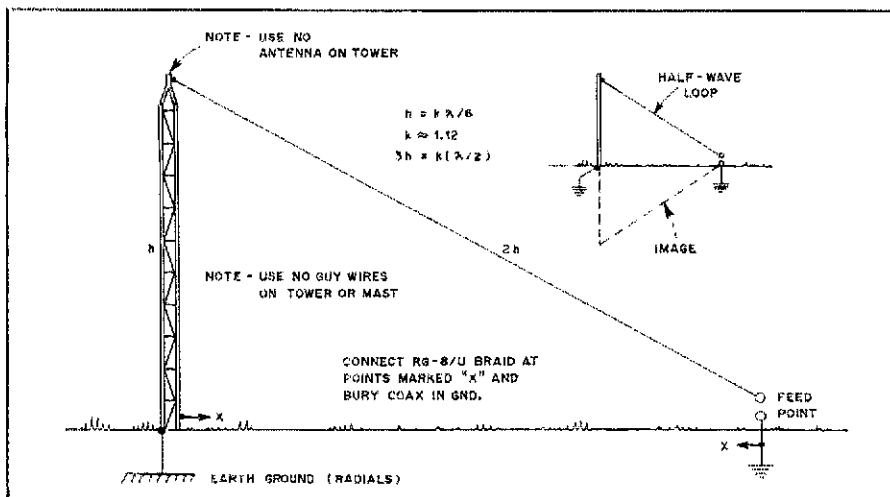


Fig. 4 — Essentials of the Half-Delta Loop antenna designed by VE2CV. The dimensional factors provided are for the ideal condition. Reasonable variations in h and $2h$ will not degrade the performance significantly.

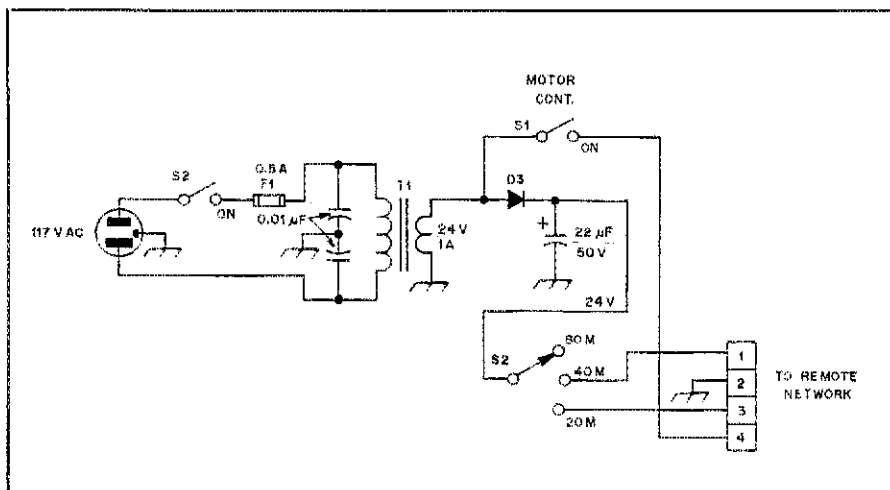


Fig. 5 — Schematic diagram of the control box and power supply for the circuit of Fig. 2. D1 is a 1-A, 50-PRV rectifier diode. S1 is a momentary push-button switch, and S2 is a single-pole, 3-position rotary switch. A Radio Shack 24-V transformer is suitable for T1. F1 is a 0.5-A fuse.

unused switch positions on the front panel.

The power unit contains a momentary switch for controlling the ac motor in the remote network. Four-wire control cable is buried in the ground (along with the 50-ohm feed line) between the house and the weatherproof box at the rear of my property. Since the current taken by the motor and relays is low, the conductor size of the control cable can be small (I used 100 feet of cable with no. 24 gauge conductors). The vinyl jacket of the cable is sealed at the far end (outdoors) to prevent moisture and dirt from entering it. The 50-ohm cable is Decibel Products VB-8, which is an impregnated type of RG-8/U, and is designed for underground use. Times Wire and Cable Co. makes a similar weatherproof, chemical-resistant line.

Construction Notes

A steatite feedthrough bushing is used

for the loop-wire feed from the matching network of Fig. 2. A terminal strip (right top of picture) provides a connection point for the control lines. A 4-pin socket can be used instead of the strip.

K1 and K2 are mounted on a vertical section of plastic to further insure against rf flashover to the aluminum chassis, which is grounded. A transient-suppression diode is used in parallel with the field coil of each relay.

A flexible shaft coupling is employed between the motor shaft and that of C1. This will help to reduce tension on the motor in the event alignment of the mating shafts is not perfect. The motor is affixed to an aluminum L bracket. A second L bracket contains the coax connector, steatite bushing and a no. 10 screw for grounding. Miniductor L1 is elevated 1 inch above the chassis on steatite stand-off posts. The completed assembly is placed in the wooden dog house, which is mounted on a 4 × 4-inch post, 3 feet

above ground. The housing is situated at the feed point of the loop antenna.

Adjustment

The photograph shows alligator clips on the leads that form the coil taps. These clips are used during initial adjustment of the network. After the proper coil taps are found, the clips are removed and the wires are soldered permanently to the appropriate coil turns. I poked every other coil turn inward before starting the tuning. This provided clearance for the clips and prevented the creation of shorted turns.

A 2-watt QRP rig (HW-8) and a homemade, low-power VSWR indicator were used for the tune-up. The VSWR meter was connected between the 50-ohm feed line and the matching network. An extension cord provided 117 V ac to operate the control box and the HW-8 at the rear of my lot.

Tuning commenced at the lowest band (relays both turned off). C1 and the tap point on L1 were adjusted for a VSWR of 1:1 at 3.510 MHz. Next, K1 was energized with the rig tuned to 7.025 MHz. The 40-meter tap on L1 and the setting of C1 were juggled until a match was obtained. Finally, K2 was energized (K1 deactivated) and the 20-meter coil tap was set for a matched condition at 14.025 MHz. The wires were then soldered in place. *Remember to keep your transmissions short and to identify your station periodically while testing.* This completed the setup for a VSWR of 1:1 on each of the three bands.

My dog house is built so that the roof lifts off to expose the matching network. It is much easier to work from the top than to reach through a side door. An oval-shaped hole was cut on the bottom-rear surface (floor) of the enclosure to permit routing the ground wire, the 50-ohm line and the feed wire to the network.

Summary Comments

Although you may not be interested in using an L network or a Half-Delta Loop antenna, some of the ideas in this article should be helpful when designing other switching and matching systems. I can say in conclusion that the results and convenience resulting from this installation more than offset the work of building the network, burying the control line and feeder, and assembling the dog house! No more junkets into the back lot at night with a flashlight in hand, especially on those cold nights when it's pouring rain or snowing.

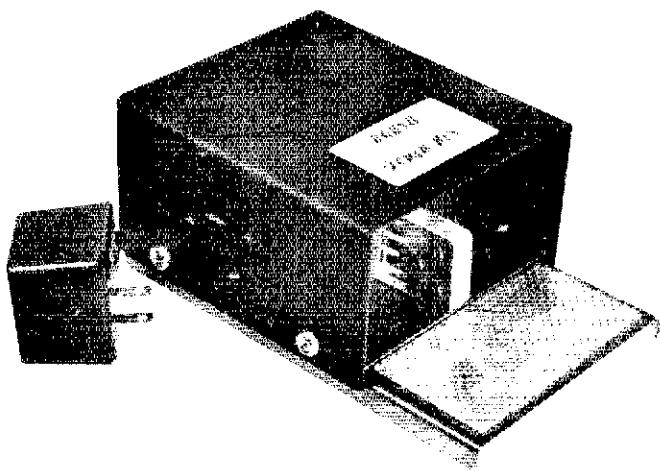
Notes

¹J. Belrose, "The Half-Delta Loop — A Grounded, Vertically Polarized Antenna," *Ham Radio*, May 1982.

²Most commercial Transmatches employ the circuit of the Ultimate Transmatch, but some use coil taps rather than a roller inductor.

³mm = in. × 25.4, and m = ft. × 0.3048.

K6BSU Touch Keyer



Tired of adjusting those blasted keyer paddles? Try something different. K6BSU sheds new light on this "touchy" subject.

By Floyd E. Carter,* K8BSU

Electronic keyers have become a standard item for the cw operator. This version incorporates a basic electronic keyer circuit with some new ideas. The keyer was especially designed and built with the home constructor in mind. It features capacitive-touch keying and is built entirely from standard, readily available parts. All of the parts were obtained from well-known, nationwide retail stores.

The capacitive-touch feature greatly simplifies construction by eliminating mechanical switches. Since physical layout is not at all critical, creative packaging designs are possible.

A survey of the commercial keyers turned up things like "squeeze" paddles and other exotic features. With many years of experience behind a mechanical "bug," and not being in a mood to retrain, I wanted an electronic keyer and that was simple to operate. Even though this keyer features self-completing characters, my transition from bug to electronic keyer was natural and effortless.

Keyer Logic

The circuit was designed in two parts. Fig. 1 gives the complete circuit diagram. The basic logic was a construction project of several years ago and was originally fitted with Microswitches operated by a keying lever. In fact, commercial paddles will operate the circuit by grounding the inputs to gates U5E and U5F for dots and dashes, respectively.

U7A and U7B are connected as a keyed multivibrator, which always starts in the same phase when triggered and is activated for both dots and dashes. Dash

keying also sets the dash flip-flop, U8. The dash flip-flop divides the dot multivibrator output by two. Output from the flip-flop is gated with the dot multivibrator output in the logic NAND gate, U7C. This has the effect of filling in the space between the first and second dot to produce a dash. If this same logic is followed, the flip-flop fills in every other space between dots and creates perfect dashes with the required 3:1 ratio.

Both dots and dashes are self-completing. It is necessary only to initiate a dot or dash. Feedback from both the dot multivibrator and the dash flip-flop is applied to gate U6A. Thus, the dot sequence always consists of a dot and a space. A dash sequence always consists of a dash, three dots in length, followed by a space.

Touch Switches

U3 is a comparator IC connected as a 100-kHz oscillator. The output is connected to the wrist plate. In operation, the wrist is placed on this plate, and the dot and dash plates are activated with the thumb and index finger in the usual manner. When the dot plate is touched, some of the 100-kHz energy is coupled into detector U1. The network R1, R2 and C3 form a high-pass filter to prevent 60-Hz pickup from activating the detector. U1 is normally biased with a fixed 1.7 volts such that in the absence of an input from the touch plate its output is high. When more than 3.7 volts pk-pk is coupled into U1, the peaks of the input signal exceed the reference bias, and the output transistor in U1 conducts to ground. This discharges C4 through the output stage. During the time when the instantaneous input is below the threshold, U1 is cut off, allowing C4 to charge

through R3. Since the discharge path resistance is much lower than the charging resistance, C4 remains nearly discharged as long as the peaks of the input exceed the threshold. Operation of the dash detector U2 is identical.

U4 is connected as a latch to prevent simultaneous dot and dash activation. Whichever detector is first activated, the other is locked out by the latch. This is an important operator convenience, as it allows dot and dash "leading" for reduced wrist and finger motion. For example, after a dash has been initiated, a dot may be programmed to follow by touching the dot plate. When the dash is finished, the index finger (for dashes) is removed, and dots will result.

Construction

The cabinet I selected consists of two U-shaped pieces of sheet aluminum for the base and top. My cabinet base is fastened to a longer piece of aluminum, which extends out from the front panel by about 4 inches. This may be seen in Fig. 2. The wrist plate, made from a piece of single-sided circuit-board material, mounts to this extension. I decided to cut off the front panel and install a heavier one set back slightly to conserve space.

The paddle is made from 1/2-inch-thick plastic, and the dot and dash plates are fastened to it with short, flat-head screws. Wires connected to the plates are passed through holes drilled in the center of the plastic. The paddle is then fastened to the front panel. It doesn't have to move, so there is nothing more to it.

The circuit is constructed on a piece of perforated circuit board that has a 0.1-inch hole pattern. The IC sockets and components are fastened to the circuit

*11232 Crist Dr., Los Altos, CA 94022

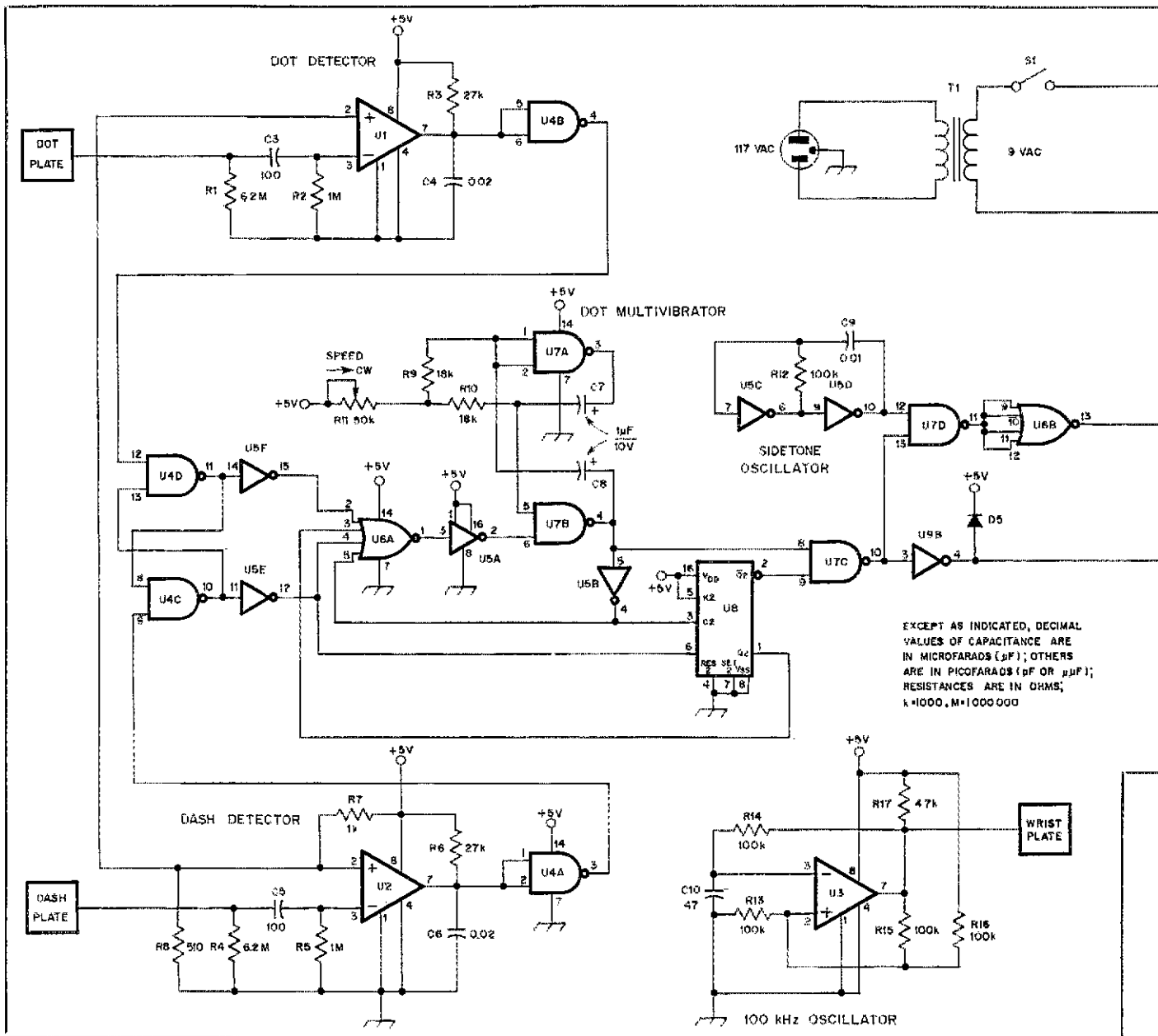


Fig. 1 — K8BSU touch keyer schematic diagram. All resistors are 1/4-W, 5% carbon-composition types; capacitors are 15-V disc ceramic, unless otherwise specified. [Note: Part numbers in parentheses are Radio Shack.]

C3, C5 — 100-pF silver mica.
 C7, C8 — 1- μF tantalum.
 C10 — 47-pF silver mica.
 D1 — D5, incl. — 1-A/50-V diodes (276-1101).
 J1 — 4-pin, Jones-type connector (274-206).
 J2 — 2-conductor, closed-circuit 1/4-in. phone jack (274-255).
 K1 — SPST-NO DIP 5-V reed relay, Magnecraft W107DIP-1 or equiv.

LS1 — 2-in. diameter, 8- Ω speaker.
 S1 — SPST slide switch (275-406).
 T1 — 9 V ac, 200-mA wall transformer.
 T2 — Audio transformer, 1000- Ω ct primary to 8- Ω secondary (273-1380).
 U1 — U3, incl. — Comparator, LM311N or equiv.
 U4, U7 — Quad 2-Input NAND gate, CD4011AE

or equiv. (276-2411).
 U5 — Hex buffer, CD4009AE or equiv.
 U6 — Dual 4 input NOR gate, CD4002AE or equiv.
 U8 — Dual J-K flip-flop, CD4027AE or equiv. (276-2427).
 U9 — Hex buffer, 7416 pc or equiv.
 U10 — 5-V regulator, LM209 or equiv. (276-1770).

board with 5-minute epoxy glue. The socket and component leads are interconnected using no. 26 solid wire for Vcc and ground and no. 30 wire for signals. This method requires a small soldering iron and a good pair of eyes, but it is still a quick way to put circuits together, as it requires no planning in laying out the components.

Power Supply

Transformer T1 is a wall-plug type

normally used to charge pocket calculators. Mine provides 9 V ac at 200 mA. The current consumption of the keyer is 30 mA, and most of that is used by the speaker amplifier and reed relay. A full-wave bridge rectifier, a filter and a monolithic voltage regulator convert the 9-V ac input to a regulated 5 V dc.

Usable Outputs

The signal from U7C consists of fully formed and perfectly timed Morse code.

For local sidetone, this signal is gated with a 500-Hz oscillator in U7D. The sidetone is amplified by an open-collector TTL gate U9A and drives a small loudspeaker through output transformer T2. A head-phone jack is provided for silent operation, and plugging phones into J2 disconnects the speaker. A second output of U7C is used to operate a keying relay for transmitters that require an isolated contact closure. The relay may be replaced by an optical isolator for low-current, low-

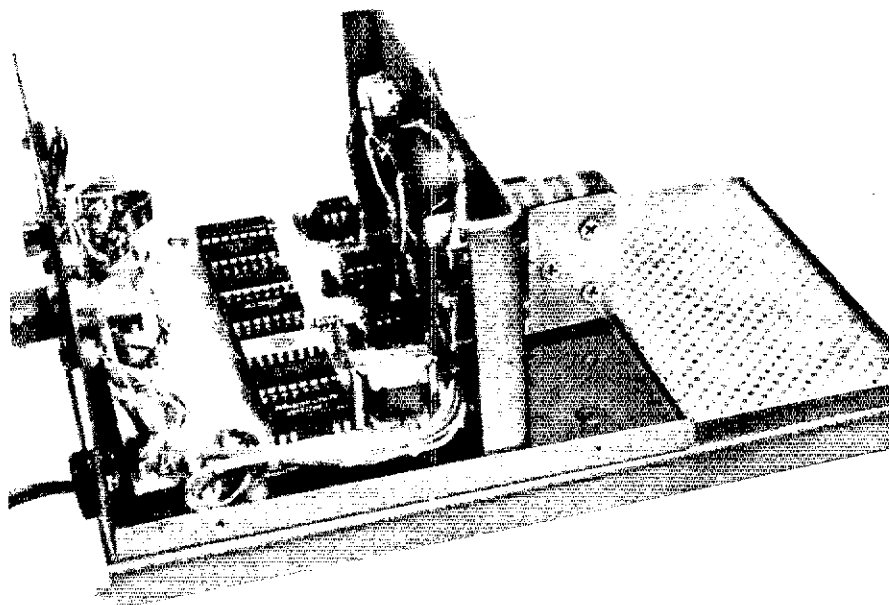
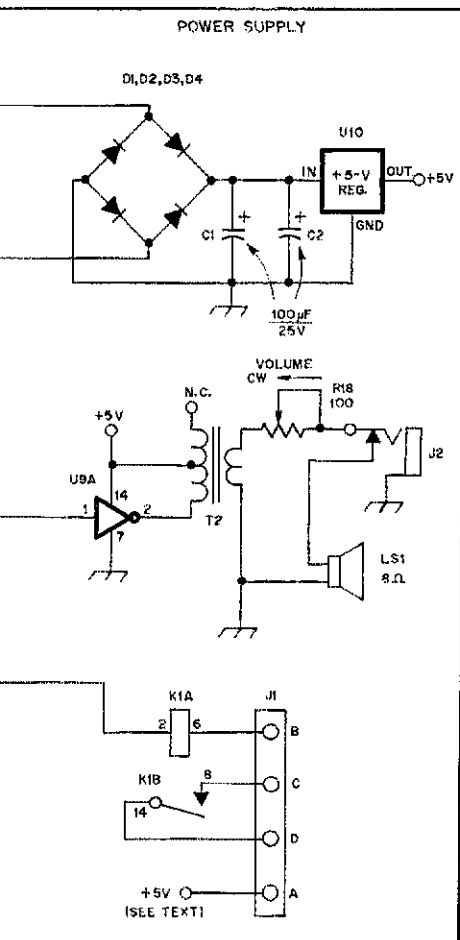


Fig. 2 — Inside view of the touch key. Note perf-board construction and chassis, as explained in text.

voltage keying requirements.

J1 is arranged so that K1 is not in use unless the interconnect cable is jumpered from pin A and B so that the relay circuit

is completed. If 5 V is available from the host transmitter, this may be wired to J1 pin A to provide dc power for the keyer. In this case, the output terminal of U10 should be removed from the voltage source to prevent damage to the regulator.

Adjustments

To prevent operating fatigue, the ideal sensitivity is very light but definite contact

with the plates. Sensitivity may be adjusted, if required, by changing R8. Raising the value increases the bias on U1 and U2, and thus requires closer contact with the touch plates. This couples enough signal into the detectors to trigger the keyer.

It is my hope that this keyer will provide an added thrill for the cw operator. Put away those mechanical paddles and give the touch keyer a try!

Next Month in QST

August QST will feature a candid interview with Senator Barry Goldwater, K7UGA; it covers his views on a no-code license, WARC, S-929 and the state of Amateur Radio today. Don't miss it!

The first of a two-part technical article delves into the always-relevant subject of 220 MHz, in the form of a construction project for a high-performance transverter system.

Among the columns, How's DX? will identify the plethora of new country prefixes, and Washington Mailbox will feature answers to those nagging questions about third-party traffic.

Although it was operational only a short time, the newest Soviet amateur satellite, (SKRA-2), managed to make history. Read about it in August QST.

Strays

NOMINATIONS OPEN FOR GREAT NORTHLAND HAM OF THE YEAR

A feature of the Augusta (Maine) Emergency Amateur Radio Unit hamfest on September 10-12, 1982 will be the Great Northland Ham of the Year award, which will be given to a ham from northern New England, Quebec or the Maritime Provinces who has made a significant contribution to Amateur Radio. Nominations close August 1, 1982. For more information, write to the Windsor Hamfest Committee, c/o W. E. Jackson, W1WCI, RFD 1, Box 3970, Winthrop, ME 04364.

AROUND THE WORLD WITH 88 A DAY

From 1976 to 1981, Richard Spenceley,

Sr., KV4AA, of St. Thomas, Virgin Islands, logged a total of 195,000 overseas QSOs, making contacts with hams, on the average, in more than 25 countries daily. That works out to 88 contacts per day, or one every 16 minutes. Anyway you look at it, that's a lot of QSOs! KV4AA thinks he might have a world record, so he's applied to the *Guinness Book of Records* in hopes of making it official.

I would like to get in touch with . . .

any amateurs interested in participating in a receiver dynamic range measurement session at the 1982 ARRL National Convention in Cedar Rapids, Iowa, on July 23. Receivers to be measured should be homebuilt or heavily modified units tunable over the 20-meter band and have an rf bandwidth greater than 20 kHz. Contact Lawrence Stoskopf, NØUU, 2413 Edgehill, Salina, KS 67401, tel. 913-823-9498, in advance.

WARC and LF on the TR-7

Will your TR-7 be ready when the new WARC bands arrive? Don't get caught short — the time is now! Here is an easy, inexpensive method for adding the new bands and more to this popular transceiver.

By Robert K. Morrow, Jr.,* WB6GTM

The Drake TR-7/DR-7 has been in production for a few years and has proven itself to be an outstanding transceiver. It is equipped with 1.5- to 30-MHz continuous receiver coverage and with transmit capability on all presently authorized amateur bands. Without the DR-7 digital-readout option, the receiver coverage is more limited, but the circuit described here will enhance the capabilities of this rig as well.

Another TR-7 option is the AUX-7 auxiliary program board, which is a small circuit board that plugs into the TR-7 chassis. This option allows the owner to install special ICs from the manufacturer, extending the receiver coverage below the 1.5 MHz lower limit and allowing the transmitter to operate in other band segments. In addition, the AUX-7 board provides crystal sockets to be used for fixed transmit or receive operation.

The AUX-7 features most useful to a ham would be the addition of transceive capability on the three new WARC band segments at 10, 18 and 24.5 MHz and the extension of receiver coverage down into the 1f region. (Would you believe 0 Hz?) This article provides details for the construction of a circuit board that will give your TR-7 the same capabilities as with the AUX-7. No modification to the rig is required, since this board simply plugs into the AUX-7 connector within the unit.

Synthesizer Operation

Since this is intended to be a construction article, a detailed analysis of the TR-7 frequency synthesizer is not included. The service and instruction manuals describe the operation, and an excellent block diagram is included with the description.

The portion of the synthesizer relevant to this project is the *load number*, which is

used to determine the lower end of the desired 500-kHz band segment tuned by the TR-7. This number is given by the formula

$$N = 86 - 2F \quad (\text{Eq. 1})$$

where N is the load number and F is the desired band segment in MHz. For example, one of the WARC bands is in the 24.5-MHz segment. The corresponding load number is $86 - [2(24.5)] = 37$. In a similar manner, load numbers may be calculated for any 500-kHz band segment within the tuning range of the TR-7.

Circuit Description

The AUX-7 control-signal pinout is shown in Table 1. The aux rotary-switch pins (1-8) are set to +5 V dc as each is selected by the AUX PROGRAM switch on the TR-7 front panel. These act as diode program source voltages for the band-select, transmit-enable and load-number logic. The band-select lines (9-12) are used to extinguish the SET BAND light on the front panel when the main rotary band switch is set to the proper range, as shown in Table 2. When the 24.5-MHz band segment is selected with the AUX PROGRAM switch, for example, the SET BAND light will illuminate until the rotary band switch is set to the 22- to 30-MHz range. This ensures that the correct low- and high-pass filters are inserted. Incidentally, the transmitter will not operate until the SET BAND light is out, to prevent spurious radiation and possible output-transistor damage. The transmit-enable pin (14) is brought to +5 V to allow transmitter operation in the new WARC bands, when they become available.

The next eight lines (15-22) are set to the load number corresponding to the desired 500-kHz band segment. The first load number digit is converted to binary-coded decimal (BCD) and placed on lines B3-B0,

Table 1
AUX-7 Plug Pin Functions

| Pin | Function |
|-------|----------------------|
| 1-8 | Aux Rotary Switch |
| 9-12 | Band Select (A-D) |
| 13† | +10 V |
| 14 | Transmitter Enable |
| 15-18 | A3-A0 Load |
| 19-22 | B3-B0 Load |
| 23 | GND |
| 24† | Fixed Oscillator Out |
| 25† | +10 V Fixed |

†Not used in this circuit

Viewed from the front of the TR-7, the pins are numbered from left to right.

Table 2
Band Select Codes

| Band (MHz) | Decimal Code | BCD (Pins 9-12) |
|------------|--------------|-----------------|
| 0-2 | 2 | 0010 |
| 2-3 | 3 | 0011 |
| 3-4.5 | 4 | 0100 |
| 4.5-7 | 5 | 0101 |
| 7-10 | 6 | 0110 |
| 10-15 | 7 | 0111 |
| 15-22 | 8 | 1000 |
| 22-30 | 9 | 1001 |

and the BCD code for the second digit is placed on lines A3-A0. Earlier, we calculated that the 24.5-MHz segment required a load number of 37. In this case, B3-B0 would be 0011 (BCD 3), and A3-A0 would be 0111 (BCD 7).

How are these binary codes implemented? Each binary "1" is realized by connecting a diode from a +5-V source to the AUX-7 pin requiring the "1." A binary "0" is automatic; pull-down resistors¹ are placed in the circuit to ensure that a line will default to logic "0." (CMOS logic is used in the TR-7.) For

*9792 Oma Pl., Garden Grove, CA 92641

example, let's completely outline the operation of the rig on the 24.5-MHz segment. We want this band to be selected by Aux Program 3 on the front panel and, of course, we want transmit capability. To implement this combination, we need the band select to be 1001 (BCD 9), the transmit enable to be activated, 0011 (BCD 3) to be on lines B3-B0, and 0111 (BCD 7) to be on lines A3-A0. From Table 1, it can be seen that pins 9, 12, 14, 16, 17, 18, 21 and 22 of the AUX-7 plug must be connected to pin 3, which becomes the +5-V source when the AUX Program switch is in position 3. Diodes are used for the links so that isolation is provided from the other AUX Program lines.

Construction and Installation

Assembly of the AUX-7 substitute board is straightforward. Fig. 1 gives the schematic diagram. The foil and component sides of the circuit board are illustrated in the etching pattern (page 39) and in Fig. 2. The circuit board measures 2-1/2 x 4-1/4 inches, and the resistors are mounted vertically. Half-watt or smaller resistors will fit easily. Both connectors are DIP solder-type, with 0.156 (5/32)-inch pin spacing. Although the AUX-7 connector has 25 pins, it is easier to assemble a 24-pin socket on the circuit board using two 10-pin and one 4-pin connector. Since pin 25 on this AUX-7 substitute circuit is unused, it may be left open. The part numbers shown in Fig. 2 are for vertically mounted connectors, which can be adjusted for horizontal mount by bending each pin down with needle-nose pliers.

To install the board, first remove the top cover of the TR-7. The large horizontal circuit board you now see is the DR-7 digital-readout board. (If you own a TR-7 without the digital-readout option, there will be a small jumper circuit board substituted for the larger DR-7. The AUX-7 plug is already exposed, so removal of the jumper board is not necessary.)

After removing all five top connectors to the DR-7, take out the single screw located near the left edge of the board, as viewed from the front of the transceiver. A blue wire and coaxial cable must be disconnected from the filter module, located to the left of the DR-7. Now, using the "bent coathanger" tool that

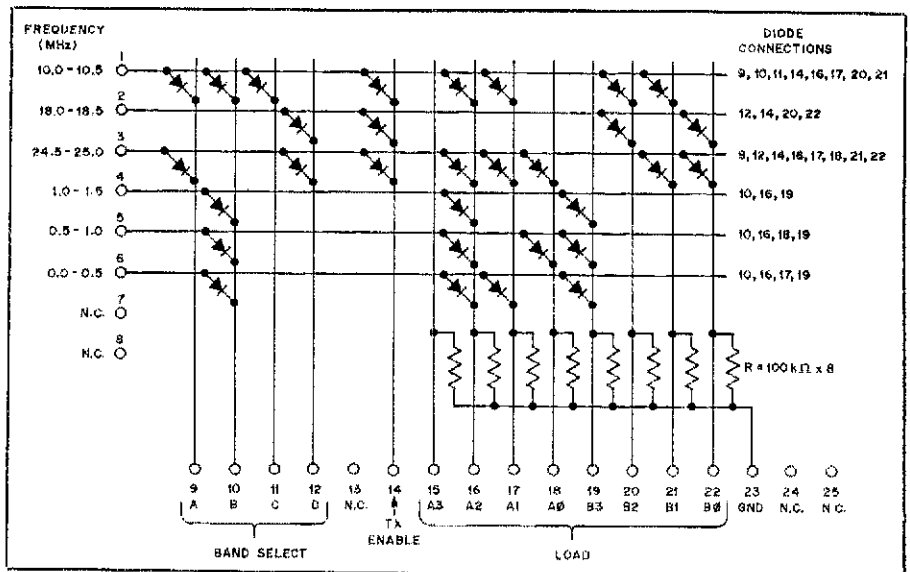


Fig. 1 — Schematic diagram of the AUX-7 substitute circuit. The pins of the AUX-7 connector are listed along the left and lower perimeter of the circuit. All diodes are 1N914, or equivalent. n.c. = no connection.

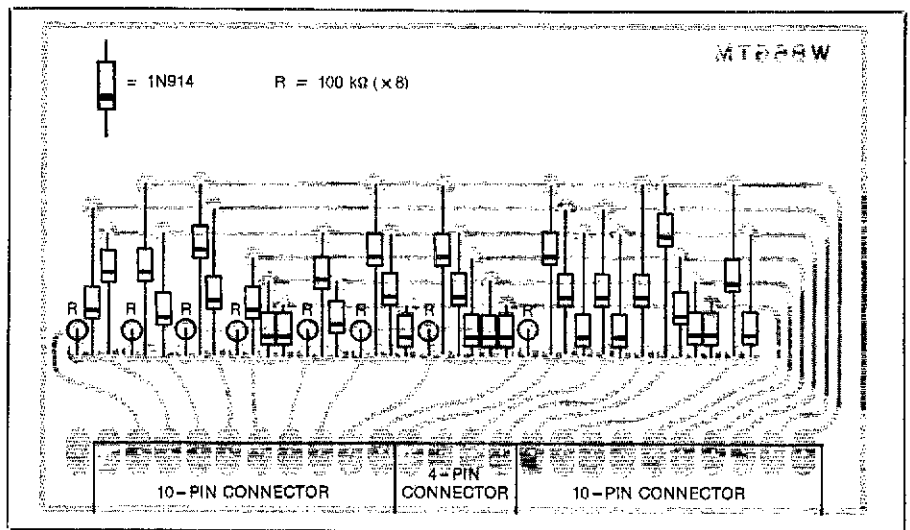


Fig. 2 — Parts-placement diagram for the TR-7 programming board. Components are mounted on the non-foil side. Gray areas represent unetched copper. The circuit-board etching pattern appears in the Hints and Kinks section of this issue. The connector consists of two 10-pin sockets (GC 41-210 or Molex 09-52-3103) and one 4-pin socket (GC 41-204 or Molex 09-52-3043).

came with the TR-7, or a suitable screwdriver, carefully lift the DR-7 board away from the rig, starting from the rear edge. A 12-pin, a 9-pin, and two 3-pin connectors are mounted on the underside of the DR-7 and are pulled free as the board is raised. Use care at this point to avoid damaging the digital displays, which are attached to the DR-7. As soon as the board is free of the fixed connectors, withdraw it from the rig, allowing the coaxial cable to slide out of the clearance hole (Fig. 3).

At this point, it should be obvious where to plug the AUX-7 substitute board; there is only one unused chassis-mounted connector available. Be sure the component side is facing the rear of the

transceiver, and push this circuit board onto the connector as shown in Fig. 4. A TR-7 equipped with the DR-7 must have this option board in place to function properly. You will have to completely reassemble the transceiver, except for the cabinet, before the new AUX-7 substitute board can be tested. Use extreme care when replacing the DR-7 circuit board. Ensure that the bottom (foil side) pins are properly aligned with their sockets before carefully pushing the board into position.

Operation

After replacing the DR-7 digital display, attach an antenna or dummy load to the TR-7, connect the power supply and a microphone or key, and turn on the

¹Certain earlier TR-7s already have 100-kΩ pull-down resistors for the load-number lines on the digital-control board, which is located just behind the AUX-7 plug. If your digital control board has nine integrated circuits on it, you have the old style, and will not need the resistors shown for this AUX-7 substitute circuit. The inclusion of these resistors should not cause any problems, however. All TR-7 transceivers have proper logic levels on the four band-select lines, so no extra resistors are needed in this circuit for AUX-7 lines 9-12.

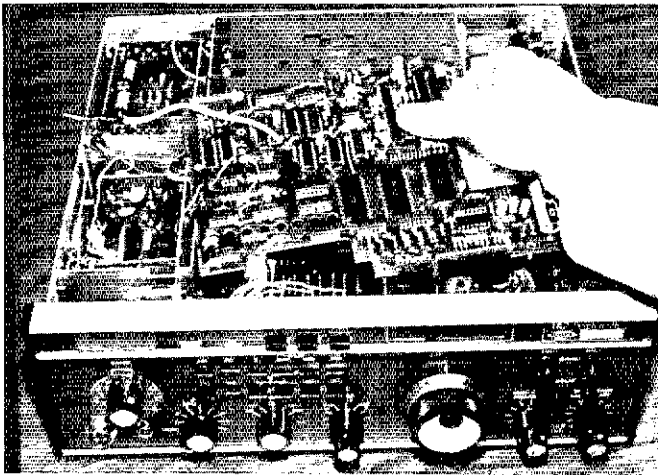


Fig. 3 — Removing the DR-7 digital display board from the TR-7.

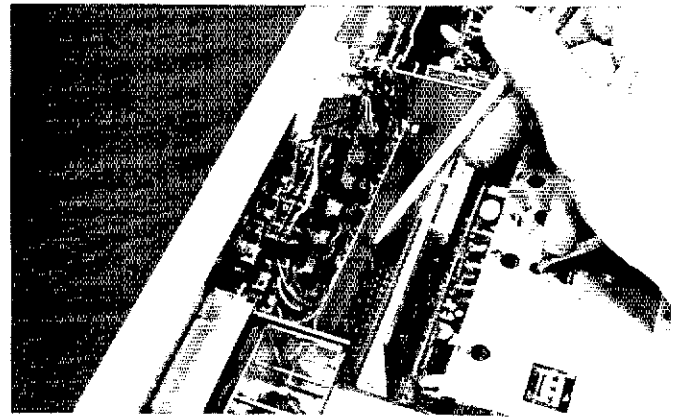


Fig. 4 — The pencil indicates where the AUX-7 substitute circuit board is mounted in the TR-7. Component side faces the rear. The pc connector shown near the middle finger is attached to the digital-control board.

transceiver. The rig should operate normally with the AUX PROGRAM switch set to NORM. Positions 1, 2 and 3 of the AUX PROGRAM switch should cause the rig to operate in the 10.0-, 18.0- and 24.5-MHz band segments, respectively, and the SET BAND light should extinguish only when the main band switch is set to the proper range for the particular band being used. Note that in some instances the synthesizer will not lock until the band switch is positioned correctly. Turn the CARRIER and MIC GAIN controls fully counterclockwise, to prevent rf transmission, and key the transmitter. As long as the SET BAND light is out, you should hear the transmit relay energize.

AUX PROGRAM switch positions 4, 5 and 6 should allow the TR-7 to receive the


three 500-kHz band segments between 0⁺ and 1.5 MHz. Maximum sensitivity in this region will be obtained by connecting the receive antenna to the vlf jack on the rear panel of the TR-7. This jack bypasses the antenna filter network, so the vlf antenna must be removed before transmitting or when receiving above 1.5 MHz. See the TR-7 instruction manual for more details.

Conclusion

The circuit provides an easy and inexpensive method for extending the capabilities of a popular transceiver. I have provided enough information to allow you to generate any combination of 500-kHz segments for this rig. A maximum of eight positions is available on the AUX PROGRAM switch, and the ad-

ditional band capability should prove especially useful to those who own a TR-7 without continuous receiver coverage.

Even if you don't have access to photo-etch equipment to make the printed-circuit board, it can still be done by drawing the circuit onto the foil with a resist marking pen. I produced mine in this manner, and it works perfectly.

If you have any questions about this circuit, I will try to answer them if an s.a.s.e. is included. 

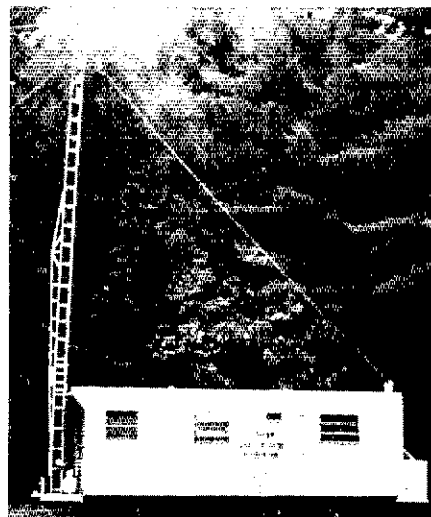
Reference

TR-7 Service Manual, R. L. Drake Co., Miamisburg, OH, Oct. 1980.

Strays

1982 INTERNATIONAL BOY SCOUT CAMPOREE ON THE AIR

□ Boy scouts from around the world will get a special introduction to Amateur Radio when the Boys' Life ARC station, K2BSA, goes portable from the Connecticut International Boy Scout Camporee, to be held July 11-17, 1982 in the foothills of the Berkshires near Winsted. Through the courtesy of station trustee Harry Harchar, W2GND, members of the Southcentral Connecticut ARA (formerly the Hamden ARA) will operate K2BSA/1 from their club's specially equipped van to enable visiting foreign scouts to hear



The SCARAVAN, with its three operating positions, 50-foot folding tower and TA-33 antenna, will keep scouts at the Connecticut International Boy Scout Camporee in touch with home. (photo courtesy Vic Stancliff, W1LQZ)

contacts with their own country. K2BSA/1 will operate 10, 15 and 20 meters on or near 28,650, 21,360 and 14,280 kHz at 0100-0200, 1400-1600 and 1700-2000 UTC. Contacts with any amateur stations will be welcome, and K2BSA/1 will QSL.

I would like to get in touch with . . .

□ anyone who has a manual or knows how to program the cards for an SBE OPTI-SCAN Model 12SM. Ralph R. Minkler, K9ZCT, 6021 S. 1st St., Phoenix, AZ 85040.

Keying Improvements to the ICOM IC-730

Transform your IC-730 into a better cw rig by making simple, low-cost changes. No active devices are required.

By Don McClure,* KB2Z

Many features of the ICOM IC-730 appealed to me for mobile use, and as a second rig. Even before I purchased it I knew its keying characteristics left something to be desired, but figured that the deficiencies could be corrected with a little effort.

This article describes revisions that provide keying that is satisfactory to even this hard-core "cw freak." The changes will probably satisfy most of those CFO "chicken cluckers" hanging around 7030 kHz and operators having lower speed requirements. Oscilloscope observations and on-the-air tests using my modified unit show the keying to be of good quality up to speeds of at least 70 wpm, with no clicks, tails, significantly shortened dots or other undesirable traits. Semi break-in can be used to over 40 wpm. Above 70 wpm, the dots shorten a little, relative to the spaces, but perfect machine copy of signals from this unit has been demonstrated at 100 wpm using the Microlog ATR-6800 to generate the code. Both the HAL DS-2000 KSR and the Radio Shack TRS-80® Model III micro-computer were used for reception.

Modification Objectives

Keying-circuit changes have been designed to achieve the following characteristics that were not provided in the original circuit:

1) Independent control of the keyed wave rise and fall times, with a goal of

2- and 5-ms, respectively. This waveshape provides a "hard-make, soft-break" sound.

2) Equal length dots and spaces at the minus 6-dB points on the rf envelope for keying speeds to at least 70 wpm.

3) Approximately a 9-ms delay prior to the rise of the rf wave to allow T-R relay closure before applying rf energy.

4) Elimination of leading-edge sharpening (and the resultant click) on the first code element after a pause. This click is caused by no alc voltage being present on the keyed stage after a pause.

5) Elimination of the shortened first element caused by the 7-ms interval required for VOX-relay closure.

6) Reduction of backwave to at least 60 dB below 100 watts (64 dB achieved).

7) Allowance of the radio to be keyed by an electronic keyer having more than 0.4-V output during key down.

8) Improvement of the sidetone-oscillator characteristics to closely approximate those of the rf wave.

Description of Revised Circuits and Their Functions

Most of the circuit changes are shown in Fig. 1. This figure is taken from the original schematic diagram and revised as needed, with the changed, added or deleted components being darker to draw attention to the revisions. Table 1 lists the parts changes.

New components added to the main circuit board have been given part numbers starting with 201, such as R201 and C201, to differentiate them from the original component lineup. The numbers are not changed for original components having different values. Components added to the PA module start with 301.

The first change made (Fig. 1) was to reduce the value of R117 so that my Heath HD-1410 keyer would key the radio. The

HD-1410 puts out 0.46 V, key down, which is too high for the IC-730. This change upset the drive voltage to the sidetone-oscillator switch, Q16, and it would no longer turn off. The solution to that problem was to separate the drive for Q16 from that for IC5 by deleting R116 and taking the drive for Q16 from another source, as will be described later. A new resistor, R201, completes the IC5 bias path that was formerly through R116 and R115.

With the key down, the output on pin 1 of IC5 goes high and C81 charges through R202. When the voltage on C81 reaches about 3.9 V with respect to ground, Zener diode D201 and D202 conduct, causing Q10, the keying switch, to turn on. This occurs about 7 ms after key down. When the collector voltage of Q10 falls below 2.3 V, D19 and D203 turn off and C33 discharges through R52. As the voltage on C33 diminishes, Q9, the dual-gate FET i-f stage, turns on and allows rf output from the transmitter. The leading-edge rise time of the rf wave is controlled by the fall time of the C33/R52 combination. Prior to Q9 turning on, the drop in voltage on C33 provides some delay in addition to the 7-ms delay preceding the Q10 turn on. The total delay before the start of the rf wave is about 9 ms. Approximately 7 ms is required for the VOX relay to close, so the 9-ms delay in the rf keying path is adequate to allow relay closure before drive is applied to the rf power-amplifier stages. It should be noted that dots shorter than the time required to charge C81 sufficiently for D201 to conduct will not key the transmitter. This fact imposes an upper speed limit that is somewhat above 100 wpm.

When the key is up, the voltage on pin 1 of IC5 drops to 1.2, and C81 is quickly discharged to 1.4 V through D18 in preparation for the next key-down condi-

*Chicken Fat Operators — a group of high-speed, cw rag chowers.

*12 West Azalea La., Mt. Laurel, NJ 08054

tion. As C81 begins to discharge, D201 and D202 turn off. The keying switch, Q10, cannot turn off immediately because of the feedback network from collector to base. As C201 charges, some delay occurs before the voltage drops of D19 and D203 are overcome and C33 begins to charge. This delay causes a stretch in the keyed rf wave, so that the trailing edge of the waveform is delayed by an amount of time similar to that of the leading-edge delay. The time required for the voltage rise at the collector of Q10 is established primarily by the transistor gain along with C201 and R205. It has been made much longer than would be the rise time of the C33/R52 combination charging through R53 and the diodes. Since C33 cannot charge faster than at the rate of Q10 collector-voltage rise, the rf-wave fall time is made slower and independently adjustable relative to the leading-edge rise time. Rise and fall times of the rf envelope are 2 and 5 ms, respectively, by virtue of the component values chosen. Waveforms at various points in the keying circuit are shown in Fig. 2.

Note that the 4.3-V Zener diode, D201, does not fire at the rated breakdown voltage, but instead begins conduction with about 2.6 V across the terminals. This is because all Zener diodes made for breakdown at less than about 7 V have a "soft" turn-on knee. The 1N749A is rated for 4.3 V at 5 mA, but the current in this circuit does not exceed approximately 0.5 mA, so the regulating voltage is considerably lower than the rated value.

Keying switch Q10 is biased just below conduction, at 0.6 V, so the voltage to which C201 charges will be nearly the same regardless of whether the circuit has been keyed recently. The bias eliminates some pulse-length jitter. D206, in the feedback circuit, provides a discharge path for C201 as Q10 turns on. This discharge prevents the feedback network from driving the voltage on the base of Q10 downward, and thereby prolongs the time required for turn-on to be completed. The fixed value of R208 is established during final testing by trying various values

Table 1
Parts Changes to Main Board for Improved Keying

| <i>Changed Capacitors</i> | <i>New Value</i> |
|---------------------------|--|
| C33 | 3.3 μ F |
| C61 | 1.0 μ F |
| C74 | 4700 pF |
| C81 | 3.3 μ F |
| <i>New Capacitor</i> | <i>Value</i> |
| C201 | 0.18 μ F |
| <i>Changed Diode</i> | <i>Type</i> |
| D18 | 1N34A (installed in reverse direction relative to original D18) |
| <i>New Diodes</i> | <i>Type</i> |
| D201 | 1N749A, 4.3-V Zener diode |
| D202 | 1N914, silicon |
| D203 | 1N914, silicon |
| D206 | 1N34A, germanium |
| <i>Changed Resistors</i> | <i>New Value</i> |
| | <i>All resistors are 1/4-W, 5% carbon-composition types.</i> |
| R54 | 10 k Ω |
| R116 | Deleted |
| R117 | 2.7 k Ω |
| R122 | Deleted |
| R128 | 51 k Ω |
| <i>New Resistors</i> | <i>Value</i> |
| R201 | 22 k Ω |
| R202 | 6.8 k Ω |
| R203 | 12 k Ω |
| R204 | 82 k Ω |
| R205 | 22 k Ω |
| R206 | 150 k Ω |
| R207 | 1.5 M Ω |
| R208 | 470 k Ω [nominal value; select final value on testing (see text)] |

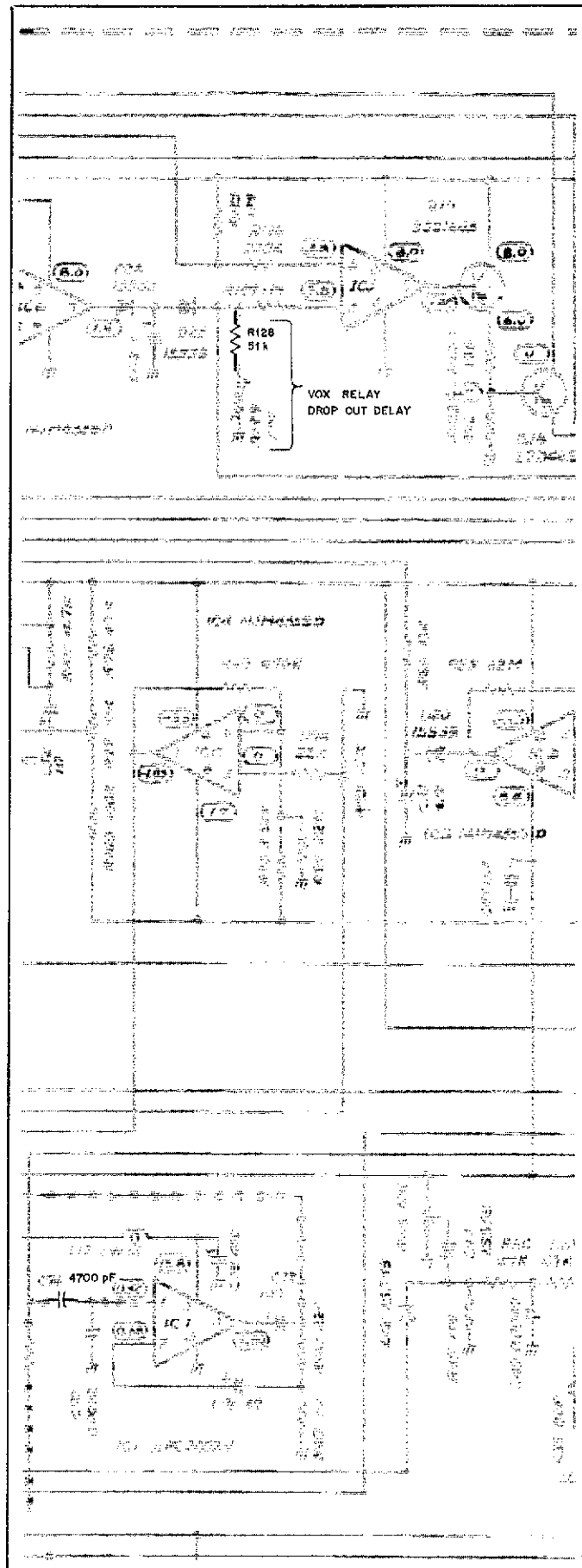
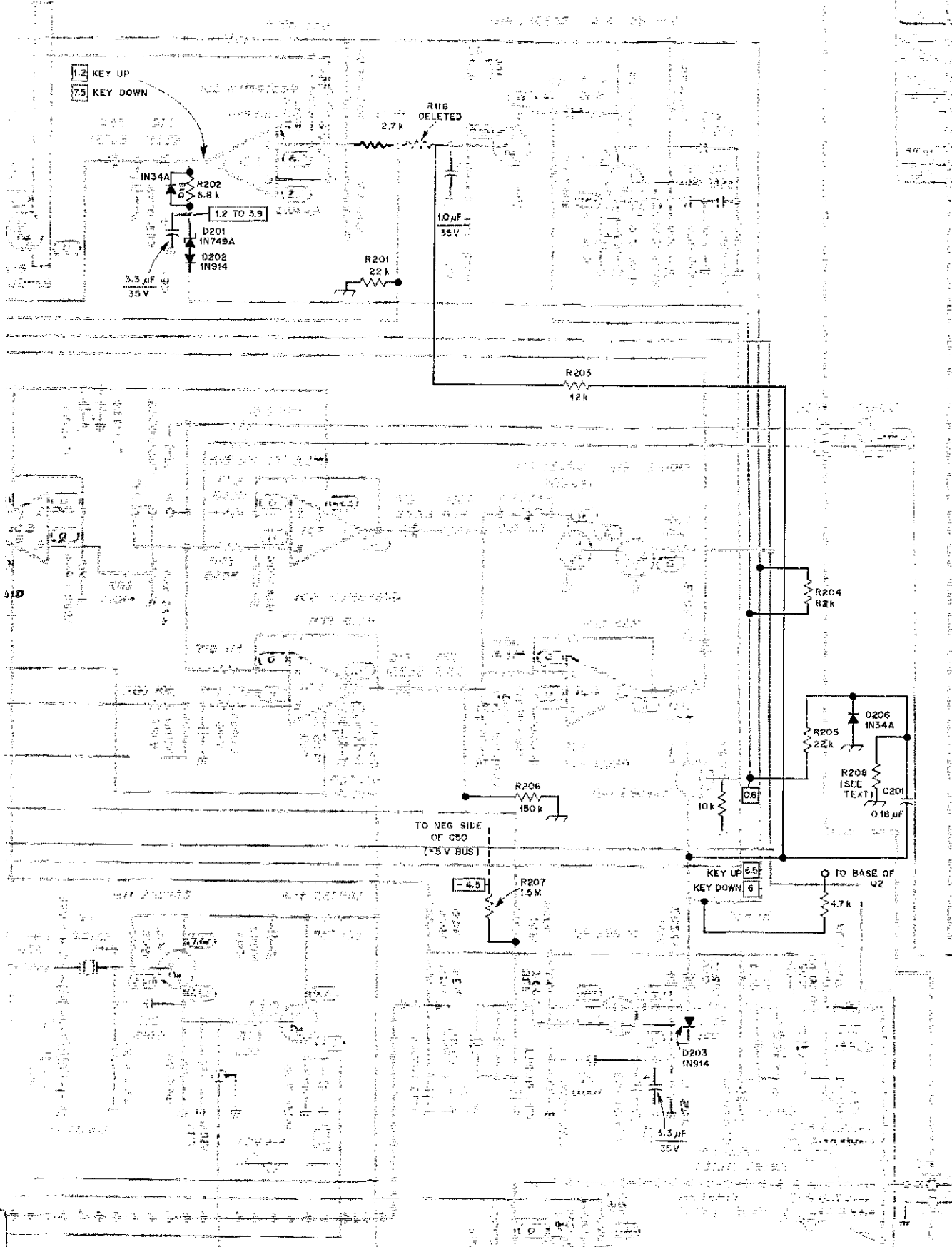


Fig. 1 — Changes to the IC-730 keying circuit, receiver audio circuit, alc circuit and VOX-delay circuit are shown. The schematic diagram is from the owner's manual.

□ - DC VOLTAGE



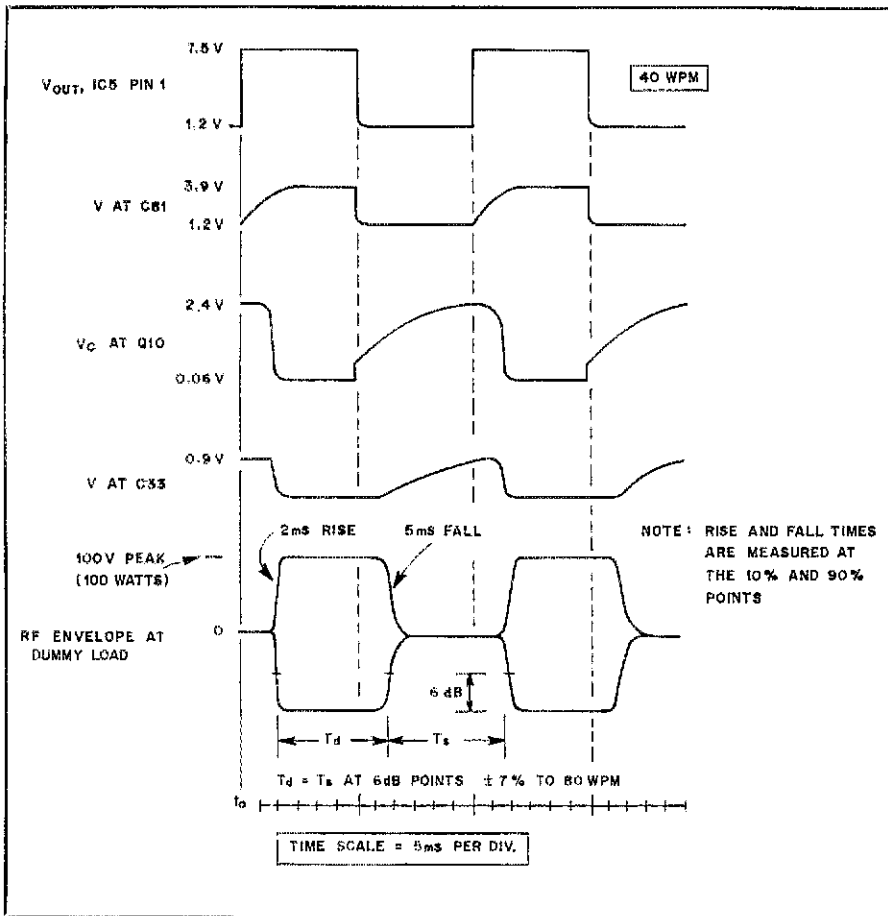


Fig. 2 — Keying waveforms, as taken at various points in the IC-730 circuit.

to equalize the dot and space duration. This adjustment can be made at any speed up to 65 wpm.

Sidetone-Circuit Keying

Drive for the sidetone keying switch, Q16, is taken from the collector of Q10 by way of R203. This arrangement allows the rise and fall times of the keyed audio wave to closely approximate the corresponding 2- and 5-ms times of the rf wave.

Reduction of Audio Ringing

Ringing at a frequency of about 22 Hz occurs at the audio output when Q16 is keyed. The ringing is present whether the sidetone volume is at zero or at an audible level, and it causes an annoying flutter in an external speaker or earphones. To reduce the ringing, capacitor C74 can be changed to 4700 pF. This reduces the very low frequency audio response without affecting appreciably the audio quality for voice reception. The cause of the ringing was not investigated.

ALC Bias

Since the keyed i-f stage also has alc voltage applied to one of the FET gates, the status of the alc voltage can affect the keying rise time and the degree of backwave. To minimize such effects,

R206 and R207 have been added (Fig. 1). An alc bias of about -0.57 V is applied to the gate of Q9 when the alc system is in the relaxed state (key up). This bias is slightly less negative than the least negative alc voltage occurring during key down intervals. The least negative alc voltage establishes the 100-watt-power output level. Thus, the bias has a minimal effect on alc-system behavior. In the unmodified circuit, the alc potential in the relaxed state is zero. This means that without the alc bias resistors, only the 1.35-V potential on C33 is keeping Q9 cut off, which is not sufficient to reduce the backwave to acceptable levels.

With the bias resistors added, the backwave is reduced to 64 dB below 100 watts. The addition of R206 shortens the alc decay time considerably, but not enough to cause speech compression and the accompanying distortion in the ssb mode. After adding the two alc bias resistors, the 100-watt-power output level control, R150, had to be adjusted slightly to reset the rf-power output from 95 watts back up to 100 watts. This adjustment was made on the 21-MHz band.

VOX Delay

The resistor that establishes the minimum hold-in time for the VOX relay

is R128. In the unmodified radio, the hold-in time is much too long to permit QSK operation at any but the slowest speeds. Reducing the value of R128 to 51 kΩ allows semi-QSK operation to speeds of 40 wpm. Fig. 1 shows the location of R128.

Physical Location of Changes

All of the modifications described so far are done on the main circuit board. This is the larger of the two boards under the top cover of the radio. The board is removed from its mounting by disconnecting J14 at the left center and J6 at the right center, and loosening the four mounting screws at the corners of the board. One or more tie wraps may have to be cut to free the cable going to J14.

Several of the new parts are mounted on top of the board by installing two components where there was one previously. For example, the combination of D201 and D202 mounts in the location of R122, which has been deleted. Components that cannot be mounted topside are mounted between solder pads on the printed-wiring side and are contained within sleeving where necessary to prevent shorts.

Test Points

Convenience of voltage measurement and waveform observations can be improved by adding a few test points on the main circuit board. Test points can be fabricated by attaching a stiff piece of bare wire, such as a scrap lead from a diode or resistor, to the appropriate leg of a component mounted at the top of the board. Bend the wire to stand alongside the component (Fig. 3). Test points are useful at the positive terminals of C33 and C81, the cathode of D18 and D202 and the anode of D19. These are worth the trouble, but care must be taken to avoid short circuits.

Fan-Motor Control

I find it annoying for the fan motor to be turning on and off as the radio is keyed. Since such rapid sequencing may shorten the motor life, it is desirable to have the option of running the fan continuously.

This change (Fig. 4) requires the addition of a switch that can be mounted on

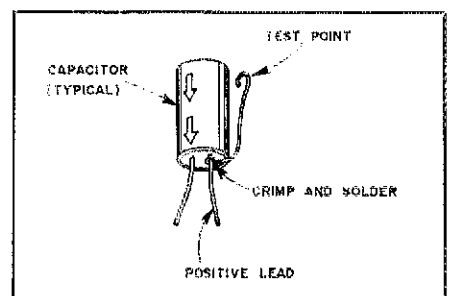


Fig. 3 — This sketch shows an easy method of providing test points in a circuit.

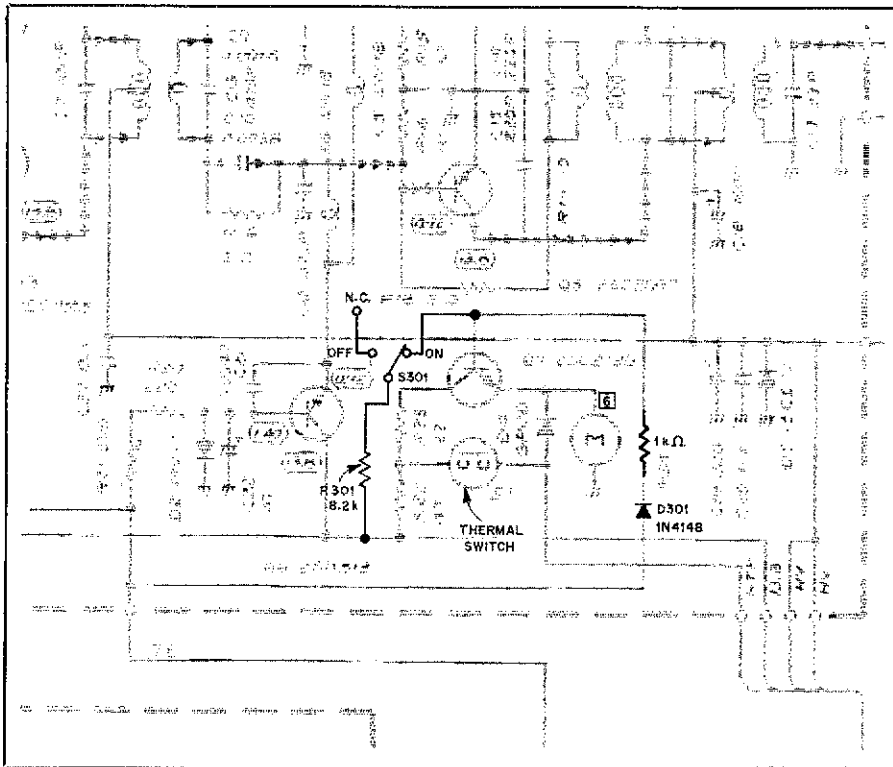


Fig. 4 — Schematic diagram showing changes to the fan-motor control circuit, which allows the fan to run continuously. This diagram is from the owner's manual.

the rear panel below the rf-output connector. I removed the clamp type of ground connector and installed a no. 8-32 ground-stud screw with locking hardware, and a wing nut. The toggle switch was mounted next to the ground screw (Fig. 5). Care must be taken to locate S301 so the terminals and body clear the end of

the band-switch shaft. Parts changes for the fan control are shown in Table 2.

Conclusion

Comments received from operators hearing the cw from this modified IC-730 have been gratifying. I hope others making the changes described here will be

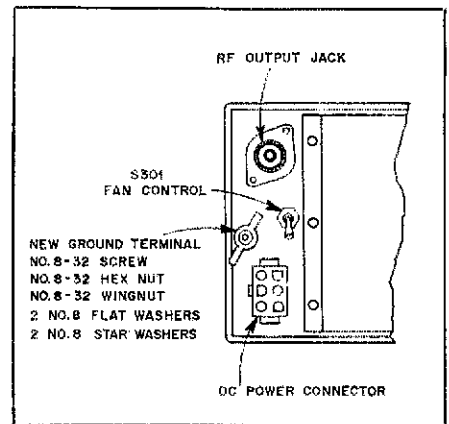


Fig. 5 — A portion of the rear panel is shown, giving the locations of the new ground terminal and the fan-motor control switch.

Table 2

Parts Changes in PA Unit to Allow Fan to Run Continuously

| Added Parts | Value |
|-------------|----------------------------|
| R24 | Change from 2.2 kΩ to 1 kΩ |
| R301 | 8.2 kΩ, 1/2 W |
| D301 | 1N4148, silicon |
| S301 | spdt toggle switch |

pleased with their results. I wish to thank Bill Skipper (KØARG), Jack Fewer (N2CJV) and Bob Ziolkowski (W2HER) for taking the time and trouble to machine copy my high-speed transmissions, and for making helpful comments. Thanks also to Dorothy Pratt (KA2MEU) for typing the original manuscript.

New Books

□ *Why Do You Need A Personal Computer?* by Lance A. Leventhal and Irvin Stafford. Published by John Wiley & Sons, Inc., New York, NY. First edition 1981. Soft-bound, 7 × 10 inches, 278 pages, \$8.95.

Computers, computers, computers — they're as much a part of our lives today as the family pet, car, or the air we breathe. We just can't seem to do without them in this fast-paced world. Grade-school kids are learning how to use them, and the chances are you have at least one member of the computer family in your ham shack. Many hams already have personal computers assisting them, and many more are contemplating planting one foot in front of the other on their way to the computer store.

Before you take that decisive step and put your money on the counter, it might

be a good idea to know a little about what you're getting into. You can find that information in this book. It's geared to the prospective personal computer owner as well as the person who already owns one.

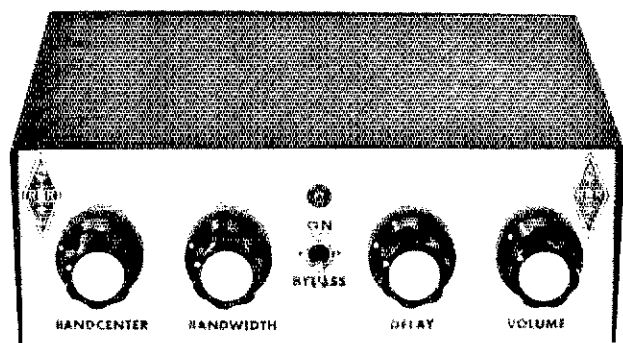
While there a lot of computer primers on the market, many of them bury the newcomer in technical jargon — not so here! This text is easy to read, from the standpoints of clarity and size of type. You're given a bit of computer history; a description of the component parts of a computer and an explanation of what the terms and acronyms mean; a touch of BASIC programming; how to write programs; computer peripherals and how to select what you need; interfacing the components; some hints and kinks of computer operation and maintenance; and some ideas on how you can find out more about the fascinating world of computers

and select the computer you need.

The 16-page glossary is a handy item to have when you run across some new terminology. A 22-page appendix will be helpful even after you've purchased your computer. It contains tables that provide interface pin-out information as well as pin and signal information for a number of popular buses: S-100, Heath H8, Radio Shack, SWTP, Apple, KIM and OSI. A table describing the different cassette data recording standards is included, too.

I'd recommend this book to anyone interested in learning something about computers, even if you don't have the purchase of a computer in mind at present. You'll want to have it around for a handy reference manual and a memory refresher as you continue the learning process. I think you'll find the \$8.95 was well spent. — Paul K. Pagel, N1FB

The KC2FR QRM Fighter



Losing the battle with QRM?
This filter makes you the champ!

By David Jagerman,* KC2FR

This article presents construction information for a nonlinear, audio cw filter intended to help reduce QRM, which every amateur faces! To alleviate interference, many filter circuits have been devised to operate in the i-f or audio sections of the receiver. These circuits are generally well designed. They allow many QSOs that otherwise might not have been attempted; however, it is still advantageous to consider alternative designs.

Consider some of the qualities desired in a cw audio filter. Its bandwidth should be narrow — otherwise noise and interfering stations will also be heard. Present-day i-f filters are quite narrow; hence the bandwidth of the audio filter should be even narrower — less than 400 Hz to provide an improvement. The passband should be flat, so that tuning in the desired station will be easy. Filter skirts should be nearly vertical, with the shape factor approaching a value of 1, in order to effectively eliminate interference. Furthermore, there should be no ringing under tight passband conditions. Typical linear-filter designs, whether passive or active, provide a narrow passband, but they have a sharply peaked "nose" and are often prone to ringing. Also, their shape factors cannot be made close to ideal, except with elaborate designs. Thus, to achieve the desired characteristics, I tried a nonlinear design.

Design and Construction

A block diagram of the QRM Fighter is given in Fig. 1, and the circuit diagram appears in Fig. 2. For the following discussion please refer to both figures. The first stage is a multiple-feedback, band-pass amplifier with a Q of 10 and a gain of 4. A 200- Ω control is used to adjust the center frequency. The second stage is a comparator whose output (pin 6) is high if the signal from the band-pass amplifier cannot overcome the bias set on pin 3. When the signal is strong enough to overcome the bias, pin 6 remains low. The net band-

pass characteristic of these two stages is shown in Fig. 3. It can be seen that the characteristics of a good cw filter are obtained. The flat top in the passband is obtained because pin 6 remains at a constant low level, even though the output of the band-pass amplifier varies. A shape factor of 1 is obtained because of the sharp cutoff that occurs when the signal drops below the bias set on the comparator. A 500- Ω control is used to set the bias level of the comparator, which in turn determines the bandwidth.

The output from the first two stages is an audio signal that is amplitude modulated by the code elements. The signal frequency matches the offset frequency of the receiver. It is the function of the third stage to remove this audio signal and to leave only the baseband code elements. Essentially, it operates as an envelope detector. This configuration also facilitates the later introduction of delay, which serves as a noise blanker. The third stage consists of a pnp switching transistor (Q1) and an NE555 IC. Pin 3 of the NE555 remains at logic high for the duration of a code element, while during a space it remains low; thus the cw envelope is obtained. This detector stage drives a tuning indicator, consisting of an LED that remains lit only for the duration of a code element.

The fourth stage — comprised of a diode, Q2 and Q3 — is used to delay the generation of tone. This stage prevents noise impulses, which have triggered the first three stages and whose duration is less than the delay set into the stage, from creating an audible output. A 100-k Ω control is used to adjust the amount of delay from zero to over 16 ms. A code element is of considerably longer duration than most noise impulses; therefore, it will produce an audible output. The envelope detector has a pulse stretching effect of approximately 3 ms, so the net loss affecting a code element is the delay introduced by this stage (less 3 ms). This loss, even at maximum delay, does not affect readability of the code.

The fifth stage is a tone generator keyed through reset-pin 4 by the output of the delay stage. It produces a tone only when that output is high. A 5-k Ω trimpot is used to adjust the pitch of the generator. The final stage is an audio power amplifier capable of driving a small loudspeaker. The 10-k Ω control is an audio-taper potentiometer.

The unit may be constructed on perf-board or a pc board. The foil side of the circuit-board etching pattern appears in the Hints and Kinks section of this issue, and the component side is shown in Fig. 4. Everything may be mounted in a cabinet measuring 7-3/4 \times 4-3/8 in. (Radio Shack 270-232). The unit shown in Fig. 5 was constructed by Circuit Board Specialists,¹ using a pc board specially made for the circuit. An open chassis was also made from pc board.

The rear of the chassis holds three connectors — one for the audio output from the receiver, one for the output of the filter to a small speaker or phones, and one for the power-supply input. Front-panel features include a VOLUME control (with power switch), DELAY control, LED tuning indicator, BYPASS/ON toggle switch, BANDWIDTH and BANDCENTER controls. Small Radio Shack knobs (274-380) are used for the VOLUME control and the BANDCENTER control. Two somewhat larger knobs with calibrated skirts (Radio Shack 274-413) may be used on the DELAY and BANDWIDTH controls to permit calibration of their settings. Rub-on fiducial lines are put on the chassis front for these calibrated controls. A 9-V battery pack consisting of 6 AA cells, or a small dc plug-in wall adapter (at least 100 mA), may be used for the power supply.

Adjustment and Calibration

Adjustment of the BANDCENTER control may be done best through the use of a

¹A complete kit of parts, including etched pc board is available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002. The ARRL and QST in no way warrant this offer.

*32 Mendell Ave., Cranford, NJ 07018

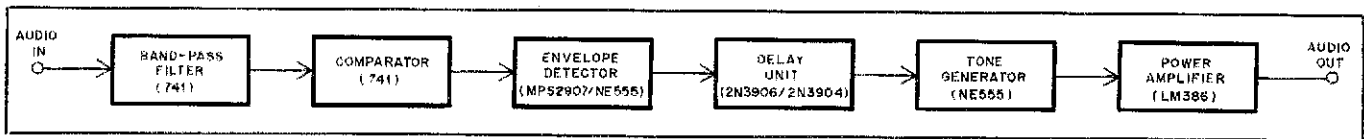


Fig. 1 — Block diagram of the QRM Fighter.

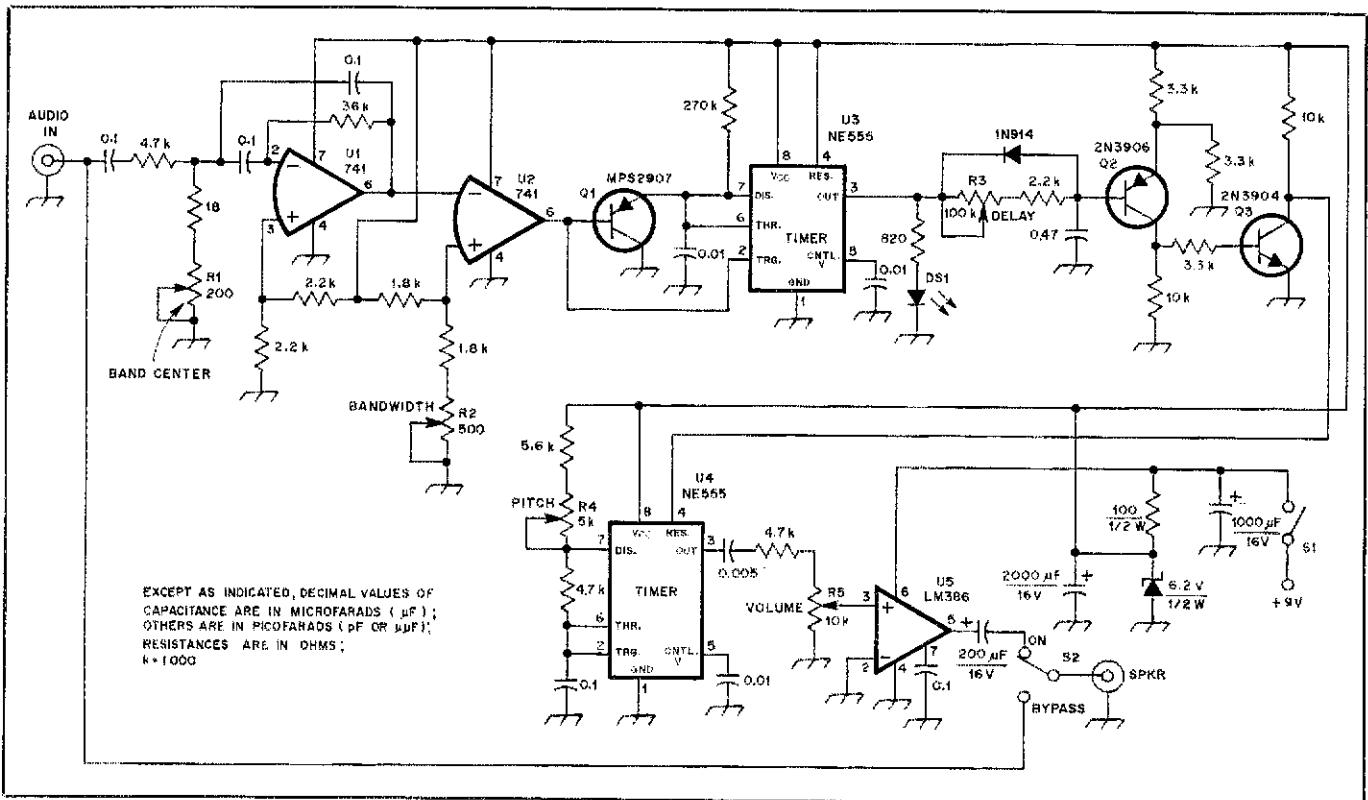


Fig. 2 — Schematic diagram of the filter. All resistors are 1/4-W, carbon-composition or film types; capacitors are 25-V, disc-ceramic types. Those with polarization marked are electrolytic.

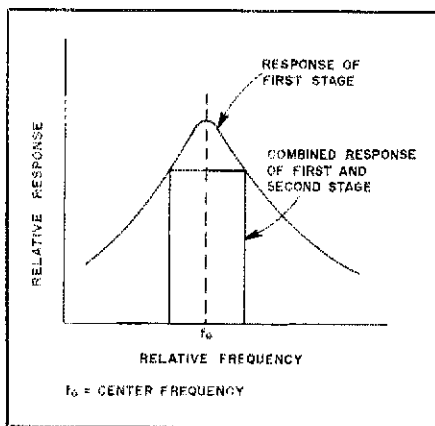


Fig. 3 — Graph showing relative response of first two stages.

steady carrier picked up by the receiver. A crystal calibrator can be used to supply the carrier. The receiver should be tuned for maximum deflection of the S meter and not disturbed for the remainder of the adjustments. With the receiver audio level set no higher than needed for detection by the filter, and the BANDWIDTH control set for maximum bandwidth, the BAND-

CENTER control is adjusted until the LED is lit and a steady tone is heard. Filter bandwidth is reduced progressively, and the BANDCENTER control adjusted, always maintaining minimum excitation necessary from the receiver. Eventually, an adjustment of the BANDCENTER control is obtained, which exactly matches the receiver offset frequency. This control should thereafter not be disturbed. At this point, the 5-kΩ pitch-control Trimpot may be adjusted to produce a pleasing tone. The pitch may be lowered further, if necessary, by paralleling the 0.1-μF capacitor in the fifth stage with a 0.05-μF unit.

The BANDWIDTH control may be calibrated by use of an audio sine-wave generator set for 100-mV output. By "rocking" the frequency dial of the generator, the filter bandwidth may be determined. Dial calibration of the BANDWIDTH control can then be noted.

For calibration of the DELAY control, a source of pulse-modulated audio set to the offset frequency of the receiver, and a dual-trace oscilloscope, are used. A suggested circuit for the signal source is given in Fig. 6. This circuit provides a series of

dots with equal dot and space durations; the dots consist of several cycles of audio from the sine-wave generator, whose amplitude is set to 100 mV. If a known code speed is desired, the frequency of the NE555 switch should be set to $2.4 \times$ wpm. This frequency is equal to $0.722/RC$; for example: $R = 91 \text{ k}\Omega$, $C = 0.47 \text{ }\mu\text{F}$ produces a code speed of 40.5 wpm, which is a good speed to use.

The simulated cw signal is connected to the input of the filter. Pin 3 of the third stage, NE555, is connected to one channel of the oscilloscope, and the collector of Q3 is connected to the other channel. Relative time delay between the two signals may now be observed, and the dial of the DELAY control can be marked correspondingly.

When the QRM Fighter is connected to a receiver and has sufficient delay dialed in, the LED will occasionally flash on strong noise impulses, but no sound will be heard. This is indicative of the extraordinary noise filtration that the delay discrimination can produce.

Operation and Comments

It is my usual procedure to tune the

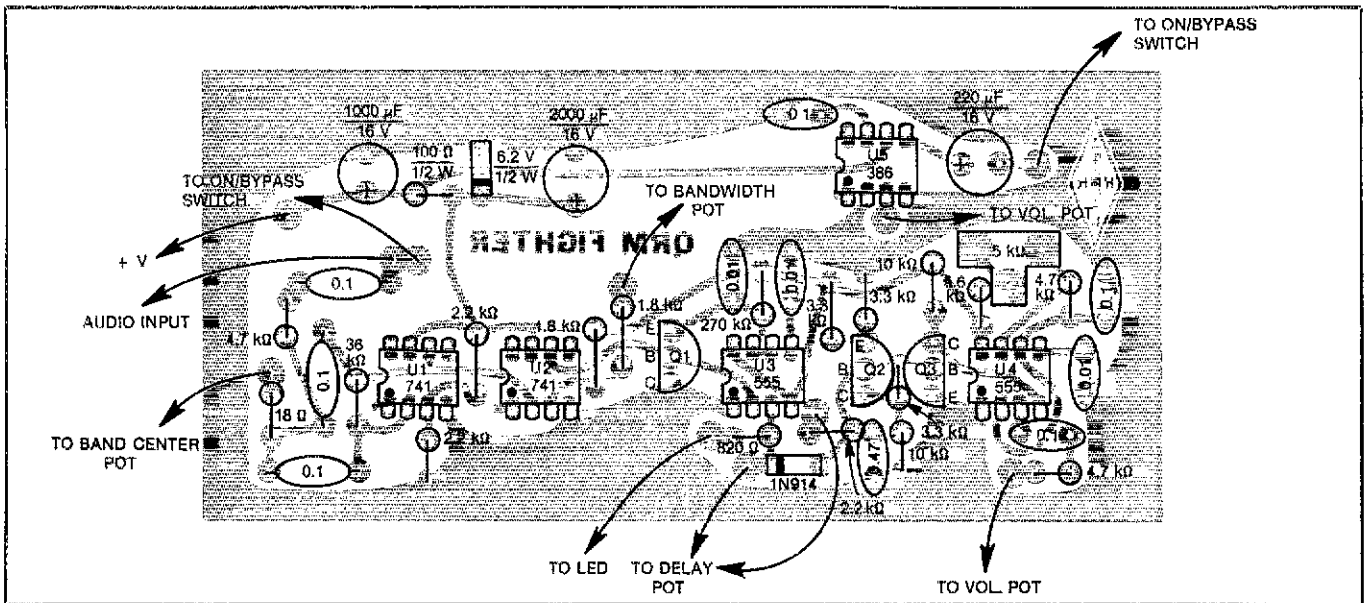


Fig. 4 — Parts-placement guide for the circuit board. Components are mounted on the non-foil side. Gray areas represent unetched copper. The circuit-board etching pattern appears on page 39.

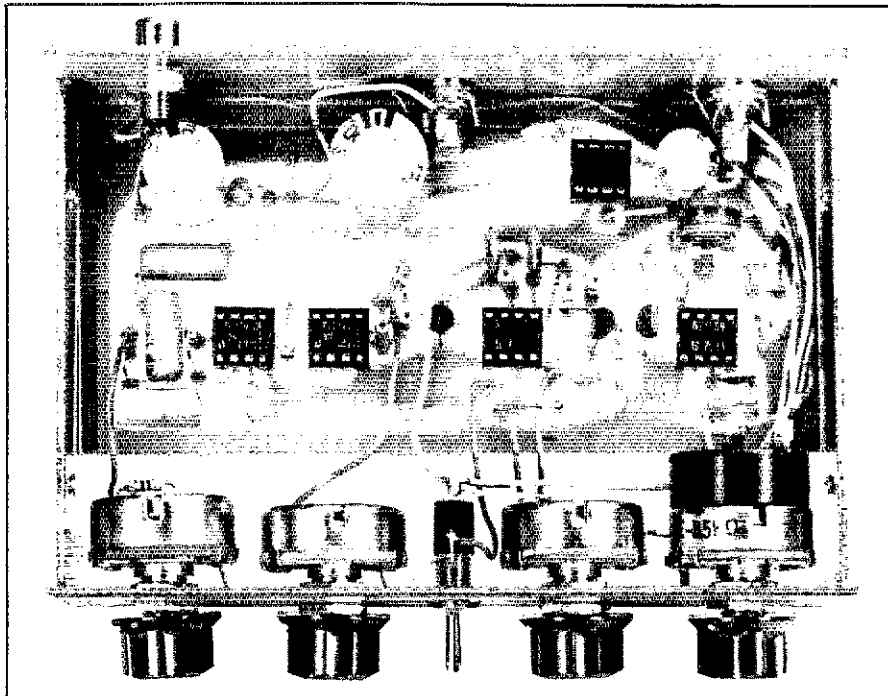


Fig. 5 — Inside view of completed QRM Fighter.

receiver with the filter in the BYPASS mode and while observing the LED, making sure the signal is properly tuned in. The BANDWIDTH control is normally set at 100 Hz, and the DELAY control at zero. If QRM suppression is desired, the filter is put into the ON position. Sometimes the filter is used when there is no QRM, simply for the pleasure of listening to a signal against a quiet low-noise background. If noise persists when the filter is in, delay may be dialed in to eliminate it. Usually a delay of 8 to 10 ms is adequate.

I was not able to test the QRM Fighter

against the Russian Woodpecker. The duration of its pulse is known to be 15 ms, however, so the filter should be effective in suppressing it.

One characteristic of this filter is that the bandwidth increases with the input level. Also, noise that actually triggers the circuit will appear in the output at the same level as the desired signal (but not with the same duration or pitch). Both problems are alleviated by using minimum drive from the receiver, consistent with filter excitation.

Because of the narrow band-pass characteristic, it may not be possible to

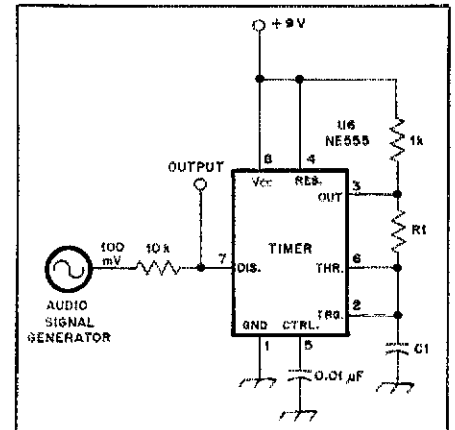


Fig. 6 — Simulated cw generator used for alignment purposes.

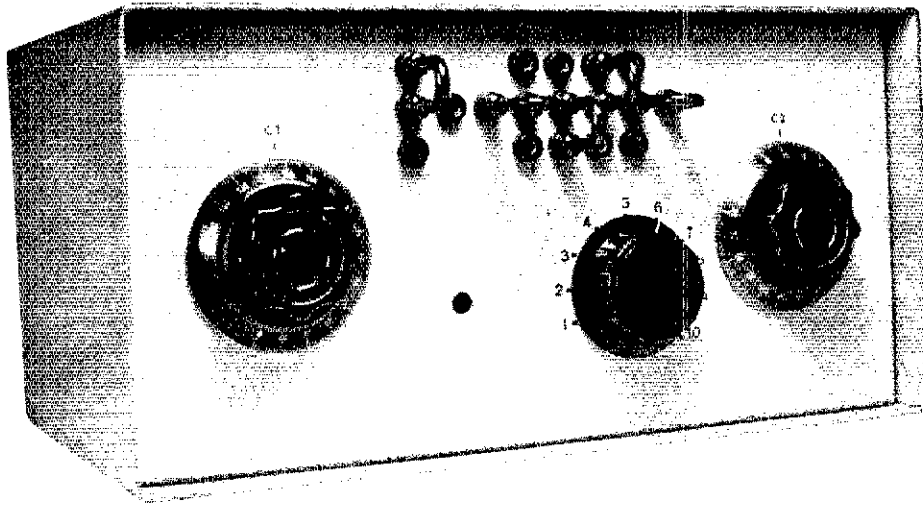
hear your transmitter sidetone. This can be corrected by adjusting the frequency of the sidetone oscillator, or simply by switching the filter back to the BYPASS mode while transmitting. It is an amusing consequence that listening to both sides of a QSO without readjusting the VFO is usually not possible because of the extreme selectivity!

The pleasure of using this filter will repay the time spent in designing and building it. It is my hope that you will derive as much satisfaction from it as I have.

References

- Berlin, H. M. *Design of Op Amp Circuits, with Experiments*. Indianapolis, IN: H. W. Sams and Co., 1977.
- Berlin, H. M. *555 Timer Applications Sourcebook, with Experiments*. Indianapolis, IN: H. W. Sams and Co., 1976.
- DeMaw, D., and W. Hayward. *Solid State Design for the Radio Amateur*. Newington: ARRL, 1977.
- Nicholls, D. "Blanking the Woodpecker," *Ham Radio*, Jan. 1982.
- Rakes, C. D. *Integrated Circuit Projects*. Indianapolis, IN: H. W. Sams and Co., 1981.

A New, More Versatile Transmatch



Another Transmatch? This one is different! It “jumps” to match your every need.

By Claude L. Frantz,* F5FC/DJØOT

Technical articles show an increasing interest in impedance matching between the transmitter and antenna systems. This is amplified by the fact that more modern equipment uses solid-state final amplifiers with a fixed-value output impedance.

The matching problem can be resolved in an elegant manner if a tube PA (power amplifier) and a well designed Pi-L matching network are used. Unfortunately, only a few articles have been published on Pi-L matching-network designs with wide-range matching capabilities. The usual approach, using a given intermediate impedance between the Pi and the L sections, is not adequate for matching widely varying load impedances.

This article describes a matching device that can be used between any receiver,

transmitter or transceiver and an antenna system having unbalanced connections. The unit will provide a matching range that is much broader than the range of most similar devices. Despite these

capabilities, it remains simple and inexpensive.

The main feature is an ability to vary the structure of the matching network in a simple manner. Any L, Pi or T network

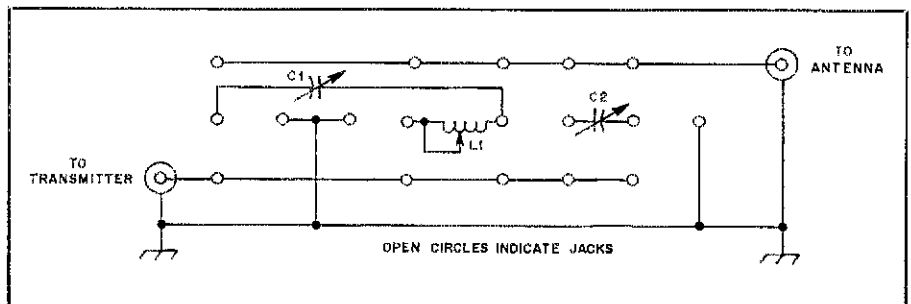


Fig. 1 — Schematic diagram of the Transmatch used at DJØOT. Jacks for the wire jumpers are shown as circles. Any desired configuration can be wired by inserting jumpers at the appropriate points. C1 and C2 are air variable capacitors, 200 pF, with a large plate spacing. L1 is a 25- μ H inductor (E. F. Johnson 229-203 or similar).

*Hauserstr. 43, 8035 Gauting-Königswiesen, West Germany

Table 1
Basic L Network

| Configuration | Jumper Location | Main Usage |
|---------------|-----------------|------------------------------------|
| | | $R < 50 \Omega$ $X < 0$ |
| | | $R > 50 \Omega$ $X > 25 \Omega$ |
| | | $R > 50 \Omega$ $X < 25 \Omega$ |
| | | $R < 50 \Omega$ $X > 0$ |
| | | $R < 50 \Omega$ $X > 25 \Omega$ |
| | | $R < 50 \Omega$ $X > 25 \Omega$ |

Table 2
Pi and T Networks

| Configuration | Jumper Location |
|---------------|-----------------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

that can be built with three components (two capacitors and one inductor) is realized easily with this device. Component values are not critical. The inductor can be a roller coil or one with switched tap points (Fig. 1). In my Transmatch, jumpers are used to make the interconnections, so any configuration can be wired quickly. I prefer this method of interconnection because it is simple and economical. Expensive switches capable of handling large current or voltage, depending on the network used, are not required. Further, the required space is

smaller. A maximum of five jumpers is required to make all interconnections. Tables 1, 2, 3 and 4 show possible networks; the location of the jumpers is given for each one.

I used variable capacitors that have ceramic-insulated supports and insulated shaft couplers. The inductor is a 25- μ H tapped coil, but a larger inductance will be needed if you plan to use the Transmatch on 160 meters. A roller inductor will provide continuous matching capability. Banana jacks are used for front-panel connections. The jumpers can be made

from pieces of heavy insulated wire with banana plugs on each end.

The adjustment can be made experimentally while using an SWR indicator in a manner similar to that of most matching devices. There is no explicit limitation on the antenna to be used. I have a multiband dipole for use between 80 and 10 meters. This device has worked well at my station. I was able to achieve DXCC, DUF 4 and DNF, using only 100 watts. All components are available from Radio-Kit, P.O. Box 429, Hollis, NH 03049.

Table 3
L-Network Variations

| Configuration | Jumper Location |
|---------------|-----------------|
| | |
| | |
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| | |
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| | |

Table 4
Simple Series Networks

| Configuration | Jumper Location |
|---------------|-----------------|
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| | |

QST

Strays

QST congratulates . . .

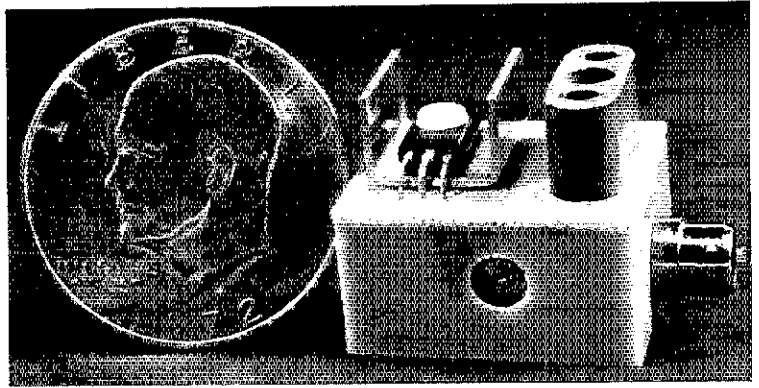
- Astronaut Owen Garriott, W5LFL, who has been named mission specialist for NASA's Space Shuttle Mission 9 flight, scheduled for September 1983.
- Linsley M. Hamilton, KD6AU, of Hawthorne, California, who was recently named Configuration Management Administrator for the Space and Communications Division of Hughes Aircraft Corp.

I would like to get in touch with . . .

- anyone who has an interest in the Collins KW1 as a museum piece or for regular communications. Howard A. Miller, W2WLZ, 163 Hoover Rd., Rochester, NY 14617.
- someone with a book or diagram for an Eico 427 oscilloscope. Dan Eggers, N7DE/5, 1219 Westover, College Station, TX 77840.
- other hams who are interested in exchanging programming/interface ideas for the Motorola 6800 series MPU, particularly for Amateur Radio applications. Tom Winfield, WA9LKD, 543 Redwood, Bolinbrook, IL 60439.
- anyone who knew T. R. McElroy, world champion radio telegrapher. B. Neal McEwen, K5RN, 1128 Midway, Richardson, TX 75081.



Build a 40-M Cubic Incher



Just a few hours and a few "bucks" will net you more watts per cubic inch — and fun — than any other rig.

By Dennis Monticelli,* AE6C

Having been afflicted with QRPer's disease¹ for the past 14 years, I found it natural to attempt to build a rig sized in proportion to its power. Of necessity, the circuit had to be simple and emphasize low parts volume as well as low parts count. The design effort was well worth the time because this rig has been more operating fun (per cubic inch or otherwise) than any other rig I have built. Other hams find it hard to believe that 2 watts and a good note can originate from such a tiny box.

Circuit Description

This rig is a crystal-controlled, 1-transistor power oscillator (Fig. 1), designed to generate power efficiently while maintaining a good cw note. A key to achieving the small size is the use of T1, a multifunction transformer. Wound on an iron-powder toroid, T1 passes dc to the transistor, couples power from that device to the tank circuit, forms one half of the resonant tank circuit, and transfers power to the antenna. The primary inductance is chosen deliberately to be unusually high (7.8 μH), so that the unloaded Q (Q_U) will be 140. By designing for such a high Q_U ,

the tank loss can be minimized. This, in turn, allows the loaded Q (Q_L) to be set high enough ($Q_L = 14$) to maintain waveform purity without the fear of consuming precious output power in the tank circuit. The impedance across the tank, as reflected by a 50- Ω load, is approximately 5 k Ω , resulting in a healthy 280-V pk-pk swing with a 12 V supply. Tuning is performed by adjusting the small, mica-compression trimmer capacitor, C3.

Normally, feedback for a simple, Pierce-type crystal oscillator is obtained by feeding the entire tank signal back to the base through the crystal. While this method results in quick starting and vigorous oscillation, it also drives the transistor harder into saturation than is necessary. This usually results in a collector current signal rich in harmonics and lower tank Q_L because of transistor input loading. A capacitive impedance transformation provided by C1 and C2 reduces the feedback signal to a more optimum level. The oscillator still starts willingly, and the output waveform is significantly cleaner than that obtained with excessive drive. Saturation still occurs on negative voltage swings, so efficiency is maintained. Start-up resistor R1 delivers about 1 mA to the base of Q1. For a typical β (current gain) of 50, this results in a collector current of 50 mA, which is ample for the circuit to develop the high-frequency voltage gain necessary to

initiate oscillation. D1 is optional, but it seems to reduce harmonic output somewhat, perhaps by equalizing the loading on the tank for positive and negative swings. It also serves to protect the base-emitter junction of Q1 from inadvertent, but potentially damaging, reverse breakdown voltage. RFC1 is also optional, but it too reduces harmonics slightly and represents a certain measure of insurance that Q1 won't parasitically oscillate at vhf.

Q1 was chosen carefully, as it is the "heart" of the circuit. Originally designed for service in the Class C output stage of a CB radio, it exhibits good efficiency up to 4-W output at 27 MHz. It also possesses the noteworthy ability to handle infinite SWR when operated at 12 V or less. And although I've found this device to be virtually impossible to destroy in this circuit, that doesn't mean some particularly resourceful ham out there won't find a way to make me eat my words. In any case, the MRF472 is inexpensive, selling for as little as \$1 at some outlets (see Fig. 1), and it comes in a tidy TO-126 package.

Construction

The little rig is built in an open-bottomed box constructed from single-sided printed-circuit-board material, and measures (you guessed it!) 1 cu in.² The circuit-board foil serves as an effective and convenient solderable ground plane.

*48617 Tonopah Ct., Fremont, CA 94538

¹Notes appear on page 36.

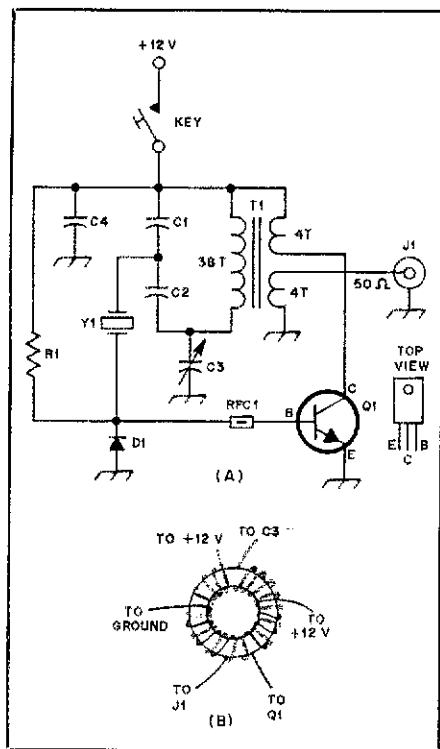


Fig. 1 — Schematic diagram of the 40-Meter Cubic Incher (A), and winding details for T1 (B).
 C1 — 430-pF silver mica or disc ceramic (exact value unimportant; 390 or 470 pF will work).
 C2 — 51-pF silver mica or disc ceramic.
 C3 — 4- to 40-pF miniature mica compression trimmer, 3/8 x 17/32 in., ARCO no. 403³ or equiv.
 C4 — 0.01- μ F and 0.001- μ F disc ceramics in parallel. The 0.001- μ F unit is optional (see text).
 D1 — High-speed silicon switching diode, 1N914 or equiv. This diode is optional (see text).
 J1 — RCA phono jack.
 Q1 — Npn medium-power rf transistor, MRF472^a or equiv.
 R1 — 10-k Ω , 1/4-W carbon type.
 RFC1 — Ferrite bead, FB-43-101 or equiv.
 T1 — Toroidal transformer wound with no. 26 enameled wire on a T50-2 core, 38 t. primary, 4 t. each secondary.
 Y1 — Fundamental-cut crystal in FT-243 or HC-6/U holder.

Surprisingly, the parts are not too tightly crammed into the box. Instead, the volumetric needs of each component were carefully considered in planning the layout to ensure efficient use of space. For example, T1, Q1 and the heat sink are all mounted to the box with one nylon bolt. The remaining parts are placed judiciously with regard to the constraints imposed by T1, C3 and the intrusive phono jack, J1 (now you know why I didn't use an SO-239!)

Begin construction by cutting the five pieces shown in Fig. 2 out of 1/16-inch-thick circuit board. Drill all the indicated holes prior to assembly. If some of the parts, such as C3 or the crystal socket, are dimensionally different from mine, you will need to make allowances in your cut-

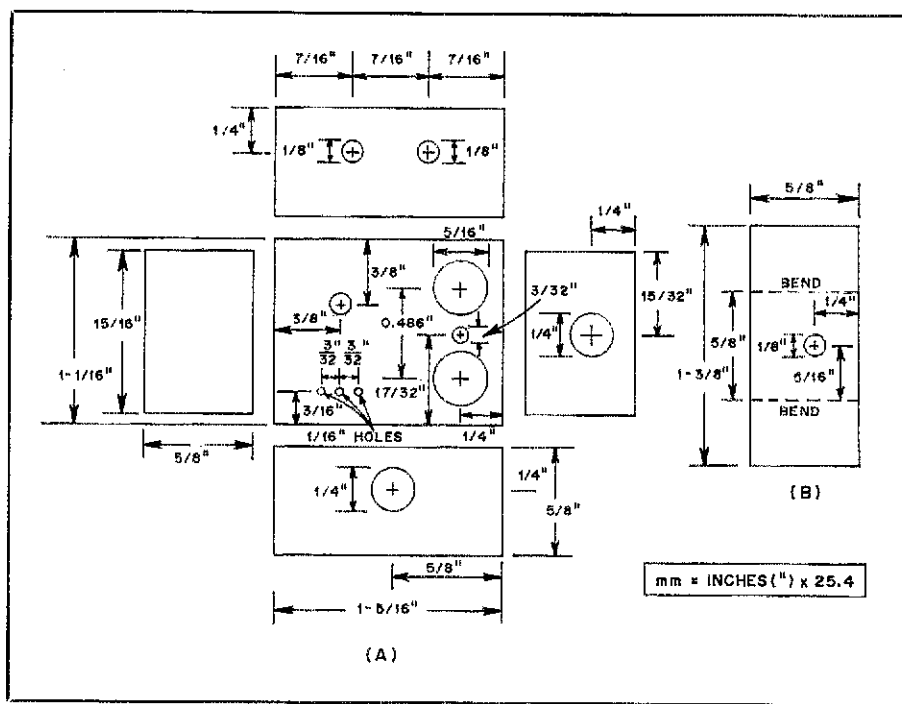


Fig. 2 — The five pieces of circuit-board material used to form the box are cut and drilled as shown in A before the box is assembled. The heat sink, B, is made from 1/16-inch aluminum or brass.

ting and drilling. Assemble the box by first soldering the long sides to the top member. Next, solder the shorter end pieces to the top. Finally, solder the four corners together. Make it easy on yourself and the circuit board by using only a single blob of solder for each joint. A small box like this one will be plenty strong enough without drowning it in solder and flux and overheating the fiberglass in the process.

Install the two 4-40 bolts that serve as the supply (v+) and ground terminals, taking care to insulate the v+ bolt from the chassis. Scrape away the copper foil from around the immediate area of the v+ hole and use a fiber washer to ensure isolation from ground. Next solder one end of C3 to the underside of the top piece after aligning it carefully with the adjustment hole in the side piece. Cut and bend the heat sink, described in Fig. 2, out of aluminum or brass and drill the mounting hole. Wind T1 as detailed in Fig. 1, paying attention to the phasing direction and placement of the windings. Scrape away the foil from around the holes for the transistor leads as you did for the v+ bolt. Bend the leads of Q1 and install it along with the heat sink and T1 as one unit, using a 3/4-inch nylon bolt. Use nylon or fiber washers to sandwich T1, thus insulating it from the chassis and providing a flat surface for the nut to clamp down on. You may wish to use thermal conducting grease between Q1 and the heat sink, although this is not mandatory because the operating temperature of the

device is normally low.

Referring to Fig. 3 for parts placement, first solder in imbedded capacitor C2, and then C1. Plan your routing scheme for the six leads from T1 and solder them in. Drop the ferrite bead over the base lead of Q1 and connect an insulated wire from the base to the crystal socket. The remaining parts, C4, D1 and R1, are all easy to wire in, as they lay near the surface. Note that two capacitors were used for C4 in this model, although one works just fine.

Testing and Tune-up

Apply a current-metered, 12-V power source (I use batteries) capable of supplying at least 300 mA, and connect a 50- Ω noninductive resistor or dummy load to J1. Plug in a crystal known to be active, and adjust C3 until the circuit breaks into oscillation as evidenced by a sudden jump in supply current. By adjusting C3, you can get the supply current to range from roughly 150 mA to 600 mA and still maintain oscillation. At the low current end, leading-edge keying will be soft and efficiency reduced. At the upper end, the power efficiency will be reduced and harmonics increased. It appears that about 300 mA yields the best combination of good keying and efficiency. The particular transistor you use, the crystal activity and your actual antenna impedance will all influence the optimum current value. Determine the optimum value yourself for your particular set-up. Once adjusted, C3 should not have to be changed when you change crystals, unless

they vary widely in activity. Don't expect to find a current dip as you tune; a heavily loaded oscillator like this one will not behave like the 6146 final amplifier in your station rig.

Troubleshooting

Obviously there is very little to go wrong with this rig. Should trouble develop, however, here are a few hints. If the circuit refuses to oscillate and draws no supply current at all, you have a bad connection or a defective transistor. If the circuit pulls roughly 20 to 100 mA, but doesn't oscillate, then your transistor is good but the tank may be out of resonance. Use a grid dip meter to check it, or experiment up and down a bit with the value of C2. It is also possible that insufficient feedback is available to kick the circuit into oscillation. Try reducing the value of C1 by an octave or so to boost this feedback.

80-Meter Operation

I see no reason why this rig shouldn't work on 80 meters with simple modification. Although I haven't tried it, merely scaling up C1, C2 and C3 by two octaves should result in good performance because the primary inductance of T1 is already high at 7.8 μ H. I would be pleased to hear from anyone who succeeds in putting a Cubic Incher to work on 80.

Performance

For such a simple circuit, the Cubic Incher gives a good account of itself. With a 12-V supply, the transmitter draws 300 mA while producing an output of 2.1 W. That's an efficiency of 58%, relative to total rig power consumption; try that test on your station rig! The Cubic Incher also works well on supplies from 6 to 18 volts, although the power efficiency and ability to withstand infinite SWR is impaired by high supply voltages.

I run the output from my Cubic Incher through the station Transmatch and low-pass filter (always good practice) to a roof-mounted Butternut vertical. This modest arrangement produces plenty of contacts and frequent comments on the nice sounding note. Other hams rarely believe me the first time I tell them the rig measures only 1 cu in. Contacts have been made with stations all over North America, in South America and frequently in Japan.

QRP is a lot of fun for many hams, but others have found it somewhat frustrating. I have some thoughts (certainly not original) on this subject. First of all, it is a misconception that elaborate antennas are needed. All that is required is that your aerial be efficient and mounted up in the clear. If the practices outlined in *The ARRL Antenna Book* are followed, simple dipoles, verticals, Zepps, etc., will work fine. Second, don't call CQ expecting to receive a snappy response. It's much better to listen, select and call the stronger stations on the assumption that either propagation is favorable between the two of you or he has a good antenna. Either way, you stand a better chance of being heard. Third, QRM and especially QRN are your two worst enemies. Choose a clear frequency and avoid operating on days with very high atmospheric noise. Fourth, arm yourself with more than one crystal. Double your crystals and you'll virtually

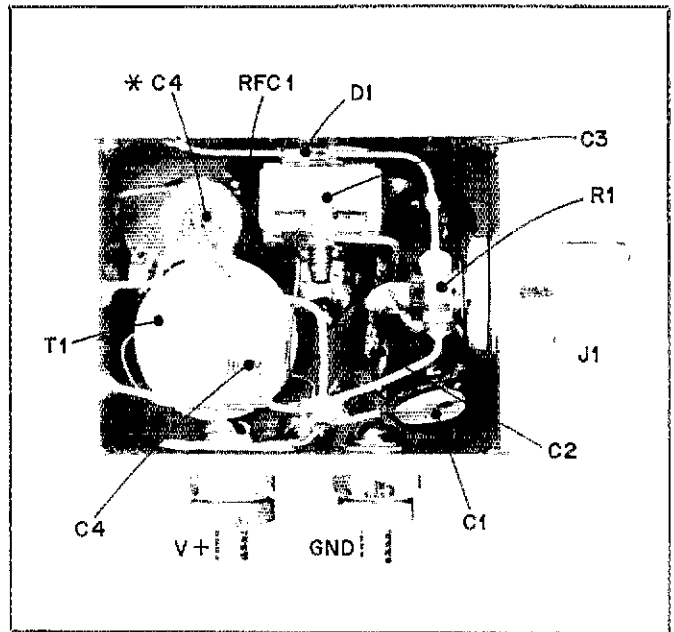
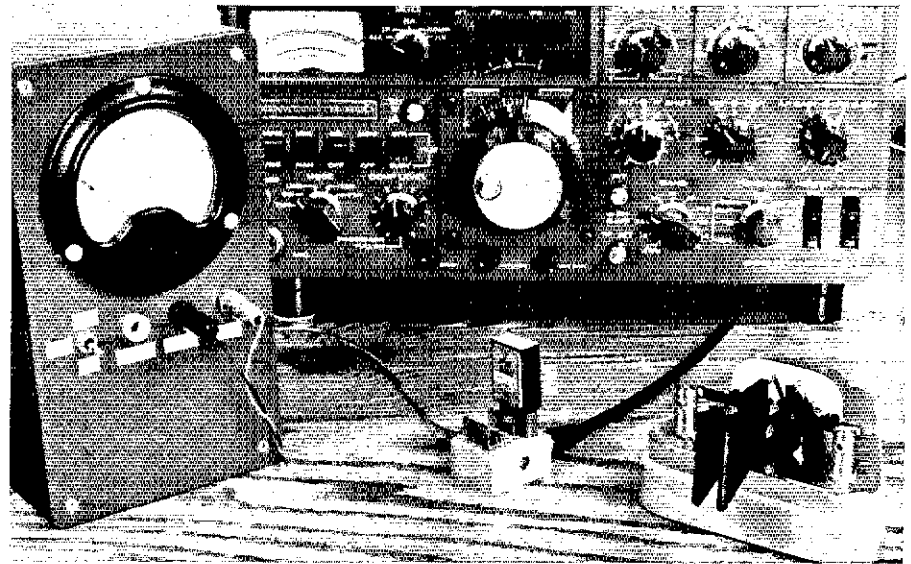


Fig. 3 — This bottom view shows the parts placement used to make the most of the tiny volume.



The QRP apparatus at AE6C. The metered power supply on the left contains two 6-V rechargeable gel cells. A flick of the switch changes the supply, from 12 to 6 volts for an extra QRP challenge.

double your opportunity for a QSO. Shop the flea markets for "rocks" or take advantage of the good buys offered by some suppliers.*

Some Thoughts

No construction article is complete without mentioning the potential disadvantages of undertaking and completing the suggested project. No doubt about it, this rig is *small!* "How small is it," you ask? It's so small it gets lost on your operating bench. It's so small it dangles on the end of a stiff coaxial cable like some sort of coaxial terminator. It's so small my cat has claimed it as her personal toy, batting it about like a ping-pong ball.

Best of all, though, it's so small it puts the thrill back into your QSOs. □

Notes

- *Operatus Iopowerus, no know cure.
- 1mm = in. \times 25.4; cu mm = cu in. \times 16,390.
- *A complete parts kit, including cut and drilled circuit-board parts, is available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002.
- *FT-243-style crystals are available from CW Crystals, 570 N. Buffalo St., Marshfield, MO 65706.
- *Available from Radio Kit, P.O. Box 411, Greenville, NH 03048.
- *Available from Semiconductor Surplus, 2822 N. 32nd St., No. 1, Phoenix, AZ 85008.
- *Iron-powder toroids and ferrite beads are available from Amidon Assoc., 12033 Orsego St., N. Hollywood, CA 91607, and from Palomar Engineers, 1925-F W. Mission Rd., Escondido, CA 92025.

Reference

Hayward, W. and DeMaw D. *Solid State Design for the Radio Amateur*. Newington: ARRL, 1977.

TEN-WATT SCALE FOR THE "COMPUTING SWR METER"

□ I recently added QRP operation to my station, and desired the convenience of the "Simple Computing SWR Meter" described by David L. Fayman, W0GI, in July 1973 *QST*. A 10-watt scale is provided by cascading a noninverting amplifier (Fig. 1) that's switched in for 10-watt, full-scale indication with the wattmeter in the 200-watt position. Wattage is read on the 1000-watt scale, with the readings divided by 100. Individual switching of forward and reverse channels of the 10-watt amplifiers is provided. This permits selection of the 10-watt reflected power in the 200-watt forward position for finer resolution of reflected power. The SWR readings are not correct when this combination is selected.

The amplifiers are of perf-board construction with Wire-Wrap® sockets. Switches for the 10-watt position are mounted on the rear panel.

Calibration is performed by first grounding the input of each channel and adjusting the offset null for 0-V dc. Switch the 10-watt scale off, and select the 200-watt scale. With a transmitter operating at 7 or 14 MHz into a dummy load adjust the power output of the transmitter for 10 watts as indicated by the 200-watt scale. Switch to the 10-watt scale. With 10 watts of rf energy applied, adjust the gain potentiometer of the 10-watt forward amplifier for full-scale deflection at 10 watts. Reverse the connection at the rf head between the transmitter and load. Depress the reflected-power switch and apply 10 watts of rf power. Adjust the gain potentiometer of the 10-watt reflected-power amplifier for a full-scale deflection of 10 watts. Reverse the rf head connections, and the device is now ready for use.

This 10-watt scale is adequate for my HW-8. It provides relative power-output measurements and SWR indications previously not attainable. Antenna matching adjustments during QRP operation are now easy to make.

My SWR meter has been battle tested through many Field Day operations and contests, with excellent results. The only problem encountered in its years of use has been thermal shutdown of the dual tracking voltage regulator. I replaced this regulator with three-terminal regulators (TO-220 case) for the plus and minus 15-V supplies to correct the difficulty. A change to the three-terminal regulators might be required because of the additional current drain of the extra amplifiers.

An attempt was made to add the 10-watt scale to the existing amplifiers by adding another gain control. The gain required was too great for a single amplifier. A noninverting amplifier with a floating input (10-watt scale switched off) causes the output to go into saturation. Another pole could be added to each switch for grounding the input when the 10-watt scale is off, if desired. No problems have been encountered by leaving the inputs in my installation ungrounded. — *Ronald W. Hooker, K9WTF, Big Bend, Wisconsin*

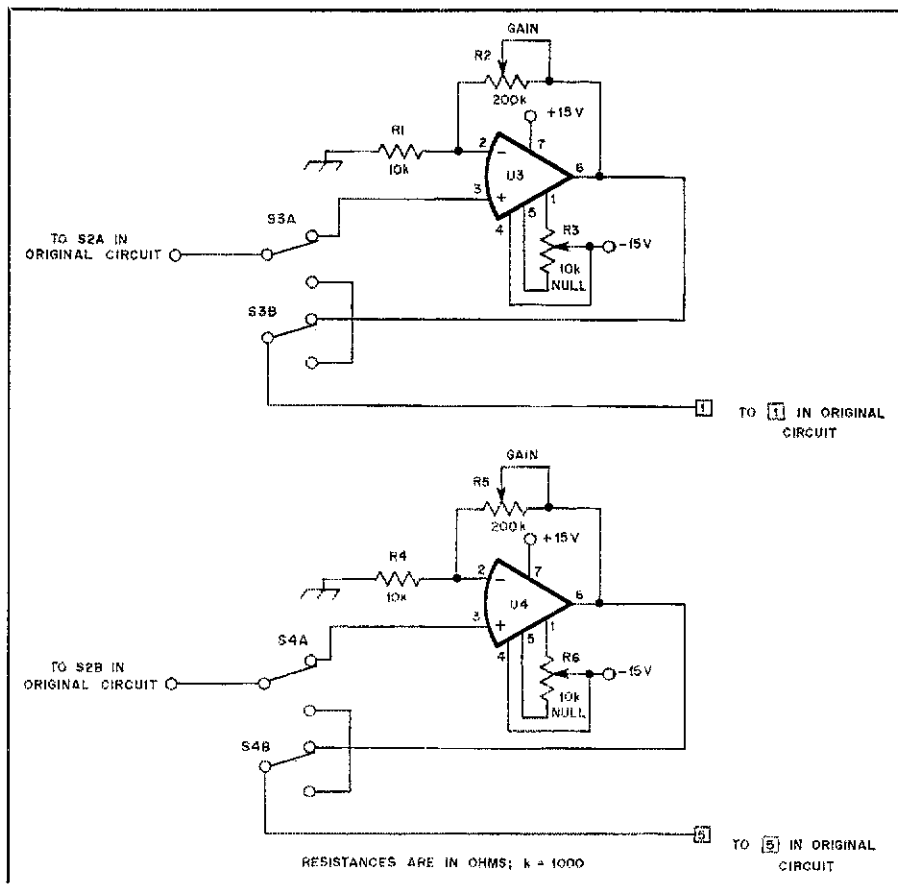


Fig. 1 — The schematic diagram of additions for providing a 10-watt scale for the "Simple Computing SWR Meter" (July 1973 *QST*). Circuitry added is between S2A and terminal 1 of the circuit board, and S2B and terminal 5 of the board as shown. Switches shown are in the 10-watt position.

- U3, U4 — General-purpose operational amplifier, 741CN or TL081.
- R1, R4 — 10 k Ω , 1/4 watt, 5%.
- R2, R5 — 200-k Ω , multiturn potentiometer.

- R3, R6 — 10-k Ω potentiometer.
- S3, S4 — Dpdt, Radio Shack no. 275-1546 or equivl.

HIGHER POWER FROM THE HEATH HA-201A 2-METER AMPLIFIER

□ After using my Kenwood TR-2400 handheld transceiver and Heath HA-201A 10-watt amplifier for more than a year, I became disheartened by the low output power, especially each time the batteries in the TR-2400 would begin to lose their charge. I found that the 2N6081 transistor in the amplifier could be replaced by an MRF 238. This transistor has a 9-dB gain compared with 6.3 dB for the original. Other specifications are nearly identical.

The transistors have similar case styles, so replacement is simple. Retune the input and output capacitors for maximum power. A 2-watt input produces a 22-watt output. The MRF 238 transistor is rated at 30 watts, and costs about \$10. I did not find it necessary to replace the 3-A fuse, but the greater current drawn by the higher-power device may require a larger fuse rating. — *Carl Nebelsky, AA1U, Pleasant Valley, Connecticut*

WIRE-TO-SPREADER CONNECTOR SYSTEM FOR QUAD ANTENNAS

□ When I began building a quad antenna for 10, 15 and 20 meters, I wanted a durable method of connecting the wires to the fiberglass spreaders. It would have to last through widely varying weather conditions, and should allow the whole system to flex in the wind without breaking.

My basic idea was to construct a pulley system. The wire would go around a wheel whose axis would be perpendicular to the spreader, in this case a 2-in. diameter fiberglass pole. The wheel would allow the wire to move, decreasing stress at the connecting points when strong winds flex the spreaders. I used a groove in the pulleys that had the same width and depth as the wire diameter. I also fabricated a shield to go over each wheel to prevent the wire from jumping out of the groove.

Pulley wheels were fabricated from a piece of 1/2-in. diameter acrylic rod. I used a lathe to cut the grooves in the acrylic rod and then

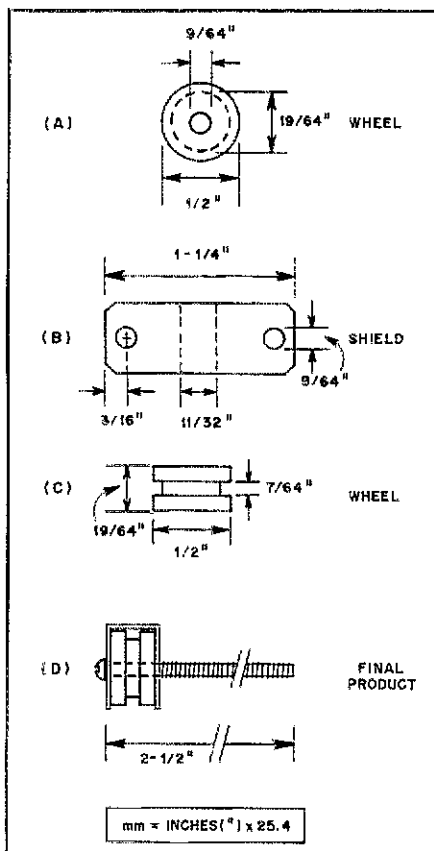


Fig. 2 — This diagram illustrates the steps in fabricating pulley wheels for use as quad-antenna wire-to-spreader connectors.

cut the 0.3-in. pulley wheels, as shown in Fig. 2. A 9/64-in. hole was drilled in each wheel to accommodate a no. 6 bolt. Each shield was cut from a sheet of galvanized steel.

These pulleys have been in use for two years, and they are as good as new. An added advantage is that they increase the radius at which the wire must bend, preventing a break at the corners. — *Peter Martin, WD9EKV, Oconomowoc, Wisconsin*

USING THE HEATH 1410 KEYSER WITH THE TEN-TEC ARGOSY

□ I found that my Heath 1410 keyer would not key my new Argosy transceiver. The Ten-Tec instructions specify the use of a reed-relay keyer output if a Ten-Tec keyer is not used. These keyers do not use a reed relay, so there must be a way to use other types. I found the voltage at the Argosy key jack to be +1.5 volts. The schematic diagram for my Heath keyer shows two sets of keying transistors, with diodes to ensure that the proper polarity is applied to each transistor. The diode voltage drop was the problem. Q6 and Q7 are used to key rigs with a positive keying voltage, so I put a jumper across D5 on the foil side of the board. The keyer and the Argosy transceiver work beautifully together now. If I need to use the keyer with another rig, I simply remove the jumper. An alternative solution would be to use one of the RCA jacks on the rear panel as a separate "Ten-Tec" output, with the hot line connected to the junction of the D5 cathode and the Q7 collector. — *Fred Wagner, KQ6Q, Omaha, Nebraska*

RECEIVER AUDIO QUALITY IMPROVEMENT

□ I was never really satisfied with the sound of the audio from my Kenwood TS-520, especially while using the wide cw position. Fig. 3 shows a circuit that I built into a surplus headset-adaptor box (model MC-385-C), which I picked up for 75 cents at a flea market. A small aluminum box will work just as well.

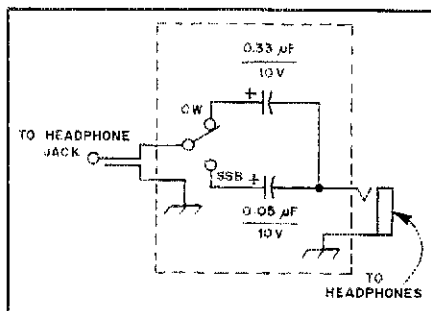


Fig. 3 — This simple circuit can be used to tailor the audio-response characteristics of your receiver.

I find that the 0.33- μ F capacitor in series with the headset line sharpens the cw audio response nicely. The 0.05- μ F unit gives a pleasant sound on ssb. Others may wish to experiment with different values to get a sound they like. — *John Fisher, K2JX, Huntington, New York*

THERMOFAX TRANSPARENCIES FOR PC BOARDS

□ In his article on making printed-circuit boards,¹ David Malley, K1NYK, states that Thermo-Fax® positive transparencies can be used with positive photo resists, but often let too much light through. This results in ruined boards.

I have used these transparencies for several years with excellent results. The trick is to use two sharp transparencies superimposed on one another. This will yield blacks that are dependably opaque to ultraviolet light. The images must be kept carefully aligned. This can be done by cutting one of the exposed sheets a bit smaller, placing it on top, and fixing the corners with transparent tape after the patterns have been carefully aligned.

Another useful feature of this method is that the black image is on the film surface, and can be scraped off easily. Circuit changes can be made by removing unwanted traces with a knife blade and by using circuit board drafting tape for new ones. I have also used this technique to sharpen a fuzzy image on the original, or where conductive areas seemed too close for comfort. — *Marty Kleinfeld, K1FHR, Woodbridge, Connecticut*

SALVAGING PARTS FROM OLD PC BOARDS

□ I had about a dozen pc boards from some old TV sets. Removing the components was a chore that I never seemed to get around to. When it came time to clean out the basement, I decided to try to save some of the board-

mounted potentiometers. Even with a large soldering gun, I could not keep all the pins from one potentiometer hot enough at once.

Finally, I took out my propane torch! When I touched the flame to the board the pots fell right off. The biggest surprise was that the parts were cold! Some experimentation showed that it was possible to torch off everything from resistors to transistors with no damage to any of them. The trick is to mount the board in a vertical position and to start at the top. By working downward, the rising heat does not damage components still on the board.

Don't try this on a board you plan to reuse. But it really is a fast, easy way to strip old pc boards. — *Charlie Burke, WA2SLK, Farmingdale, New Jersey*

SMALL-VALUE GIMMICK CAPACITORS

□ When I needed some small-value capacitors to use as coupling elements for a band-pass filter, I tested some twisted-wire "gimmick" capacitors on a Boonton RX meter. It was nearly impossible to obtain capacitances of less than 1.5 pF, and reproducibility was poor.

When I discovered a piece of ribbon cable of the type used for interconnecting computer equipment, I came up with the idea of using short pieces of this wire. Values down to 0.2 pF were obtainable and reproducible. Fig. 4 shows how pieces of this cable can be cut and formed into small capacitors.

Table 1 shows some typical values of capacitance for different lengths of cable that I had. The exact type of cable, insulation and wire size will cause the capacitance to vary, so these values should only be taken as typical.

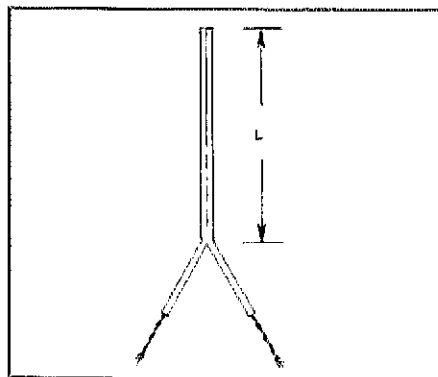


Fig. 4 — This drawing shows how to cut small-value capacitors from computer ribbon cable.

Table 1
Length and Capacitance Values from Some Common Ribbon Cable

| Cable with no. 26 wire conductors | |
|-----------------------------------|------------------|
| Length (in.) | Capacitance (pF) |
| 1.3 | 1.0 |
| 0.55 | 0.5 |
| 0.15 | 0.2 |
| Cable with no. 22 wire conductors | |
| 1.1 | 1.5 |
| 0.7 | 1.0 |

¹mm = in. x 25.4.

¹D. Malley, "Circuit Boards From Scratch," QST, Feb. 1981, p. 29.

These capacitors should not be used at rf power levels above a few watts. The insulation may melt, as I found when I used a couple of them in a 144-MHz to 432-MHz varactor tripler. — *Joseph Fleagle, W0FY, Chesterfield, Missouri*

[Editor's Note: We tried making some of these capacitors in the ARRL lab, using a piece of ribbon cable found in a junk box. When the ribbon cable is cut to a given length from the same piece, the capacitance was nearly the same each time. Fine trimming of the value is easily accomplished with a pair of wire cutters. The Q of these capacitors compared very favorably with similar-value silver-mica units. We tested them up to 150 MHz.]

LOSS OF AUDIO ON THE ICOM IC-215

□ My IC-215 had no audio output, even though the S meter indicated plenty of received-signal strength. I traced the problem to the audio-output chip, IC2, on the receiver board. This chip has an internal resistor connected between pins 2 and 6, which had failed, removing power from part of the IC.

The simple cure for this problem is to connect a 220-Ω, 1/2-watt resistor from J13 to IC2 pin 2 on the bottom of the board. Check your operator's manual for a schematic diagram and a parts layout to locate the connection points for this resistor. If the entire chip fails at a later date, be sure to remove the resistor before replacing IC2. A replacement chip is the GEIC-138, a 2-W af power amplifier. — *Lance Aue, KA2EJD, Bellmore, New York*

MURCH UT-2000A TRANSMATCH

□ I had two problems with my Murch Ultimate Transmatch. Both had simple solutions from which others may benefit.

The first problem was that the brass roller wheel, which slides along a brass shaft to contact the inductor windings, would skip turns or even land between turns. This would cause false readings on the turns counter. The cure was to clean the mechanism, and then apply a thin coat of lubricant to the brass shaft. I used GC Electronics Tunerlub, no. 26-01. This reduced the sliding friction and eliminated the problem of the wheel jumping turns. Electrical performance remained the same.

Another problem involved arcing inside the cabinet when certain antennas were used. Examination revealed that the sheet metal screws protruded too close to the variable-capacitor stator. I replaced the six screws that fasten the wrap-around chassis bottom to the main unit with shorter ones. — *Richard Regent, K9GDF, Milwaukee, Wisconsin*

HEATH SA-5010 μMATIC KEYSER MODIFICATIONS

□ I like many of the useful microprocessor-controlled features of my new Heath keyer. I experienced some difficulty with the capacitive-touch paddles, though. Sensitivity settings were extremely critical, and the keyer was susceptible to stray rf pickup, causing erratic keying.

I made the following changes to correct these problems:

- 1) Add a 0.001-μF ceramic capacitor between pins 8 and 9 of U8.
- 2) Change C24 and C25 to 33 pF.
- 3) Provide a ground plane for your keying hand. This can be a sheet of aluminum foil

under a plastic table-top cover. Staple a wire lead to the foil and connect it to ground. Do not place the keyer over the ground plane, however. — *Samuel Bases, K2IUV, Yonkers, New York*

OLD TIMERS' NOTEBOOK

Toothpaste-Tube Cap Insulators

□ Toothpaste-tube caps are an excellent source of material for constructing feedthrough and standoff insulators, as illustrated in Fig. 6. The feedthrough in example A is made by mounting a toothpaste cap on each side of a metal plate and passing a threaded rod through both caps. A spacer of insulating material is mounted at the center of the rod to prevent accidental contact between the rod and the metal plate. The nylon wheel of a curtain runner is ideal for this purpose. In example B, the necessary hardware is bolted to the cap and the cap in turn glued to the plate.

A non-insulated standoff is constructed by directly bolting the toothpaste cap to the plate

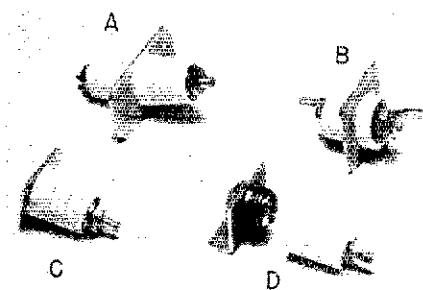
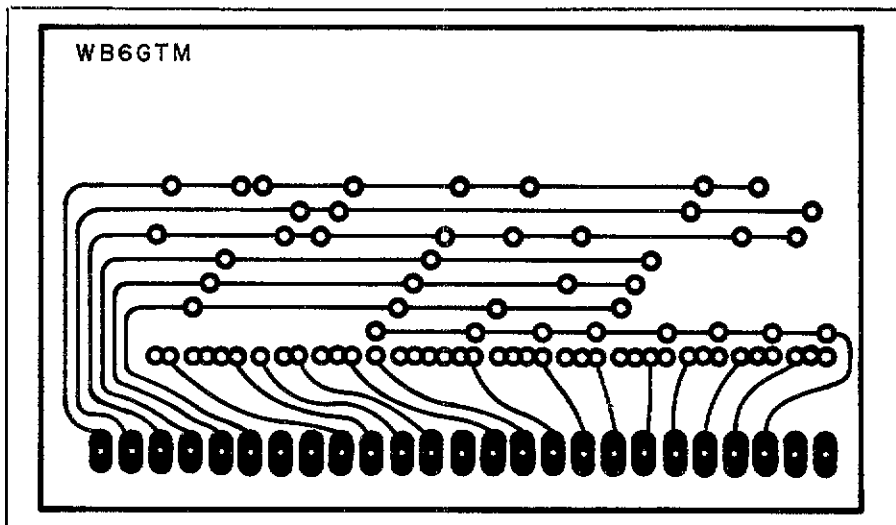
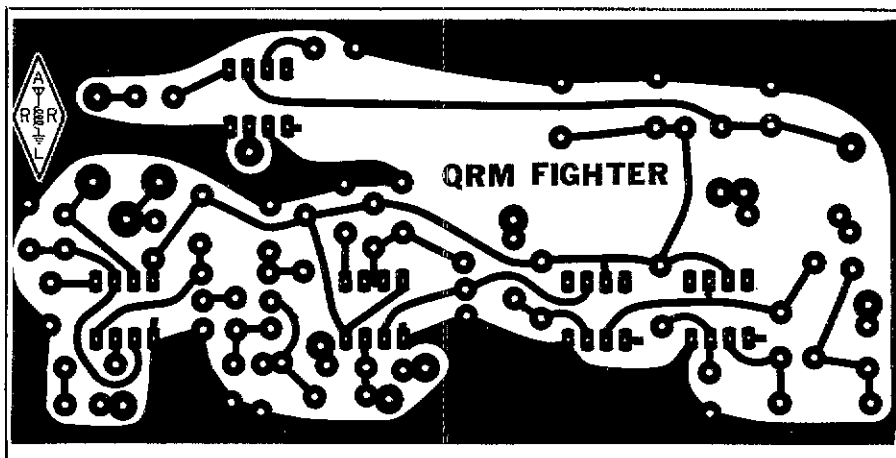


Fig. 6 — Toothpaste cap feedthroughs and standoffs.

as illustrated in example C. An insulated version is made by cementing a machine screw to the concave recess in the top of the cap and gluing the cap to the plate. The cap can also be bolted to the plate as shown in example D. — *D. P. Taylor, ex-G8OD (Reprinted from Hints and Kinks for the Radio Amateur, 8th ed., 1968, p. 123)*



Circuit-board etching pattern for the TR-7 programming board. Black represents copper. Pattern is shown in full-size from the foil side of the board. The parts-placement guide appears on page 21.



Circuit-board etching pattern for the QRM Fighter. Black represents unetched copper. View is from the foil-side of the board. Parts-placement diagram appears on page 30.

Heath SA-2060 Transmatch

Today, few amateur stations are not equipped with a Transmatch of some type. Whether it is used with open-wire feeders or a coaxial-cable-fed Yagi (for an occasional foray on the *other* mode), the versatile operator soon depends on his or her Transmatch. Most commercial units are one of two types: the T network or the modified T network, known as the Ultimate Transmatch.¹ The Heath SA-2060 is no exception. Heath has chosen the straightforward T network for their top-of-the-line "tuner," and it's an excellent choice. Few circuits can equal the T network in ease of adjustment and matching range.

To enhance the versatility of the unit, Heath has included switching to select one of two coaxial feed lines or a dummy load (bypassing the matching circuit). Also included in the SA-2060 are dual wattmeters for measuring forward and reflected power. An SWR function is also provided; a variable SENSITIVITY control is used to set the reference level, and a calibrated scale allows direct reading of SWR up to 3:1. The metering circuit is of the W. Bruene type,² the rf and calibration portion of which is factory assembled and calibrated. This circuit is contained in a shielded enclosure along with the antenna selection switch. Two power ranges are provided (200 W forward/50 W reflected and 2000 W forward/500 W reflected), making the SA-2060 suitable for low-power or "QRO" operation. The first calibration point on the forward power scale is 10 W (100 W on the high range). Below that point, the scale would be very nonlinear and thus is not calibrated. Dial scales on the capacitors (20 divisions) and a three-digit turns counter on the rotary inductor (1/10-turn resolution) round out the operational features.

The T network is designed for unbalanced to unbalanced matching — the case when a coaxial-cable-fed antenna or end-fed wire antenna is used. To accommodate balanced feed lines, a 4:1 toroidal balun is employed. This is an acceptable method, provided the impedance being matched is within the range suitable for the balun (less than 1 k Ω). At high impedance levels, the balun is not capable of providing accurate balance. This could impair the performance of some antenna systems. In practice, open-wire-fed dipoles and inverted Vs, used for casual multiband operation, are not seriously affected by a lack of feed line balance. A 130-ft inverted V, fed with approximately 60 ft of 300- Ω ladder line, was used with the SA-2060 during operation from 80 through 10 meters, with good results. Even with 700 W of rf power applied, the SA-2060 never "voiced" an objection (no arcs, sparks or funny smells). The same antenna was also used on the 160-meter band, both as a dipole and as a top-loaded vertical, with satisfactory results. Output power was limited to 125 W on this band.

Assembly and Operation

As with all Heathkits,³ the instruction manual supplied with the SA-2060 is outstanding. Total assembly time, including a careful parts inventory, was approximately 10 hours. Much of that time was required to assemble the two variable capacitors.

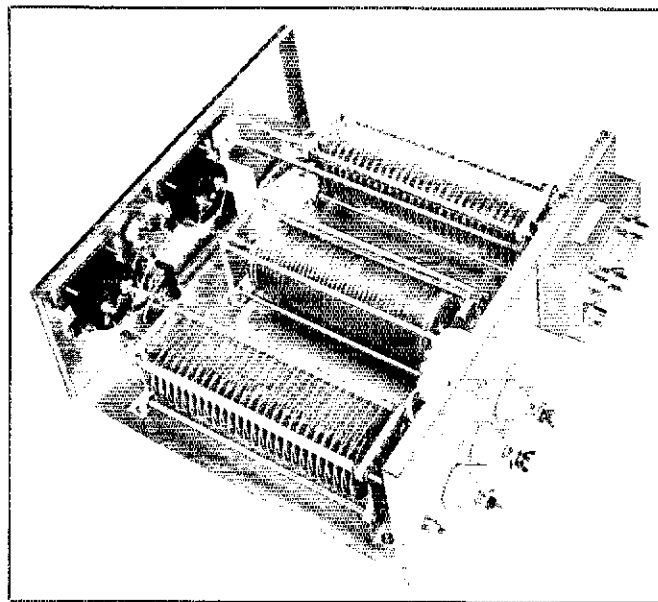
After using the unit with a number of dif-

ferent antenna types, I found it to be a highly satisfactory addition to my station. It is versatile and reliable. The dial calibrations and turns counter allow the operator to accurately preset the controls, minimizing QRM - producing on-the-air tuning. The BYPASS jack also aids in this regard.

I have only two criticisms of the unit, both relating to the antenna switching. The particular switching arrangement used in the SA-2060 (see Fig. 1) results in two operational inconveniences. Because the terminal for single-wire antennas is connected directly to the output of the matching network, you must have at least one unused coaxial connector (ant. 1 or ant. 2) available if a wire antenna is to be used. When switching to coaxial line, the

wire must be removed. If this is not done, the coaxial-cable-fed antenna and the wire antenna would be in parallel. The same holds true for balanced feed lines, as they are connected to the matching network through a jumper to the wire-antenna terminal. This is of no concern to the operator who uses only coaxial-cable-fed antennas.

The second criticism is of interest to all users. The switching arrangement does not allow the matching circuit to be switched in and out of the system. This forces the use of the Transmatch in situations where it is not really needed. For example, my triband Yagi has a fairly narrow SWR bandwidth when used on 20 meters, and the Transmatch is normally needed. On 10 meters, the bandwidth is such



Heath SA-2060 Transmatch

Manufacturer's Claimed Specifications

Frequency range: 1.8 to 30 MHz
 Power-handling capability: Full legal limit.
 Input impedance: 50 ohms (at matched condition).
 Output impedance, balanced output: 100 to 1000 ohms; unbalanced output: a maximum SWR of 10:1, or an impedance-matching range of 50 to 500 ohms; single-wire output: 6:1 SWR using an odd-multiple 1/4 wavelength of wire.
 Forward power ranges: Low, 0 to 200 W; high, 0 to 2000 W.
 Reflected power ranges: Low, 0 to 50 W; high, 0 to 500 W; SWR 1:1 to 1:3.
 Wattmeter accuracy (full scale): 200 W and 2000 W (fwd); 50 W (ref): $\pm 5\%$ (avg); 50 W (ref): $\pm 7.5\%$ (avg).
 Size: 5-3/4 x 14-1/2 x 13-7/8 in. (HWD).

ARRL Lab Results

As specified.
 As specified.
 As specified.
 As specified (see text).
 As specified.
 Measured at center scale, at 14.10 MHz with 50-ohm load; 200 W (fwd): -5% ; 2000 W (fwd): -5% ; 50 W (ref): $+3\%$; 50 W (ref): $+8\%$.
 As specified.

¹D. DeMaw, ed., *The Radio Amateur's Handbook*, 57th ed. (Newington: ARRL, 1980), p. 19-8.

²W. B. Bruene, "An Inside Picture of Directional Wattmeters," *QST*, April 1959, pp. 24-28.

³m = ft x 0.305; mm = in. x 25.4; kg = lb x 0.454.

*Assistant Technical Editor

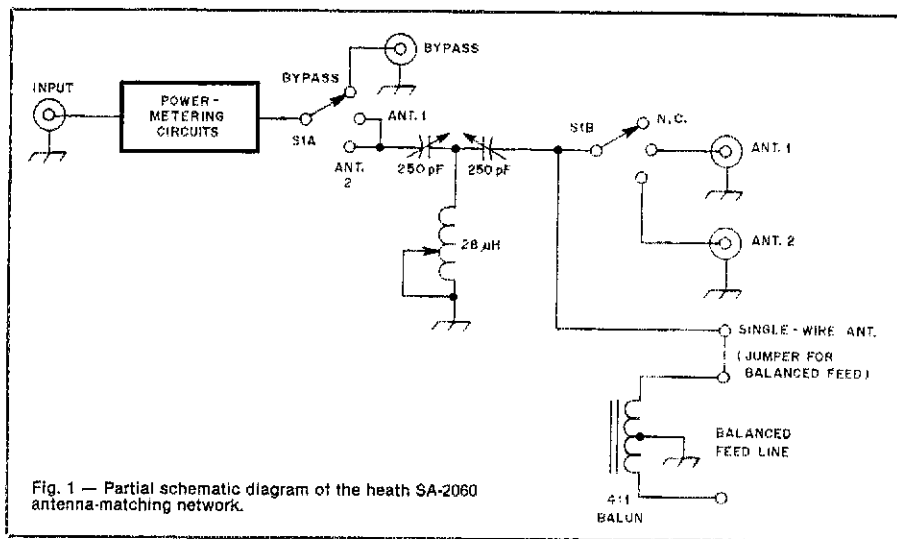


Fig. 1 — Partial schematic diagram of the heath SA-2060 antenna-matching network.

the memory and keyboard special functions, I used it in conjunction with a paddle, during the November Sweepstakes contest. The incremental number generator was a great help, and each of the special functions performed as specified. To check the RTTY modes, I fed the keyboard TTL output into another piece of RTTY equipment. What was typed in, was typed out! During each keyboard test, the station receiver was checked carefully for signs of RFI from the computer. MFJ must have done its homework in that regard, as no interference was noted through 144 MHz. Several accessories are available to complement the standard features of the board. These are a real-time clock, an afsk/fsk RTTY generator and a high-voltage loop-keying circuit. Each of these is on a separate plug-in board, which can be mounted inside the '496 cabinet.

Conclusion

As an operator who enjoys high-speed cw, I found the '496 a breeze to operate. Each of the special functions, including memory loading and dumping, requires only a few simple key strokes. The lack of an element-weighting adjustment disappointed me, as other keyboards on the market offer this feature. Overall, the MFJ-496 provided good service; it would be a worthwhile addition to the modern hamshack. The '496 is available from MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762. Price class is \$340. — *Gerry Hull, AK4L*

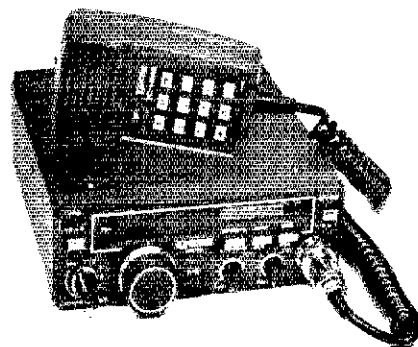
ICOM IC-25A 2-METER TRANSCEIVER

□ This transceiver could have been made to order for James Bond. At least you'll feel like a secret agent when you hide one of these units in your car. It's small — I have seen one IC-25A hidden in the ash tray of a luxury car! This could be a major buying point if you live in a street-crime area and want to keep your mobile electronics out of sight of passing strangers.

Options

Small size does not mean that anything was left out. The panel is functional. Often-used controls are prominent. Less-often-used controls are accessible, but are best used when the vehicle is parked. "Set-and-forget" controls are internal. As the transceiver comes with all you could ask for built in, the choice of options is thereby limited, primarily, to microphones. Here you have a choice of a standard push-to-talk (IC-HM7), a tone pad (IC-HM8) or a frequency up-down mike (IC-HM10).

The basic transceiver comes in two models designated by an A/E suffix. This simply designates the transceiver for American or



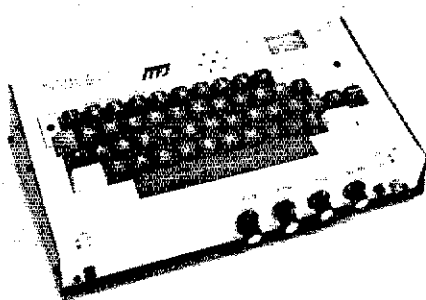
that the Transmatch is seldom required, but, because no "through" position is provided, I must readjust the SA-2060 when switching between these bands. The only option is to remove the feed line and attach it to the BYPASS jack normally used for the dummy load. I found that to be less convenient than readjusting the Transmatch. Considering the overall quality and usefulness of the SA-2060, I would classify both of these criticisms as minor.

Styled in the new Heathkit black and gray colors, the SA-2060 is both attractive and functional. Price class of the unit is \$255. For additional information, contact Heath Co., Benton Harbor, MI 49022 — *George Collins, KC1V*

MFJ-496 SUPER KEYBOARD

□ Wow! Since I became a ham back in the mid '70s, the technology of electronic keyboards used for amateur communications (cw and RTTY) has changed dramatically. Do you remember those keyboard circuits using toroid cores (as pulse input transformers), or large diode matrices? How about the boards that included only a few characters of buffer or storage memory? Today the microprocessor (µP) is firmly established in the amateur marketplace, and one use for the µP is the generation of cw and RTTY signals — hence the new rash of computerized keyboards on the market.

The MFJ-496 uses a microcomputer, which contains the µP, the random-access memory (RAM) for buffer/memory storage, and the read-only memory (ROM) to hold the control program — all on one chip! Curtis Electro Devices manufactures the component, called a "Keyboard on a chip." Since it is an easy task to generate cw and RTTY signals, the '496 uses



the microcomputer to perform all kinds of functions.

Features

Morse, Baudot and ASCII are the standard codes available from the '496. The Morse speed range is 5 to 100 wpm; Baudot speed is 60 wpm; and ASCII is 110 baud. Two-hundred fifty-six characters of buffer and storage memory are available. The storage memory is unique in that it is soft partitioned into four sections. This means the operator may determine how many characters of memory are allocated to each of the four sections — as long as the total number of characters does not exceed 256. The keyboard speed and the relative buffer fullness can be monitored by means of a front-panel meter. A group of special automatic messages are programmed into the board. By programming your call into one of the four memories, for example, you may send any one of the following messages by simply pressing a key — CQ CQ DE (call), CQ TEST DE (call), DE (call) or QRZ (call). For contest operators, an incremental serial number generator is built in, with a range of 0 to 9999. For those learning the Morse code, the keyboard offers a training mode, which sends random code groups or pseudo-random five-character groups. The manual contains a list of the pseudo-random groups to check copy. Keyboard power requirements are 9 to 18V dc at 400 mA, or 117-V ac with the MFJ wall-plug transformer adapter. A paddle input is available for those who get tired of sending with the keys, and its operation is fully iambic, with dot and dash memories. For European users, several special characters are generated: Å, Ä, É, Ö, Û, Ñ and CH.

Operation

Testing keyboards is a lot of fun! I "hang out" around 7035 kHz on the weekends and, as most users of the band know, this is where the high-speed folks are. Comments about the on-the-air sound of the keyboard were varied — some operators said the Morse weighting was too heavy, and others said the sound was fine — it depended on the sending speed of the board. At high speeds, many operators prefer the cw signal weighting to be lighter than the standard 1:3:1 dot-dash-space ratio. Unfortunately, the '496 cannot be set for a lighter weight than the standard ratio. This makes copy difficult at speeds above 50 wpm. To test

ICOM IC-25A 2-Meter FM Transceiver

Manufacturer's Claimed Specifications

Frequency coverage: 143.800 to 148.195 MHz.
Mode of operation: FM.
Frequency readout: 4-digit, red LED display.

kHz/turn of knob: Not specified.

S-meter sensitivity: Not specified.

Receiver sensitivity: Less than 0.6 μ V for 20 dB quieting.

Transmitter power output: 25 W/1 W.

Size: (HWD) 2 \times 5-1/2 \times 7 in.

Weight: 3.3 lb.

Power supply requirements at 13.8 V dc: Approximately 4.8 A at high power.

Measured in ARRL Lab

143.800 to 148.195 MHz.

As specified.

Three 0.34-inch digits; One 0.16 inch digit.

250 kHz/turn VFO A; 750 kHz/turn VFO B.

S1, 0.93 μ V; S9, 3 μ V; S9 + 20 dB, 3.4 μ V.

0.15 μ V for 20 dB quieting.

32 W/0.9 W.

4.3 A at 32 W output.

access frequency, simplex-duplex and alternate VFOs with transfer write control, may be a bit more than needed. But for the guy or spy on the go, this little rig could put extra pleasure into long automobile trips and family vacation tours.

A suggestion for the new owner: Use the unit at home on an ac supply for several nights to become familiar with the various functions before installing it in your car. Roaring down the highway at 55 mph is not a condition under which to take your mind off the road and try to figure out what your ICOM 25 just did for you — or to you!

Construction

Construction appears to be quite solid. Most of the circuit is contained on one printed-circuit card that is mounted by means of four corner posts. This allowed for some bowing in the review unit pc board, but no intermitents were noticed in two months of mobile operation.

Disconnecting the power connector causes a memory loss. A third wire is brought out of the radio for memory "keep-alive." Though the manual does not specify that an accessory battery pack is available, ICOM offers a BU-1 battery backup for \$38.75.

Performance

If you operate the unit into a high VSWR, as I did (about 2:1), for more than a few short transmissions at the high power level, the unit will shut down to protect itself. In the 1-watt position, it ran without any shut-down. Finally, you should be aware that if you program an odd-ball split all frequencies stored in memory will take on the modified split. The first time that happened to me, I was sure the local gang was ignoring me. But slowly it came to me: Check the readout when you talk, and be sure you're where you're supposed to be. Price class: \$349 with HM-8; available from ICOM East, Inc., 3331 Towerwood Dr., Suite 307, Dallas TX 75234. — *Phil Accardi, AJIN*

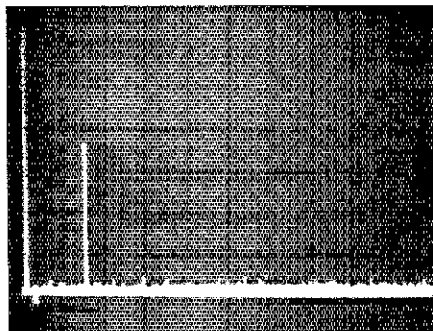


Fig. 2 — Spectral display of the IC-25A. Vertical divisions are each 10 dB; horizontal divisions are each 100 MHz. Output power is approximately 32 watts at 146 MHz. The fundamental has been reduced in amplitude approximately 33 dB by means of notch cavities; this prevents analyzer overload. All spurious emissions and harmonics are greater than 65 dB below peak fundamental output. The IC-25A complies with current FCC specifications for spectral purity.

European Frequency Plan.

The E model has a 1750-Hz tone-access generator, and the A model provides room to install one if needed. The A model synthesizer steps are 5 kHz/15 kHz; with the E model, these become 5 kHz/25 kHz. Other than that, there are no substantial differences between the two units.

Read the Instructions

At first, you may be tempted to scan through the manual quickly, chuckle over the cumbersome phrasing and put it away, assuming you can figure it out all by yourself. It won't take more than a few minutes of experimenting to realize that the old saying "when all else fails read the instructions" was never so true. The manual is complete and accurate. Following each functional description to the letter will indeed allow you to fully enjoy the IC-25 A/E.

If the transceiver has a "fault," it would be that it offers so much. For some operators, two or three channels for local repeaters are plenty. This unit, with its microprocessor-controlled memory scan, frequency split, invert normal-

New Products

INLINE COMPONENTS DIP HEADERS

□ One product of possible interest to amateur experimenters is the DIP header series manufactured by Inline Components Company. A DIP header is a component holder that looks similar to an IC socket, but contains tie points to which components may be attached. The headers come in standard 0.100 \times 0.300-inch (mm = in. \times 25.4) package, designed to mate with 14- or 16-pin dual-in-line IC sockets. One practical use I found for the headers was in the construction of a repeater identifier, which used a diode matrix for programming. The diode matrix for any call sign can be placed on the header, and call signs altered by simply changing this "custom" IC.

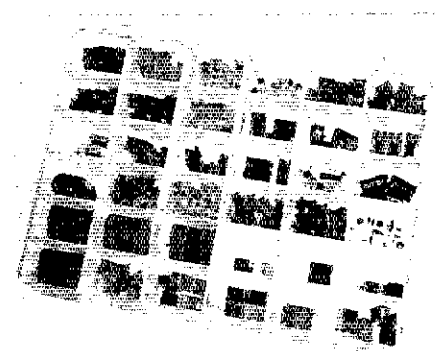
Inline offers the headers in two kits. Each kit contains a set of five 14- or 16-pin headers, and 10 assorted covers. An option offered in the kits is the header width. Kit A headers have a 0.400-inch width, and Kit B headers have a 0.495-inch width, to accept larger components.

Special orders for any number of pins or spacing are available on request. For more information on these components contact Inline Components Company, 250 17th, Suite 1, Costa Mesa, CA 92627. Price class is \$8.50 per kit. — *Gerry Hull, AK4L*

ZENITH FIXED-VALUE AND VARIABLE INDUCTORS

□ The Zenith Radio Corporation has announced the availability of fixed-value and variable inductors in single-lot quantity. This should be of interest to the home-builder who has witnessed the widespread availability of these components dwindle in recent years. The inductors are manufactured in a broad range of values from 42 nH to 390 μ H, and the experimenter can select from various values and current ratings. Zenith part numbers include the series 20-3849, 20-3907 through 20-3907-31, 20-3935 through 20-3938 and 20-3946. Prices range from 59¢ to \$2.06 for the single-lot quantity. The components may be obtained from

any of the 17,000 Zenith dealers or distributors, worldwide. Further information may be obtained from Terry C. Agpawa, Parts Sales Engineering, Components and Accessories Division, Zenith Sales Company, 11000 Seymour Ave., Franklin Park, IL 60131. — *Dennis Lusty, W1LJ*



The publishers of QST assume no responsibility for statements made herein by correspondents.

UoSAT-OSCAR 9 BAND-PASS FILTER DESIGN

A simple but effective band-pass filter for receiving the 1200- and 2400-Hz tones of OSCAR can be easily and inexpensively constructed with a single stack of five 88-mH inductors and one modified 440-mH inductor. See Fig. 1 for the schematic and pictorial diagrams of the band-pass filter. In particular, note the convenient capacitor values (all standard, with C3 being on the 2% low side of 0.33 μ F), and the convenient 580- Ω source and load terminal impedance required by the filter. For those receivers having a 600- Ω output, an 18-k Ω , 1/2-watt resistor can be connected in parallel with the receiver audio output to obtain the desired 580- Ω source for the filter. The filter load should also closely approximate the 580- Ω value. A precise match is not necessary, and anything within $\pm 20\%$ will suffice.

The computer-calculated attenuation response (based on an inductor Q of 40 at 1 kHz) is shown in Fig. 2. The measured insertion loss at the filter center frequency was 0.5 dB.

Construction Procedure

- 1) Remove the end inductor from the 88-mH stack. This is done easily by first unsoldering the wires connected to the four terminals of the stack. Two or three staples are removed from one end of the stack to allow the sides to be spread apart for removal of the end inductor. Cut the adhesive tape holding the end inductor with a hobby knife, and lift out the inductor. This inductor will not be needed for the filter.

- 2) Modify a bifilar-wound, 44-mH inductor by removing 57 turn-pairs to get an inductance of 27.2 mH in the series-aiding connection. Leave approximately 3 inches of lead for reconnection.

- 3) Pair up the red start with the green finish leads. Pair up the green start with the red finish leads.

- 4) Insert the modified 44-mH inductor into the place previously occupied by the 88-mH inductor. One pair of leads connects to the two vacant terminals on one side of the cardboard case, and the other pair connects to the two vacant terminals on the opposite side of the case. This completes the inductor modification.

- 5) Connect the capacitors as shown in the pictorial diagram, Fig. 1. The inductor terminals make a convenient tie point for all capacitors. The center taps of L1 and L5 provide an alternate input/output connection for source and load impedances of 145 Ω . This completes the filter construction.

This band-pass filter design is based on the transformation of a 5-element Butterworth low-pass filter having a 3-dB cutoff frequency of 1697 Hz and an impedance level of 580 Ω . The design center frequency of the band-pass filter is 1697 Hz, which is the same as the cutoff

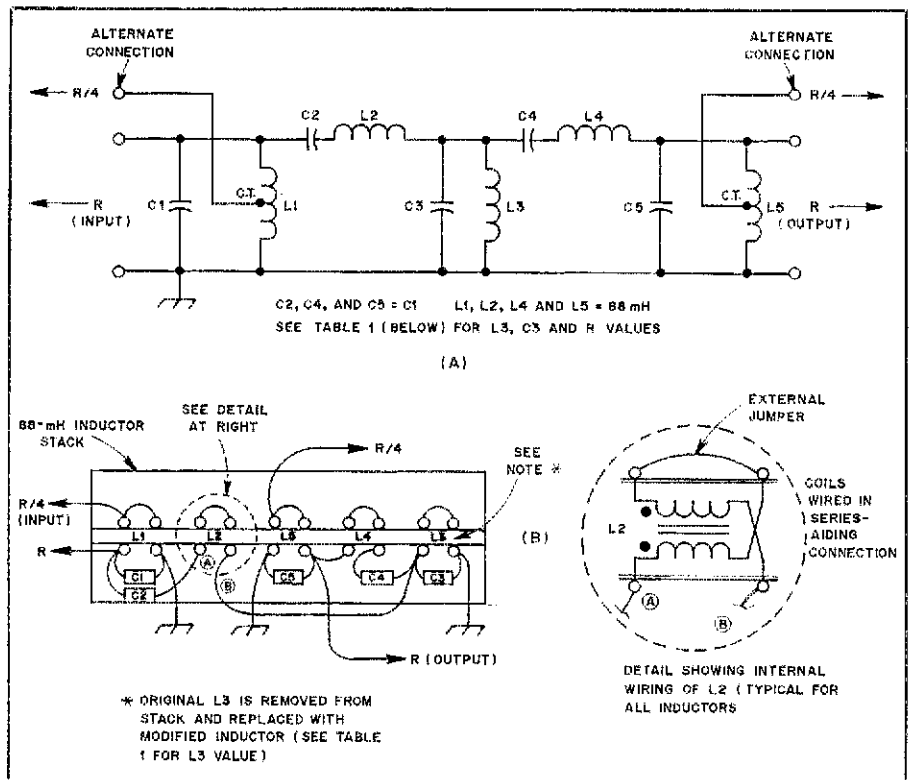


Fig. 1 — (A) Schematic diagram of the band-pass filter. (B) Pictorial diagram.

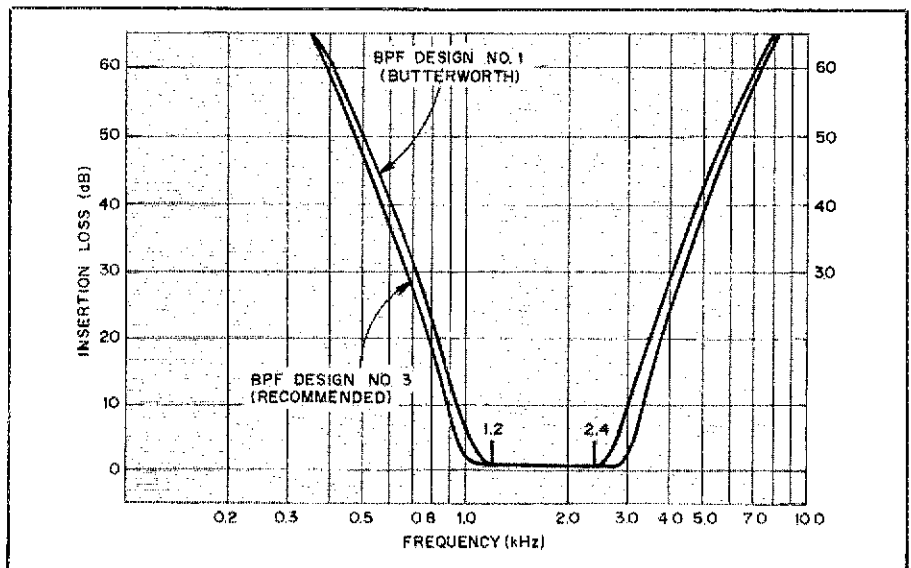


Fig. 2 — Calculated response curves of two band-pass filters based on an inductor Q of 40 at 1 kHz.

frequency of the low-pass prototype filter. These values were chosen to require only standard-value capacitors for ease in filter construction, and to provide the desired passband response. Of special interest was the fact that four of five inductors required by the filter could be obtained from unmodified 88-mH in-

ductors. The only compromise necessary was that inductor L3 be 27.2 mH, which requires removal of turns from either the standard 88- or 44-mH inductor. A 44-mH inductor is recommended for this particular application because its modification requires fewer turns to be removed than if an 88-mH inductor is used.

Table 1
Band-pass Filter Component and Calculated Performance Values

| BPF No. | F _C (Hz) | F _B (Hz) | F _{3LO} (Hz) | F _{3HI} (Hz) | R (Ω) | C1 (μF) | C3 (μF) | L3 (mH) | BW (%) | R.C. (%) | C3/C1 Ratio | G1 |
|---------|---------------------|---------------------|-----------------------|-----------------------|-------|---------|---------|---------|--------|----------|-------------|---------|
| 1 | 1697 | 1697 | 1049 | 2746 | 580 | 0.100 | 0.324 | 27.2 | 100.0 | 0 | 3.236 | 0.09836 |
| 2 | ↑ | 1883.7 | 999 | 2883 | 619 | ↓ | 0.270 | 32.6 | 111.0 | 0.42 | 2.700 | 0.1166 |
| 3 | ↓ | 2114.5 | 942 | 3057 | 688 | ↑ | 0.220 | 40.0 | 124.6 | 3.29 | 2.200 | 0.1455 |
| 4 | 1697 | 2358.8 | 887 | 3246 | 814 | 0.100 | 0.180 | 48.9 | 139.0 | 11.8 | 1.800 | 0.1920 |

Notes

- 1) F_C = center frequency; F_B = 3-dB bandwidth.
- 2) G1 is the normalized value of C1 obtained from the 5-element low-pass prototype having a 3-dB cutoff frequency of 1 Hz.

Equations relating the parameters in Table 1

$$F_C \text{ (kHz)} = \frac{1}{2\pi\sqrt{LC}}; L(\text{H}), C(\mu\text{F}) \quad (\text{Eq. 1})$$

$$F_C = \sqrt{(F_{3LO}) \times (F_{3HI})} \quad (\text{Eq. 2})$$

$$F_B = \text{BW} (\%) \times \frac{F_C}{100} \quad (\text{Eq. 3})$$

$$F_{3LO} = \frac{-F_B}{2} + \sqrt{F_C^2 + \frac{F_B^2}{2}} \quad (\text{Eq. 4})$$

$$F_{3HI} = F_{3LO} + F_B \quad (\text{Eq. 5})$$

$$L3 \text{ (mH)} = \frac{88}{\left(\frac{C3}{C1}\right)} \quad (\text{Eq. 6})$$

$$R (\Omega) = \frac{(1000 \times G1)}{C1 \times F_B}; C1 (\mu\text{F}), F_B \text{ (kHz)} \quad (\text{Eq. 7})$$

The inductors for this filter are provided free of charge to the radio amateur fraternity through the courtesy and cooperation of the C & P Telephone Co. of Maryland. I am serving as liaison between the C & P Tel. Co. and radio amateurs for the distribution of these inductors. Amateurs who have a legitimate and well-thought-out design application are encouraged to write to me requesting an 88-mH inductor stack and one 44-mH bifilar-wound inductor for the L3 modification. Because of uncertain availability of these inductors, I may have none when your request is received; consequently, be prepared to wait for as long as 60 days for your order to be shipped. As an alternative source, check the Ham Ads in *QST* for these inductors. In addition, I have a number of related components available to radio amateurs. I am providing these parts at minimum cost to make it as easy and inexpensive as possible for those who wish to construct a filter.

At the time of writing this letter, I am out of the 88-mH inductor stacks, but I do have a few hundred of the individually potted 88-mH inductors. If you are willing to use individually potted inductors, you should so state in your request. The potted inductors are contained in a plastic shell having an outside diameter of either 1-1/2 or 1-3/4 inches. The height of both types is 1 inch. The potted inductor mounts in a 1/4-inch hole and is held in place with a Timmerman clip, which I provide. The 44-mH inductor (bifilar-wound) is in very short supply and can be provided only to those who have a bona fide application. The priority of delivery to those requesting these surplus inductors will be dependent on the information provided with their letter. First priority will, of course, be given to ARRL-affiliated clubs. — *Ed Wetherhold, W3NQN, 102 Archwood Ave., Annapolis, MD 21401*

*Please include \$3 to cover shipping and handling costs. The inductor stack may be mounted with 3M Scotch® mounting tape, or with a component clip, available for 50 cents each. The ARRL and *QST* in no warrant this or any other offer.

*A 1% matched capacitor set is available for \$5. Individuals with an 8-Ω audio source may obtain a 0.4-W, 8- to 500-Ω matching transformer for \$1 each. If the capacitors and transformer are ordered separately from the inductors, please include \$1 for shipping and handling.

*Please include \$4 to cover shipping and handling costs for the potted inductors.

References

- Wetherhold, E., "Modern Design of a CW Filter Using 88- and 48-mH Surplus Inductors," *QST*, December 1980, pp. 14-19.
Wetherhold, E., "High Performance CW Filter," *Ham Radio*, April 1981, pp. 18-25.

PREDICTING SPORADIC-E OPENINGS ON VHF

□ This is a good time of the year to think about our E_s season, and to become prepared to catch those elusive band openings. As many of us have observed, these openings return each year during late spring and continue through the summer months, bringing strong DX signals to the 6- and 2-meter bands.

The mechanism that results in ionization of this nature is not clearly understood, and several interesting theories exist. An understanding of the mechanism might allow one to predict their occurrence somewhat, or at least to aim his or her array in the direction of a possible opening.

Many researchers have noticed some connection between E_s and violent or bad-weather areas. One contemporary theory states that sharp and violent "rips" in the continuity of the stratosphere result in wind shears at very high altitudes; this effect results in strong charges of static electricity, which ionize lower levels of the ionosphere, including the E layer.

Through an in-depth study lasting several summers, I found that a relationship does exist between certain types of severe weather and E_s cloud formation. Specifically, severe thunderstorms and E_s clouds often exist simultaneously. Aside from heavy rain, turbulence, hail and tornado potential, severe thunderstorms produce wind shears and large, static-electric charges, which may develop E_s clouds. Wind-shear areas can also develop during any season as a result of jet stream movement.

After comparing hundreds of weather maps and other bits of data, I found that in most cases a severe-weather area existed near the midpoint of the path between two stations who worked on 6- or 2-meter E_s, and that this same point was used by other stations in various path directions. In a few number of cases, the reflection point was just behind or perhaps directly over one end of the QSO!

Another interesting factor was the altitude of the thunderstorm area below the reflection point, or E_s cloud. I found that storm activity

above 40,000 ft' usually produced an opening on 6 meters, and that storms above 60,000 ft' often allowed 2 meters to open. Although 60,000-ft cloud tops are rare, I have found some near 72,000 ft!

These massive, disturbed areas all appear to have something in common; they grow vertically to a point where they punch through a region known to meteorologists as the "tropopause." This region is where the normal cooling of air with increasing altitude reverses, and the air temperature begins to rise with altitude. The height of the tropopause varies according to many factors, but once a thunderstorm builds vertically and rises into it, warm air can be drawn and the storm will possibly build higher.

If you wish to forecast E_s openings, look toward the areas where severe weather is expected to form. If the distance to the reflection point is approximately 700 miles, you may be rewarded with an opening. The other, more rare type (where the reflection point is near or above you) may be looked for just after a severe weather area has passed. Try beaming directly into the storm system to see if backscatter exists. Rotating the antenna will often have no effect on signal strength if the E cloud is directly overhead. Such conditions exist typically for less than an hour.

Severe weather areas are forecast well in advance by the National Weather Service. This information may be obtained direct from the NWS, or by watching television weather programs.

Perhaps these hints will help you catch the one that got away last summer. Boost the state count on your favorite vhf band! — *Jim Stewart, WA4MVI, ARRL TA, Greer, SC*

$$^*m = \text{ft} \times 0.3048$$

Feedback

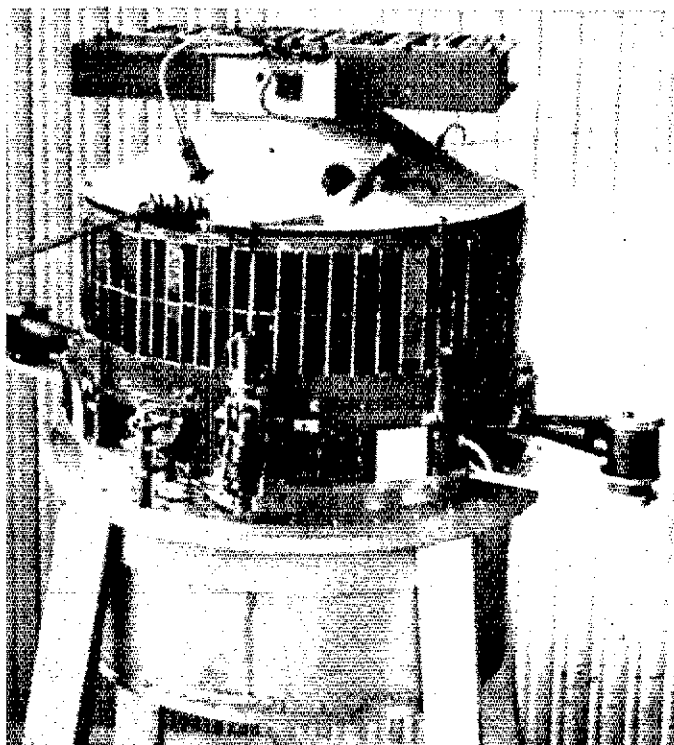
□ The correct price of the Apple II® User's Guide is \$15, not \$7.95 as shown in *May QST* New Books.

□ Howard Weinberg, WA6JCH, informs us that there was an error in his Hints and Kinks article, "Low-Cost Active Audio Filter" in *May QST*. Fig. 6, page 36, should show R2 as 100 Ω, not 100 kΩ.

Amateur Radio Sputniks

Six new Soviet satellites were placed in orbit on December 17, 1981. These new generation RADIO satellites add another dimension to long-distance amateur communication.

By Bernie Glassmeyer,* W9KDR



Soviet Amateur Radio satellite efforts began in 1974, when the Coordinating Committee of *RADIO*, the official publication of the USSR's Federation of Radiosport, organized a group in Moscow to build Amateur Radio satellites. [Editor's Note: Translations of several *RADIO* articles were used for some of the information in this article. Thanks to Dex Anderson, W4KM, for translating them.] Members of the committee included workers of the DOSAAF USSR (Voluntary Society for Assistance to the Army, Air Force and Navy of the USSR), and representatives of higher education institutions in Moscow and of a series of agencies and organizations. The DOSAAF has a membership of 86 million, which is comparable to the military reserves of the USA. About 46,000 DOSAAF members are Amateur Radio operators. The Central Radio Club also joined in the work.

In 1978, the DOSAAF committee opened the DOSAAF Space Technology Volunteer Laboratory at the Technical Sport Club of the Zhdanov Rayon in Moscow. With the cooperation of the radio amateurs of a number of higher education institutions, the first two USSR Amateur Radio communication satellites, RADIO 1 and RADIO 2 (shown in the photo), were built. These two satellites provided communication to more than 700 Amateur Radio operators from 70 countries in all continents. Communication range was 8000 km (5000 miles).

*OSCAR Program Manager, ARRL

The DOSAAF Space Technology Laboratory was soon given the unofficial name of "Lyudmila," the namesake of a modern department store across the street. "Such an informal name for the laboratory was appropriate," said N. Grigor'yeva in his article, "Without a Table of Organization," in *RADIO* 1 1979, "since everything was done here unofficially, voluntarily, out of selfless love of technology." Grigor'yeva also said, "While the rest of Moscow settled in for a pleasant evening after the work day, here, on the 10th floor of an apartment building, work got under way, and people didn't go home 'til close to midnight." The common bond that held this group together was Amateur Radio.

RADIO 1 and RADIO 2 were launched from Plesetsk, 475 miles north of Moscow, on October 26, 1978, into a 1700-km (1060-mile) polar orbit. Both of these satellites had 2- to 10-meter transponders that were extremely sensitive, requiring only a few watts of power to access the satellites. Launched with the Cosmos 1046 navigation series, RADIO 1 and RADIO 2 were dedicated to space experimentation commemorating the 60th anniversary of the Lenin Komsomol. RADIO 1 and RADIO 2 are no longer operational, but they did serve as useful pioneers.

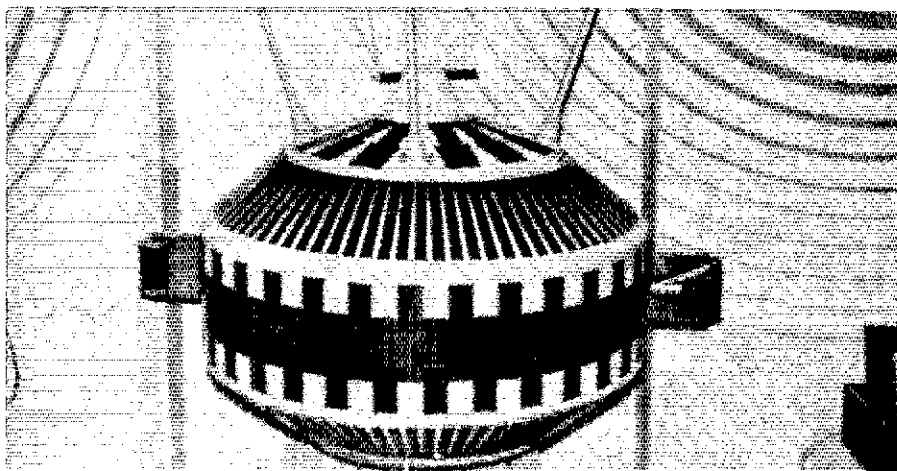
The New Generation

Construction of the new generation of Radio satellites was the work of many of the pioneers of the first RADIO satellites. The six new satellites, RADIO 3 through

RADIO 8, launched on December 17, 1981, differ from RADIO 1 and RADIO 2 in their more advanced power supply and heat-regulation and telemetry systems. Besides beacons and transponders, some of the satellites have an automatic answerer called ROBOT. These ROBOTs have on-board logs and operational memories for bulletin-board announcements. Frequencies for RADIO 5 through RADIO 8 are listed monthly in the *QST* Amateur Satellite Operating Schedule.

High Altitude Orbit

The orbits of the new RADIO satellites are similar in altitude to their predecessors, RADIO 1 and RADIO 2. Maximum communication distance is in excess of 8000 km (5000 miles). To plot the position of the RADIO satellites, you will need orbital information and the New OSCARlocator Package, available from your local radio store or from ARRL Hq. The package is \$7 in the U.S. and \$8 elsewhere. The OSCARlocator may be modified easily by referring to February 1982 *QST*, page 56. AMSAT has made available an accessory RADIO tracking overlay for the OSCARlocator Package for a \$2 donation. Write to AMSAT, P.O. Box 27, Washington, DC 20044. Orbital information and net frequencies are listed monthly in *QST*. Updated reports are transmitted daily by W1AW, and weekly by AMSAT nets. Project OSCAR has an orbital calendar available for \$8.75. Write to them at P.O. Box 1136, Los Altos, CA 94022.



A model of the new generation RADIO satellite. The 2-meter antennas on top of the spacecraft are mounted in a canted configuration, similar to OSCARs 7, 8 and 9. Ports for the 10-meter antenna, which are on opposite sides of the spacecraft center, were deployed after launch.

Beacons

Listening for the beacons of the RADIO satellites can be a lot of fun. Sometimes, with the extended propagation on 10 meters, you may be able to listen to one or more of the six satellites all the way around the world. RADIO 6 and

RADIO 8 each have a beacon at each end of the 40-kHz transponder. Both of these beacons have two power levels, 0.1 and 1 watt, switchable by command from earth. The beacons of RADIO 5 and RADIO 7 are 0.1 watt and are at the high end of their 40-kHz transponders. RADIO 3 and

Table 1
RADIO Telemetry Parameters

| Group | Address | Parameter | Unit of Measure | Decoding Formula |
|----------|---|---|-----------------|------------------|
| (E) | K | Output power of transponder | mW | $N^2/5$ |
| | D | Voltage of power source | V | $0.2N$ |
| | O | Load current | mA | $20(100 - N)$ |
| | G | Telemetry test | | |
| | U | Hermetically sealed container pressure | | |
| | S | Temperature of stabilizing unit | °C | N |
| | W | Temperature of transmitter radiator | °C | N |
| I (S) | K | Output power of transponder | mW | $N^2/5$ |
| | D | Zero setting of telemetry mV meter | | N |
| | O | Output power of beacon | mW | $N^2/5$ |
| | G | Repeater sensitivity control | dB | N |
| | U | S-meter for 1st service receiver | S | $0.1(N - 10)$ |
| N(R) | S | S-meter for ROBOT receiver | S | $0.1(N - 10)$ |
| | W | S-meter for 2nd service receiver | S | $0.1(N - 10)$ |
| A (U) | | Parameter being completed | | |
| | K | Output power of transponder | mW | $N^2/5$ |
| | D | 9 V voltage at transponder | V | 0.1N |
| | O | 7.5 V voltage at transponder | V | 0.1N |
| | G | 9 V voltage at 1st stabilizer | V | 0.1N |
| | U | 7.5 V voltage at 1st stabilizer | V | 0.1N |
| | S | 9 V voltage of 2nd stabilizer | V | 0.1N |
| W | 7.5 V voltage at 2nd stabilizer | V | 0.1N | |
| M (W) | K | Output of transponder | mW | $N^2/5$ |
| | D | Filling out of ROBOT log | QSO | $N \pm 1$ |
| | O | Power of turned-on heaters | W | 0.1N |
| | G | Power of ROBOT transmitter | mW | 20N |
| | U | Power of service-channel transmitter | mW | 20N |
| | S | Sensitivity control for ROBOT transmitter | dB | N |
| W | Sensitivity control for service-channel transmitter | dB | N | |

Group letters shown in parentheses indicate the spacecraft is in service condition. They will precede the Address.

RADIO 4, which are designed for experiments only, have 1-watt beacons. All RADIO beacons transmit alphanumeric text in Morse code at a speed of 50 to 90 characters per minute. The telemetry of the beacons tells the status of the on-board system.

Telemetry

The telemetry information is presented in 35 channels, grouped into five groups of seven address channels: K, D, O, G, U, S and W followed by two numbers ranging from 00 to 99. The first group is the basic one and is always present in the telemetry frame; the remaining groups with letter indicators 1, N, A and M may be switched in when needed. The beginning of each group is preceded by the spacecraft call sign (RADIO 3 through RADIO 8 would be sent RS 3, RS 4, RS 5, etc.). When service operations are being carried out, an E may appear before the address, so that, for example, the address K in the basic group would change to EK, ED, EO, EG, EU and ES. Other groups would change according to the supplementary meanings shown in parentheses in Table 1.

The letter K in any group shows the output power of the transponder. K00 indicates the transponder is off and the power of the telemetry beacon can be read at the 10 address. The RADIO transponder output power is determined by the number and strength of signals in the receiver input. Attenuation of the receiver inputs, reported on channels 10, MS and MW, is used to prevent overload of the spacecraft battery. With this arrangement, it helps prevent operators from running excessive power on the satellite uplinks. If the uplink receiver is saturated, attenuation is switched in. If signals in the downlink passband are stronger than the beacon, that is an indication of excessive uplink power.

Operating Through the New RADIO Satellites

From operating experience obtained so far, it seems that the new generation satellites have very sensitive receivers. Long-distance contacts have been made using 2-meter uplink powers of less than 10 watts. My first Hawaii contact, with KH6IBA via RS 6, was the fourth New England-to-Hawaii two-way ever made through any Amateur Radio satellite. The first station to achieve this feat was K1HTV, second was WINU and third was W1PV. Since then, WAIZUB (Massachusetts) and K1DS (Rhode Island) have made the long connection to Hawaii.

Several important points have to be understood when operating through the RADIO satellites. The most important operating hint is to listen first to the satellite beacon. The beacon will tell you if the transponder is operating and if the receiver sensitivity is at maximum. Remember that the K address with a reading of greater than 00 indicates out-

put power from the transponder. Sensitivity of the transponder and the ROBOT (automatic-operator) receivers can be determined by the readings of address IG for the transponder and MS for the ROBOT. Readings of 00 mean maximum sensitivity. RADIOS 3, 4, 5, 6, 7 and 8 have transponders; only RADIOS 3, 5 and 7 have ROBOTs. RADIO 3 and RADIO 4 are designated for experiments only and will probably be used for special operating events.

Receiving RADIO satellite downlink signals on 10 meters requires the use of a good low-noise receiver preamplifier. This one simple feature can make more difference than you can imagine. During a pass you may have to switch from a beam to a dipole or a turnstile to get best reception. Using a turnstile antenna (shown in Fig. 1) will help reduce fading caused by polarization and spacecraft spin. This antenna will give you circular polarization and a match to a 50-ohm feed line. Mount dipoles A and B at 90 degrees from each other in the same horizontal plane and in the clear $3/8$ wavelength above ground. There are a lot of CB ground-plane antennas around just waiting for your modification. If you go this route, make sure it has four radials that can be converted to dipoles.

Insulate each of the four ground-plane radials used in this type antenna with wood dowel or plastic stock. Discard the vertical portion of the ground plane. Connect the feed line and the delay line as shown in the drawing. Cut each dipole for the center of the downlink frequency, 29.400 MHz, and you have a first-class antenna for receiving the RADIO satellites. This antenna will work equally well for the OSCAR satellites. If you can't find a ground plane to modify, a pair of wire dipoles suspended in the same plane will work just as well. An article in May 1980 *QST*, "Circular Polarization and OSCAR Communications," describes several antenna systems that may be used for the RADIO uplink and downlink frequencies.

Develop good listening habits. Listening and timing are as important to the satellite operator as they are to the DX contester in a pileup. One thing is certain: You will not become a seasoned satellite user overnight or even in a week. Don't give up; keep trying. If you hear some station calling CQ, break in and start the QSO without delay. One advantage Amateur Radio satellite transponders offer is full duplex operation (being able to hear both input and output signals simultaneously). Why waste valuable operating time calling one CQ after another? Break in or listen for someone to break your call. Keeping your operating time brief can only enhance your operating pleasure and skill.

Satellite passes are predictable, making it very important to have accurate

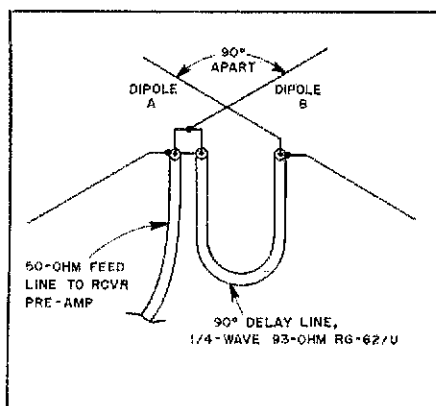


Fig. 1 — 10-meter turnstile for circular polarization.

tracking information. A few minutes of error can ruin all your efforts. Plan your passes, and double check times and dates. If possible, coordinate the entire pass. Write down the time and antenna tracking information so you know where the satellite is at all times.

What most successful operators of the RADIO Mode-A-type satellites try to do is to regulate their uplink power so the return signal from the transponder is never stronger than the beacon signal. The beacon can also provide you with some idea of what to expect in the way of propagation. One of the more interesting uses of beacon propagation is to follow each of the six RADIO satellites in sequence, noting the propagation and operating mode of each. This will help you predict what to expect from one satellite to the next. Whether propagation is good or poor, you can expect the next satellite's pass to be similar.

Talking to the ROBOT

A unique feature of the new generation RADIO satellites is the ROBOT, an automatic operator. Listening to this highly skilled electronic cw operator, you may wonder if there is a human aboard the satellite. The ROBOT remembers call signs, assigns the terrestrial operator a QSO number and, if necessary, asks for a repeat call. The ROBOT can also ask the sender to QRS (slow the sending speed) or even to QRX (send faster). Other replies are RPT (repeat) and QSD (your keying is defective). The QSD Q signal is one that operators of the RADIO automatic answerers learn to appreciate very soon; the ROBOT insists that the input transmission be clear and your fist perfect.

Very few operators are able to get a QSO number on the first try. Working the ROBOT requires operating skill and quite a bit of patience. If you are keen on space-age video games and you like to compete with other operators, this is something you must try. Satellite communicating is

always a challenge, but the RS ROBOT has to be one of the greatest new ideas to come along, creating new excitement for even the seasoned satellite operator.

To communicate successfully with the ROBOT, you must first know where to listen, what to listen for and what to send. The ROBOTs even send their input frequency (remember to allow for Doppler frequency shift). The greatest shift is on an overhead pass, during which the uplink frequency can vary plus or minus 3 kHz. Even if RS 5 is sending, CQ CQ DE RS 5 QSU ON FQ 145830 KHZ K, it will almost always be necessary to call several kilohertz lower than the ROBOT-announced frequency. The passband of the ROBOT is very narrow; if you cannot monitor your own signals coming back without any QSD, stop sending and find the proper input frequency. Correct calling procedure is RS (#) DE (your call) AR.

Operating Challenge

Solar activity is declining now, which will improve 10-meter reception of Amateur Radio satellites. Improving your satellite receiving antennas, listening and planning could be the keys to new operating excitement. If this challenge is met successfully, you will be ready for yet more sophisticated satellites in the future.

The first step for the beginner to try is listening in on the contacts being made. If this generates a little interest and excitement, watch out! If you take the next step and send a signal to the satellite, that's when it starts. When the circuit is completed, and your signals come back for the first time, you're involved and on the way to step three of completing a first satellite QSO. That's when the addiction begins. After a few more contacts, you will be saying, "Wow, why didn't I try this a long time ago?" With awards to shoot for, like WAS, DXCC, WAC and the Soviet operating events, set your goals and settle back for some real operating pleasure.

After you are "hooked" on satellite communication, it becomes a pleasure to explain your funny-looking antennas. "Oh! I use those for sending and receiving satellite signals," you say proudly. After a few bewildered looks, there is a pause and a flashback to when you first heard or read about Amateur Radio satellites. Only then will you realize that you have taken a step into the future and Amateur Radio satellite communication is the way to get there. □

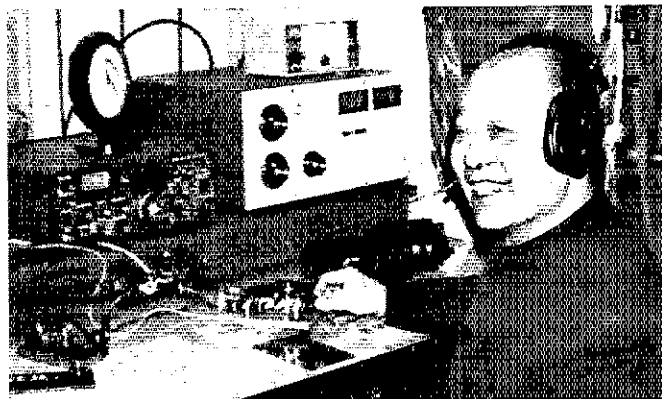
References

- Campbell, E. L., "Turnstile for Two," *QST*, April 1959.
- Glassmeyer, B., "Circular Polarization and Satellite Communications," *QST*, May 1980.
- Grif, A. and A. Gorokhovskiy, "Satellites of the New Generation," *RADIO*, 1 1982.
- Grigor'yeva, N., "Without a Table of Organization," *RADIO*, 1 1979.
- Papkov, A. and V. Rybkin, "Telemetry of the Repeater," *RADIO*, 2 1980.
- Woodward, G. and G. Collins, eds. *The Radio Amateur's Handbook* (59th edition). Newington: ARRL, Inc., 1982, ch. 14.

China: Active Once Again

Long dormant, Amateur Radio in BY-land is with us in the form of BY1PK, a club station in Peking. Tune it in around 14.030 or 21.030 MHz.

By Richard L. Baldwin,* W1RU



There seems little question that, for DXers and those interested in the international aspects of Amateur Radio, the reentry of China into active participation in international Amateur Radio is one of the most exciting prospects immediately before us. Long dormant, Amateur Radio in China took another step forward when, on March 29, 1982, on-the-air operations began from BY1PK. As we write this, in mid-May, BY1PK is the only Amateur Radio station to have operated officially from China in many years, and is currently the only station active. We expect that before the year is out, it will be joined by at least one other club station, located in another Chinese province.

BY1PK is well-equipped, as shown in the accompanying photographs. The equipment is a Yaesu FT-107 transceiver with a Canadian-made Hammond linear amplifier, brought into China by Tom Wong, VE7BC. The main antenna is a Hy-Gain TH6DXX tri-bander, just above the rooftop of a not-very-high building.

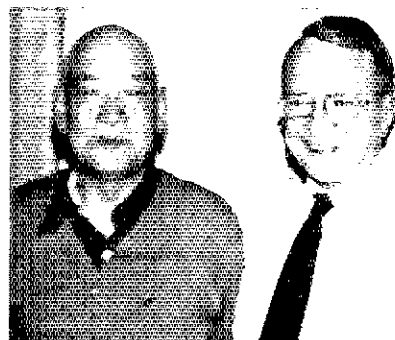
Presently, BY1PK operates only on cw on the 15- and 20-meter bands. QSLs go to the China Radio Sports Association, P.O. Box 6106, Peking, the People's Republic of China.

Amateur Radio in China is being organized on a pattern similar to that in other socialist countries. That is, all sports activities (which include such a wide spectrum as chess, paddle tennis, track and

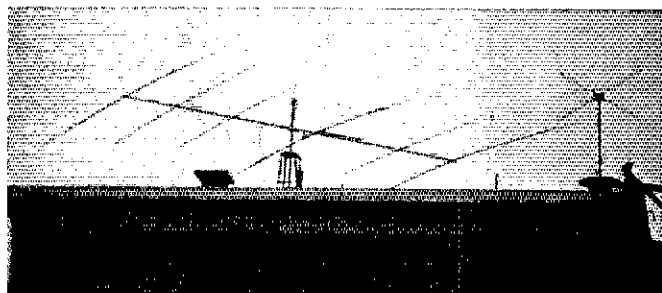
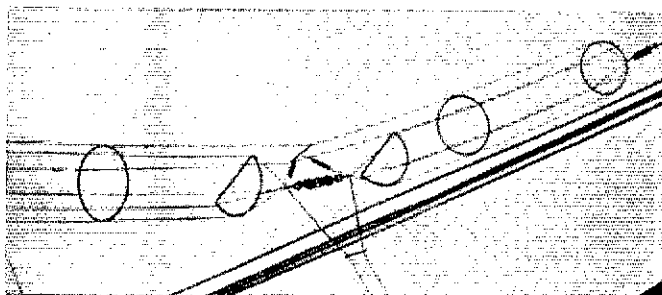
Amateur Radio) are organized and coordinated under the umbrella of the China Sports Commission. All of these activities are organized and coordinated in such a way as to be beneficial to the national interest. Each "sports" activity has its own organization, and in the case of Amateur Radio that is the China Radio Sports Association, whose secretary-general is Mr. Cheng Ping. The CRSA is responsible



A group of the operators (and visitors) at BY1PK. Center front is CRSA Secretary-General Cheng Ping.



Mr. Li Qinchaun, vice-minister of the China Sports Commission (left), with W1RU.



The antennas at BY1PK. (JA1BK photos)



Morse-code training begins at an early age in China!



This photo of the BY1PK operating position comes to us from Frank Wen, KM2X (ex-C1BC). Tuning an all-Chinese-made solid-state receiver is Tong Shao Yun, chief operator; standing is Chow Ha Yin, ex-C1CY, an old-timer in Chinese Amateur Radio. Frank reports that as of April 18 BY1PK had made 256 QSOs, representing 30 countries and all continents except Africa. Their favorite frequencies are near 14.030 and 21.030 MHz.

Chinese Students Train to Operate Club Stations

Noted DXer Kan Mizoguchi, JA1BK, visited BY1PK on May 11, and was asked to present a lecture on Amateur Radio to new trainees. After briefing the students on IARU, ARRL and the Japan Amateur Radio League, Kan described Amateur Radio operation in other countries, and explained how to operate contests and how to manage a DX pileup. He reports that trainees from such cities as Chungking, Nanking, Shanghai and Kwangchow were in Beijing for Amateur Radio training, and that we may see additional club stations appear on the air from these and other cities with prefixes such as BY4 or BY7 (the "Y" in the call sign denotes a club station).

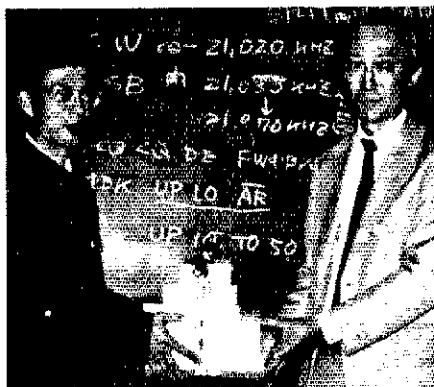


Radio direction-finding is an important part of Amateur Radio in China.

for all Amateur Radio activity in China. There are a number of other groups interested in one aspect or another of radio communications, but only the CRSA has jurisdiction over Amateur Radio, which includes such activities as radio direction-finding (fox-hunting).

In April, IARU past president Noel Eaton, VE3CJ, and W1RU, in their IARU roles, were invited by the China Radio Sports Association to visit Peking (presently also known as Beijing). It proved to be an opportunity to have wide-ranging discussions on all aspects of Amateur Radio, both from the operating and the organizational points of view. We met with senior officials of the CRSA and of the China Sports Commission, we saw a great deal of Peking and the surrounding area and, of course, we visited BY1PK.

Now, and for the immediate future, Amateur Radio in China is a club-station activity. No individual station licenses are being issued at this time. Although we talked extensively about Amateur Radio regulations in other countries and the existence of reciprocal operating permits,



When JA1BK visited BY1PK recently, he presented gifts for the station to its chief operator, Tong (left).

it does not seem likely that non-citizens of China will soon be issued permission to operate from that country. Even those who visit China regularly and who have a close personal relationship with Chinese authorities feel that requests for permission to operate by non-citizens is premature.

Amateur Radio in China is not yet the way Amateur Radio is in other countries of the world. The words "radio amateur" in China mean someone who is interested in experimenting with radio circuits, not

necessarily someone who is on the air. The Chinese monthly magazine, *Wuxiandian*, full of technical information, has a circulation of 1.6 million! As you can see, the prospects for a future expansion of Amateur Radio in China are truly exciting.

Over the past six or seven years there has been increasing contact with the Chinese in matters relating to Amateur Radio. Many interested individuals and groups, traveling to China either on business or as tourists, have been the means for bringing news and information about the "outside" world to the Chinese. The Chinese are receptive, but are moving cautiously. They are a friendly, outgoing people who are eager for information on Amateur Radio in the rest of the world, but who will be selective on how they adapt that information for use in their own country. The Chinese have a long history of outstanding cultural achievement, and they will be careful on how they allow their culture to be changed by outside influences. Again, our advice to those who have the privilege of visiting China: don't push too hard.

The New Frontier

Conducted By Bob Atkins,* KA1GT

The World Above 1 Gig

10-GHz Operation in the UK

Owing to a family emergency, I had to fly to England and stay there during the time that I would normally have written this column. Without access to reference material, I could not write the column I had planned, but while in the UK I did spend one afternoon operating in a part of the RSGB microwave cumulative contest with G3WDG and G4KGC, and I thought that a description of this operation might be of interest.

A cumulative contest, as has been outlined in this column previously, is one that is spread out over several months with a number of operating periods; in this case, six operating periods, one per month over the summer, each one lasting about nine hours. The session in May was for 10 GHz and 5.7 GHz operation. The site chosen for operation (most operation in these contests is from hilltop sites) was Meriton Low in the Midlands of England just south of Manchester, at a height of about 1600 ft. It turned out that three groups had chosen to operate from this site: G8AGN operating a home-built 10 GHz wideband fm system, G3POH also operating 10 GHz wideband with home-built equipment and G3WDG/G4KGC with two 10-GHz narrowband ssb/cw systems and one 5.7-GHz narrowband ssb/cw system (G4KGC-built). Activity was high, as could be


judged from the number of stations calling for 10 GHz contacts on the 2-m liaison frequency of 144.33 MHz. The wideband stations made about six or seven contacts each, some over obstructed (non-line of sight) paths, which was quite surprising. Fewer contacts were made on narrowband, owing to the fewer number of stations operating that mode. Some very interesting contacts were made, however. GW4KNZ/P and GW4LXO/P were worked over a highly obstructed 184-km path. The contact was initially established with the GW stations running 2 W of 10-GHz cw and using a GaAs FET preamp on receive. Signals were strong enough, however, that contact was subsequently made using 1 mW cw and a 2-ft dish at each end of the path! G3YGF was worked over a 236-km, highly obstructed path. He was running 10 W from a TWT and was a loud signal using open waveguide (no dish) on the receiver. With a 2-ft dish, the 10-GHz signal was much better than the 2-m talkback signal! No two-way contacts were made on 5.7 GHz, but G4KGC heard one station running 30 mW cw over an obstructed path of 136 km.

Surprising, to an observer familiar with U.S. levels of activity, was the number of stations taking part in the contest. Upwards of 20 stations were heard on the 2-m liaison frequency. Undoubtedly the small size of the UK has much to do with the activity level. Since the population density is high, there is a good chance of

there being a station close enough to work even if you are not using state-of-the-art equipment. Another probable incentive to operation in the UK is an extensive beacon network including both wideband and narrowband beacons on 10 GHz. Not only do these beacons provide interesting information on propagation and warn of enhanced conditions, but they also provide something to listen for on a band that at times may have no other activity. The beacon station GB3BPO, which has signals on 1296 MHz and 10 GHz, has proven particularly useful in indicating good propagation conditions between the UK and Europe. Dutch stations regularly monitor the 1296-MHz beacon, and when it becomes very strong the 10-GHz beacon is often audible. Many 10-GHz G-PAØ contacts that might never otherwise have been made have been achieved by monitoring this beacon.

10 GHz USA

KD6RV has written advising me of the 10-GHz activities of the Lenkurt Amateur Radio Club. They have built Gunnplexer-type systems, and their best DX to date is 36.4 miles across San Francisco Bay. They have plans to extend this over the summer.

If you are operational on 10 GHz, write and let me know what you are doing. It might be possible to put groups in touch with each other who might not otherwise know of each other's activities. 

*103 Division Ave., Millington, NJ 07946

Strays

ROSES — OR MY HUSBAND'S YAGI ANTENNA

□ Now you must understand. My husband is afraid of heights. Terrified! Petrified! He will empty a mousetrap, extinguish a grease fire, escort his shaking wife through a dark, deserted parking lot — these courageous feats and more he'll perform with his particular brand of quiet calm. Show him a step ladder, on the other hand, and he pales. The mere idea of extension ladders or scaffolding causes him to mutter gibberish and sweat.

So you can see how unprepared I was for the box of poles. Of course I didn't know it was a box of poles when the UPS man brought it to my door. I hoped, judging by the shape of the carton, that I had received three dozen extra-long-stemmed roses. Wrong. Would you believe three dozen poles? Surely the package was delivered to us mistakenly. Wrong again.

"My antenna!" shouted Barry when he arrived home from work.

"Your antenna?" I scoffed. "An antenna is a length of wire that you string up by throwing rocks at limbs. At least that's what you told me when I accused you of tying the house to every tree in the yard."

"Those are rudimentary. I am about to assemble this aluminum tubing into a genuine Yagi antenna and chimney-mount it on the roof."

Yagi? Could he have meant Yoga? A lotus position, maybe, for hams. And chimney-mounted? Barry, the acrophobic, putting something up on the roof? Never. One of us was dreaming. Maybe both.

But the rattling and the clanging that awoke me the following Saturday morning was no dream. My husband was hard at work. First, he built a giant oven rack on the basement floor. Then, he moved it out to the driveway and made it even bigger. Then, wonder of wonders, he placed the extension ladder against the side of the house and skipped up it and onto the roof! In vain I waited for the familiar signs of acrophobia.

All that day and part of the next Barry moved up and down the ladder with ape-like agility. He carried up poles as if they were toothpicks. He hung on with one finger while he went up with the antenna. He strode around the roof with confidence as he admired his handiwork from every angle. He had conquered his fear!


And I had an idea. I raced to the nearest hardware store for 10 gallons of exterior latex, brought them home, and unloaded them next to the ladder. That seemed as good a place as any to start painting the house.

"One more check of the SWR and I'm done!" shouted Barry from the roof. Halfway down the ladder he spotted the paint cans, and an amazing thing happened. He looked at the ground, up at the roof and down at the ground again. He froze. His knuckles were white from gripping the rungs, and his breath was labored as — ever so slowly and carefully — he completed his descent. With one last look at the ladder — and at the paint — he disappeared into his ham shack.

I didn't see him again for two weeks. In the meantime, our 10-year-old and I painted every shingle, every strip of trim and every square inch of foundation, high and low. As we wearily gathered up the last of the paint cans for the garbage, Barry came outside.

"Don't put the ladder away," he said. "I've been testing the rotor, and there's an adjustment I have to make on the mounting."

I beat him to it. The acrophobic is now making quite an adjustment on all three dozen poles.

And, bent or straight, twisted or mangled, they still don't look like roses. — Sara Pettes McWilliams, Wappingers Falls, New York 

League Members to Choose Board Representatives

It is not "Newington" that dictates what the League will and will not do — it's you! As a Full member, your voice determines the direction and the policy that the ARRL will take. This fall, members of the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions will choose directors and vice directors to represent their interests on the ARRL Board of Directors for two-year terms beginning January 1, 1983.

The future of the League is in your hands — let your voice be heard. Come election time — vote!

ARRL Divisions

The policies of the League are established by 16 directors, who are elected on a geographical basis to represent their divisions and constituents on the Board (see page 8 of any *QST* for a list of the divisions, directors and vice directors). These directors serve for two-year terms, with half standing for election in even-numbered years, half in the odd. Just as in national, state or provincial politics, the voters/members have the privilege and responsibility either to decide they like the actions of their incumbent representatives and support them actively for reelection, or to decide that other representatives could do a better job and work for the election of those persons. At the same time directors are elected, vice directors, who can fill in when the director is unable to serve, are also chosen.

Call for Nominations

Nominations are now open for director and vice director in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions for the two-year term beginning January 1, 1983. From now until August 20 at noon, League headquarters will accept nominating petitions signed by 10 or more Full members of a division, naming a Full member of that division as a candidate for director or vice director.

The candidate must submit information (on a form provided by Headquarters) that will allow the Executive Committee to determine the eligibility of the candidate in accordance with the provisions of the Articles of Association and By-Laws, and by a statement of not more than 300 words setting forth the candidate's qualifications, which will be included with the ballot mailed to members. The candidate's 300-word statement will be reprinted without content editing; if the statement as submitted exceeds 300 words, the first 300 words will be used. The statement must not contain any derogatory reference to any person or entity. The candidate must also submit an accompanying signed statement certifying that the information is true to the best of the candidate's knowledge and belief. Any willful violation of this statement will be grounds for disqualification by the Executive Committee.

The nominee must hold at least a General class amateur license or a Canadian Amateur Advanced Certificate, must be at least 21 years of age, and must have been licensed as a Full member of the League for a continuous term of at least four years at the time of the election. No person is eligible whose business connections are of such nature that he or she could gain financially through the shaping of the affairs of the League by the Board, or by the improper exploitation of his or her office for the furtherance of his or her own aims or those of his or her employer. Accordingly, the primary test of eligibility is the candidate's freedom from commercial or governmental connections of such nature that his or her influence in the affairs of the League could be used for his or her private benefit. Neither is a person eligible who is engaged in frequency-allocation planning or implementation. Finally, no one can run who is commercially engaged in the publication of radio literature intended in whole or in part for radio amateurs. The idea behind these rules is to ensure that candidates (1) possess a lasting interest in Amateur Radio and the League, (2) have the legal capacity to make decisions for ARRL, and (3) are free from conflicts of interest.

Balloting Will Follow

Whenever there is more than one candidate for either office, ballots will be sent to all Full members of the League in that division who were in good standing on September 10. (You must be a licensed radio amateur to be a Full member.) The ballots will be mailed not later than October 1 and, to be valid, must be returned to Hq. by noon on November 20. A group of nominators can name a candidate for director or vice director, or both, but there are no "slates" as such — each candidate appears on the ballot in alphabetical order. If a person is nominated for both director and vice director, the nomination for director will stand, and that for vice director will be void. A person nominated for both offices does have the option, however, of declining the higher nomination and running for vice director if he or she wishes. Since all the powers of director are transferred to the vice director in the event of the director's death, resignation, recall, removal outside the division or inability to serve, careful selection of candidates for vice director is just as important as for director.

Nominating Form

The following form for nomination is suggested; it may be copied onto any paper, or a blank following this form may be obtained from headquarters upon request:

Executive Committee
The American Radio Relay League
Newington, CT 06111

We, the undersigned, Full members of ARRL residing in the . . . Division, hereby nominate . . . of . . . as a candidate for director; and we also nominate . . . of . . . as a candidate for vice director from this division for the 1983-1984 term.

(Signature . . . Call . . . City . . . ZIP . . . Date . . .)

Nominees, or indeed any member, may obtain a copy of the Articles of Association and By-Laws, along with a pamphlet outlining the duties and responsibilities of elected League officials.

Absentee Ballots

All ARRL members who are licensed by FCC or DOC but are temporarily residing outside the U.S. or Canada are eligible for Full membership. Those members overseas who arrange to be listed as Full members in an appropriate division prior to September 10 will be able to vote this year where elections are being held. Members with APO and FPO addresses should take special note of this provision; in the absence of information received to the contrary, ballots will be sent to them based on their postal address.

Even within the U.S., Full members temporarily living outside the ARRL division they consider home may have voting privileges by notifying the secretary prior to September 10 giving their current *QST* address and the reason that another division is considered home (for instance, holding an amateur call appropriate to the division). If your home division is the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf Divisions, but your *QST* goes elsewhere, please let the ARRL secretary know, as soon as possible, but no later than September 10, so you can receive a ballot for your home division.

The Incumbents

These persons presently hold the offices of director and vice director, respectively, in the divisions conducting elections this year: Central — Edmond A. Metzger, W9PRN, and Kenneth A. Ebner, K9EN; Hudson — Stan Zak, K2SJO, and Linda S. Ferdinand, N2YL; New England — John C. Sullivan, W1HHR, and Richard P. Beebe, K1PAD; Northwestern — Mary E. Lewis, W7QGP, and Mel C. Ellis, K7AOZ; Roanoke — Gay E. Milius, Jr., W4UG, and John C. Kanode, N4MM; Rocky Mountain — Lys J. Carey, K0PGM, and Marshall Quiat, AG0X; Southwestern — Jay A. Holladay, W6EJJ, and Peter F. Matthews, WB6UIA; West Gulf — Raymond B. Wangler, W5EDZ, and Thomas W. Comstock, N5TC.

Petitions need 10 or more signatures of Full members, and are due at Headquarters by noon, August 20. If there is only one candidate for an office, he or she will be declared elected by the Executive Committee; otherwise, ballots will be mailed not later than October 1 to Full members of record September 10. To be valid, ballots must reach Headquarters before noon, November 20. The new term will begin at noon, January 1, 1983.

For the Board of Directors:

June 1, 1982
David Sumner, K1ZZ
Secretary

*Deputy Manager, Membership Services, ARRL

WARC RATIFICATION HEARINGS

On May 18, the Foreign Relations Committee of the U.S. Senate held a hearing on Senate Treaty Document 97-21 concerning whether the Senate should advise and consent to ratification of the Radio Regulations and Final Protocols, Geneva, 1979. Ratification of the WARC Treaty by the United States will enable the FCC to implement the frequency allocations decided at the World Administrative Radio Conference in Geneva in 1979. At stake is radio amateurs' access to three new high-frequency bands allocated to the Amateur Service at the Conference, as well as other changes and improvements to the amateur bands. Allocations in the 10-, 18- and 24-MHz bands have been earmarked for amateurs, with the 10-MHz allocation expected to be the first of the three to become available. However, the FCC recently denied ARRL's petition to prepare regulations for the use of the 10-MHz band for the primary reason that the WARC Treaty had not yet been ratified. (See June 1982 Happenings, page 61.)

Present at the hearing on Capitol Hill were representatives from ARRL and spokesmen from the Department of State and other government agencies. The only other speakers from the private sector, besides ARRL, were from Motorola. All the government speakers urged prompt ratification of the treaty. An FCC representative noted that some 80 comments received in Docket 80-739 were in favor of WARC ratification. Docket 80-739 is the FCC's administrative proceeding preparing for domestic implementation of the WARC Final Acts.

ARRL Testifies

The ARRL contingent to the Senate hearings was led by Vic Clark, W4KFC, the League's president. After first explaining what ARRL is and why Amateur Radio operators are important, President Clark introduced ARRL's consultant for international conferences on frequency management, E. Merle Glunt, W3OKN. Mr. Glunt was a full working member of the U.S. Delegation and was the U.S. spokesman in the working group that considered the necessary Terms and Definitions for the international Radio Regulations. He was also the official spokesman for the Amateur Radio Service on the U.S. Delegation to WARC-79. Though Mr. Glunt emphasized the importance of early ratification to U.S. radio amateurs, he also addressed the more general concerns of some that WARC-79, in general, may not be in the best interests of the United States. According to Mr. Glunt, "While the Amateur Service worldwide was successful in attaining a number of its goals, any shortcomings which may have been experienced by some of the other services are not of an insurmountable nature. A number of reservations were taken by the United States and appear in the Final Protocol. . . . I perceive on balance that the Final Acts provide a reasonable and workable basis for international harmony in the use of the radio-frequency spectrum for many years to come, particularly in view of the adjustments that can be provided by the several specialized conferences scheduled for the remainder of this century."

Senator Schmitt Proposes to Delay Ratification

Late in the day of the Hearing, Senator

Harrison Schmitt (R-NM) filed a seven-page paper suggesting that the Foreign Relations Committee delay ratification at least until after the Plenipotentiary Conference of the International Telecommunication Union (ITU), scheduled to be held this fall. The Plenipotentiary Conference of the ITU will consider changes in the basic convention governing the structure and functions of the ITU. The Senator feels that the U.S. must first establish its long-range goals for telecommunications policy. He says that the delay in ratifying the Treaty "would be beneficial as a strong signal of Senate disapproval of the dilatory approach of this Administration, which, like its predecessor, has failed to comprehend the extraordinary long-term importance of these ITU conferences."

OBSCENE BROADCASTS RESULT IN HAM RADIO OPERATOR INDICTMENT

United States Attorney Stephen S. Trott announced that a federal grand jury returned a seven-count indictment charging Richard A. Burton, 37, ex-WB6JAC, of Reseda, California, with operating an Amateur Radio station without a license and broadcasting obscene, indecent and profane language during his radio communications.

According to Assistant U.S. Attorney Laurie L. Levenson, who handled the case, Burton made the unlicensed broadcasts from his residence in Reseda during November 1981 and January and April 1982. Burton was arrested at his residence on April 30, 1982 and arraigned on May 3, 1982 on charges of unlicensed operation of a radio station. The arrest was made by the U.S. Marshal's Office with assistance of the investigating officials from the Federal Communications Commission.

Burton was expected to be arraigned in federal court in Los Angeles on June 1, 1982. If convicted, Burton faces a maximum sentence of 10 years imprisonment and a \$70,000 fine.

An indictment is only a charge and is not evidence of guilt. The defendant is entitled to a fair trial in which it will be the government's burden to prove guilt beyond a reasonable doubt. — *Press Release, U.S. Attorney's Office, Los Angeles*

TWENTIETH-ANNIVERSARY AMATEUR SATELLITE FUND DRIVE

The amateur community is rising to meet the challenge of the space program. With a Phase III-B satellite launch scheduled for January 1983, "hams in space" are getting involved. Contributions continue to roll into the ARRL Foundation in support of its Twentieth-Anniversary Amateur Satellite Fund Drive.

Why not make yourself a part of tomorrow's telecommunications world today by sending your tax-deductible contribution to the ARRL Foundation Amateur Satellite Program? Your donation will be matched dollar-for-dollar, thanks to a recent American Radio Relay League matching-funds grant. Your donation will be doubly effective for the future of amateur space communications!

Recent friends of the Foundation's amateur satellite fund drive include: Jim Swafford, W7FF, and ARRL Director Ray Wangler, W5EDZ. — *Richard Palm, KICE, Assistant Secretary, ARRL Foundation*

STAFF NOTES

Halprin Advances to Deputy CM

We are pleased to report the recent appointment of Robert J. Halprin, K1XA, to the post of deputy communications manager. First licensed in 1970, Bob joined the Hq. staff in 1975, became the assistant communications manager for Public Service in 1976, took on the additional responsibility of supervising the Field Organization branch in 1981, and, in March 1982, was promoted to deputy communications manager. Although Bob will continue to direct the efforts of the Public Service/Field Organization branch, the scope of his responsibilities will expand into the many other phases of Amateur Radio operation sponsored by the Communications Department, such as contests, DXCC, awards, WIAW, and so on.

K1XA's versatile Amateur Radio background makes him well-suited to the Deputy CM post. He is active on all bands and modes, and his extensive on-the-air activities include contesting, traffic handling and DXing. The latter includes being on the *other* side of the pileup during operations from Africa, South America and the Caribbean. Among the many operating awards he has earned are 5-Band DXCC, 5-Band WAS and WAZ. *QST* readers see his byline each month as conductor of the Public Service column; K1XA also served as editor of the *ARRL Operating Manual*.

A 1975 graduate of American University (Washington, DC) with a BA in communication, Bob is in the process of completing his MA in communication at the University of Hartford.

FCC JUDGE REVOKES LICENSE OF COOL, CALIFORNIA AMATEUR

In an initial decision issued March 23, FCC Administrative Law Judge Edward J. Kuhlmann revoked the license of Robert Harkins, of Cool, California, for Amateur Radio station WD6GRV, affirmed the Private Radio Bureau's suspension of Harkins' Amateur Radio operator's license and denied his application for an Advanced class operator's license.

The proceeding was initiated by the FCC Private Radio Bureau in March 1981 to determine if Harkins knowingly violated the rules by assisting Alfred E. Bloch, a prospective licensee, to obtain a radio operator license by filing an application and taking a license examination using Bloch's name.

After evaluating the findings submitted in the case, Judge Kuhlmann concluded that Harkins, by his own admissions, knowingly carried out the fraudulent scheme and no longer holds the requisite qualifications to remain a licensee.

The initial decision becomes effective 50 days after its release unless exceptions are filed within 30 days or the Commission reviews the case on its own motion. — *FCC News Release*

[Editor's Note: This decision became final on May 19, 1982 per FCC News Report 17008, released May 21, 1982.]

N6OZ Revoked

In another action, Judge Kuhlmann has revoked the Amateur Radio station license, N6OZ, of Donald E. Gilbeau, of Stockton,

California, and affirmed the suspension of his Amateur Extra Class radio operator license for transmitting unidentified interfering or jamming signals on an amateur frequency.

In an Initial Decision, Judge Kuhlmann found that Gilbeau was monitored by FCC personnel on May 28, 1980, while he was transmitting random words, Morse code signals and unintelligible sounds on 146.22 MHz. That frequency is used for receiving by the Grizzly Peak signal repeater, an amateur station used to extend transmission distance beyond the mountains shielding the California Central Valley.

Earlier the FCC had received complaints of interference on that frequency and 146.82 MHz, which also is used by the Grizzly Peak repeater. The FCC rules governing the Amateur Radio Service forbid transmissions designed to interfere with other communications.

When confronted by an FCC engineer, Gilbeau admitted the transmissions and said he was trying to get even with others who had been jamming the frequency with interfering signals. He later confirmed the admission in two letters to the FCC.

In hearing June 24, 1981, Gilbeau claimed that all but one of the monitored transmissions occurred accidentally. The hearing was held in San Francisco on FCC Private Radio Bureau order suspending Gilbeau's operator license and ordering him to show cause why his station license should not be revoked.

Judge Kuhlmann agreed with the Bureau that Gilbeau's accidental transmission claim was false and that he attempted to deceive the FCC. Any leniency that Gilbeau's long, previously unblemished record as an amateur licensee might warrant was outweighed by the attempted deception, the judge said.

The decision will take effect 50 days after release unless an appeal is filed within 30 days or the commission reviews the case on its own motion. — *FCC News Release*

[Editor's Note: Mr. Gilbeau has since filed an appeal, thereby suspending the decision of FCC Administrative Law Judge Kuhlman. No decision is final until all avenues for appeal are exhausted.]

FCC DENIES APPLICATIONS FOR RENEWAL OF WA6JIY

In an initial decision by FCC Administrative Law Judge Edward J. Kuhlmann, the applications of Gary W. Kerr for renewal of his Amateur Radio station license WA6JIY and his General class operator's license have been denied.

In August 1980, according to the decision's findings of fact, the FCC began receiving complaints at its Livermore Monitoring Station from Amateur Radio operators that the Grizzly Peak signal repeater was unusable because Gary Kerr was jamming the frequencies. In response to these complaints, the FCC began monitoring the Grizzly Peak repeater, WB6AAE/R. On August 6, 1980, the Commission's monitoring station intercepted the following transmission from Mr. Kerr:

"This is WA6JIY portable six conducting a transmitter audio test for circuit adjustment purposes only for a possibly indefinite length of time. These tests are legal under FCC Rules and Regulations and this station will be identified by call sign at an approximate sixty second interval. This is WA6JIY portable six testing. It is a point of law that no amateur or

group of amateurs may set aside a frequency or frequencies for their exclusive use. Any licensed amateur is entitled to make use of the various frequencies that he is licensed for providing that the FCC Rules and Regulations are strictly adhered to. This is WA6JIY portable six."

The FCC's monitoring station picked up the same or essentially the same transmission on at least seven occasions. The length of each transmission varied. For example, on August 7, 1980, the Commission monitored a transmission from 4:33 P.M. to 5:02 P.M. The next day the transmissions lasted from 6:40 P.M. until 7:28 P.M. and then from 7:31 P.M. until 8:02 P.M. The monitoring station watch officer observed that during each monitoring period other amateur operators were unable to use the repeater, either because the transmitter could not switch off and on or because Mr. Kerr's transmissions interfered with outgoing transmissions and prevented an understandable signal from being transmitted.

Conclusions of Law

The FCC's Private Radio Bureau stated that Mr. Kerr's conduct is not "in accordance with good engineering and good amateur practice," that his transmissions were not permitted because they were not one of the permissible types of Amateur Radio communications, and that his transmissions willfully and repeatedly caused interference to other radio transmissions on shared frequencies. Mr. Kerr does not dispute that he repeatedly and deliberately or intentionally transmitted the statements referred to by the Bureau. However, Mr. Kerr argues that his transmissions were permissible communications and that he did not interfere with any other operator's use of the frequency.

Judge Kuhlmann wrote that "In fact, the Kerr transmissions were not a test of anything except maybe the patience of his fellow amateur operators who were unable to use the single shared frequency that allowed contact with the Grizzly Peak repeater. . . . Amateur licensees corroborated the Commission staff's testimony that Mr. Kerr's transmissions prevented the repeater from functioning and prevented others who were trying to communicate through the use of the repeater from doing so. There is furthermore no indication that Mr. Kerr was actually conducting tests.

"On August 12, 1980, Mr. Kerr explained what he was really doing. He was going to 'really raise hell for a while' by jamming the repeater. One way to escape the consequences of such an action, he was overheard to say, was to pretend that tests were being conducted. He also knew that 'if they catch you at what you are doing, they are going to sock it to you.'" According to the Judge, Mr. Kerr has demonstrated that a renewal of his amateur licenses would not serve the public interest, convenience and necessity. [Editor's Note: This decision is not final. However, if exceptions are not filed within 30 days after the release of this Initial Decision, which is April 12, 1982, and the FCC does not review the case on its own motion, the Initial Decision becomes effective.]

ARRL PUBLICATIONS DONATED

Recently, the officers of the Adams County ARS (Gettysburg, Pennsylvania) donated a complete set of ARRL publications to the Adams County Library. ARRL-affiliated clubs may purchase a complete set of League publications at a reduced rate for such a pur-



From left to right are Charles Doggett, WB3FRG, club vice president; Carolyn Wilkes, library director; Walter Lake, W3KGN, club president; and Joseph Pittenger, KA3GVU, club treasurer.

pose. A payment of \$75 must accompany a letter from your local library official who has agreed to display and circulate the materials. Sorry, we cannot bill. For further information, contact the Publications Sales Office at ARRL Hq.

FCC ISSUES LIABILITY NOTICES FOR UNLICENSED OPERATIONS IN MIAMI

In response to a complaint from the International Frequency Registration Board and complaints from U.S. Amateur Radio operators, the Commission has issued notices of apparent liability for unlicensed radio operations. The transmissions, identified as "the Voice of Alpha 66," were broadcasting anti-communist and anti-Castro information in the 7-MHz Amateur Radio frequency band.

The illegal transmissions, broadcast in Spanish on 7040 kHz, were traced by the FCC's Miami Field Office and Fort Lauderdale Monitoring Station to the Miami area. At 6:30 P.M. on March 25, FCC investigators from the FCC Field Operations Bureau inspected three locations and determined that the unlicensed transmissions were coming from a fixed station in a house and from a mobile station operated at two other houses.

Three official Notices of Apparent Liability for \$750 are being issued for violations of Section 301 of the Communications Act, which requires an FCC license before operation of a radio transmitter. Although this matter is currently being handled as an administrative action by the FCC, further unlicensed operations may be referred to the U.S. Department of Justice with a request for criminal prosecution, which could result in a \$10,000 fine and/or a one-year jail sentence for each violation. — *FCC News Release*

JESSE BIEBERMAN, W3KT

ARRL Atlantic Division Director Jesse Bieberman, W3KT, died May 27 at the age of 77. A later issue of *QST* will provide more details on Jesse's long association with the League. Vice Director Hugh Turnbull, W3ABC, has assumed the duties of Atlantic Division Director.

Canadian NewsFronts

Conducted By Harry MacLean,* VE3GRO



CRRL Officers and Directors

President: A. Mitch Powell, VE3OT
Honorary Vice President: Noel B. Eaton, VE3CJ
Secretary: Thomas B. J. Atkins, VE3CDM

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Counsel: B. Robert Benson, Q.C., VE2VW

CRRL, Box 7009, Station E, London, ON N5Y 4J9

Yves Gelin, VEØMAP

Montrealer Yves Gelin, VEØMAP, was a man with a dream to sail around the world in a 9-metre-long sailboat. That dream almost became reality. Last September, Yves departed from St. Malo, France. He rounded the Cape of Good Hope, crossed the Indian Ocean and reached Australia. He was proceeding east, near the Chatham Islands, when he suddenly vanished.

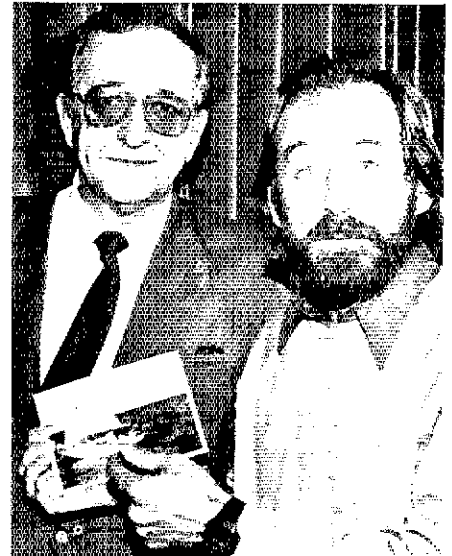
Pierre Decarie, VE2KD, of Dorval, Quebec, had been in daily contact with Yves, keeping track of his progress and supplying phone patches to family and friends. When Pierre didn't hear from Yves, he became concerned. With the help of ZL amateurs, he contacted New Zealand marine authorities. Hours later, a search was launched for the lost sailor.

The news media had followed Yves's voyage with great interest. Each day, Pierre reported

to the newspapers and the local radio and television stations. Often, tapes of on-the-air conversations would be played. Now the media expressed concern about Yves's safety. They gave high praise to Pierre for his quick action.

The story has a happy ending. On February 23, Yves was back on the air. He reported that his mast had broken in a storm, severing the radio antenna. It had taken eight days to make repairs. He would have to cancel his trip because of the damage, but would be trying again soon. — *Michael Shaer, VE2XB*

Pierre Decarie, VE2KD (left), and Yves Gelin, VEØMAP, with a photo of his 9-metre sloop, *Jean-du-Sud*. "It was partly my fault. Maybe I should have used stronger bolts." A storm took out Yves's mast and radio antenna, and cut short his attempt to sail around the world. (*Journal de Montreal photo*)



FLASH! 30-METRE BAND AVAILABLE

On May 21, DOC released the 10.1- to 10.15-MHz band to Canadian amateurs. Amateurs are now the primary users of this band in Canada, but DOC is treating amateurs as secondary users from an international viewpoint. This means that DOC expects Canadian amateurs not to interfere with foreign commercial stations still on this band. Emissions permitted are A1 for Amateur class licensees, and A1 and F1 for Advanced Amateurs. DOC did not indicate any power restrictions or whether or not Amateur class licensees with "10-meter endorsements" would be permitted to use F1 emissions. CRRL has requested clarification of these points.

MORE ON DOC SECTION 50

DOC Section 50 continues to be a controversial topic. Yes, the FCC has guidelines that outline conditions under which a foreign amateur may operate in the U.S. — and they are similar to DOC Section 50. The CRRL position remains that U.S. and Canadian amateurs are exempt from such guidelines. Canada-U.S. reciprocal operation continues to be governed by a treaty of February 8, 1951, entitled "Convention Between Canada and the United States Relating to the Operation by Citizens of Either Country of Certain Radio Equipment or Stations in the Other Country." Such a treaty is not like a Canadian or U.S. government regulation. It carries the weight of the Parliament of Canada and the Congress of the United States, and cannot be changed by either FCC or DOC rulemaking.

Fred Maia, W5YI, who publishes the *W5YI Report*, was able to learn the official FCC position on DOC Section 50. He spoke with Frank Williams, chief of FCC's Washington Treaty Branch. In Mr. Williams's opinion, the 1951 treaty was still in effect. In applying Section 50 to visiting U.S. amateurs, DOC was not complying with the treaty. He told Fred that "Canada has withdrawn privileges from visiting U.S. amateurs, and that, indeed, Section 50 "would be an issue." We hope Mr. Williams did not mean it would be an issue in another matter, that of proposed U.S. phone-band expansion. He added that the treaty could be changed, but it would have to be renegotiated.

Meanwhile, FCC continues to give Canadian Advanced Amateurs full U.S. Extra Class privileges when they operate in the United States. Interesting.

*163 Meridene Cr. W., London, ON N5X 1G3

CRRL NEWS

□ CRRL has submitted comments to DOC's proposed amendments to the Radio Act. Here are some highlights: (1) CRRL supported the proposal to remove restrictions on the 160-metre band, as had been requested by CRRL in a submission to DOC dated February 1981. (2) CRRL supported the proposal to make the entire 2-meter band available to all amateurs from countries that have reciprocal operating agreements with Canada. CRRL noted that DOC Section 50 still made it difficult for those amateurs to communicate with Canadian amateurs on many of the frequencies where Canadian amateurs normally operate. (3) CRRL supported changes that would allow repeater operation on 29.5 to 29.7 MHz, as had been requested by CRRL in a submission to DOC dated May 1981. CRRL also suggested a number of small changes that would clarify the intended meaning of certain regulations. CRRL asked that DOC consider reinstating F1 privileges on 7.05 to 7.1 MHz. This would permit Canadian RTTY operators to communicate with the many RTTY stations that use the upper 10 kHz of this subband. CRRL also asked DOC to permit amateurs to use the same emissions on 902 to 928 MHz that are permitted on other bands, 432 MHz and above.

□ DOC has supplied CRRL with its overrun of April and June examination booklets. They are available to you, free, on a first-come, first-served basis. If you would find it useful to have a copy of the April or June Amateur, Advanced Amateur or Digital Amateur examination, send an s.a.s.e. (9 x 12 in.) to CRRL, Box 7009, Station E, London, ON N5Y 4J9. The booklets are heavy; please remit 80 cents postage for first-class mail.

CRRL representatives and workers, and Amateur Radio clubs across Canada, have received a mailing, partly concerned with DOC Section 50 but mainly concerned with U.S. FCC proposals to expand the U.S. phone band on 20 metres, and possibly other bands. The mailing included a petition asking amateurs to support CRRL in its opposition to these proposals. Response so far has been excellent. Within a week, completed petitions bearing several hundred signatures were received in London. CRRL would like several thousand signatures. There is still time, as FCC has extended the deadline for comments to August 16. Ask your club secretary for the CRRL mailing and, please, sign the petition form. Your support is crucial. □ Dick Reiber, VE3IBV, has completed his survey of delivery dates of *QST*. The conclusion? Postal service is slow and inconsistent in every part of Canada, not

just in southwestern Ontario, as was first believed. January was particularly bad. No one surveyed received their *QST* until three weeks after it was mailed. Several surveyed had to wait seven weeks. A few never received their copy at all. CRRL test mailings show that Canada Post can consistently deliver *QST* in 7 to 10 days, if it is mailed from Canada. This method is also more cost-effective than mailing from the U.S. There are still a few wrinkles to iron out, but indications are that mailing of *QST* from Canada will take place in the near future.

□ Nominations for CRRL Amateur of the Year are now open. Deadline this year is September 15. The CRRL Board will vote on the final ballot shortly after that date. The award will be presented at the 1982 RSO Convention, to be held in Kitchener, Ontario, on October 1, 2 and 3.

NEWS FROM ALL OVER

□ DOC has published dates for 1983 Amateur Radio examinations. They are: February 9, April 20, June 15 and October 19. Closing dates for applying to DOC will be January 12, March 23, May 18 and September 21, or about one month before the date of each examination. Remaining date for Amateur Radio examinations in 1982 is October 20.

□ Congratulations to Peter Guenther, VE4PG, who was reelected Manitoba SCM. Peter begins his new term this month.

□ The Canadian Amateur Radio Teletype Group (CARTG) 1981 RTTY DX Contest attracted participants from 67 countries. Fraser Jamieson, VE2JR, won the CRRL President's Award, with 1,052,312 points. This year's contest will be held on the weekend of October 16-17. If you operate RTTY, plan to take part.

□ Over 25,000 amateurs attended the annual Hanvention held in Dayton, Ohio, on April 23-25. Canadians could be seen everywhere. More than one U.S. amateur was convinced that the entire amateur population of Canada was in attendance!

□ Have you worked BY1PK in China? It operates cw only, on the lower ends of the 15- and 20-metre bands. BY1PK uses a linear amplifier that was made in Canada. It's a Hammond HL-2000, donated by Fred Hammond, VE3HC, of Guelph, Ontario. Yes, these amplifiers can be bought, though no longer from Fred's company. Engineering and further production still using top-quality Hammond components, has been turned over to Paul Hrivnak, VE3UP, of Toronto.

More About Soviet Hams

[This month's column was contributed by a Soviet Amateur Radio official. — Ed.]

The era of amateur communications in the USSR began in 1925, when Fedor Lbov first signed R1FL (Russia-One-Fedor-Lbov) from Gorky, a big city located some 400 km to the east of Moscow. R1FL signals were copied then in France, the UK and Iraq, it was in 1927 that regular issue of amateur licenses began in our country.

Now in the USSR there are more than 30,000 amateur stations, both club and individual. Besides, there are about 100,000 SWLs over here, basically teenagers, many of whom regularly operate one of the club stations. Thus, the club stations' activity is high enough to produce an impression that the majority of Soviet stations are clubs. In fact they comprise less than 15 percent of the total.

Soviet citizens may apply for several classes of licenses. The newcomers may get the so-called "novice" ticket, which allows them to operate cw, ssb and a-m in the 1850-1950 kHz segment of the 160-meter band with power input not to exceed 5 watts. One can get such a license at the age of 14. The "novice" stations are issued EZ prefixes.

The next class is the VHF license (it is issued to persons who have reached 16 years). The VHFers here can operate all bands above 30 MHz (144, 430, etc.) and also 10 and 160 meters. The maximum input power the VHFers can use depends on the particular band and license sub-class. The call signs issued for VHFers all begin with the letter R. Both novices and VHFers can pass without knowing any Morse code.

Those who know the code may apply for a shortwave license. There are now three different sub-classes within this class of license, each involving different limitations imposed on bands and modes. The first-class license allows operation on all hf bands using cw, ssb, a-m and, with special permission, also RTTY. Input power shall not exceed 200 watts. The call signs used by shortwave stations begin with the letter U. One may apply for the VHF or shortwave license at the age of 16.

To help the beginners take their first steps to Amateur Radio and, in particular, learn Morse code, there are local radio clubs in many Soviet cities. Such radio clubs exist on different levels from the Central Radio Club of the USSR down to small community clubs. A good example of the latter is "The Distant Countries" youth club, which was set up over 18 years ago in a microdistrict of Minsk, the capital of Byelorussia. It is run free of charge by a famous Soviet ham, Jacob Aksel, UC2BF. The club has a shortwave station, UK2AAB,

operated by the youth living in the vicinity. So far, UK2AAB has made over 80,000 QSOs with 170 countries.

To pass an amateur exam, one comes to the nearest regional radio club, where qualification commissions reside. Each such commission consists of a number of most experienced local hams selected and adopted by the local radio sports federation. The exam for every class of amateur license is conducted according to the programmes worked out by the Radio Sports Federation of the USSR.

In the course of their on-the-air activities, Soviet hams pay a lot of attention to contests. To make sure of that one may go through the results of any international competition. Usually the U-stations represent a considerable amount of participants, and quite often their call signs may be seen among the winners. In many respects this contest activity is stimulated by the fact that amateur communications are considered to be a real sport over here just as, say, the Olympic sports. There are sports ranks for which Soviet hams struggle to reach: the Master of Sports of the USSR and the International Class Master.

Everyone who is taking part in the hf contest can easily see the difficulties on the way to the true determination of the best operator. For example, it's hardly possible to compensate for Murphy strikes by any scoring system in case of big national or international event. Also it's very difficult to set up any efficient inspection when participants operate from many different cities. That is why we are looking hard for a new form of hf contest which would ensure maximum objectivity in determination of the USSR hf-communications champions.

One of the most successful forms of such contest proved to be the one suggested by the editorial staff of our monthly *Radio*. According to the rules, the leading Soviet hams all gather at a certain place, each with his own equipment and, operating portable, try to make as many QSOs as possible with the rest of Soviet amateurs operating fixed. Thus, any change in band conditions will equally affect all the challengers. At the same time there is no chance for any severe violation of contest rules (excessive power, assistant operators, etc.) because it goes under close observation of the contest committee members.

The first such contest, the *Radio Prix*, took place in August 1981. Teams from 13 union republics of the USSR were operating portable from the Klaipeda area in western Lithuania. The best of them proved to be UP2 team, and the top single operator was Tautvidas (Ted) Misiunas, UP2OX. Ted should be well known to many American DXers. He is the chief operator of UK2PAP, which is active in DX contests. Also, Ted often was with the teams of UK2BBB and UK2BAS, the most active Lithuanian club stations.

Who knows, maybe in due course the IARU

Radiosport Championships will be conducted following the same principles. The contests such as *The Radio Prix* demand much of the portable equipment and particularly of receiver dynamic range. Indeed, the operating positions during the last contest have only been separated 100 meters from each other while it was allowed to use 200-watt input transmitters and beam antennas. And in fact some participants managed to design real masterpieces of equipment, including high-dynamic-range receivers.

Here I should say that the vast majority of Soviet radio amateurs are using homemade equipment. Many hams design their own transceivers or transmitters but, of course, many more prefer to reproduce one of the proven designs. Detailed descriptions of homebrew rigs, including receivers, transmitters, transverters for surplus communication receivers, tube-type or solid-state transceivers, regularly appear on the pages of *Radio* and in a variety of booklets devoted to amateur hf and vhf communications. Quite often one can see an amateur call sign in the "Equipment" column on Soviet QSLs. It means that the station equipment was made after the design of a certain ham. The most popular now are transceivers of Yuri Kudryavtsev (UW3DI), Jacob Lapovok (UA1FA), Vladas Zalnerauskas (UP2NV), the KRS-78 transceiver designed by Valery Kobzev (UW4HZ), Gennady Roshchin (UA4IQ) and Sergey Sevastianov (UA4HAD), and also the "Radio-76" and "Radio-77" transceivers constructed in the *Radio* magazine laboratory by Gennady Shulgin (UA3ACM) and this author. The "Radio-76" is on the market now as a kit for the beginners.

To stimulate radio amateur designers and bring to light the best constructions which other amateurs could then reproduce, there are All-Union Amateur Radio exhibitions organized every two years. The latest such exhibition, the 30th, took place in October 1981. There were exhibited about 100 transceivers, receivers, digital keyers, etc. which were selected during the same kind of display held earlier in Union republics. The transceiver voted to be the best was one of Victor Tereshchuk (UB5DBJ). This all-band transceiver features a power FET in the rf amplifier, hot-carrier diode ring mixers, a homemade crystal ladder filter, PLL and built-in converters for the 144- and 430-MHz bands.

In a short article it's impossible, of course, just even to mention all the activities in which Soviet radio amateurs are involved, such as, say, design and construction of the "Radio" amateur satellites [see *League Lines* and the article on these satellites elsewhere in this issue — Ed.]. I hope nonetheless that it will help the QST readers to learn a bit more about their Soviet colleagues. — Boris Stepanov, UW3AX, Master of Sports of the USSR

*Vice President, International Affairs, ARRL

The publishers of QST assume no responsibility for statements made herein by correspondents.

Expansion Soapbox

□ I am in favor of expanding the 14-MHz phone subband. In fact, I am in favor of expanding all of the present phone subbands. I would like to see this 50-kHz expansion, 14,150 to 14,200 kHz, available to Amateur Extra and Advanced class only (K1KOB). The 20-meter phone subband is in need of additional frequencies (WB8RDN). Let's have no "gaps" — 14,225 to 14,150 (W4AJR). In regard to expanding the telephony privileges in the 14-MHz amateur band, I am in full agreement with your proposal for the General class operators (WB9KDW). I support the expansion to 14,150 and the addition of an Extra Class subband from 14,150 to 14,175. They will provide a long-needed incentive for upgrade in the amateur community (W4NTI). I would recommend keeping the General class telephony frequency assignment in a continuous block at the upper end of 14 MHz (WD5JMV). I would like the Advanced class to keep 75 kHz of band privilege on 20 meters (WB8YUQ). The best interest of the majority would be achieved by *not* providing a new subband for Extra Class or extending present Extra and Advanced class subband privileges at this time (KC8ER). It is my desire that the League push for additional frequencies for the radio amateur Extra Class operators (N4CCQ). It does seem that the Extra phone and cw subbands should be contiguous, though, for easier operation (KC8OD). The principle of incentive licensing is valid and recognized; therefore, any expansion should recognize this principle and reward the Advanced and Extra classes accordingly, rather than increasing General class privileges (W6FN). We need more room. I am in favor of your choice of frequencies (KB0WG). I propose that the telephony and telegraphy modes alternate their days of operation. Emergency and all other modes retain their present status quo, as set forth in Part 97 (W6WEQ). I am opposed to your band plan for 20 meters. It's not fair because 50% of this new expansion you are offering is only to the Extras, which currently compose only 10% of the total amateur community (N6DYJ). I am opposed to any changes in our bands. Want them like they are now. I use cw, and I think the phones have enough (W9IPH). I felt years ago that the incentive licensing was a slap in the face and an injustice, and now you want to "give" frequencies away again. No way! Where is the justice in that? (K7ABV). The goals of the incentive licensing program should be strongly considered concerning the phone-band expansion (KD3A). I am very much *in favor* of extending the phone portion *on all bands*, not just 20 meters. The cw portions of all the bands have long been underutilized, whereas the phone portions have often been very crowded (W6SLR). I think ARRL should remember that membership went way down then for what they did, and, if you do it again, I know you will see 75% cancel out (W9DMH). I have never been in full agreement over incentive licensing, and absolutely disagree with Extras,

in particular, receiving additional phone subbands as per the ARRL proposal (K8OFQ). I recommend moving the 40-meter Novice subband to 7,250 to 7,300 MHz and locating the U.S. telephony subband at 7,100 to 7,250 MHz. (N4OM). I am not in favor of allowing the band to be segmented so that a General class licensee can use the 14,150- to 14,200- and 14,275- to 14,350-kHz portions of the 20-meter band. (N7AME) Incentive licensing depends not only on the amount of frequency to be obtained by upgrading, but also on being allowed to use some desirable frequencies (K7GD). The International DX Convention at Visalia, April 16-18, 1982, had a large room full of delegates, standing room only. The question was asked: "How many favor the ARRL frequency arrangement proposal?" The vote appeared unanimous. "How many favor the FCC frequency arrangement proposal?" Not one single vote could be seen (W6AM). I am totally opposed to the FCC proposals for 20 meters regarding the General class. It is too unwieldy (KT2D). Under *no* circumstances should General class amateurs have access to this particularly choice piece of spectrum, *and* I, frankly, would prefer it to be solely the use of Extra Class amateurs . . . to further incentive licensing goals (N7DM). *The American Way* is through incentive, whether the goal is business or pleasure. The hobby of Amateur Radio now enjoys a licensing system that recognizes this fact (W5LYD). Enough room is already set aside to promote incentive licensing (WA5DTK). When the subject of frequency changes comes up for the benefit of a few, I am more convinced than ever there is as much rotten politics in ham radio as there is in our government. Those people who always suggest taking over portions of the cw bands for phone are the poor souls who could never master the code (W8BSS). I am in favor of adding 14,225 kHz to 14,275 kHz to the General class privileges, but I most strongly object to the League's proposals to add an Extra Class section only to the 20-meter band. (W7GYR). I see no reason why the foreign stations couldn't have enough room in the 50-kHz band between 14,100 and 14,150 if they close up ranks a little! (N5CP). On 40, move the Novice subband down 50 kHz so that it would then occupy the frequencies of 7050 through 7100 (W6DGF). I also support the League-proposed subdivisions by class of license within the 20-meter band (K0JV). Briefly stated: I support RM-3860 (W1ZW). The 75-meter and the 15-meter phone bands, while looking good and noble on paper, have *not* worked out in actual practice to justify this exclusive assignment (W6PSD). I would like to see the 50 kHz that is added to the 20-meter band be opened to *all* ham operators with license of General and up (KD4ZS). In the matter of an expansion of the telephony segments of the high frequency Amateur Radio Service Bands, it is my contention that with the advent of incentive licensing a great and grievous harm was done to all of the amateurs in the USA (WA4CZE). I am in favor of making them available to all classes of General and

above (W6HSV). Please, please don't persist with this senseless proposal to expand U.S. phone privileges on 14 MHz (VE4AED). As far as your proposal for enlarging the 20-meter ssb band, I totally disapprove of it unless the cw portion is equally expanded (KA9FYZ). Any expansion of our ssb operations on 20 meters will cause foreign hams to readjust their ssb subband so as to keep their exclusive 100 kHz (W1GV/4). The Advanced have all to lose (W3SOH). Sharing of this new frequency subband with foreign amateurs should be granted as a privilege only to Extra Class amateurs (K3JT). The River City Contesters, at their May meeting, voted unanimously in favor of the ARRL proposal for the 20-meter phone-band expansion (K6SG). I feel that the ARRL plan would benefit the largest number of hams and maintain incentive licensing (WA2CLP). No, no, no! (VE5RB). Your proposed idea on expanding the 20-meter band for phone operation subbands is okay. I would back that (RM-3860) all the way (KU5Q). I am at severe odds with you. The proposed Extra portion in the new allocation is without any merit whatsoever (K3HVG). Let's make better use of those segments of the hf bands we have, or we'll lose them to commercial interests who have no compunction to stick with outdated techniques (KC7MM). We are in complete agreement with the ARRL proposal to simultaneously establish a 25-kHz Extra Class phone subband on 20 meters (W1OE and KAIHQM). ARRL has the best plan, and you have *all* my support (WD6AFC). I feel that the band should be left as is. If any changes are to be made, I think an Extra Class subband should be added to the first 20 kHz of the existing phone band (KA7FAH). While I am not an Extra Class operator, I feel that the top-grade license should have extra privileges (K6CWM). The bands should remain as they are at this date (W6AIT). I feel that we should open all of our phone bands to all of our phone operators (K1DOW). Your (FCC) approach to the expansion of the 20-meter phone band is clearly incompatible with incentive licensing (N4OM). I hereby approve of the 20-meter phone expansion plan (KA1GDG). The need for such wide segments of each band devoted to cw is obsolete thinking (W6GYM). The American radio amateur has as much right to the frequencies as do amateurs of other countries (N8RC). I am violently, vehemently opposed to the expansion of the Advanced and Extra portions of these bands (WD4DAH). I don't like the idea of any part of it (the new, expanded phone section) being reserved for Extra only, and I don't care if the overseas DX fellows don't like it (KC5ND). Considering that between 4 and 6 cw contacts occupy about the same bandwidth as one ssb contact, it seems reasonable that the future trend should be toward wider phone bands and narrower cw bands (K5SAC). I understand that the ARRL has problems relating to the amateur, but your proposal is utterly preposterous (WA2JBV). The good news is the proposed phone-band expansion of 20 meters. The bad news — Ad-

*Public Information Officer, ARRL

vanced class receiving the shaft (K3LUE). It would be appropriate to relocate the Novice telegraphy subbands, as required, to make the expansion of existing phone subbands more orderly (WB7TXY). I want to go on record as opposing FCC's proposal to expand the telephony privileges in the 14-MHz amateur band (W1FTX/4). Slowly, but surely, the lobbyists are out to wipe out cw (K8YWI). If Generals are banned from 14,150-225 completely, and instead are given 14,225-350, it would not be that beneficial to them (KA2MXO).

[This is but a sample of the hundreds of comments we have received, and are continuing to receive. — Ed.]

NUKES AND HAMS

□ I do not believe that Mr. Hendrickson (QST, Oct. 1981) is advocating a nuclear war, but is merely alerting the amateur community to consider seriously the need for proper preparation in case of an actual emergency. To limit the amateur's response to a possible nuclear war only to political persuasion against using nuclear weapons is quite like saying the best way to deal with the problem is to prevent it. That sounds fine, but we must remember, it is the constant hope of most of our defense system to do the same thing!

Hendrickson is telling us to prepare in case the defense fails. To pretend that could not happen is quite unrealistic. The "nuclear club" has long included more than just the "Big Four." Also, international terrorists might be able to get a viable nuclear device. It is quite conceivable that a nuclear explosion could occur where Amateur Radio would be a valuable and vital asset to helping the survivors of such a disaster.

Most of the letters published assume only the possibility of an unlimited nuclear exchange between the U.S. and the Soviets. A limited exchange, however, is more conceivable today than in the past. This situation is one in which any amateurs in the area could provide valuable assistance in relief and rescue operations.

The main point that I am trying to make is that this issue needs to be studied by experts on policies that are workable in such a situation. Plans need to be formulated! The plans should be published so that the amateur community will have a clear idea of how to operate in the event of a nuclear disaster. — *Ted Drude, KA9ELV/0, University Park, Iowa*

THANKS!

□ On February 2, 1982, the station license of the Coast Guard ARC at the Coast Guard Station in Alexandria, Virginia, was renewed. The fact that K4CG is on the air once again can be attributed to the efforts of Perry Williams (ARRL Washington area coordinator) and James McKinney, chief of the FCC's Private Radio Bureau. We owe a debt of gratitude to Mr. Williams and Mr. McKinney. — *Larry Schimelpfenig, K7SV (operator of K4CG), Alexandria, Virginia*

CALL SIGN CHAOS

□ May I point out that the call sign confusion was created by the FCC, not the U.S. Air Force (see March QST, page 10). KA call signs have been used by the U.S. Armed Forces in Japan for a long time — long before the KAs showed up in the states. KA 2 × 2 call signs were to be

reserved for use in Japan; it was the FCC that issued them in the first call district. The ARRL, of all people, should know where the confusion originated! — *Ray Burns, KA8RB (WA3DYP), Misawa, Japan*

UP WHAT?

□ I hereby respectfully submit my application for official "UP" station. It would certainly please me to be able to further the cause of Amateur Radio in general, and DXing in particular, if my station were among the ranks of this elite and quality group of operators. They zero beat a DX station's transmit frequency, and send UP UP UP while he is answering a call. What a wonderful service these guys perform. — *Robert A. Mock, K9TMM, Fortville, Indiana*

GULP!

□ Back in 1964, in Navy Bootcamp, I had to eat the cover of one issue of QST. That is a long story, but I can tell you this much. Had you gone to the new format and size then, I'd still be there trying to get it down. — *Andrew J. Francis, III, WB5FZA/AAV6MK, San Antonio, Texas*

[Editor's Note: We wonder if this incident had anything to do with Andrew's decision to join Army MARS.]

WHO R U?

□ I have a suggestion that should identify the maritime mobile intruders. A simple inquiry on cw at 13 wpm should separate the hams from the pigs. "What is the color of your boat? How is the weather today?" I am active in both boating and ham radio in Southern California waters; I don't think legal boating hams would get up in arms. At the very least, the bootleggers would be encouraged to learn the code! — *David O. Guimont, Jr., WB6LLO, San Diego, California*

YES NO NO-CODE

□ Thanks for a fine magazine, and keep up the good work; but please consider a no-code phone Novice license similar to Japan's. I have talked with many "20 watters" from JA-land. They often showed more skill and courtesy than our code-proficient hams over here. — *Dale W. Avery, KC7MM, Spokane, Washington*

□ It is with great pleasure, in this day where the trend appears to be for "code-less" amateur examinations, to see that the ARRL directors, at their last meeting in Newington, have adopted a position strongly opposing the issuance of any amateur license with no Morse code requirement. — *W. B. Precht, W3KO, Bridge City, Texas*

□ I am very interested in radio communications, and have been practicing cw, but I have decided not to persevere with ham radio, as I do not believe it necessary to do the cw exam if you have no intention of ever using it. Before you amateurs start writing to complain, I should like to point out that my professional qualifications take me to Extra Class theory, without a doubt.

Perhaps, one day, FCC and ARRL will get together and devise a codeless examination procedure. Until then, you have lost a very keen associate member. I was truly astounded at some of the comments from some of your narrow-minded members in the March Correspondence. — *David R. Bishop, Phoenixville, Pennsylvania*

COUNTY HUNTER KUDOS

□ The New Zealand High Commission in Suva, Fiji, would like to convey its thanks to the members of the County Hunters' Net, normally operating on 14,335 kHz. By keeping the frequency clear for a period at the end of January 1982, they greatly assisted the successful completion of a sea search and rescue operation for a New Zealand family in distress off the coast of New Caledonia. — *D. W. Leask, Deputy High Commissioner, New Zealand High Commission, Suva, Fiji*

CABLE'S POSITIVE SIDE

□ About six years ago, Winchester TV Cable Co. installed a system in Winchester, Virginia. I operate on all bands (75 through 2). I run full legal power on 80 through 10, and 160 W output on 2-meter ssb. I also work the satellites. I have not had any type of interference complaint in the last five years. It wasn't that way in "the good old days." I am sure the cable system is responsible for this. I have good neighbors, and I am sure they would let me know if they had any problems. The point of this letter is that a properly installed cable system is good for the hams. It should not add to their problems. — *Roy A. Cartier, K4AC, Winchester, Virginia*

PERMANENTLY PORTABLE?

□ One glance at a quarterly supplement of the *Callbook* will reveal almost one-half of the corrections and additions are from previously licensed operators. Allowing hams to keep their original call signs after relocating their stations must relieve a good portion of the burden on the FCC. The operator also feels a relief, because he does not have to reintroduce himself to his fellow rag chews. The largest, and possibly the only, problem arising from this is the confusion to other stations. Adding the "portable" suffix to the call sign alleviates the problem; it should be required for clarification. It should be the individual radio operator's choice to change his call sign or use the suffix. Both are effective in stopping the confusion, and both introduce a moderate amount of inconvenience to the amateur. — *Robert Vandevender, II, KR2K/1, Groton, Connecticut*

HOW MANY CANDLES DO WE PUT ON THE CAKE?

□ Common usage seems to indicate that dates, when shown numerically should read "day-month-year." For example, the nineteenth of March 1982 would read 19-03-82. As an old Signal Corps hand, I was taught that, even if the month was spelled out, it should still read "day-month-year." For instance, 19 Mar 82 reads better than Mar 19 82, which might be mistaken for Mar 1982 (no day) in telegraphy.

The expiration date on my ticket read 05/03/82. In filling out FCC Form 610, I found the FCC uses month-day-year, and, therefore, the expiration date of my license was May, not March. Then being an Army retiree, I had occasion to request a new I-d card for my wife. Lo and behold, the Army wants "year-month-day!"

Supposing I was born on the tenth of November, 1912 (I wasn't, but I'm darn near that old): Date of birth: 10-11-12. Right? Nope! FCC says 11-10-12, Army says 12-11-10. Gosh, I wouldn't know how old I was . . . — *Robert K. Slaven, W1MOZ, Blue Hill, Maine*

Moved and Seconded

MINUTES OF EXECUTIVE COMMITTEE MEETING
NO. 399
MAY 1, 1982

AGENDA

1. Recognition of Life Members
2. Affiliation of Clubs
3. Approval of Conventions
4. Report on requests for direct Antenna Case funding; Mr. Imlay
5. Report on FCC actions; Mr. Imlay
6. Review of actions taken by General Manager
7. Report on Wallace Nolen suit; Mr. Sumner
8. Request for financial assistance from Michael J. Wetzel, W9RE
9. Report on Manila IARU Region 3 Conference; Mr. Clark
10. Report on IARU travel; Mr. Smith
11. Report on 1982 National Convention preparations; Mr. Grauer
12. Consideration of Board Meeting dates for 1983
13. Proposal for cooperative relations between ARRL and REACT
14. Increasing the political awareness of League members, e.g. SPAR

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 9 A.M. CDT on Saturday, May 1, 1982, at the Best Western — KCI Airport Hotel, Kansas City, Missouri. Present were President Victor C. Clark, W4KFC, in the Chair; Directors Paul Grauer, W0FIR, Jay Holladay, W6EJJ, and Mitch Powell, VE3OT; First Vice President Carl L. Smith, W0BWJ; and General Manager David Sumner, K1ZZ. Also present, at the invitation of the Committee were Vice Presidents Larry E. Price, W4RA, and Gar Anderson, K0GA, and Counsel Christopher D. Imlay, N3AKD.

Mr. Clark conveyed to the group the regrets of Director William J. Stevens, W6ZM, who was ill and unable to attend.

1. On motion of Mr. Powell, the Committee recognized the names of 69 members recently elected to Life Membership, and directed the General Manager to list their names in *QST*.

2. On motion of Mr. Grauer, the affiliation of the following clubs was approved (Category I affiliates, unless otherwise indicated): Boothell Amateur Radio Society, Dexter, MO; Centroplex Amateur Radio Club, Killen, TX; Encon Amateur Radio Society, Albany, NY (Category II); Grand Mesa Contesters, Fruita, CO; Mid-Atlantic Amateur Radio Club, Villanova, PA; Morton Area DX Association, Morton, IL; Orange County Contest Society, Westminster, CA; Southern Appalachian Wireless Society, Bluefield, WV; West Coast Amateur Radio Club, Newport Beach, CA.

With this action, the League now has the following number of active affiliated clubs: Category I, 1758; Category II, 10; Category III, 231.

3. On motion of Mr. Holladay, approval was granted for the holding of the following ARRL conventions: Kentucky State, September 25-26, 1982, Louisville, KY; West Gulf Division, October 1-3, 1982, Houston, TX; Ohio State, February 26-27, 1983, Sharonville (Cincinnati, OH).

4. Mr. Imlay reviewed the status of requests for direct ARRL funding of litigation concerning amateur radio antennas.

4.1. Mr. Imlay pointed out that Minute 72 of the 1982 Annual Meeting of the Board directed a study of possible revisions to the criteria under which such requests are reviewed. On motion of Mr. Powell, it was voted that the Executive Committee requests Counsel and the General Manager to circulate their draft recommendations in response to Minute 72 to Board members at least 45 days before the July Meeting of the Board, with comments to be invited at that time.

4.2. A request for ARRL involvement in a challenge of an anti-amateur ordinance in the city of Burbank, Illinois, received from James C. O'Connell, W9WU, was discussed at length. The ordinance in question is aimed at amateur and CB antennas as well as against rf interference, and could have a serious negative impact on amateur operations in that community; however, it also appears to be subject to legal challenge on several grounds. On motion of Mr. Holladay, it was voted that the Executive Committee views the recently enacted Burbank, Illinois, ordinance with extreme concern and directs the General Manager to investigate the extent of local sources of support for a challenge of the ordinance, with a report

to be given to the Committee at its next meeting.

4.3. The renewed request for financial support of a case involving Thomas Boudreau, N0CBX, of New Brighton, Minnesota, was considered. Considerable League support has been provided in the form of legal assistance from the Counsel's office at League expense. After discussion, on motion of Mr. Grauer, it was voted to let stand the earlier decision that direct financial support not be provided.

4.4. Mr. Imlay reported briefly on the status of cases involving Harvey Ellis, WD8BCM, of Farmington Hills, Michigan, and Charles Guschke, N5SW, of Oklahoma City, which had previously been brought to the attention of the Committee. An extensive *Amicus Curiae* brief has been filed by the League in support of Mr. Guschke's position.

5. Mr. Imlay reported on recent FCC actions as follows:

5.1. Pursuant to Minute 73 of the March Meeting of the Board, an Application for Review of the dismissal of the League's petition, RM-3855, has been filed along with a Request for Expedited Action on that Application.

5.2. A request for a 47-day extension of time for filing comments on the Inquiry portion of FCC Docket 82-83 has been filed; favorable action is expected.

5.3. Comments have been filed by the League in connection with two petitions for rulemaking from industry, RM-4062 and RM-4075, which seek additional frequencies for cordless telephones near 47 and 50 MHz. The League's comments encourage abandonment of the 1.6- to 2.0-MHz frequencies presently used by cordless phones without specific authorization in the FCC rules, but cautions against the marketing of cordless phones that are susceptible to overload from nearby 50-MHz amateur transmitters.

5.4. Reply comments in Docket 81-414 were filed by the League to rebut the contentions of the Association of Maximum Service Telecasters that amateur spread-spectrum operation would cause interference to television broadcasting.

5.5. Reply comments in Docket 81-823 were filed to reiterate the League's concern that rules for automatic beacon operation not place new restrictions on manual beacon operation.

The Committee was in recess from 12:07 to 1:26 P.M.

5.6. A report that it might be possible for Mr. James McKinney, Chief of the FCC Private Radio Bureau, to meet informally with the Board prior to the July Meeting in Cedar Rapids was greeted enthusiastically by the Committee members.

5.7. A discussion of the FCC action in dismissing the petition of Joseph Speroni, AH0A, which sought changes in the rules governing operation by reciprocal permittees in the U.S., led to the adoption of the following resolution proposed by Mr. Smith:

Whereas, certain inequities exist in present construction of Section 97.311 of FCC Rules pertaining to operating conditions for aliens operating in the United States pursuant to reciprocal operating agreements,

it is, therefore, RESOLVED that the President and General Manager shall review the matter of alien reciprocal operating conditions in the United States, and take action as perceived necessary to change or clarify present rules so that alien amateur reciprocal operating privileges and limitations in the United States shall correspond to those applicable to U.S. licensees and shall be in accordance with ITU Radio Regulations.

6. The General Manager's report was postponed in the interests of time; a written report will be circulated to Committee members, and to the Board.

7. Mr. Sumner reported on a suit entered against the League in Supreme Court of the State of New York, Westchester County, by member Wallace S. Nolen, WA2BLM. A copy of the complaint is not available until the League files an appearance in this Court, so the grounds of the suit are not known. After consultation with Messrs. Clark and Imlay, local counsel has been retained to represent the League in this matter.

8. Mr. Sumner reported on the change in FCC policy that now permits the holders of secondary station licenses to transfer those call signs to their primary station licenses up to one year after the expiration of the secondary license. Michael J. Wetzel, W9RE, has requested financial assistance from the League to defray attorney's fees he incurred in the effort to regain his call sign, an effort which was at least partially responsible for this change in Commission policy. The members of the Committee congratulated

Mr. Wetzel and suggested that support be offered in the form of publicity, so that those individuals who may have benefited from Mr. Wetzel's efforts may contribute directly to him.

9. Mr. Clark reported on his visit to JARL Headquarters in Tokyo, his attendance as the ARRL representative at the IARU Region 3 Conference in Manila, and on subsequent visits to members in Guam and Hawaii on his return trip.

10. Mr. Smith delivered a report on his attendance at the Manila Conference as Vice President of IARU, on subsequent visits to IARU-member societies in Thailand, Bangladesh, India and Bahrain, and on his attendance at the meeting of the IARU Region 1 Executive Committee the weekend of April 24.

11. Mr. Grauer reported on preparations for the 1982 National Convention in Cedar Rapids. Plans for the convention program found favor with the Committee members.

12. After discussion, the following tentative dates for Board Meetings in 1983 were recommended: April 21-22 and October 20-21.

13. After discussion, on motion of Mr. Holladay, the proposal from REACT for cooperative relations between that organization and the ARRL was referred to the Emergency Communications Advisory Committee for study. Mr. Grauer left the meeting at 3:28 P.M., followed by Messrs. Powell and Anderson, at 3:58 P.M.

14. Mr. Holladay presented for discussion background on a proposed concept for greater political involvement by amateurs called SPAR (Society for the Preservation of Amateur Radio). The discussion highlighted many valuable ideas contained in the proposal, and noted that some of the same concerns were identified in the report of the ARRL Long Range Planning Committee, but also noted that the limitations on political activity by not-for-profit organizations such as the League were not so severe as to require the creation of a separate corporate structure. The dialogue with the authors of the SPAR concept is to be continued.

There being no further business, the Committee adjourned at 4:40 P.M.

Respectfully submitted,
David Sumner, K1ZZ
Secretary

Victor C. Clark, W4KFC
President

Life Membership Applicants May 1, 1982

Don Anderson, WD8OOR; M. L. Bandler, K3EEX; Richard C. Baum, KE2K; David A. Behar, K7DB; Wilfrid F. Berg, WB9UZR; S. K. Blackburn, KA7CMD; Buster B. Boatman, Jr., N0CKC; David N. Cash, KC5UH; James J. Coleman, KA6A; Tim Constable, WB1EXG; Guillermo A. Costello, WA6QDR; Jonathan A. Cunitz, W1BWS; Richard Louis Deal, WB3BFC; Richard A. Eichel, WB6STV; Ralph W. Fallon, Jr., KA2HUS; H. F. Filson, K0SMI; Danny Foster, WB7UIE; William P. Frame, W0PKT; La Vonne M. Frank, AC9J; Gil Frey, K4JST; Linda Kay Frey, KA4IUM; William J. Gaydos, WB2YBY; Richard Gilcrease, WA0OQA; Mike Grimes, K5MLG; Terry L. Gunter, KA4TYO; Willie Flora Henderson, WD5AHH; Edward Hendrix, WD4FJP; Mike D. Henry, WA4TKR; Roger Hentershee, N1NN; Steven D. Howard, WD0GST; Evelyn Lucy Hughes, KA4PKT; Dalene M. Hutchinson, W0TTK; Steven P. Hutchinson, KN0L; Robert F. Imhof, AG2K; George R. Isely, WD9GIG; William H. Jackson, K9RZ; Edward R. Jansson, WD4DTC; Frank J. Jaworski, K1EF; Donald K. Johnson, W6AAQ; William G. Jones, WD5BEP; Donald H. Kahn, KC2BP; Alan V. Kaiser, N1API; Stephen Karas, Jr., WB6BKK; Joel F. Klinger, WA9YAO; George M. Kowal, WA2MDW; Mary Ann Lentz, KA0X; Mary E. Lewis, W7QGP; Thomas C. McAllister, WB4TLX; Joseph D. McDaniel, WB7PHM; Cecil Mimmis, K9BNA; Jerry Wayne Morris, KB5UQ; Ronald J. Murray, N9JJ; Donald E. Novy, Jr., WB9NMN; John P. O'Donnell, N2CNP; David F. Reed, KK5D; Ed Rjordann, W2QH; John R. Robertson, N4BGL; Joseph J. Schuler, N3TW; Douglas A. Sebranek, KA0G; Fernando Semiao; Werner R. Steinhauer, N9UN; Ronald L. Stier, W9ICZ; Ted Van Lingham, WD5JNT; Johan Van Nimwegen, KO6I; Terry N. Wilkin, KC6S; Larry A. Wood, W3IFM; Thomas M. Zieha, WD0AFF; Stan Zulaski, K7VYH; Edgar H. Zysset, KA8ANQ.

Auxiliary Stations

Interest in fm repeater systems continues unabated at a steady S9 clip. Increasing complexity in these operations is yielding greater facility for public service and, of course, fun. Accordingly, use of auxiliary stations is on the rise. This month, we tackle the topic of auxiliary station operation.

Q. First things first. What is auxiliary operation?

A. Essentially, auxiliary operation exists to facilitate *point-to-point* communications within a system of stations. An Amateur Radio station is said to be in auxiliary operation if it is being used for any of the following: (1) *remote control* of another station; (2) *automatic relay* of signals of other stations in a system of stations; and (3) *intercommunication* with other stations in a system of stations (Sec. 97.3[1]).

The point-to-point characteristic of auxiliary stations should be emphasized; such a station exists solely to relay signals from one point to another to accomplish one or more of the above operations.

Q. What are some examples of auxiliary stations?

A. A common application of an auxiliary station is *remote control* of repeaters and other Amateur Radio stations. Repeaters often sit atop mountains or tall buildings so that local (at the transmitter) control is impractical. A viable means of accomplishing control for those amateurs unable to leap tall buildings at a single bound is radio remote control. The station used by the control operator to operate the remote station is in auxiliary operation.

Another application is *remote control* of conventional Amateur Radio stations. For example, an amateur who lives in a valley between two mountains may put a 20-meter station atop one of the mountains and remotely control it with an auxiliary station at the control point at his home in the valley. The "uplink" carries the voice and control information. A second auxiliary station may be installed at the remotely controlled station site for the point-to-point "downlink" carrying the returning voice taken from the 20-meter receiver. Many amateurs use this scenario to relay signals to hit distant repeaters (refer to Fig. 1).

Auxiliary stations are often employed to *relay* signals of other stations in a system *automatically*. When terrain prohibits direct linking, repeater clubs will often use a midway station in auxiliary operation to effect long-distance linking of their two repeaters. Similarly, repeaters may also incorporate "remote" receivers in auxiliary operation to carry distant signals into their systems.

Q. What frequencies may be used for auxiliary operation?

A. A station in auxiliary operation must use

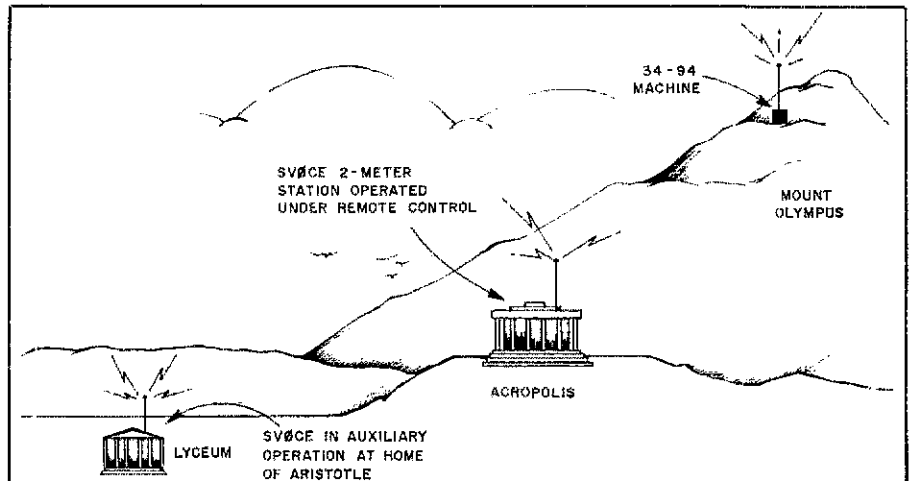


Fig. 1 — In ancient Athens, Aristotle, SVØCE, used an auxiliary link to remotely control his 2-meter station atop the Parthenon. This system enabled him to check into the nightly Philosophy Net on the distant Mount Olympus repeater to discuss the issues of the day with fellow hams Theophrastus, Eudemus and Alexander The Great.

the amateur frequencies above 220.5 MHz (except 431-433 and 435-438 MHz), but if the auxiliary station is relaying another station's signals into a repeater, the auxiliary station may use an input (receiving) frequency in the auxiliary bands, repeater bands, or both (Sec. 97.61 [d] and Sec. 97.86[b]).

Q. What are the logging requirements of an auxiliary station?

A. In addition to the logging requirements of every amateur station, the log of an auxiliary station must show: (1) a system network diagram; (2) transmitting bands of the station; (3) transmitter output power; and (4) if remotely controlled, details about the control link (Sec. 97.103[f]).

Q. How are auxiliary stations identified?

A. On phone, "WA1VEI auxiliary" does the trick. A cw i-d should take the form of WA1VEI/A or WA1VEI/AUX (Sec. 97.84[d][2]). The station in auxiliary operation may also be identified by the call sign of an associated station. For example, an auxiliary station relaying signals in a system that includes W1AW/RPT may identify itself with W1AW/AUX (Sec. 97.84[e]).

Stations in repeater or auxiliary operation must transmit an i-d at least once every 10 minutes of operation (Sec. 97.84[a]).

Q. Would you describe the rules concerning remote control?

A. As discussed above, remote control of amateur stations is permitted under the Rules. If you are remotely controlling a repeater station using another Amateur Radio station (a station in auxiliary operation), however, you may not use the input frequency of the repeater to effect control (Sec. 97.88[e]). A station may also be controlled remotely by means other than radio signals; a telephone line, for example. FCC defines remote control as manual control, with the control operator on duty at a

control point located elsewhere than at the station transmitter, such that the associated operating adjustments are accessible through a control link.

FCC requires that remotely controlled stations have provisions to limit transmissions to periods of no longer than *three minutes* in case of control link failure (Sec. 97.88[d]). The remotely controlled station's license (a photocopy will suffice) must be posted in a conspicuous location at the station site. You must also post the name, address and phone number of the station licensee and at least one control operator. The control operator must be on duty at all times (unless that station is under automatic control¹) to monitor emissions and terminate any violative operation (Sec. 97.88[a], [b] and [c]).

Q. How about log requirements for stations that are remotely controlled?

A. The log of a remotely controlled station must contain names, addresses and call signs of all authorized control operators. It must also contain a functional block diagram of the control link and a technical explanation sufficient to describe its operation. In addition, the log must contain descriptions of (1) the measures taken for protection against unauthorized operation, (2) the measures taken for shutting down the station in the event the control link fails and (3) the means used for monitoring the transmitting frequencies (Sec. 97.103[c]). [R1E]

¹Automatic control may be used for repeaters only. However, an auxiliary station may also be controlled automatically when it is part of a repeater system under automatic control (Sec. 97.85[e] and 97.86[a]).

[Note: Questions appearing in this column are typical of those frequently asked of the FCC and other agencies. Answers, prepared at ARRL, have been reviewed by the FCC's Personal Radio Branch for agreement with current FCC interpretations and policy. Numbers in parentheses refer to specific sections of the FCC rules.]

*Assistant Manager, Membership Services, ARRL

Where's All the Good Audio?

We all know that there is a point of diminishing returns when it comes to the modulation of any transmitter, whether it be am, fm or ssb. Did you ever want to cuss out that guy on 20 meters who's running his kilowatt with a speech processor and is taking up about 30 kilohertz of valuable band space? And, like 20 meters, some fm repeaters are having problems.

In my travels through Virginia and North Carolina, I've found some repeaters that are following the same principle as those operators on 20 meters; it goes like this: When the band gets full, turn up the audio. I don't know if this is the real reason that some repeater owners turn up the deviation. However, the end result is the same. I've recently encountered some repeaters that were deviating 7, 8 and as high as 9 kHz. A few months ago, I measured the deviation of one repeater that was peaking at 9 kHz. The instrument I was using was a \$5000-plus Cushman analyzer.

Most ham rigs are manufactured with 5 kHz deviation in mind; why feed them 7 or 8 kHz? The repeater audio sounds terrible and if your squelch is tight, the repeater signal chops right

out of the bandpass of your receiver in some cases. It's the same logic that a cb'er uses when he puts a "power mic" on his rig so he can modulate 125 percent. Cranking up the modulation isn't going to make the signal go farther. We all know that, don't we? Repeater owners and repeater users should be sure that their transmitters are below 6 kHz in deviation.

One method of limiting incoming and outgoing repeater signal lies with the techniques used by commercial fm broadcast stations. Knowing that the d.j. in the control room is often modulating in excess of 100 percent, they use peak limiters to avoid excess deviation. I know of no commercial broadcast station and I've worked at several in the last 20 years, that doesn't compress and limit its audio. With new super processors replacing peak limiters in commercial broadcast stations all over the country, there are a number of CBS, Gates and Thompson peak limiters gathering dust in the back of some storage room.

Wouldn't it be nice to hear a repeater with everyone's output signal at exactly the same volume level, no matter what was the level of the input audio? Instead of trying to convince everyone on the ham bands to set their transmitters to exactly 5 kHz, it seems to me

that it would be easier to use a limiter at the repeater to achieve the same result.

Listen to your favorite fm broadcast station sometime, paying particular attention to its audio level. Chances are you'll find the announcer's voice, the recorded commercials and the music all exactly at the same volume, despite the fact that the announcer in the control room is feeding one, two or maybe three different levels to the transmitter.

The 2-meter band is getting crowded. Let's not start a deviation/volume war like the boys on channel 13 with their power mikes. And, if your friend comes on the air with a brand new 2-meter rig and his deviation is too "heavy," do him a favor and ask him to turn it down. FM can sound so good! — *Mike Williams, KC4AO (from Repeater Journal)*

NEW REPEATER DIRECTORY

By the time you read this, the new edition of the *Repeater Directory* will be available from the ARRL, as well as from dealers of ARRL publications. All repeater enthusiasts will find this book to be a valuable reference when traveling cross country or scanning the vhf-uhf bands from the shack. (I always keep one copy in my car and one at my operating table.)

*72 Stiles St., Waterbury, CT 06706

Strays



HOMEMADE BEATS STORE-BOUGHT RIG

□ Roy Coia, KA8CFN, hankered to tinker and build his own QRP transceiver. To hasten Roy's entry into the fun world of low-power operation, his wife surprised him with a commercially built QRP rig. According to Roy, the performance was dreadful: the agc thumped, the transmitter would not load properly and instability was excessive. He returned the equipment to the "local manufacturer" and obtained a different transceiver of the same brand, but of a different model. It suffered from front-end overloading, blocking and severe IMD.

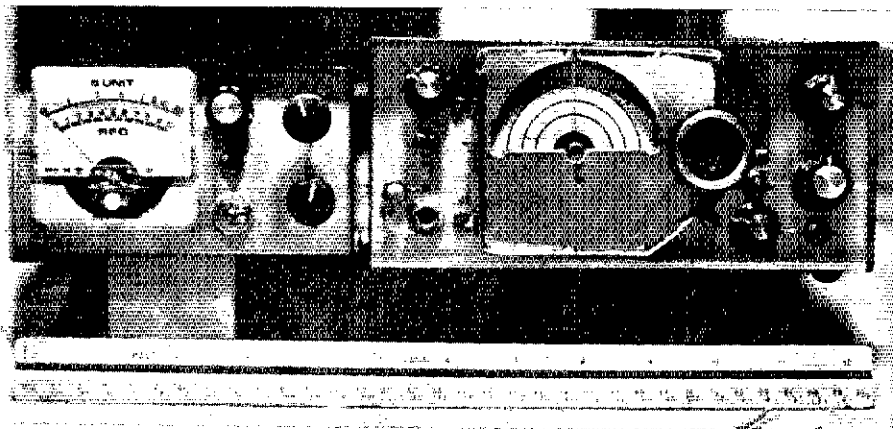
Roy returned to the workbench and resumed his home-construction endeavors. Inspiration for the design came from *QST*, as Roy read articles by W7EL, W7ZOI and W1FB on allied subjects. The end product is shown in the photograph for this Stray. It is built for 40-meter cw use, has RIT, QSK, a tuned input filter and a 3-pole R-C active audio filter. A direct-conversion receiver is used. The transmitter is VFO-controlled and puts out a stable 4 watts. A 5-watt audio amplifier is at the tail end of the receiver.

Roy says, "Operation with the rig has been smooth and clean. Reports have been excellent and, at times, unbelievable. Nothing gets into

the receiver that isn't supposed to, and large signals do not cause blocking or distortion. The received signals are clear and melodious."

Soon after the new homemade rig was commissioned, Roy filled two logbook pages with QSOs from California to New York, and from Michigan to Florida. He uses a vertical antenna.

Those who feel that building one's own gear is too costly or difficult can take heart from success stories such as this one. Roy is but one of thousands in our amateur fraternity who have experienced the pride and thrill attendant to building a rig and understanding how it functions. This approach makes servicing much easier, too! — *Doug DeMaw, W1FB*



"Clear and melodious" are the words Roy Coia, KA8CFN, uses to describe the signals he receives on his homebuilt, 40-meter, cw, QRP transceiver. Inspiration for the design came from various articles in *QST*.



International DX Convention Revisited

For more than three decades, a yearly West Coast confab has enhanced a spirited camaraderie between two outstanding clubs — the Southern and Northern California DX Clubs, meeting annually for their DX Convention. For most of these years, the meetings have occurred at Fresno, a roughly equidistant point for those traveling from both ends of the state. In fact, it is only in the recent few years that the location has changed to Visalia, just a few miles farther south. This "Fresno" event has been ingrained in the minds and hearts of the faithful to such an extent that it frequently is referred to as the "Fresno DX Convention at Visalia."

This assembly, alternately sponsored by the two clubs, was hosted last April in superb fashion by N6AR and his hard-working crew, representing SCDXC. Truly, it is now an *International DX Convention*, welcoming over 500 attendees for close to three days of eyeball QSOs, demonstrations and presentations by some of the outstanding DXers of our time. The exotic flavor of DX permeated everything. Program notes heralded the arrival of ZL1BKF (VK8OM, 3D2DK/VR2DK); TN8/9U5/S9/3V8 by K5VT; Navassa KP2A by that superb operator N6CW; JA8BMK on Burma; SM0AGD, Niue/Samoa by AA6AD; VS6CT, FG0FOO VP2ML, HK3ZO, VK5QX, the Colvins, and *then some!* The Saturday after-

noon DX forum, with 400 in attendance, was manned by DX Advisory Committee member N6RJ, with attendance by your scribe, and that never-equalled writer of the illustrious *West Coast DX Bulletin*, Hugh Cassidy, WA6AUD. A book could be written about the weekend, but the balance of this column lead and attendant photos will have to suffice for now.

Erik, SM0AGD, delivered an engaging talk on his travels past and current (announcing his Pacific voyage as crew member on a yacht circumnavigating the globe with interesting DX stops over a two-year stint!) He continues to find DXing the most fun of all combined with the opportunity to meet hams worldwide. "I think the major problem with DXing today is jammers." The best way to cope with them, he says, is to ignore them.

Vince, K5VT, feels the biggest current headache is lack of sportsmanship and consideration for not just the DXer, but for the competitor as well. DXers have to share their contacts with everybody. In our eagerness and desire to have a contact, we may disregard the other person who wants that contact just as badly. Vince doesn't remember this being the case 15 years or so ago. He feels that the new WARC bands will alleviate some of the problems.

Terry, N6CW, one of the savvy KP2A/Navassa ops (excitingly covered in the May 3 issue of *Time*), feels problems in DXing today can be controlled by the guy on the DX end. Terry comments that EU stations won't

let you work them on phone. On cw this doesn't present a problem. Why does he go on an expedition? The fun, the challenge, just two countries to work (China/Heard) to "have 'em all." He just enjoys all of the Amateur Radio experience. Terry doesn't feel problems today are great, and what there are can be handled by a savvy DX operator.

Phil, VS6CT, president of the Hong Kong ARS, on his second swing through the U.S. reported that Hong Kong hams have done a great deal of work these past few years, resulting in a brand new visitor's license that is available to any nonresident staying less than 90 days. You now can operate using your home call, portable VS6. New on the Hong Kong scene for locals is a code-free license for those passing the London exam, permitting operation above 30 MHz. Phil reports a brand new award, the "Catch 22," for working all the countries located on the 22nd parallel latitude north (25 of 'em). Flyers will be out soon for details that permit contacts on or after January 1, 1980. Phil rates JAs tops as ops, with kudos for U.S. hams, who are well disciplined once they understand the system being used. Look for VS6CT Thursday at 1030Z on 14,332, moving down to 14,307 with WB2KXA. Other times are Saturday at 2330Z on 28,705, to speak with KB9N (his manager) moving up to 21,260. Phil enjoys the operating end all the more thanks to his JA manager and KB9N handling cards for the rest of the world — what with 1000+ QSOs per month the managers are

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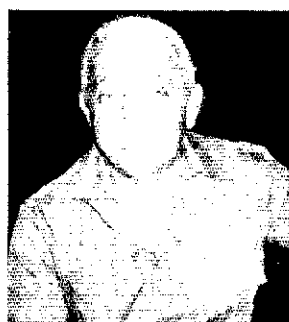
VP2ML



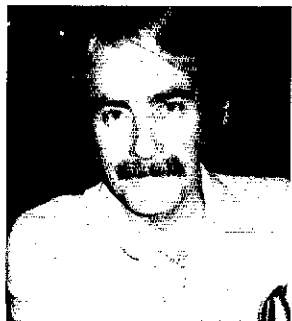
N6CW



VS6CT



FY7E



K5VT



The globe-trotting Colvins recently were presented an award from the Surinam Government by Communications Director PZ1AC proclaiming their goodwill ham activities.



SM0AGD (left) sketching out his Pacific voyage for KJ4N (thanks W42R).

essential. VS6CT feels list operation may be useful for stations with low-power and inadequate setups.

The Colvins: "We started in earnest on the Yasme DXpeditions in 1965." Don Wallace notes that Lloyd and Iris approached him at that time wanting to buy a small island to operate DX from. Don advised them that in no time they'd lose contact with the world and be bored to death, suggesting that they go to a lot of countries. The Colvins like traveling, meeting people, getting on the air. Their recent Curacao operation summed up operations in 143 countries, 600,000 QSOs, about 50-50 phone/cw. Lloyd and Iris report that all funding comes from them personally, but they do get a lot of help from the Yasme Foundation in the way of QSLing, obtaining license authorizations, etc. Thoughtful comments from them both may well indicate that the apparent rudeness in operation from some countries may well be attributed to lack of comprehension of the English language. Iris notes a bit of change in JA philosophy which is a healthy one. She said that just a few years ago a JA ham would not have corrected you had you gotten his call wrong, but these days they're rather insistent that you get it right! Lloyd is annoyed by those who call twice on the same band/mode for that "insurance" QSO.

FY7YE finds few problems in DXing today, preferring 20/15 cw, at which he is mighty proficient. Mario speaks highly for the Colvins as ambassadors of goodwill for the United States. He and his charming XYL appeared to be

having a fine time at the convention.

VK5QX reported on plans for an early 1983 expedition to Heard Island, cosponsored by hams and members of a mountaineering DXpedition. Early details noted that the Wireless Institute of Australia will be liable and accountable for funds received and will be the only authoritative source for printed information. Details to the U.S. will be channelled through N2DT, of the International DX Foundation. IDXF, WIA and the Northern California DX Foundation are aiding sponsorship on this expensive and hazardous venture. Essentially, the expedition will be primarily a mountaineering effort with the crew consisting of six mountaineers and two amateurs, one from Australia and one from the U.S. The climbers will need six weeks to scale the almost 10,000-foot-high ice-covered volcano, and ham radio will be the only entertainment, as well as required communications. Early indications are that there will be no list operation, and that selective calling will be avoided. Further IDXF information from Box 117, Manahawkin, NJ 08050.

If you're the type who likes to plan ahead and take your DXing seriously, plan your 1983 vacation to encompass the International DX Convention at Visalia, early 1983, with plans already in the works by the Northern California DX Club.

THE CIRCUIT

□ Kudos to the North Jersey DX Association (NJDXA) during this, their 25th anniversary year.

This live-wire club has sparked DX interest through their own savvy, enthusiasm and downright dedication (running the 2nd call area QSL Bureau). Look for further NJDXA details later this year.

□ 4S7MX recommends that the services of his QSL manager, SM3CXS, be used instead of sending letters to his *Callbook* address. (It seems that the reply postage is usually pilfered before the letters reach him!)

□ Tree, N6TR, is the new QSL manager for 9K2DX, relieving W6LV.

□ Seven members of the Vasteras Radio Club are planning a July 4-14 stint from the Faroes, using OY5ACQ, OY5BTX, OY5ENX, OY5IB, OY5FUG, OY5KMU and OY7WI. The club plans all-band operation, including the new WARC bands. QSL via their home SM calls (substitute SM for OY).

□ An s.a.s.e. to Hq. will bring you the current DXCC list, released early April.

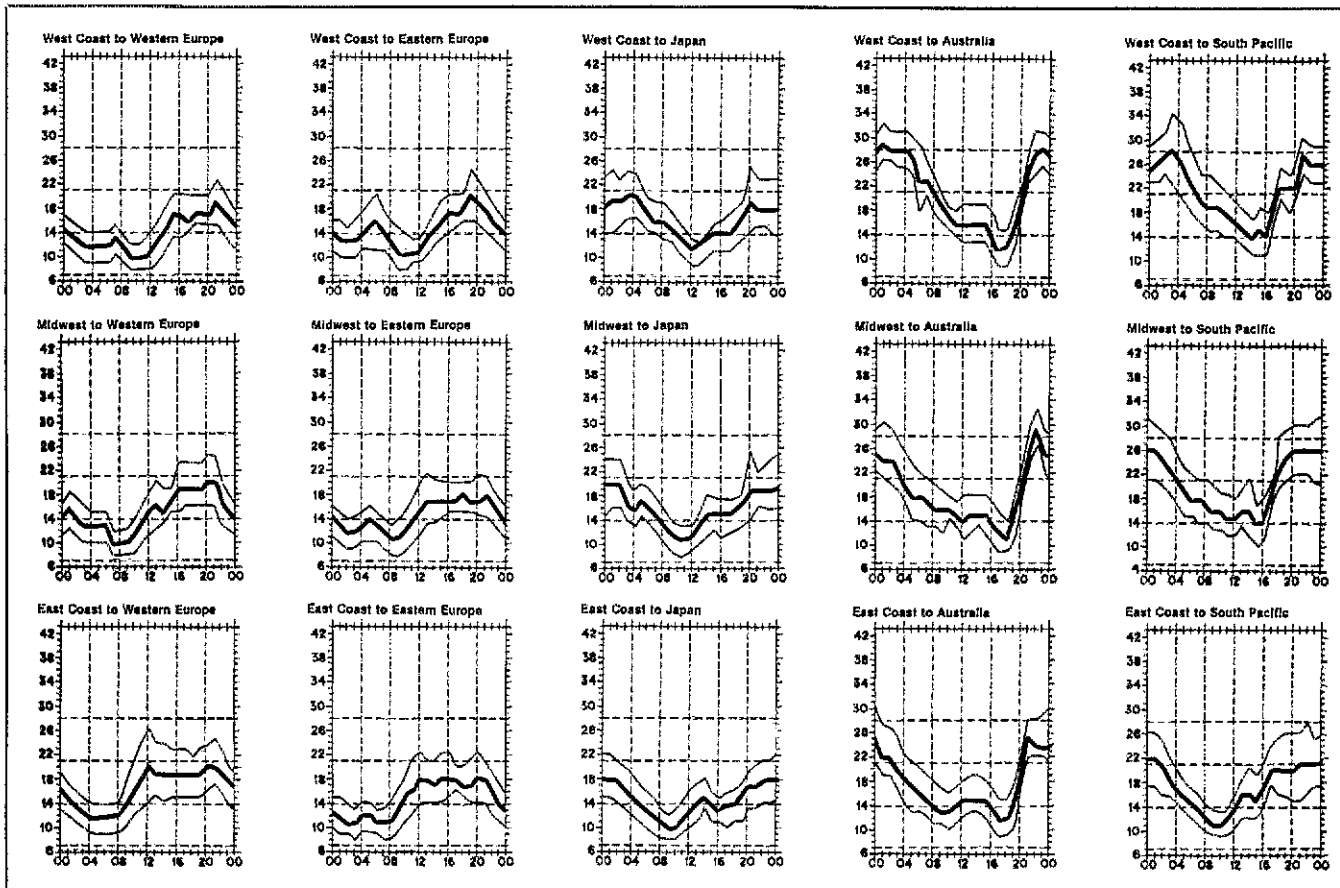
□ KHRAC goes via WP2ACL.

□ July 16-25 will feature a Liechtenstein operation by DF4GV and DJ8BD, signing /HBØ. Main operation will be on cw, 30 kHz up from the low end, including possible operation on the new WARC band. Plans include Novice-band operation on 28,130/21,130. Last year 2/3 of their 5000 QSOs were made with stateside hams, with discipline from USA/Canada excellent.

□ KJØH notes that cards for Z21DL for U.S. stations go to him; all others go direct to David Melvin, 12 Surrey Rd., Avondale West, Salisbury, Zimbabwe, Africa. All Zimbabwe calls are the same as before, except that the letter "E" has been replaced by the numeral "2." Dave is always willing to work a few after his schedules, so please be patient with him if he is in QSO at the time you hear him.

□ Ron Payne, WA6YOU (ex-OD5MX, WA6YOU/DU2), is now at the American Embassy in New Delhi, India, and will be found operating VU2YOU for the next three years. He can be found working stateside contacts from 0130-0230Z on or about 14,030, but he also enjoys the DX portions of 10 and 15. QSL via K4YT.

□ Trinidad and Tobago commemorates 50 years of Amateur Radio. Participating stations will be using the special prefix of 9Y5Ø through the end of the year.



When are the bands open? These charts predict this month's average propagation conditions for high-frequency circuits between the U.S. and various overseas points. One chart for East Coast to West Coast is also included. On 10 percent of the days of the month, the highest frequency propagated will be at least as high as the uppermost curve (highest possible frequency, or hpf). On 50 percent of the days of the month, it will be at least as high as the middle curve (maximum usable frequency, or muf). On 90 percent of the days of the month, it will be at least as high as the

□ Effective March 1, all Bahrain amateurs began using the call sign construction of A9 (prefix) X (numeral) followed by single or double call letters. In general, the numeral 2 replace the initial X call-letter designation in the old two- and three-letter calls. The new call sign structure neatly removes them from the FCC 9th call district! Their bureau remains as: ARAB QSL Bureau, P.O. Box 25425, Awali, Bahrain, Arabian Gulf. (Special thanks to Ian Cable, A92BW, ex-MP4BBW.)

□ W9CN operated from Ascension 2/24-3/5/82 as ZD8JGN. QSL him direct via John Nauman, W9CN, 420 Patrick Ave., Merritt Island, FL 32952.

□ Anyone who QSL'd 4X6FY via the 4X bureau is requested to re-QSL to KT2D, Box 191, Oakland, NJ 07436, as some of the cards sent that way were misplaced. Rob claims that is an euphemism for "lost by his wife"!

OA8V (N4CQ)
 OD5LX (SM0DJZ)
 OH0XX (OH2BBM)
 TR8DX P.O.B. 231, Libreville, Gabon
 T2GMM (PA0GMM)
 T32AE (PA0GMM)
 UK6CAA (UD6DLJ)
 VC3IAE (VE3IAE)
 VE3DUS/J87 (VE3DUS)
 VK9YM (K1MM)
 VK9YT (VK3OT)
 VP2EGP (WA1GSO)
 VP2EL (PA0VDV)
 VP2MKD (N0DH)
 VU2VZ (VU2RQ)
 XZ9A (JA81XM)
 YB2DI P.O.B. 4, Solo, Java Island
 ZF2AA (W8LUJ)
 ZF2FU (W2LZX)
 1A0KM (I0MGM)
 3B8ZZ (W2TR)
 3V8AA (IS0LYN)
 5N0WRA (DF3FN)
 5W1BZ (ZL1AIZ)
 5Z4CS (J11VLV)
 6F5RT (XE3RT)
 6J5LM (XE1OX)
 6W8HL (WA4VDE)
 7X4AN (DJ2BW)
 7X4BL (VE2LQ)
 8P6JC (WB4RRK)
 9L1LS (N3ADC)



The ARRL Zero QSL Bureau, superbly managed by W0QQN, his charming XYL, Alma, and numerous dedicated volunteers, is a service to be proud of. In 1981 the 0 service handled over a half-million QSLs, which would run for 50 miles end-to-end, or over 300' stacked up. Are your envelopes on file with your bureau? (W1YL4 photo)

QSL Corner

Administered by Joan Becker, KA1IFO

Here is some QSL information for those of you who would like to QSL direct to the station location. It is passed along as we receive it and, therefore, may not be accurate. The call sign in parentheses is the QSL manager.

CN8BX (AK3F)
 DJ6SL/3X (DJ6SL)
 FP0FSZ (VO1FB)
 G6ZY/CN (G6ZY)
 JW5OD (LA6ZW)
 J20Z (F6ATQ)
 J3AE (J3AAG)
 J6LCV (WD4NBX)
 KH8AC (WP2ACL)
 KP2A/KPI (WB2MSH)
 LZ1NQ Box 25, Karlovo, Bulgaria
 OA4JR (KA9FKL)

QSL Manager Volunteers

N8CKH
 VE6BEU
 W5QLA, for two African stations

QSL manager needed for new VS5 cw station. Include s.a.s.e. Contact K4CLA, 562 Oak, Lexington, SC 29072.

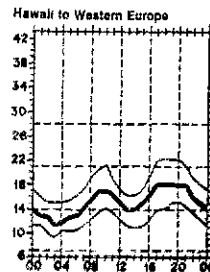
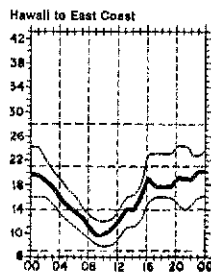
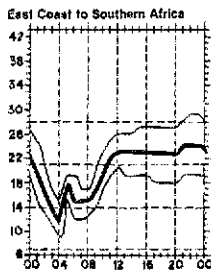
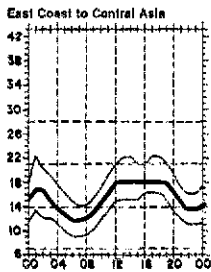
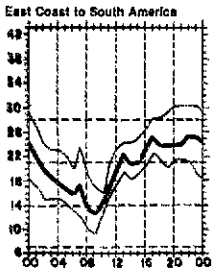
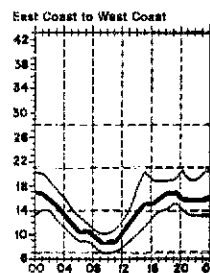
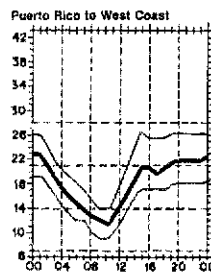
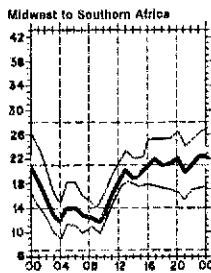
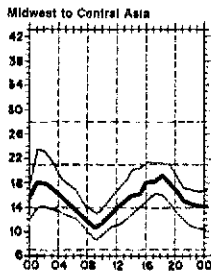
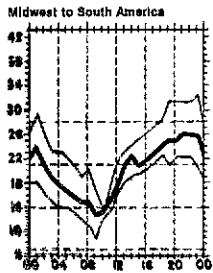
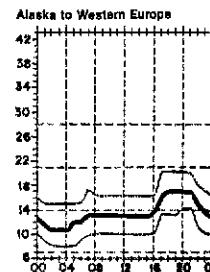
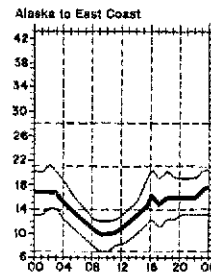
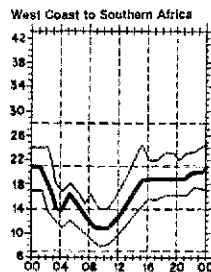
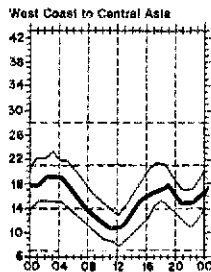
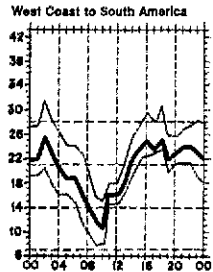
Note

If you worked VR1BE or VR1BE/KH1 get your QSLs

in the mail a.s.a.p., as the logs will be destroyed on Jan. 1, 1983. No further cards will be issued for QSOs by VR1BE. QSLs can be sent to VR1BE, c/o N6ADI, P.O. Box 379, Ojai, CA 93023. Include s.a.s.e. for prompt reply.

"QSL Corner," June 1982, contains information on the operation of the Incoming QSL Bureaus. March 1982 "QSL Corner," page 71, contains information on the ARRL Outgoing QSL Service. For information on bureau operations (Incoming and Outgoing) send a self-addressed, stamped envelope to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.

Our tnx to W2QL, KA9FYZ and AA4MI for their helpful information.



lowest curve (optimum traffic frequency, or f_{ot}). See January 1977 QST, page 58, September 1977 QST, page 35 and January 1979 QST, page 11 for a complete explanation. The horizontal axis shows Coordinated Universal Time (UTC); the vertical axis, frequency in MHz. Data are provided by the institute for Telecommunication Sciences, Boulder, Colorado. These predictions, for July 15 to August 15, 1982, assume a sunspot number of 103, which corresponds to a 2800-MHz solar flux of 150.

DX Century Club Awards

Administered by Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmations for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 25-country increments through 250, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from March 1 through March 31, 1982. An s.a.s.e. will bring you the full rules for participation in the DXCC, the DXCC list and application forms.

New Members

| | | | | | | | | | |
|--------------|---|---|--|--|--|--|--|---|--|
| Mixed | CX3AN/195 DF1PI/119 DJ2CT/110 DJ8ET/107 DK8AE/108 DL2EE/100 DL3BAQ/103 DL3GAF/109 DL8PY/105 G3RDQ/139 G4GRM/108 GW3KLU/101 HA5KKG/121 | 11RBJ/332 IS0RZU/109 JA1RLV/159 JM1RFU/103 JH3EUJ/108 DL2EE/100 JA5CTN/107 JA7FS/310 KH6HY/104 LA4TE/114 LX1BI/146 OE8KS/130 OZ1AXG/129 | PT7CSI/103 SM7CLZ/117 SM7FPN/120 VE1BWP/165 VE2ET/113 VE5UK/199 VE7PW/113 VP5FP/102 VQ9AA/109 Y78XL/170 ZL2TT/173 AK1E/110 K1VHS/292 | WB1ATK/102 K2MOY/109 KA2CKS/107 KA2GER/110 KD2A/104 KG2T/104 KI2U/101 KJ2A/100 KS2C/103 KS2BI/102 N2CGB/100 N2CQI/100 | WA2RNK/102 W3KEK/231 WA3YLN/109 WB3KWR/101 K4BWU/149 K4NLN/103 K4ARPD/106 KC4QT/104 K4IR/101 N4DAZ/123 N4FAC/109 N4SF/286 | WA4MO/101 WA4MYR/105 WA4UGU/100 WA4SAC/110 WB4THL/128 WD4GXT/144 WD4MDW/157 AE5W/107 K85FP/109 K85NO/122 KT5T/104 N5CEM/100 | WB5FX/102 WD5ELJ/109 KA6FNW/108 KA6GJW/107 K6BZA/103 N6ER/244 W6KRO/100 WB6BPA/107 K7NGA/112 N7DB/108 WA7PZO/150 WA7ZSR/103 | WB7UUE/103 KA8EEA/102 KA8IUM/108 KA8LAC/100 KA8RB/103 KC8FN/109 N8BKO/115 WD8IAH/105 WD8QJ/109 AG9S/250 N9BFF/105 N9RH/105 | WB9WNN/100 AF6M/111 KB8TL/110 N0AFV/102 N0AKZ/177 N0TW/109 W0CHJ/101 W0DKI/102 W0LSD/270 WA0ADY/130 WB0KVD/108 WD0PTC/107 |
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| Radiotelephone | CE3FH/150 DA1HG/106 DL1AM/161 DL4FW/103 EA4AZQ/103 E15DP/100 G3YGI/104 G4HLS/104 G14DOR/101 | GM4FGI/101 GM4IKT/121 GM4JDU/120 11RBJ/332 IT9LYF/158 JA4HCK/107 JA5CTN/107 JA7FS/111 LX1BI/143 | SP6ECA/230 VE1BWP/124 VE2DPJ/100 VE3LRU/110 VE5UK/161 VK9NL/193 VQ9AA/106 Y78XL/167 ZK1AR/107 | ZL1ABQ/107 ZL2TT/151 8P6OV/100 9G1RT/111 9Q5FL/110 K1VHS/279 W1KAN/119 K2PWG/116 KG2T/103 | N2CGB/100 W2UBS/130 WA2PKR/104 WB2AXJ/101 K3HVG/102 W3CPR/102 KB4Y/126 N4AEC/100 N4CQM/108 | N4EBG/107 WA4MYR/103 WD4MDW/129 K5HW/112 K5QDG/102 K65K/101 K85NO/121 W5UML/112 KA6CMD/KH2/105 | KA6GJW/105 N6DJY/110 W6PN/107 WA6FMO/DU/128 WB6GJ/292 WD6GF/102 KB7L/105 K17X/128 WA7UHW/110 | WD8IAH/102 WD8JLM/145 KA9GLB/112 KB9SV/154 N9BFF/105 W9ITT/148 K8RAB/100 KA0D/103 KB0VQ/102 | KC0BN/108 KE0C/145 N0AFV/102 W0GOD/108 W0GXY/104 WD0APT/119 WD0BHS/150 WD0GBU/112 |
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| CW | DJ2YE/101 DL7NS/212 G3RDQ/109 LA4YW/115 | LZ2LT/108 SM4ACW/109 VE1BSH/101 VE1BWP/137 | AD1S/105 AG1C/100 K1VHS/264 N1BAX/102 | W1RM/104 WE2C/109 KF2F/116 KN2Q/110 | N2CQH/102 W2YQ/180 N3ARK/167 WB3AKI/100 | K4BWU/149 WA4QBX/181 K65U/130 WSORM/100 | KA6IYE/107 N8BJQ/157 N8XE/100 | AK9V/103 WB9VE/100 W9TX/104 | WB9EEA/104 AA0E/100 K10J/106 |
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| RTTY | DL1VR | F5JA | | | | | | | |
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| 5BDXCC | K9BWQ Y45RA ON7EJ | DL7NB WD9IX SMSAQB | LZ1GC N7MC N0XA | F8DLM WA2MUA K7TM | W4PZV JA1BRK N2JJ | K7NN ZP5AO W1DA | K3NS EA1IY WA8SAE | VE1ANU W6TMD | W2FCR N8ABL |
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Endorsements

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|--------------|---|---|---|--|---|--|---|---|---|
| Mixed | DF1FX/178 DF4TD/228 F5D5P/182 DJ4W/183 DJ5JH/327 DK6GK/259 DL7AP/354 DL9XW/156 EA6DE/262 F0EYS/230 F8XL/252 G2GM/300 G3DQG/316 GW3AHN/360 HB9AOF/132 HK9EHM/254 H21AB/242 118BU/306 IT9VGI/304 JA1BWA/337 JA1TNV/260 JH1APK/290 JH1IF5/319 JH1DWT/274 JH2PYX/211 JA3CMD/315 JH4UUV/181 JA5ELM/275 JA5NG/275 | JH5FQO/265 JA8BSM/324 KL7JAI/220 KP4V/253 LA4YW/159 OE1FF/347 OE3PKU/153 OH8SR/324 OK1AUP/175 OK1DH/281 OK2BLG/262 OY7ML/307 OZ3PO/338 OZ7Y/319 OZ8WH/202 PT2LS/185 SM5DQC/325 VE3DQX/288 VE3FEA/252 VE3GJH/290 VE3LAJ/150 VE3MZ/272 VE7DX/294 YU1DZ/314 YU1OHF/184 YU2AKL/302 YU2CBM/312 YU3TIR/136 ZL1AMO/330 | ZL1AV/338 424AB/204 424DX/313 AB1A/276 AG1C/221 AK1A/273 K1KJ/320 K1MEM/315 K1VPR/310 K1WQ/283 K1WJ/305 KA1A/227 K1YZW/338 KA1DOS/208 N1BCV/124 W1AIO/205 W1BFA/321 W1JR/357 W1JNZ/156 W1OU/268 W1WDD/335 WB1CCH/285 K2BT/330 K2FW/224 K2ON/272 K2QOV/181 K2SHZ/349 K2ZGC/175 K2BEN/292 | KB2NU/299 KB2XJ/214 WB2HM/354 W2IX/174 W2JB/322 W2LNB/340 W2LPE/358 W2MT/278 W2OBK/288 W2QM/356 W2RS/320 W2TJ/125 WA2F5/271 WB2VFT/315 AC3A/232 AE3T/320 AE3Y/267 K3PPI/189 KA3CVD/152 KB3KV/265 N3ARV/228 N3UN/309 WB3BL/225 W3KLR/167 W3MP/363 W3MZ/274 W3SO/337 W3YQ/199 WA3EEE/233 | WB3DNA/285 WB3EWB/235 WB3HTK/213 WB3IGR/230 WB3KAM/263 AB4X/289 AD4F/212 K4AHJ/151 K4ELK/290 K4JC/345 K4LQ/284 K4MLR/125 K4PR/179 KA4MZ/177 WB5DI/289 N4BQD/225 N4CQT/299 N4UH/329 N4VZ/309 N4XR/310 NO4N/132 W4HLY/202 W4JVV/336 W4OMY/231 W4PTH/303 W4TO/298 WA4LOF/301 WA4QBX/317 WA4VCC/261 | WA4YZF/227 WB4CSK/236 WB4RUA/310 WD4OCO/140 K5GO/328 K5GOE/237 K5KV/285 K5OA/321 K5OG/290 K65WQ/251 K6LQ/284 N5RQ/299 W5GEL/340 W5KFN/310 KA7AUH/299 WB5OF/138 WN5MBS/201 AJ6V/259 K6DT/338 K6FM/281 K6RF/348 K6VL/203 K6XT/318 K6ZH/140 K6ZOR/241 K6Q/265 KM6B/294 N6AN/326 N6CYL/180 | W6DN/321 W6ETR/224 W6GPR/157 W6NLC/272 W6OMR/320 W6PLK/330 W6PN/329 W6SWM/279 W6ZM/351 W6ZJU/322 K7AOZ/294 K7LJQ/251 K7NN/325 K7OXB/310 KA7AUH/299 KB7OD/200 KB7VD/225 K17X/132 W7AO/353 W7GUR/300 W7UZA/311 WB7RQ/125 K8CV/236 K8CX/292 K8DD/210 K8DJC/281 K8MW/153 KA8AEO/179 KB8AU/182 | KB8KW/296 KB8MF/173 KC8CN/189 N8AAT/250 N8AVK/201 W8CEU/270 W8DWP/251 W8DX/326 W8EWS/359 W8YLU/196 WA8CZS/185 WA8SAE/270 WB8DOD/250 WB8VLC/245 K9DG/148 K9ECE/350 K9UWA/311 KB9L/159 N0AN/322 K19T/153 W9EP/225 W9FU/301 W9LF/317 W9NYW/235 W9SS/321 W9TWM/176 | WA9EKA/292 WA9EL/261 WA9OVU/225 WA9UCH/150 WA9YJN/207 WB9LF/276 WB9MSV/283 WB9VJ/226 WB9VOZ/125 WB9YX/300 WD9COI/242 WD9IVL/141 WB8DOD/250 K0CVD/255 K0SVX/303 K0XB/126 K0C/159 KF0H/311 N0EL/311 N0RR/322 W0FF/320 W0FZ/320 W0ULU/273 W0VZ/345 WB0GQ/190 WB0SAX/248 WB0BNC/290 |
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| Radiotelephone | CE3TZ/152 CP6ID/182 CT4IB/234 DF2AL/20 DF6DP/180 DL6QT/275 DL9XW/182 EA3AEO/200 EA3SA/313 EA5ANR/176 EA6DE/262 EA7AGQ/279 F8AJA/311 F8FWW/177 G3DQG/297 G4BWP/226 HB9AOF/128 HK3DD/270 HK3YH/283 HK9EHM/254 H21AB/132 | I8AA/337 I8SAT/303 I8YRK/333 I0OLK/315 I0RIZ/283 JA1BWA/313 JA1HEE/229 JA1TNV/183 JH1IF5/319 JH1DWT/274 JH2PYX/211 JA3CMD/310 JA5NG/266 JH5FQO/265 JA6BSM/322 KL7JAI/210 LA6UL/203 LA7EJ/206 OE1FF/327 OK2BLG/198 OZ3SK/343 | P29FV/223 PT2LS/185 PY4AKL/309 SM5DQC/324 VE3DQX/288 VE3FEA/240 VE3GJH/285 VE3KGK/237 VE3YE/165 VE7DX/284 Y59RV/300 YV1KZ/331 ZL1AV/321 ZL2AFT/287 Z56FU/258 424AB/170 9H3BA/163 AG1C/208 AK1A/268 K1MEM/305 KA1ND/270 | N1ALR/185 W1BFA/307 W1DOH/175 W1K5Z/298 W1NM/261 W1WDD/314 WA1KYW/305 WB1CTO/164 K2QOV/148 KB2L/137 KB2L/195 KB2XJ/201 N2BAT/130 W2HXF/290 W2HX/174 W2IOO/314 W2NCL/290 W2NCH/150 WA2FS/267 WB2RQX/176 | WB2TOJ/150 WD2AER/207 AC3A/213 AE3Y/175 K3BYV/177 K3PPI/177 KB3KV/265 N3UN/309 W3IGU/228 W3KLR/167 W3MP/337 WB3BG/220 WB3EX/158 K4LQ/261 K4GUF/129 KB4BL/173 KB4OW/154 KB4PL/153 N4BCP/284 | W4HLY/200 W4JVV/335 W4OMY/208 W4PKM/247 WA4LOF/296 WA4QBX/301 WA4VCC/261 WB4COO/175 WB4CSK/188 WD4R/150 WD4OCC/131 W5GEL/228 K5OA/321 K5OG/250 KA5DFE/202 W5ACE/354 W5LDH/190 W5VUZ/151 WA5BBR/223 | WN5MBS/201 K6CCY/344 K6DT/319 K6RF/319 K16G/188 N6CYL/157 W6ARJ/331 W6KOE/328 W6NLC/289 W6SWM/269 W6TSH/303 W6ZM/300 W6ZPV/270 WB6PSY/281 K7LJQ/251 K7NN/325 K7OXB/296 KA7AUH/297 KB7YX/175 N7US/305 | W7GUR/295 WA7DRP/318 WA7PVE/150 WB7VHA/192 K8CV/301 N8CYL/157 W8ARJ/331 W8KOE/328 W8NLC/289 K8BAU/182 N8BI/226 N8BO/300 W8DX/238 WB8JQR/169 WB8PNC/296 WB8CZS/180 WB8DOD/250 WB8HL/201 WB8VKL/239 WD8MRF/176 | K9CE/348 KC9Z/261 W9ABM/300 W9SS/321 K9CV/301 K9CX/278 K8DJC/281 K8GWM/289 K8LZ/315 WB9ZA/182 N8BI/226 N8BO/300 W8DX/238 N0RR/317 WB9PNC/296 WB9FHA/235 W0LZ/288 W0NZA/282 W0ULU/270 WA0PVW/276 |
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| CW | F3AT/297 DL1AM/128 G4BWP/156 F9XL/201 IT9GLJ/199 JA1BN/270 JA1BWA/290 JE1CKA/285 | JH1IF5/275 JH1DWT/136 JH3XGD/132 JA6BSM/282 OK2BLG/209 ON5NT/307 PY2CYE/150 SM5DQC/211 | SM6CNX/131 SM0BZH/200 VE2FOU/188 VE3FEA/141 424DX/207 AK1A/149 K1MEM/292 | K1VKO/166 W1K5Z/236 K2BZT/281 K2SHZ/258 W2IFK/150 W2LZX/269 W2SSC/200 | AE3Y/186 KB3MM/151 W3AP/284 W3EVW/280 K4JC/273 K4LQ/237 KV4F/150 | N4VZ/250 W4VO/300 W4ZRI/174 WA4LOF/190 WA4YZF/166 WB4CSK/140 K5KV/256 | N5JR/296 K6DT/284 N6AN/239 W6JL/280 KA7BDA/153 W7EJ/203 K8OV/296 | K8CX/225 K8DD/154 WA8SAE/251 K9GX/180 K9TE/160 KB9LI/153 WA9EKA/251 | K0CVD/225 K0SVX/263 KC0Q/207 N0RR/320 N0ZA/202 W0CJ/178 WB9TT/204 |
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West Coast Enthusiasm

Betty Bravin, AG6C, first became licensed as a radio amateur four and a half years ago. She was one of few licensed YLs in Sonoma County, California, at the time. The number of licensed YLs in the county has since dramatically increased — all as a result of Betty's incredible enthusiasm for Amateur Radio.

The following are excerpts from material submitted by Don Bremer, KB6LO, about Betty Bravin, AG6C.

Amateur of the Year may also be the understatement of the year, when the recipient of that award is AG6C, Betty Bravin. Her activities and achievements as an Amateur Radio operator are nothing short of spectacular — at least in the eyes of amateurs in Sonoma County.

Betty became WD6CKR in August 1977. She worked all states the first month. September 1977, General class. June 1978, Advanced as KB6CF, and one month later became AG6C, Amateur Extra — a remarkable record any time. She served as secretary/treasurer of the Sonoma County Radio Amateurs in 1978, and made thousands of QSOs at the same time. Her first love is cw rag chewing, and she has developed some outstanding friendships. Her Japanese friends fell in love with her and sent gifts of appreciation. When she failed to show up for a sked, they would resort to long-distance phone telephone calls to make sure she was all right. Several foreign amateur friends have visited her when they have visited the States.

Locally, she is the unofficial 2-meter autopatch and emergency monitor. Any amateur in the area knows Betty is there, when help is needed, with a phone call or any other assistance. She is well acquainted with all the Law enforcement agencies, and is always available for assistance during public-service events, such as March of Dimes walk-a-thons and Field Day.

Her Good Samaritan work does not stop there. Betty is an official examiner for the handicapped and, as such, was both instructor

and examiner for a blind YL, Teri, N6CYV, who passed her General test on the first attempt without stopping first at Novice. Betty has also administered cw tests for the hard of hearing.



Betty Bravin, AG6C — Sonoma County's Amateur of the Year.

Tired of being one of few YLs in the county, Betty decided to help a small group of friends get their licenses. In a very short time, there were four new Technician class YLs in Sonoma County. So successful was that class, there immediately developed a waiting list for the next one. Not wanting anyone to wait and to lose enthusiasm, she tackled three separate classes simultaneously. She formulated her own teaching techniques and provided her students with printed notes, which she paid for herself.

When each class attained the Novice level, Betty continued her classes and then personally escorted each group to the FCC for their

upgrade test. As of this writing, December 1981, her record stands at 18 new amateur YLs in Sonoma County in nine months. Of those 18, two are General class and 16 are Technicians. To top that, every student passed the written test on the first attempt.

A great deal of credit should be given to Betty's OM and staunchest supporter, Hoppy, WD6CKP. Understandably proud of his wife's achievements, Hoppy spent many a cold night out in the workshop while classes were in session.

For her dedication, Betty was presented a silver, engraved serving tray and was voted Amateur of the Year by the new YL Amateurs of Sonoma County, California. — Don Bremer, KB6LO, assistant director, Pacific Division

Betty's Comments

Betty was both surprised and most appreciative to learn that KB6LO had taken the time to write about her activities. Her reward has been to see the smiling faces of the many YLs waving their white interim cards as they have passed their exams.

At the start of each class a date was set to travel the 100-mile round trip to the San Francisco FCC office for the exam. Betty accompanied them on the trip, mentally took the exam for everyone, and upon "victory" (none have failed), organized a celebration luncheon for all.

As news of "Betty's YLs" spread, more and more YLs expressed an interest in attending her classes. Her present Novice class has 14 YLs. By the time this appears in print, all should have their Technician or higher class license. This will bring the total number of husband/wife teams in their area up to 31.

Many YL graduates miss the fun of the get-together classes, and it would appear that there will soon be a new YL club in Sonoma County. Her West Coast enthusiasm has proven contagious — and Betty's not through yet! Why does she do it? In her words, "Needless to say, I love ham radio."

A SECOND FAMILY AFFAIR

In June 1981, YL News and Views carried a story entitled "Family Affair." Three generations of the Baker family had all become licensed radio amateurs. This led to finding the Esheim family. Ed Esheim telephoned with excitement the day he read the story in QST, as his family is also a three-generation ham family. Getting everyone together for a picture wasn't easy; he and his family are on the East Coast and his parents live on the West Coast.

Ed Esheim, W6NCG, his wife, Fumika, KA6PRH



The Esheims. Front row (l-r) KA6PRH, KA6PRI, KA6PRJ and K6PEH. Back row (l-r) W6NCG, Taiki, K6PPI.

their two daughters, Asako, KA6PRI, and Sue, KA6PRJ, and their son, Taiki (too young to be licensed), presently live in Rocky Point, New York. Ed's mother Velma, K6PEH, and his dad, Ray, K6PPI, live in Fresno, California. They're another family of three generations who have become licensed radio amateurs.

Ed's engineering work with General Electric Company provides the opportunity for travel. Prior to living on Long Island, Ed's family lived in Japan, where they operated under two calls. In the summer of 1982, they will go to Spain for a few years, where they hope to operate 40-meter cw and ssb, RTTY and via the OSCAR satellite. His daughters speak, read and write Japanese, English and Spanish. Asako, now 11 years old, was first licensed at 10. Sue, 9 years old, was first licensed when she was 8.

I'm sure that every radio amateur has wished for scattered family members to become licensed, thus keeping the family in closer touch. The Esheims did it. Congratulations to a second "family affair." □

*Country Club Dr., Monson, MA 01057

Club Corner

Conducted By Sally O'Dell,* KB1O

THE LITTLE RED HEN — A FABLE

Once upon a time, there was a little red hen who scratched 'round the barnyard until she uncovered some grains of wheat. She called her neighbors over and said, "If we plant this wheat we shall have bread to eat. Who will help me plant it?"

"Not I," said the cow.

"Not I," said the duck.

"Not I," said the pig.

"Not I," said the goose.

"Then I will," said the little red hen. And she did.

The wheat grew tall and ripened into golden grain. "Who will help me reap the wheat?" said the little red hen.

"Not I," said the cow.

"Let the charmed inner circle do it," said the duck.

"I'm too busy," said the pig.

"I will," said the goose — only she didn't.

"Then I will," said the little red hen. And she did.

At last it came time to bake the bread. "Who will help me bake the bread?" asked the little red hen.

"You're not friendly enough," said the cow.

"This isn't the way my old barnyard used to do it," said the duck.

"I paid my dues — let others do it," said the pig.

"Only I know how to do it right — but I never do it at all," said the goose.

"Then I will," said the little red hen. And she did.

Then it was time to set the bread out to cool. "Who will watch the bread to be sure it isn't taken?" asked the little red hen.

"I was watching bread before you were born," said the cow.

"Another plot by the clique," said the duck.

"Only if someone else does it first — maybe next time," said the pig.

The goose didn't say anything, as she couldn't be bothered showing up at the barnyard that night.

"Then I will," said the little red hen. And she did.

She watched the loaves through the long night, and, at last, it was time to eat the bread. All of the animals wanted some, even the goose (who could be bothered to come around if there was free food). But the little red hen said, "I can eat the loaves by myself."

"No one else's opinions count around here — it's

unfair!" said the cow.

"I paid my dues — I'm entitled!" yelled the duck.

The pig resigned in a huff, but he stayed around the barnyard and made nasty comments to all of the passersby.

The goose threatened to have the little red hen cut up for Campbell's soup. No one heard in the barnyard, however, since she couldn't be bothered to show up. Anyway, everyone knows no one listens to geese.

Then the president of the barnyard stopped by, and he told the little red hen, "You have to share the bread. After all you've been baking for years now, and everyone expects it. Besides, if you don't make the bread for everyone else, who will?"

So the little red hen divided up the bread, and they all lived happily ever after, including the little red hen, who clucked, "I'm grateful. I'm grateful!"

But all of her neighbors wondered why she never again baked any more bread.

The final words, printed in the "Hilltopper" (published by the Tompkins County ARC, Lansing, New York), are "Don't let this fable come true! Agree to serve your club. Run for office . . ."

*Club Program Manager, ARRL



The Associated Radio Amateurs of Southern New England, Inc., East Providence, Rhode Island, celebrated its 50th anniversary recently. New England Division Director John Sullivan, W1HHR (right), presented a certificate to club President Bob Allen, WA1CVF.



Members of the Washington (Pennsylvania) Amateur Communications (WACOM) club on a recent tour of the National Weather Service Office in Pittsburgh. The members are intently watching NOAA Meteorologist Ray Vineski examine a weather chart. (N3BKW Photo)

50 Years Ago

July 1932

□ Although the "d.c. plate supply" regulations have been in effect for several years, there are still some selfish operators with broad, modulated c.w. signals. K. B. Warner sounds off against them in his editorial.

□ In Part I of "Building a Low-Cost 1750-Kc. 'Phone-C.W. Transmitter," George Grammer describes the Class-B modulator section. It uses three of the new Type '46 tubes, one as a Class-A driver for the two operated zero-bias in the output. Twenty-six watts of audio.

□ Under the heading, "Eliminating the 'Phone Monologue," two different approaches are shown. M. F. Chapin, W9CJU, uses a two-relay voice-controlled changeover system that picks up some audio from the modulator output for operation. George Ewing, W6GM, uses a little audio from the grids of his modulator tubes, and, through relays and the thermal inertia of some filaments, gets his 'phone break-in system. He notes that it gives him a Cockney accent: "How's my modulation?" comes out, "Ow's my modulation?"

□ In a slightly tongue-in-cheek "I Can't Be Bothered," engineer and great radio amateur Roland Bourne, W1ANA, tells how he kept his interest in ham radio over twenty years without becoming a slave to mathematics.

□ L. C. Waller, W2BRO, writes about "The New '57 as a High-Gain Audio Amplifier," pointing out the necessary steps to get a stable gain of 200 from the receiving-type sharp-cutoff pentode.

25 Years Ago

July 1957

□ Ted Crosby, W6TC, leads the issue with an article that started a cult. Entitled "Ham-Band 14-Tube Double-Conversion Receiver," it produced a resurgence in built-from-scratch receivers that many cynics thought impossible. The author aimed the design at hams who always had a yen to "build their own," and he succeeded admirably. The straightforward concept was state-of-the-art, except for the use of plug-in coils for bandchanging. Useless in a commercial design, this was the key to simple home brew. Gang-tuning, r.f. stage, first i.f. of 1600 kc. and second of 75, with lots of gain controls, the HBR-14 was a practical receiver. (In a footnote, the editor points out that the front-end coils, wound on 1-1/4 in. diameter polystyrene forms, probably provide better performance than the coils found in commercial receivers.)

□ "Transistorized Regenerative Receiver" is a report on the unit submitted by S. A. Sullivan, W6WXU. Using two transistors, two diodes, a ferrite-rod anten-

na/inductor and a 4-1/2 V battery, the solid-state version of the old "reflex" circuit gives remarkable performance on 80, 40 and 20 meters.

□ W. Gerald Bانشak describes how to adapt a couple of war-surplus items in "Wavemeters Using Butterfly Tank Circuits." One covers 135 to 485 Mc., and the other tunes 300 to 1000 Mc.

□ "A Simple Support for Quad Antennas" is the title of the description by J. T. Hall, W3PRU, of a lightweight framework using aluminum and bamboo. The "Simple Gamma-Match Construction" of Fred Reynolds, W2VS, involves a built-in adjustable capacitor using polystyrene tubing. A step-by-step tuning procedure is given.

□ "Pete" Morrow, W1VG, sounds off on DXCC "Rule 11 . . ." which concerns the altering of QSL cards submitted for credit.

□ In his "The World Above 50 Mc.," columnist Ed Tilton lists some of the small bands of experimenters who are following up the 144-Mc. meteor-scatter work of W2JK and W4HHK some five years earlier. And, in the *Recent Equipment* section, Ed gives high praise to the Tapetone XC-144 and XC-50 v.h.f. converters.

□ Lew McCoy's Novice article is "Test Meters and How To Use Them," a discourse on troubleshooting a rig with a volt-ohm-milliammeter or a v.t.v.m., complete with tables of the various tests.

□ "A Saw-Tooth Crystal Calibrator" by Laird Campbell, W1CUT, uses a patented circuit that develops *beaucoup* harmonics (to 50 Mc.) from a 100-kc. crystal by converting the oscillator waveform to a sawtooth. — Byron Goodman, W1DX

A CODELESS LICENSE?

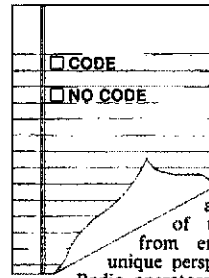
□ The ARRL instructor has always had to possess at least two teaching skills. He or she must have the technical expertise and knowledge of regulations to teach the "written" part of the exam, and possess the experience and patience to help students increase their code speed. Through the years, the FCC has reorganized its syllabus and changed its exams. We even have seen a number of changes in the code test format: from perfect copy to multiple choice, to the present fill-in-the-blank style. But the one task that has remained constant for the Amateur Radio instructor has been finding the right method, the right balance of encouragement and discipline, to lead students to the goal of a successful code exam.

During the last two years, we have devoted a number of In Training columns to the subject of teaching the code. The response to these columns has been high, both from those who teach the code and from those who are learning it. Among this second group, though, we have found a surprisingly high number who have had an extremely difficult time either learning the code for the Novice exam or increasing their speed for the General exam. The response may reflect what many of us have heard so often in Amateur Radio circles: "It's really the code that keeps people out of ham radio." We must add, however, that the majority of those who wrote to tell

us that they had difficulty passing the exam believe that the code should remain a requirement for all ham licenses. Still, there were a vocal few who claimed that because they were interested only in voice communication they should not be required to learn the code. In other words, some people feel that there should be a code-free license that assigns voice privileges for a theory-and-regulations-only examination.

For years, the organized amateur community has resisted this suggestion. Indeed, the ARRL Board of Directors has recently reiterated its strong opposition to the introduction of a code-free license. But the FCC has recently given us the message unofficially (for example, in Amateur Radio magazine interviews) that we may see a codeless license in the near future as a result of general deregulation. The chief reason given for creating a codeless license is that code acts as a block to many who want to enter Amateur Radio and contribute to its technical advancement. These people are forever lost to us, we are told, because they were never given a chance to learn, advance and subsequently contribute their developed expertise to the radio art. An entry-level, no-code license would provide an opportunity for these people to begin their amateur career with a minimum of obstacles to overcome.

This argument assumes, of course, that the code is a great stumbling block to many who would like to become hams, that there are a substantial number of people who simply cannot learn code and who could otherwise contribute to the advancement of Amateur Radio. The popular argument, outlined above, for a



code-free license turns on this assumption, and the Amateur Radio instructor is the person best suited to pronounce on its truth or falsity.

Your role as ham radio teacher allows you to see and judge whether our present code requirements are preventing large numbers of technically talented people from entering our hobby. Your unique perspective on aspiring Amateur

Radio operators is invaluable in the debate over a code-free ticket. Year after year, many of you spend days and evenings teaching your students code and theory. Is it true that the code requirement deprives us of otherwise technically creative people who could advance the state of the art significantly? In your role as an ARRL instructor, are you aware of a need to create an entry-level license with no code requirements? Do you find students in your classes who have great technical potential but who simply can't learn the code, even at 5 wpm? Answers to these questions from you, the instructor, will give us a much better perspective on the arguments that have been advanced in favor of a code-free license. If you feel strongly about this issue, please let us know. Your input can help shape the future of Amateur Radio licensing. QST

*Training Program Manager, ARRL

Silent Keys

It is with deep regret that we record the passing of these amateurs:

N1AZA, William M. Moss, Orono, ME
 K1BKN, Francis J. Mahan, Franklin, MA
 W1BKU, John H. Day, Ocala, FL
 W1COB, Culver "Whitey" A. Wightman, Ashford, CT
 W1CST, Ronald I. Berube, Monson, MA
 W1DDI, Otto F. Persson, West Lynn, MA
 K1EBG, William H. Stover, Belfast, ME
 ex-K1FKN, Philip Garovoy, Sharon, CT
 KA1GEL, William J. Marrinan, New Haven, CT
 W1KZU, Herbert Binns, Feeding Hills, MA
 W1LCD, Leo J. Emond, Allenstown, NH
 W1OTN, Marvin G. Wood, Maynard, MA
 WA1PUH, Gordon W. Turnbull, Sr., West Townshend, VT
 K1YQQ, Chester A. Wisiolek, Springfield, MA
 W2BCV, Marvin L. Gaskill, Cherry Hill, NJ
 W2BD, Roswell D. Gayton, Lincroft, NJ
 W2FRW, Morris Stern, Neptune, NJ
 KA2G1K, Frederick S. Loughton, Pennsville, NJ
 WB2GUF, Nelson Griswold, Kenmore, NY
 W2IVT, William J. LaHiff, Bronx, NY
 K2JXX, Martin I. Bettan, Flushing, NY
 WA2KUJ, Robert L. Cochrane, Honeoye Falls, NY
 W2MHD, John N. Herland, Port Jefferson, NY
 W2PZL, Millard C. Davison, Orchard Park, NY
 W2QMB, Hobart W. Rickmyre, Sherburne, NY
 ex-WA2RFF, Charles W. Comfort, Corning, NY
 WB2VOR, Daniel F. Michaels, East Berne, NY
 K2VZO, Donald D. Gregory, Niverville, NY
 WB2YON, Robert G. Short, Medina, NY
 K2ZF1, John W. Banke, Towaco, NJ
 ex-W3AR, Albert P. McDowell, Jr., Jenkintown, PA
 W3BFF, Cecil C. Kahn, Towanda, PA
 W3CWY, David F. Morris, Mesa, AZ
 W3HPD, Harry C. Weidner, West Reading, PA
 K3IDM, Hillary T. Jarman, Lester, PA
 WA3IPM, Mary-Jo Yeasted, Pottsville, PA
 W3NHI, Ruth M. Kurtzner, Earleville, MD
 W3NNR, Ivan E. Zimmerman, Pittsburgh, PA
 W3QJM, Paul A. McNichol, Altoona, PA
 K3SMC, Stephen J. Varnecky, Johnstown, PA
 KA4CPC, Gordon M. Moore, Inverness, FL
 *K4DZ, Ralph Harburton, Orlando, FL
 W4KJM/ex-W3ESY, Ralph S. Krebs, St. Petersburg, FL
 KA4GXG, John R. Wooley, Sewanee, TN

WD4JAW, Charley H. Rust, Nashville, TN
 W4KJY, Stanley B. Angle, Kingsport, TN
 K4KXF, George J. Jodoain, Clearwater, FL
 K4RGZ, Sam F. Brooks, Richmond, VA
 WA4RNN, Luther E. Tarlton, Great Falls, SC
 W4WPS, Perry A. Burham, Grand Bay, AL
 W4YBL, Anderson T. Grant, Charlotte, NC
 WB4YJ1, James C. Merrill, III, Hialeah Gardens, FL
 K4ZIL, Leo J. Stengel, Louisville, KY
 W5AYO, Horace J. Marrinan, Oklahoma City, OK
 N5EAT, Burley Clark, Dallas, TX
 W5HQT, Troy E. Pomroy, Carlsbad, NM
 K5IKA, James K. Perryman, Calico Rock, AR
 KA5JZS, Virgil E. Inge, Hugo, OK
 KQ5JP, Emile H. Larose, Huffman, TX
 WA5QGE, Leonard V. Moxom, Borger, TX
 W5SXF, Jack R. Baum, Alamogordo, NM
 *AH6CC, Dr. Albert F. Lee, Mercer Island, WA
 K6CR, Ernest H. Gutermann, Grass Valley, CA
 W6DVS, Claude K. Sanders, Turlock, CA
 WB6EMY, Willard B. Covert, Summerland, CA
 KA6EPK, Charles K. Mason, Hornitos, CA
 N6FIJW, Louis E. Donnet, Palm Springs, CA
 W6FOG, Oscar G. Smarling, Morro Bay, CA
 K6HLF, William Lebo, Murrieta Hot Spring, CA
 K6KEV, Eldridge A. Douglass, Menlo Park, CA
 W6QJP, Richard M. Rowland, Lompoc, CA
 W6OZL, Roy Fleming, Standard, CA
 W6QM, Walter A. Nelson, Long Beach, CA
 WA6SIL, John W. Hill, Fresno, CA
 KB6UL, Arthur C. Cummins, Fresno, CA
 WA6VUT, H. Ernest Wright, Pomona, CA
 W6YXU, Robert E. Hopper, Del Mar, CA
 WA6YZP, Edward A. Norstrand, Solvang, CA
 W6ZEN, Floyd A. McPherson, Thousand Oaks, CA
 WB6ZST, James E. Moses, Santa Clara, CA
 N7AHS, Jimmie C. Gray, Flagstaff, AZ
 N7AOX, William G. North, Boise, ID
 WB7ATL, A. James Bryant, Sedona, AZ
 WB7DEU, Obadiah Richmond, Hoodspout, WA
 W7EEA, Robert M. Sherman, Vancouver, WA
 W7EG, Glenn R. Stewart, Ellensburg, WA
 W7FQE, John M. Gates, Jr., Vancouver, WA
 W7GQA, Francis C. Fine, Garden City, ID
 W7JK, Francis Klemgard, Pullman, WA
 W7MDD, Fred Thurman, Jr., Phoenix, AZ
 WB7PAR, Howard L. Van Fosson, Phoenix, AZ

W7YHS, Dr. Marvin F. Hash, Billings, MT
 *W8FPM, Hugh K. Cotton, Fairborn, OH
 W8GNP, Charles J. Nahm, Lorain, OH
 K8KAJ, Denver G. Burns, Mesa, AZ
 KA8OLZ, Robert L. Derry, Manton, MI
 WB8VFJ, Theodore J. Henke, Sr., Warren, MI
 K9AIU, Charles E. Wallace, Champaign, IL
 W9APB, Harold O. Kartman, Racine, WI
 N9BPH, Jerome Roth, Jr., Chicago, IL
 K9EOC, Richard E. Brobst, Alton, IL
 W9ESQ, Louis D. Welsh, Russiaville, IN
 W9MME, John Plucinski, Lakehurst, NJ
 W9UGE, E. Ray Cooke, Milwaukee, WI
 WA0BAA, Charles R. McDowell, Fort Morgan, CO
 N0BNM, Deo K. Gloschen, Kansas City, MO
 ex-W0GTF, John B. Krudwig, St. Louis, MO
 W0GV, Harrison A. Miller, Englewood, CO
 W0HDL, Haakon "Haak" Herigstad, Roland, IA
 W0KVV, Irvin K. Ebel, Colorado Springs, CO
 *W0LIJ, Arnold E. Verdow, Marion, IA
 W0NX, Victor E. Morrison, Shawnee, KS
 W0RTQ, Walter P. Patterson, Albert, KS
 W0VEH/K4RS, James D. Barker, Virginia Beach, VA
 W0WQR, William H. Verser, Brentwood, MO
 WA0YCO, Millard T. "Mitty" Schloemer, Bison, KS
 W0YGG, George L. Plummer, St. Ansgar, IA
 VE3UD, John C. R. Punchard, Ottawa, ON
 VE6HO, James R. McKenna, Ft. MacLeod, AB
 VE7VK, George M. Neale, Saanichton, BC
 JH1WDN, Masanobu Tada, Meguroku, Tokyo

*Life Member, ARRL

In order to avoid unfortunate errors in the Silent Keys column, reports of Silent Keys will henceforth be confirmed through acknowledgment only to the family of the deceased. Thus, those who report a Silent Key will not necessarily receive an acknowledgment from Hq.

Note: All Silent Key reports sent to Hq. must include the name, address and call sign of the reporter as well as the name, address and call of the Silent Key in order to be listed in the column. Please allow several months for the listing to appear in QST. QST

The World Above 50 MHz



Conducted By William A. Tynan,* W3XO

Terrestrial DX Records

From time to time, readers ask about the Record Boxes and when they will be published again. Others inquire about records for specific bands. Frankly, I have been quite remiss in keeping the Record Boxes up to date. The last time the DX Record Box appeared was in April 1979. This lapse has not been from lack of interest on my part, but rather because keeping up with the records is such a difficult task. Collecting the information is hard enough. Seldom do I receive a letter specifically claiming a new world record. Although I may receive information about particularly interesting and noteworthy contacts, whether or not they surpass an existing record is usually left for me to determine.

Additionally, the information provided is often incomplete with respect to the details needed to serve as evidence to support a claim for a new world record. Fundamental data, such as date and time of the QSO, signal level, mode of transmission and type of propagation, are often not included. Almost never are the geographic coordinates of the participating stations given. These are a necessity in order to calculate the exact distance. A guess as to the approximate distance is not sufficient, and using such guesstimates would not be fair to others who might also be in contention for the record. Securing the additional needed information is far from simple, especially if both claimants are far away, often on another continent. Frequently, their ability to read and write English is lacking, and my knowledge of other languages is essentially nonexistent. SM5AGM regularly supplies me with a list of European records, and VK5LP does the same for similar accomplishments Down Under. Such information is interesting and sometimes helpful, but it is not necessarily conclusive in documenting claims for worldwide records.

For the bands above 1 GHz, the San Bernardino Microwave Society has, in the past, assisted by collecting and verifying claims of new records. I have not heard anything on the subject from that organization for quite some time, however. If the terrestrial DX records are to be published in this column on a regular basis, I am going to have to get some help from someone, a group, or several groups, to do the legwork necessary to make sure the information published is valid and up to date. In the meantime, this month's column must serve to pass along what I know concerning the current status for those who have sought information on the subject, as well as give a feel for the difficulty associated with obtaining complete and correct data. Each band will be covered separately.

6 Meters: This band is probably the most difficult of all, especially considering the fantastic propagation it

has been experiencing over the past few years and the very large number of extended-distance contacts made. There is even some argument for not publishing a 6-meter record. Some may have noticed that it did not appear the last time the box was run. Trying to determine the rightful holders of the 6-meter record is like trying to figure out who has the DX record on 10 or 15 meters! However, I am inclined to include the 50-MHz record along with those for the other vhf and uhf bands, provided that appropriate information can be obtained to substantiate it. In addition to the fact that so many globe-girdling QSOs have taken place, the other problem posed in determining the 6-meter record is whether to use the propagation path distance or merely the geographical distance between the two stations. There certainly have been many instances of "long path" openings during the course of this solar cycle. The South Florida-to-Japan openings of late March were a prime example. I believe, however, that only the geographical distance, and not a difficult-to-prove propagation path distance should be used. It seems to me that attempting to take into account the propagation distance will leave the matter open to all sorts of unresolvable controversy. In addition to long-versus short-path arguments, there are certain to be instances in which it is insisted that a particular contact took place by some sort of bent path, yielding a still greater propagation distance. There certainly have been a number of instances in which this is exactly what happened, but it is almost impossible to furnish hard evidence as to the precise length of the path.

If only the geographical distance is to be the determining factor, the matter boils down to what pair of stations are the closest to being on opposite sides of the earth from each other. Based on this, and from the various reports I have received over the past few years, it would appear that HL9WI Seoul, Korea, has one end of the record. Bill is known to have worked several stations in the Buenos Aires area, including LU3FX and LU8AHW. I am not sure which station represents the greater distance, so I cannot tell, at the moment, what Argentine station is the co-holder of the record, but I calculate the distance between Seoul and Buenos Aires to be 12,059 miles. This is just 377 miles short of halfway around the world. The other piece of missing information is the date of the earliest record-breaking contact. A recent claim to a new record was forwarded to me from JASHTP, who, operating from South Diato Island, contacted PYSBAD operating in Cubatao Province. I compute this distance to be 11,771 miles, 288 miles less than that from Seoul to Buenos Aires. If anyone can furnish additional or updated information on any of this, or evidence concerning any other potential records, I will certainly consider it.

2 Meters: The last time the Record box was published, it listed the 2-meter record as 3934 miles, with the holders as KP4EOR and LU5DJZ. It required some detective work to determine the station at the southern end that should be credited with being the co-holder, as two stations in Mar del Plata, Argentina, were involved in the TE contacts with KP4EOR. I can only hope that the correct one was accorded the honor. This gives some idea of the difficulty of publishing authoritative records when geographic coordinates of all the stations involved are not provided with the other information.

Since the box appeared, I have received no direct information of a new record. However, an article that appeared in the November and December 1981 issues of *QST* begins with the statement that the current 2-meter two-way record is held by SV1AB and ZS61.W for TE contacts over a 4475-mile path. Although no specific date is given for the first of these contacts, it is known that they, along with a number of others in the area, took place in late winter and early spring of 1979. The article also states that the signals of ZS3B were heard by I4EAT over a distance of 4930 miles. If no two-way contact resulted, as this article indicates, this cannot be accorded the record. On the other hand, I have a compilation of Region 1 records furnished by SM5AGM, who is the official keeper of DX records for that IARU region. Folke's list includes a March 30, 1979 contact between these two stations, and notes the distance as approximately 7790 km, which works out to 4842 miles. It goes without saying that I will welcome any help I can get in straightening out this situation. Particularly needed are dates of

QSOs and geographic coordinates of all stations involved.

1-1/4 Meters: I have received no specific claims that the West Coast-to-Hawaii tropo openings that took place in the summer of 1980, in which a number of contacts involving this band occurred, resulted in a new record. I must conclude, therefore, that the record published in the box the last time it appeared is still valid. It lists a QSO between W6NLZ and KH6UK on June 22, 1959, over a distance of 2591 miles. If anyone can document a contact over a greater distance, I will certainly credit them with the 220-MHz record.

70 Cm: According to all information that I can obtain, no two-ways have yet taken place via trans-equatorial propagation although several instances of reception by southern Europeans of South African beacons operating near 432 MHz have been reported. Unfortunately, these cannot be counted for a two-way record. Therefore, it would appear that the tropo path across the Pacific from Southern California to Hawaii has produced the record for this band. This path produced its first 70-cm contacts during the summer of 1980, when WB6NMT San Diego worked KH6IAA operating portable on the slopes of Mauna Loa on July 24. N6NB and AA6DD in the Los Angeles area also made the grade the same evening. A few days later, KD6R on Mount Palomar also negotiated the path. I have not been given exact coordinates for any of the locations in question, but from an atlas I have assumed some. Using these, I calculate the distance for WB6NMT to be approximately 2535 miles. From the Los Angeles area it appears to be about 2490 miles. I conclude that the record holder, along with KH6IAA/P, is KD6R, as the distance appears to be about 2560 miles. I emphasize that I am using assumed coordinates, not the known coordinates of the stations. I also do not know the exact date of the KD6R contact, but I believe it to be about July 27, 1980. Not the kind of precision that should go into documenting records.

23 Cm: The latest information that I can locate for this band comes via a note written by VK3ATN and passed along to me by the late Jim Fisk, W1HR. It states that VK6KZ/P and VK5MC/P set a new terrestrial 23-cm record of 1422 miles on January 23, 1980. This is 112 miles farther than their previous mark established about a year earlier and reported in the last running of the box.

13 Cm: As far as I know, the old record of 1170 miles achieved by VK6WG and VK5QR on January 17, 1978 still stands.

9 Cm: It would appear that the last box was incorrect in crediting ZL2THW and ZL2TSM with a 278-mile contact in February 1975. I make this assertion because I am in receipt of a letter from the New Zealand Association of Radio Transmitters, dated January 22, 1979, that states the distance for this work is 383 km or 230 miles. If this is, in fact, the correct distance, the same two stations still own the record, but with a somewhat lower distance figure.

5 Cm: The record for this band apparently belongs to K5FUD and K5PIR for a 267-mile contact made September 20, 1977. This represents a correction from the record listed in the box the last time it appeared.

3 Cm: This band is very popular in Europe, where they have learned how to take advantage of a variety of propagation enhancements that affect it. One of the most effective of these is evaporative ducting, which takes place over water. Using this mode, Italian amateurs have broken world records several times. The most recent report appears in *Radio Rivista*, October 1981. Using 1-meter dishes at both ends, I0SNY (JA63H) worked I3SOY and IW3EHQ (FG5OJ) at a distance of 860 km.

1.24 Cm: As far as I can determine, the 24-GHz record is still held by G3BNL and G3EEZ for their 96-mile contact on September 14, 1975.

I have no information on would-be records for any of the higher bands.

As stated earlier, any help I can get to resolve some of the questions noted, or to provide updated information, will be greatly appreciated. With such assistance, the Terrestrial Record Box will again become a regular feature of *The World Above 50 MHz*.

*Send reports to Bill Tynan, W3XO, P.O. Box 117, Burtonsville, MD 20866, or call 301-384-6736 to record late-breaking information.

Hamfest Calendar

Conducted By Marjorie C. Tenney,* WB1FSN

[Note: Sponsors of large gatherings should check with League Headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.]

Arizona: The Amateur Radio Council of Arizona will hold their 32nd annual hamfest in Flagstaff July 30-Aug. 1, at the Fort Tuthill fairgrounds, a few miles south of I-40. Many prizes, women's activities, a swapfest, a transmitter hunt, speakers, forums, awards, exhibits, entertainment on Friday and Saturday nights. Talk-in on 147.870/147.270. Overnight camping facilities available. For further information, write to Wm. Oliver Grieve, W7WGW, 4301 N. 31st Ave., Phoenix, AZ 85017, or call 602-246-0200.

British Columbia: The Maple Ridge ARC is hosting Hamfest '82 July 10-11, at the Maple Ridge Fairgrounds, 30 miles east of Vancouver. Food, prizes, swap and shop, displays, bunny hunt, ladies' and children's programs. Camper space available. Registration: hams, \$5; non-hams over 12 years old, \$2. Talk-in on 34/94 and 20/80. For more info and registration, contact the Maple Ridge ARC, Box 292, Maple Ridge, BC V2X 7G2, Canada.

California: The Tri-County ARA is having its annual hamfest/picnic on Saturday, Aug. 7, from 7 A.M. to 1 P.M. at the Los Angeles County Fairgrounds, Pomona. Buyers, sellers, computer buffs welcome. Prizes, exhibits and refreshments. Talk-in on 025/625. For more information, write to TCARA Hamfest Chairman, W6ELZ, P.O. Box 142, Pomona, CA 91769.

Colorado: The Ski Country ARC will hold its first annual swapfest on July 24, from 9 A.M. to 5 P.M. at the Colorado Mountain College Building, 1402 Blake Ave., Glenwood Springs. Admission is \$3; tables are \$5. Flea market, commercial exhibitors, prizes and refreshments. Talk-in on 07/67. For further information, write to Frank, WA0BBI, P.O. Box 280, El Jebel, CO 81628.

Illinois: The Silver Anniversary Breakfast Club Hamfest and Picnic will be held on Saturday and Sunday, July 17-18, at Terry Park, Palmyra. Flea market, games, food, music and prizes. Camping on grounds for self-contained units. Activities start at noon Saturday, and close about 4 P.M. Sunday. On-ground religious service. Talk-in on 52 simplex and 3.973 MHz. Information available from Quad-Co Radio Club members WA9ARY, K9CIL, W9KIC or K9UCC.

Illinois: Belvidere Hamfest, sponsored by the Big Thunder ARC, will be held on Sunday, Aug. 1, from 8 A.M. to 3 P.M., at the Boone County Fairgrounds, Rte. 76, Belvidere. Admission is \$2 in advance and \$2.50 at the door. Camping facilities available Saturday night. Exhibition building for displays, and huge, outdoor swappers' row. Many prizes, coffee and refreshments available. Talk-in on 147.975/147.375 and 52. Further information and advance tickets from Jim Grimmsby, W9HRF, 418 Beacon Dr., Belvidere, IL 61008, tel. 815-547-8664.

Illinois: The 48th annual hamfest, sponsored by the Hamfesters RC, Inc., will be held at Santa Fe Park, 91st and Wolf Rd., Willow Springs, on Sunday Aug. 8, from 6 A.M. to 4 P.M. Admission is \$2 in advance and \$3 at the door. Prizes, manufacturer's displays, swappers' row, early-bird coffee, refreshments, clowns. Talk-in on 52. Information and advance tickets from Ernest Kaiser, N9BVT, tel. 312-284-7935 or 312-496-4540.

Indiana: The LaPorte County Summer Hamfest will be held on Sunday, July 18, at the County Fairgrounds, LaPorte. Food, drinks and indoor selling area available. Information and reservations from P.O. Box 30, LaPorte, IN 46350.

Indiana: The Steuben County Radio Amateurs present the 24th annual FM Picnic and Hamfest at Crooked Lake, Angola, on Sunday, Aug. 1. Prizes, picnic-style BBQ chicken, inside tables and vendors and exhibitors, overnight camping (fee charged by County Park). Admission is \$2.50. Talk-in on 81/21 and 52.

Louisiana: The Delgado Community College ARC will hold its annual swapfest on Sunday, July 25, from 8 A.M. to 4 P.M., at the Peristyle in City Park, New Orleans. No charge for setup; those participating must

bring own tables. Admission is free. Plenty of parking, food and drinks nearby. Talk-in on 146.67. For further information, contact Jim Wolfe, club president, at Delgado ARC, Delgado Community College, City Park Campus, New Orleans, LA 70119.

Maine: The Blackstrap Repeater Assn. hamfest will be held at the Cumberland Fairgrounds, Cumberland, on Aug. 7. Advance tickets are \$2; at the gate, \$3; and sellers, \$4.50.

Maryland: The Baltimore Radio Amateur Television Society presents the famous BRATS Maryland Hamfest at the Howard County Fairgrounds, Rte. 144 at Rte. 32, adjacent to I-70, about 15 miles west of Baltimore, on Sunday, July 25. Indoor tables with a/c power, \$15 each; without a/c, \$10 each. Indoor tailgating, \$5 per space; outdoor tailgating, \$3 per space. Overnight RV hookup available. For information and reservations, write to BRATS, P.O. Box 5915, Baltimore, MD 21208.

Michigan: The Straits Area ARC will hold its annual hamfest on July 17 at the Harbor Springs High School in Harbor Springs. Doors open at 8 A.M. for set up, for others at 9 A.M. Many prizes. Free overnight parking in school parking lot for self-contained RVs. No hook-ups. Donation: \$2 at door, table space \$2.50. Talk-in on 07/67 and 52. For lodging, contact Harbor Springs Chamber of Commerce, 450 Bay Harbor Springs, MI 49740, tel. 616-526-2761, or Petoskey Chamber of Commerce, 401 E. Mitchell, Petoskey, MI 49770, tel. 616-347-4150. For more details, contact Bernie Slotnick, KB8RE, 630 Ann St., Harbor Springs, MI 49740, tel. 616-526-5614.

Michigan: The Amateur Radio Public Service Assn. of St. Joseph County Michigan will hold its 4th annual swap and shop on July 25, at the St. Joseph County Fairgrounds, Centreville. Doors open at 8 A.M. Tickets are \$2 in advance and \$3 at the gate. Indoor tables \$2; trunk sales are free. Camping available Saturday night only for \$6. Talk-in on 52. For more information, contact Dennis Cutler, N8DDU, 3051 Z Ave., Vicksburg, MI 49097.

Michigan: The Black River ARC will sponsor the 29th annual Southwestern Michigan VHF picnic at West Side County Park near Glenn, on Sunday, Aug. 1. Swimming, playground, small flea market and prizes. Registration \$1. No food available, so bring your picnic basket. Take Glenn exit (exit 30) from I-196, and follow the signs. For additional information, contact Ed Alderman, K18Z, RR #2, Box 44, Lawrence, MI 49064.

Michigan: The 34th annual U.P. Hamfest, sponsored by the Mich-A-Con ARC of Iron Mountain-Kingsford, will be held on Saturday, July 31 and Sunday, Aug. 1, at the Dickinson county Armory on M-95 in Kingsford. Registration begins at 9 A.M. both days. Tickets \$2.50 at the door; no advance ticket sales. Seating for Saturday night banquet is limited, advance reservations needed; write committee for banquet information. Talk-in on 25/85 and 3922. For further information, write UPHAMFEST-82, 105 East Breitung Ave., Kingsford, MI 49801.

Minnesota: The Detroit Lakes ARC will hold its annual ham picnic on Sunday, Aug. 1, at Long Lake Park, located two miles west on Hwy. 10; road will be marked. Free coffee, hot dogs, prizes. Flea market items welcomed. Talk-in on 22/82.

Minnesota: The St. Cloud RC will be holding its annual hamfest on Sunday, Aug. 8, at Sauk Rapids Municipal Park, Sauk Rapids, from 8:30 A.M. to 4 P.M. Talk-in on 34/94. For more information, contact Mike Lynch, 2115 1st St. South, St. Cloud, MN 56301, tel. 612-251-2297.

Missouri: The Zero Beaters ARC Hamfest will be held on July 18, starting at 9 A.M., at the Washington, Missouri Fairgrounds. Admission is free. Traders' row, bingo for the ladies, prizes, displays, food and refreshments. Talk-in on 84/24. For further information, contact Rich Noelke, WA0NUI, Rte. 3, 10 Richard Dr., Washington, MO 63090, tel. 314-239-2457.

Montana: The Glacier-Waterton International Hamfest, sponsored by the Havre Hi-Line ARC, will take place at Three Forks Campgrounds, East Glacier, on July 16-18, from noon on Friday until noon on Sunday. Advance registration is \$8; at the door, \$9. Bazaar, dealer displays, bingo, crafts, transmitter building contest, seminars. Camping on grounds, hotels close by. Talk-in on 52 simplex. Information and reservations from Beverly Nord, WB7UOJ, 1540 5th Ave., Havre, MT 59501, tel. 406-265-6250.

New York: The Batavia Hamfest, sponsored by Genesee Radio Amateurs (GRAM), Inc., will be held at the Alexander Firemen's Grounds, Rte. 98 (8 miles south of Batavia), in Alexander, on Sunday, July 11, from 7 A.M. to 5 P.M. Admission is \$2 in advance, \$3 at the door, under 12 years free. Prizes, programs, ladies activities, cw and QSL-card contests, boat-anchor auction at 3 P.M., large flea market, large indoor exhibit area. Free camping (\$2 electric). Talk-in on 144.71/145.31 or 52 simplex. Advance tickets mailed by July 1. Flea market space available for \$1. For advance tickets and reservations, write to Batavia Hamfest, c/o GRAM, Inc., Box 572, Batavia, NY 14020.

New York: The Mt. Beacon Hamfest, sponsored by the Mt. Beacon ARC, will be held at the Arlington Senior High School, Poughkeepsie, on Saturday, July 24, from 8 A.M. to 3 P.M. Admission is \$2, ladies and children free. Tailgating space is \$3 (1 free admission), table \$4 (1 free table and admission). Auction starts at 2 P.M. Prizes, free parking, big indoor location, hot food and beverages. Talk-in on 37/97 and 52 simplex beginning at 5:30 A.M. For information and reservations, send s.a.s.e. or call Walt Cotter, WA2ZCN, North Hillside Lake Rd., Wappingers Falls, NY 12590, tel. 914-226-6636, or Walt Sutkowski, K2DPL, W. Redoubt Rd., Fishkill, NY 12524, tel. 914-897-5158.

Ohio: The Hall of Fame Hamfest, sponsored by Tusco ARC W8ZX and Canton ARC W8AL, will be held on July 18 at Nimishillen Grange, 6461 Easton St., Canton. Flea market opens at 9 A.M. Advance admission \$2.50, at the door \$3, under 16 free. Forums, dealers, flea market, food, ladies' activities. Talk-in on 19/79, 72/12 and 52. For information and advance tickets, write to Max "Butch" Lebold, WA8SHP, 10877 Hazelview Ave., Alliance, OH 44601, tel. 216-821-8794.

Ohio: The 17th annual Wood County Ham-A-Rama will be held Sunday, July 18, at the Wood County (Ohio) Fairgrounds, Bowling Green. Gates officially open at 10 A.M.; free admission and parking. Prizes, trunk sale space and food available. Tickets are \$1.50 in advance and \$2 at the gate. Advance table rentals \$3 to dealers only. Saturday setup until 8 P.M. Talk-in on 52. For more info or dealer rentals, send an s.a.s.e. to: Wood Co. ARC, c/o S. Irons, P.O. Box 73, Luckey, OH 43443.

Ohio: The Northern Ohio ARS will hold its annual NOARSfest on Saturday, July 24, in Wellington, 18 miles south of Lorain, at the Lorain County Fairgrounds, 1 mile west of Rte. 58 on Rte. 18. Many prizes, huge blacktopped flea market area. Parking for flea market is \$1 per car space. Large, indoor exhibit hall. Campers may park overnight Friday at no charge, no hookups. Indoor exhibit space with 8-ft tables at \$8 each. Send check for advance registration to: Ernie or Pat Jackson, 201 Park Ave., Elyria, OH 44035. Admission tickets are \$2.50 advance, \$3 at the gate, children under 12 free. Admission ticket also serves as ticket for prizes. Order admission tickets from NOARSfest, P.O. Box 354, Lorain, OH 44052. Talk-in on 52. Directions and information on 10/70.

Ohio: Warren ARA, Inc., will host their 25th annual hamfest on Sunday, Aug. 15, at Kent State University (Trumbull Campus), located at the intersection of the State Rte. 5 bypass and State Rte. 45, Warren. The giant flea market opens at 6 A.M. Tickets in advance \$2.50, at the gate \$3; flea market space is \$2 per 10-ft space. Prizes, programs, forums, ladies' hospitality suite. Guest speakers: Bill Clepper, W3HV, on OSCAR; Bob Schenck, N200, on DX; Bob Heil, K9EID, on 10-Meter fm; Art Greenberg, W2LH, and Madeline Greenberg, W2EED, live demonstration of antennas; Clarence Ieter, W8PKC, on ATV; and Leo Fry, K8PYD, on the 8th-Area QSL Bureau. Hamfest banquet, Saturday, Aug. 14, Jamestown Inn, buffet \$10 per person. Banquet reservation deadline Aug. 1. Talk-in on 37/97. For further information, tickets and reservations, write to Warren Hamfest, P.O. Box 809, Warren, OH 44482, c/o Dick Hunter, K8WYY.

Ontario: The 8th annual Ontario Hamfest will be held at the Milton Fairgrounds, Milton on Saturday, July 10, hosted by the Burlington ARC, Inc. Flea market, displays, latest state-of-the-art, auction, contests and prizes. Admission \$3 per person, \$2 for pre-registration. Camping available. For pre-registration, contact Mike Cobb, VE3MWR, P.O. Box 836, Burlington, ON L7R 3Y7, Canada.

†ARRL Hamfest

*Convention/Travel Coordinator, ARRL

†**Pennsylvania:** The Mt. Nittany Ham Festival, sponsored by the Nittany ARC, will be held at H.R.B. Singer Picnic Grounds, Science Park Rd., State College, on July 10, from 8 A.M. to 5 P.M. Admission is \$3. Tech sessions, ARRL program, contests, prizes. Talk-in on 17/76, 25/85 and 52. For information, contact R. L. Sine, KB3WN, P.O. Box 8085, State College, PA 16801, tel. 814-238-3737.

†**Pennsylvania:** The Two Rivers ARC of McKeesport will hold its annual hamfest at the McKeesport Campus of Penn State University on July 11, from 8 A.M. to 4 P.M. Forums, prizes, food, outdoor flea market, indoor setups. Talk-in on 22/82. Tel. 412-464-0550 for more information.

†**Pennsylvania:** The 45th annual South Hills Brass Pounders and Modulators Hamfest will be held on Aug. 1, from 10 A.M. to 4 P.M. at South Campus, Community College of Allegheny County, Pittsburgh. Admission \$2 or 3/\$5. Computer, OSCAR and ATV demos, flea market. Talk-in on 13/73 and 52. Further information from Andrew L. Pato, WA3PBD, 1433 Schuaffler Dr., West Homestead, PA 15120.

Pennsylvania: The Mid-Atlantic ARC announces its annual J.B.M. Hamfest, to be held on Sunday, Aug. 8, from 9 A.M. to 4 P.M., rain or shine, at the Rte. 309 Drive-In Theater, 1/4 mile north of Rte. 63, Montgomery (6 miles north of the Fort Washington interchange of the Pennsylvania Tpke.) Tailgate setup begins at 8 A.M. Admission \$2.50, \$1 additional for each tailgate space. Children and non-licensed women free. Parking, refreshments, prizes and more. Talk-in on WB3IOE/R, 66/06 or 52 simplex. For further information, write to the club, P.O. Box 352, Villanova, PA 19085.

Tennessee: The Radio Amateur Transmitting Society (RATS) will sponsor the Nashville Hamfest-Computerfest, to be held Sunday, July 25, at the Exhibition Hall of the Nashville Municipal Auditorium, James Robertson Pkwy., Nashville. All indoors and air-conditioned in 63,000 square feet of space. Doors open at 8 A.M. Admission \$3. Ample space for dealers and flea market. Refreshments on site. Talk-in on 34/94. For more info, contact RATS, P.O. Box 2892, Nashville, TN 37219, or phone during business hours, 615-459-2636, or in Nashville 254-0088.

Texas: The 17th annual Northwest Texas Emergency NET Picnic and Swapfest will be held on Sunday, Aug. 1, at 8 A.M., in the city park in Levelland. Cosponsored by the Hockley County ARC and the Northwest Texas Emergency NET. Talk-in on 28/88. A family event; bring your own picnic basket. Swapping all day with tables provided. A \$3 registration requested, but not required.

†**Virginia:** The Winchester Hamfest, sponsored by the Shenandoah Valley ARC, will be held at the Ruritan Fairgrounds, Berryville, on Aug. 1, from 8 A.M. to 5 P.M. Admission is \$3. Net meetings, flea market, manufacturers' exhibits, free women's bingo, Ruritan Club barbecue. Tailgaters \$5. Talk-in on 146.82. For information, write to Richard Rush, W4HXB, 1309 Ambrose Dr., Winchester, VA 22601, tel. 703-662-7968.

†**Washington:** The Okanogan Valley Hamfest Assn. will host the Okanogan Valley International Hamfest at the Okanogan County Fairgrounds in Okanogan on July 24-25. Tickets are \$3 for hams, \$2 for non-hams. Prizes, bingo, cake walk, 2-meter bunny hunt, Sunday

noon potluck dinner. Hookups for RVs available. Motels and restaurants nearby. Talk-in on 146.97. For information, call Frank Bigelow, WA7ZEV, tel. 826-1506, or Buck Buchanon, W7GSN, tel. 422-2912.

West Virginia: The Triple States RAC will hold its 4th annual hamfest at Wheeling Park, Wheeling, on Sunday, July 25, from 9 A.M. to 4 P.M. (dealers 7 A.M., unload on floor). Admission \$2, children under 12 free. Prizes, indoor dealer displays, flea market, auction, added park attractions — family affair. Reasonable motel accommodations can be made by committee; catch the Saturday night WWVA Jamboree. Talk-in on 31/91 and 52. For more information, contact TSRAC, Box 240, RD 2, Adena, OH 43901.

†**West Virginia:** The Jackson County Hamfest, sponsored by the Jackson County ARC, Inc., will be held at the Jackson County Airport, Ravenswood, on Sunday, Aug. 8, from 9 A.M. to 5 P.M. First ticket \$3, additional tickets \$2. Advance sales \$5 for \$10. Forum, flea market, air show, women's activities, food and drinks. Talk-in on 146.67. Information and advance tickets from Les Shockey, W8SNO, Rte. 2 Box 36, Sandyville, WV 25275, tel. 304-273-3525.

Wisconsin: The 3rd annual Sheboygan County ARC Lakeshore Swapfest and Brat Fry will be held on July 17 at the Wilson Town Hall, south of Sheboygan, from 8 A.M. to 4 P.M. Public auction and prizes. Tables are free, and camping is available at Terry Andre State Park. For flyer and other information, call 414-457-3203, or write P.O. Box 895, Sheboygan, WI 53081.

Coming Conventions

July 2-5
ARRL/CRRL Midwest, Saskatoon,
Saskatchewan

July 3-4
West Virginia State, Weston (Jackson's Mill)

July 11
Indiana State, Indianapolis

July 23-25
Oklahoma State, Oklahoma City

August 6-8
Northwestern Division/Rocky Mountain
Division, West Yellowstone, Montana

August 7-8
North Florida Section, Jacksonville

August 22
Illinois State, St. Charles

September 11-12
Georgia State, Warner Robins

ARRL NATIONAL CONVENTIONS

July 23-25, 1982
Cedar Rapids, Iowa

October 7-9, 1983
Houston, Texas

July 20-22, 1984
New York, NY

INDIANA STATE CONVENTION

July 11, 1982, Indianapolis

The ARRL Indiana State convention will be held in conjunction with the Indianapolis Hamfest and Computer Show on Sunday, July 11, at the Marion County Fairgrounds at the southeast intersection of I-74 and I-465.

Technical forums all day. Club activities. Inside and outside flea markets. Large, indoor commercial vendors' display area and separate computer show. Ladies' activities.

Newly elected President of ARRL, Vic Clark, W4KFC, along with Central Division Director Ed Metzger, W9PRN, will be attending to answer any questions.

Setup after 2 P.M. (EST) on Saturday, July 10. Camper hookup facilities available on the grounds. A camping fee will be required and will be collected by the fairground management from all persons spending Saturday night on the grounds. Numerous motels close by. Security provided Saturday night and Sunday. Professional food services. Your gate ticket of \$4 entitles you to all activities, including major prizes. For further information contact: Indianapolis Hamfest, Box 11086, Indianapolis, IN 46201.

OKLAHOMA STATE CONVENTION

July 23-25, 1982, Oklahoma City

Central Oklahoma Radio Amateurs, Inc., is pleased to sponsor the ARRL Oklahoma State Convention at the Myriad Center in downtown Oklahoma City. This year's "Ham Holiday" will help celebrate 75 years of statehood in Oklahoma's "Diamond Jubilee."

In addition to Amateur Radio activities, special forums and displays on personal computers will be presented. The program includes AMSAT, DX,

QSLing, antennas, earth stations, fm and wind power. All "Ham Holiday" programs will be held at the beautiful, air-conditioned Myriad Center.

Admission is \$6 for pre-registrants; \$7 at the door. A flea market table is free for pre-registrants. Saturday night banquet is \$8 per person. A Country and Western dance follows the banquet. Friday: Registration and eyeball QSOs. Hours: 9 A.M. to 5 P.M. Saturday, 9 A.M. to 2 P.M. Sunday, 146.34/94 is the talk-in frequency.

For full information and pre-registration, write to "Ham Holiday," P.O. Box 15013, Del City, OK 73155.

NORTHWESTERN/ROCKY MOUNTAIN DIVISION CONVENTION

August 6-8, 1982,
West Yellowstone, Montana

The Northwestern Division and Rocky Mountain Division Conventions will be sponsored by Wyoming, Idaho, Montana and Utah (WIMU). This 50th Annual WIMU Convention will be held at the Convention and Civic Center at West Yellowstone, Montana, August 6-8, 1982. Activities will begin Friday at noon and will continue until noon Sunday. Some activities include: hidden transmitter hunts on 2 and 75 meters, movies, meetings, swap tables, commercial tables, cw contests, women's crafts, Chinese auction, breakfast, OSCAR demo, computer demo, ARRL forums and divisional meetings.

Pre-registration is \$15 for adults and \$5.50 for children, before July 15, 1982. Late and registration at the door will be \$17 and \$5.50. This includes all activities, prizes and breakfast. This convention is near Yellowstone Park, where you can continue your vacation. Many cabins, campgrounds and modern motels

are available. Talk-in on 3935 and 146.34/94 and 146.28/88. For information, contact Ron Moss, K7ENE, Route #3, Box 400, Rexburg, ID 83440, tel. 208-356-3742.

NORTH FLORIDA SECTION CONVENTION

August 7-8, 1982, Jacksonville

The Greater Jacksonville Hamfest Assn. is pleased to announce the ARRL North Florida Section Convention and Ninth Annual Jacksonville Hamfest, to be held Aug. 7-8 at the Orange Park Kennel Club. This facility is conveniently located near the intersection of I-295 and U.S. 17, just south of Jacksonville, and offers over 30,000 square feet of indoor display space.

The FCC will conduct amateur and commercial exams on Friday, Aug. 6, at the hamfest site. Form 610 should be sent to the Atlanta FCC office as soon as possible, noting that the exam will be taken at the convention. Headquarters hotel will be the Best Western First National Inn. Special rates may be obtained by writing to Jim Canfield, KD4CG, 996 Dostie Circle, Orange Park, FL 32073. A full slate of programs is scheduled, along with meetings of statewide and regional nets and organizations. Competitions including a rabbit hunt and a pileup contest are also on tap. Talk-in on 16/76 and 07/67.

Advanced registrations are available from Robert J. Cutting, W2KGI, 1249 Cape Charles Ave., Atlantic Beach, FL 32233, and are priced at \$3.50. Registration at the door is \$4. Swap tables are available through Andy Burton, NX4G, 5101 Younis Rd., Jacksonville, FL 32218, at \$12 per table both days. No one-day tables. Registrations may be ordered with tables through NX4G.

The Greater Jacksonville Hamfest is sponsored by six Amateur Radio clubs in the Florida Crown area, and you are cordially invited to attend.

Special Events

Conducted By Mark Wilson,* AA2Z

Gettysburg, Pennsylvania: Adams Co. ARS will operate W3KGN from 2000-0200Z July 1-3 commemorating the 119th anniversary of the Civil War battle. Frequencies: 3.900 7.275 14.305. Special QSL card for large s.a.s.e. (2 units postage) and QSO number to: ACARS, 34 York St., Gettysburg, PA 17325.

Winona, Minnesota: Winona ARC will operate WB0NIU from 1500-2100Z July 3 commemorating the 125th anniversary of the signing of the city's charter. Frequencies: 7.245 14.290 21.365 28.650. Special QSL for s.a.s.e. to: WB0NIU, 3655 6th St., Winona, MN 55987.

Enterprise, Alabama: Enterprise ARS will operate WD4ROJ July 3 from the home of the Boll Weevil Monument during the city's centennial. Frequencies: 10 kHz up from bottom of General class phone bands, 80-10 meters. Certificate available from: EARS, P.O. Box 34, Enterprise, AL 36331.

Greensboro, Maryland: Lion's Club will sponsor KA3CNX, operating 1300-2100Z July 3-5 commemorating the 250th anniversary. Frequencies: 7.270 21.420. Certificate for QSL and large s.a.s.e. to: KA3CNX, Rte. 1, Box 514, Greensboro, MD 21639.

Hannibal, Missouri: Hannibal ARC will operate W0KEM from 1500-2100Z July 3-4 during the National Tom Sawyer Days from Mark Twain's home town. Frequencies: phone — 7.245 14.290 21.400 28.770; cw — 7.125 21.125. Certificate for QSL and large s.a.s.e. to: HARC, 2108 Orchard Ave., Hannibal, MO 63401.

Bonfield, Illinois: WB9WOC will operate starting at 1300Z July 4-5 during the centennial celebration. Frequencies: 3.800 7.275 14.325 21.400 50.115 144.250 146.52 223.500. QSL for s.a.s.e. to: WB9WOC, Rte. 2, Box 185, Kankakee, IL 60901.

Fort Laramie, Wyoming: High Plains ARC will operate K7YPT at the historic fort from 0000Z July 4 until 0000Z July 5. Frequencies: phone — 3.900 3.850 7.250 14.250 14.300 21.300 21.360 28.550; cw — 50 kHz up from lower band edge; Novice — center of band. Certificate for large s.a.s.e. to: K7YPT, P.O. Drawer T, Torrington, WY 82240.

Baltimore, Maryland: Laurel ARC will operate W3QQR from 1200-2400Z July 4 at Fort McHenry, birthplace of "The Star Spangled Banner." Frequencies: phone — 7.260 14.285 21.400; cw — 14.065 on the half hour. Special QSL for s.a.s.e. to: LARC, P.O. Box 259, Annapolis Jct., MD 20701.

Waterville, New York: Waterville Central School ARC will operate WD2ALL from 1300-2100Z July 10 to celebrate the 98th anniversary of the birth of pioneer photographer George Eastman. Frequencies: 10 kHz up from lower General class phone-band edges and 10 kHz up from lower Novice-band edges; also 146.52. Certificate for large s.a.s.e. to: K. Pritts, Madison St., Waterville, NY 13480.

Racine, Wisconsin: Racine Megacycle Club will operate W9UDU from 1100-2300Z July 10, 11 and 17 and 1100-2000Z July 18 during the Salmon-a-Rama fishing contest. Operation in the 20-, 15-, 10-meter General class phone bands. Special QSL for s.a.s.e. to: W9UDU, c/o Lakeshore Co. Red Cross, 4521 Taylor Ave., Racine, WI 53405.

*Assistant Communications Manager, ARRL

Denison, Texas: Texoma ARC will operate K5GQD from 1400Z July 10 until 0100Z July 11 and 1400-2300Z July 11 during the City of Denison Western Days celebration. Operation in the lower part of the 80- to 10-meter General class phone bands. Certificate for large s.a.s.e. (2 units postage) to: K5GQD, 1303 E. Richards, Sherman, TX 75090.

Hermiston, Oregon: Hermiston ARC will operate KC7LK from 1600Z July 10 until 0400Z July 11 to celebrate the watermelon capital of the world's 75th anniversary. Frequencies: 80- to 10-meter General class bands; Novice cw bands; 147.03. Special QSL for s.a.s.e. to: L. Umphres, P.O. Box 604, Stanfield, OR 97875.

Bath, Michigan: WD8OEV will operate from 1200-2200Z July 17 during the annual Bath Tub Races. Frequencies: 7.240 during the first half of each hour and 28.590 during the last 20 mins. of each hour. Certificate for large s.a.s.e. to: 5220 Clark Rd., Bath, MI 48808.

Port Huron, Michigan: Eastern Michigan ARC will operate K8DD from 2200Z July 16 until 0200Z July 17, 1400Z July 17 until 0200Z July 18, and 1400Z July 18 until 0200Z July 19 during the annual Port Huron-to-Mackinac Yacht Race. Frequencies: 10 kHz up from lower General class 80-, 40-, 15-meter phone-band edges and 10 kHz up from Novice-band edges. Certificate for large s.a.s.e. to: K8DD, 1640 Henry, Port Huron, MI 48060.

Wapakoneta, Ohio: Reservoir ARA will operate K8QYL from 1300Z July 17 until 0400Z July 18 and 1300-1900Z July 18 from the birthplace of astronaut Neil Armstrong. Frequencies: phone — 3.940 7.260 14.285 21.360 28.590; cw — 50 kHz up from lower band edge on odd hours; also 147.93/33. Certificate for QSL and large s.a.s.e. to: K8QYL, P.O. Box 268, Celina, OH 45822.

Kenora, Ontario: Lake of the Woods ARS will operate CK3LWR from July 23 until August 2 during the town's centennial week celebration. Certificate for QSL and large s.a.s.e. with IRC to: 628 Second St. South, Kenora, ON P9N 1H1, Canada.

Celina, Ohio: Reservoir ARA will operate W8DN from 1300-1800Z July 24 from the court house lawn during the Celina Lake Festival. Frequencies: phone — 3.940 7.260 14.285 21.360 28.590 146.01/61. Certificate for QSL and large s.a.s.e. to: W8DN, P.O. Box 268, Celina, OH 45822.

Bend, Oregon: Central Oregon RA will operate WN7ODD and N7CSH from Brothers, OR, and Sisters, OR, from 1300Z July 24 until 0100Z July 25. Frequencies: phone — 10 kHz up from bottom of General class bands; cw — 15 kHz up from bottom of Novice bands. QSL and certificate for large s.a.s.e. to: CORA, P.O. Box 723, Bend, OR 97709.

Oneida Lake, New York: Liverpool ARC will operate KC2PG from 1200Z July 24 until 2000Z July 25 at the walleye pike fishing grounds at Frenchman Island. Frequencies: 30 kHz up from lower General class band edge; cw — 35 kHz up from lower 40-, 20-, 15-meter band edges; 21.150 on odd hours; 146.58. Certificate for QSL and large s.a.s.e. to: LARC, P.O. Box 126, Bridgeport, NY 13036.

Ashland, Illinois: Ashland-area amateurs will operate WD9IOX on July 24-25 commemorating the city's 125th anniversary. Operation planned in the 40-, 20-,

15-, 10-meter General class phone bands. Special QSL with first-day postal cancellation for s.a.s.e. to: WD9IOX, P.O. Box 752, Ashland, IL 62612.

Canon City, Colorado: Royal Gorge Ham Club will operate N0BIB from 1600Z July 24 until 0200Z July 25 from the world's highest suspension bridge. Frequencies: phone — 3.900 7.250 14.300 21.375; cw — 7.125 21.150. QSL for s.a.s.e. to: N0BIB, 808 Oak Ave., Canon City, CO 81212.

Greenville, Ohio: Treaty City ARA will operate W8UMD from 1600Z July 24 until 1600Z July 25 during the Annie Oakley Days celebration. Operation on 7.235 and 14.285; some 40-M Novice operation. Certificate for QSL and large s.a.s.e. to: TCARA, Box 91, Greenville, OH 45331.

Bowling Green, Kentucky: Western KY DX Club will operate from 1600-2400Z July 24-25 from the following KY counties: Monroe, Allen, Butler, Logan, Breckenridge. Check County Hunters Net, QSL for s.a.s.e. to: WA4QQV, Box 986, Bowling Green, KY 42101.

Chincoteague Island, Virginia: Eastern Shore ARC will operate KC4HN on July 28 during the annual pony-penning festivities. Frequencies: phone — 3.890 7.235 14.285 21.360 28.600; cw — 3.590 7.050 14.050 21.090 28.150. QSL with large s.a.s.e. to: ESHARC, 110 Church St., Chincoteague, VA 23336.

Plymouth, Vermont: Green Mt. Wireless Society will operate N1VT on July 31-Aug. 1 from Calvin Coolidge State Park, near the site of Coolidge's inauguration. Frequencies: 10 kHz up from 80- to 10-meter phone and cw General class-band edges, phone and cw; 10 kHz up from Novice-band edges. Certificate for large s.a.s.e. and QSL to: GMWS, P.O. Box 84, Rutland, VT 05701.

Elmira, New York: Elmira-area amateurs will operate W2ZJ from 1300Z July 31 until 2100Z Aug. 1 during the Chemung Co. Good Neighbor Festival. Operation 30 kHz up from bottom of 80-, 40-, 20-meter General class phone bands. Certificate for large s.a.s.e. to: ARS W2ZJ, General Delivery, Elmira, NY 14904.

Victoria Lake, Ontario: Salvation Army Scouts will operate VE3SAS from July 31 through Aug. 8 from Camp Madawaska, looking especially for other Boy Scout stations. 80-10 meters, phone and cw. Special QSL for s.a.s.e. and IRC to: D. Digweed, 12 Frederick St., St. Catharines, ON L2S 2S2, Canada.

Warren, Michigan: Tank-Automotive Command ARS will operate W8JPW on July 31 commemorating the 41st year of the Detroit Arsenal, home of the nation's first defense plant. Frequencies: 7.250-7.275 21.400 146.55. Certificate for large s.a.s.e. to: W8JPW, U.S. Army Comm. Command, CCNC-TAC-M, 28251 Van Dyke, Warren, MI 48090.

Friendship, New York: Allegany Highlands ARC will operate KA2CGV from 1300-2100Z Aug. 1 in observance of National Friendship Day. Frequencies: phone — 7.280 14.280 21.380 28.580; cw — 7.125 14.060 21.060 28.060. Certificate for large s.a.s.e. to: AHARC, P.O. Box 373, Friendship, NY 14739.

Note: The deadline for receipt of items for this column is the 15th day of the second month preceding publication. For example, your information would have to reach Hq. by July 15 to make the Sept. issue.

Strays

COAST TO COAST WITH AMATEUR RADIO

□ To celebrate his retirement, David Adams, VE3HBF/G4NWA, of Sutton West, Ontario, is walking the length of Great Britain. He started in Scilly on April 30, and plans to finish at Stromness in the Orkney Isles on August 2, 1982, having traveled a distance of 1163 miles.

David, who will be equipped with a 2-meter hand-held fm transceiver, hopes to make contacts with, and possibly meet in person, many British amateurs as he

journeys northward. David's wife, Betty, also will be kept informed of his whereabouts and welfare by Amateur Radio.

Any U.K. amateurs having news of VE3HBF are invited to call VE3CDM and/or VE3AND in Toronto, both of whom will be monitoring 21,222 kHz every Sunday at 1430Z. — Tom Atkins, VE3CDM/G4ABN, Willowdale, Ontario

EMERGENCY SERVICE TIP

□ During a recent RACES call out, I had to transfer my 2-meter rig to another vehicle. The cigarette lighter plug did not fit too well, and there may have also been a loose connection behind the socket. Consequently, when I arrived at the scene of a fire, after a ride across some rough terrain, the rig went dead! Following

some seconds of hysteria, I found that I could operate by holding the lighter plug in place by hand. But holding down a power connection with one hand and having a mike in the other leaves no hand for the other numerous jobs. The moral: operators expecting to do emergency service should include in their equipment a power cable of suitable length for direct connection to a vehicle's battery. — James Don Young, KA6DZU, Riverside, California

QST congratulates . . .

□ John D. Goldman, WB9WTM, of Evanston, Illinois, one of 40 high school seniors from across the country who were named winners in the 1982 Science Talent Search sponsored by the U.S. Department of Education.

Rules, 1982 ARRL UHF Contest

This year's UHF Contest has a significant change in the scoring procedure, so please read sections 5 (A) through 5 (D) very carefully. The ARRL VHF/UHF Ad Hoc Committee for Contesting has proposed the changes, which vary the points per contact to reward more distant QSOs. Basically, the number of points per individual QSO is determined by taking the difference between your longitude/latitude and the long/lat of the station you work. There is still a weighting factor (band multiplier) to encourage activity on the higher bands. See the rules for details.

Revised summary sheets are available, and we strongly recommend that you send for a set to help with the scoring. Send a business-size s.a.s.e. to ARRL Hq. with your request.

Rules

1) **Object:** To work as many amateur stations in as many 1° × 1° longitude-latitude grid squares as possible using authorized amateur frequencies above 220 MHz and all authorized modes of emission. (However, use of the 430-MHz band is limited to 430-433 MHz, inclusive.)

2) **Contest period:** Begins 1900 UTC Saturday, Aug. 7 and ends at 1900 UTC, Sunday, Aug. 8. Entrants may use as much of this time as they wish.

3) Categories:

(A) **Single Operator:** one person performs all operating and logging functions, as well as equipment and antenna adjustments.

(B) **Multioperator:** Multioperator stations must locate all equipment (including antennas) within a circle whose diameter does not exceed 300 meters (1000 feet).

4) **Exchange:** Signal report plus either a four- or five-digit number, indicating the location of the station in longitude and latitude, rounded down to the next whole number.

Example: K8WW in Seven Hills, Ohio, would send 59 and 8141 as his exchange, since his longitude and latitude are 81° W, 41° N. WB6NMT in San Diego, California, might send 599 and 11732 (117° W and 32° N). Even a station at 117° 59' west would send 117, not 118.

Stations not competing in the contest may be counted for credit if they send their location precisely enough that the competing station may determine the appropriate longitude-latitude designation. Most road maps and

atlases have enough information to help you determine the proper designation. On-the-air assistance to those not knowing their long-lat location is encouraged.

5) Scoring:

(A) **QSO points.** Each QSO has a point value based on the distance between stations. To arrive at the point value, take the difference between your long/lat and that of the station you worked. Use the larger number difference, plus 1, with a maximum of 10. Example: W1AW in 7241 works W3XX in 7638. The difference between 72 and 76 (long) is 4, and the difference between 41 and 38 (lat) is 3. Take the larger of the two numbers, 4, plus 1 equals 5 points for that QSO. Each QSO may have a point value between 1 (for contacts in your own grid square) and 10.

(B) **Band multiplier.** Add the QSO points for each band individually and multiply by the following: 220 and 430 MHz, by 3; 1296 MHz, by 6; 2304 MHz and higher, by 12.

(C) **Grid square multiplier.** The total number of different long-lat grid squares worked per band. Each 1° by 1° square counts as one multiplier on each band it is worked.

(D) **Final Score.** Multiply the result of (B) above by the sum of the grid square multipliers as explained in (C) above.

Example: W3HMU works 14 stations worth 38 QSO points in eight 1° multipliers on 220 MHz, 10 stations worth 22 QSO points in six 1° multipliers on 432 MHz, and 3 stations worth six QSO points in two 1° squares on 10 GHz. His score is calculated as follows:

220 MHz 14 QSOs 38 QSO points
× 3 (band multiplier) = 114 points
432 MHz 10 QSOs 22 QSO points
× 3 (band multiplier) = 66 points
10 GHz 3 QSOs 6 QSO points
× 12 (band multiplier) = 72 points
Totals: 27 QSOs 66 QSO points = 252 points
Final score equals 252 points × 16 1° multipliers, or 4032 total points.

6) Miscellaneous:

(A) Stations may be worked only once per band for credit, regardless of mode.

(B) Partial QSOs do not count. Both calls, the full exchange, and acknowledgment must be sent and received.

(C) Fixed, portable or mobile operation under one call is permitted. Only land-based stations (not aeronautical- or maritime-mobile stations) may be counted for grid square multipliers. A portable or mobile station may

not be counted for more than one QSO per band, even if the station is moving. However, a station that changes locations may be contacted for additional grid square multipliers, but not for QSO points.

(D) A transmitter, receiver or antenna used to contact one or more stations under one call sign may not be used subsequently during the contest period under any other call sign (with the exception of family stations where more than one call is assigned to one location by the FCC/DOC). The intent of this rule is to accommodate family members who share a rig, not to manufacture artificial contacts.

(E) All equipment and antennas used by entrants must be owned and operated by amateurs. Use of nonamateur-owned gear is not prohibited, but use of such equipment places the entrant in a separate category, ineligible for awards.

(F) While no minimum distance is specified for contacts, equipment in use must be capable of real communication (i.e., able to communicate over a distance of at least 1 km).

(G) Contacts made by retransmitting either or both stations, whether by satellite or terrestrial means, are prohibited. Frequencies regularly occupied by a repeater in a locality may not be used for contest work, even if the repeater is turned off.


(H) A station located precisely on a dividing line between two 1° longitude or latitude units may select either one as his location, but may not hand out both multipliers without moving his complete station (including antennas) at least 100 meters.

(I) Above 300 GHz, contacts are permitted for contest credit only between licensed amateurs of Technician class or higher using coherent radiation on transmission (e.g. laser) and employing at least one stage of electronic detection on receive.

7) **Reporting:** Entries must be postmarked no later than August 26, 1982. Official forms are available for an s.a.s.e. from ARRL Hq., and all entrants are strongly urged to send early for a set.

8) **Awards:** (A) The high scoring single operator and multioperator station in each ARRL Division.

(B) Additional certificates where significant effort or competition is evidenced.

9) **Disqualification:** See January 1982 *QST*, page 92. 

thesis during 1981 at New Mexico State University.

Lenore Jensen, W6NAZ, left, receives the George Washington Honor Medal from Patricia Sigmon, of the Freedoms Foundation in Valley Forge, Pennsylvania. Looking on are KA6SFM, second from left, founding president of the Pacific Pioneer Broadcasters, and WB6ELR, a Los Angeles police officer. An ARRL PIA for many years, W6NAZ was recognized for her many years of volunteer work, including handling a great number of messages for Army MARS and reading for Recording for the Blind, Inc. (photo by Bob Jensen, W6VQG)



Strays

QST congratulates . . .

Bill Leonard, W2SKE, former president of CBS News, who has received a 1981 Peabody award from the University of Georgia School of Journalism and Mass Communication for "meritorious public service."

Judy Moore, KA5CRK, on winning the James H. Davis award for the best doctoral

Results, Ninth Annual ARRL 10-Meter Contest

By Mark Wilson,* AA2Z and Bill Jennings,** K1WJ

It's 0000Z December 12. Across the U.S. and Canada, amateurs are about to start what is considered by many to be the most enjoyable operating event of the year. Larry, N7DD, has made the final adjustments to his equipment; his rotor indicator says "NE" and that's where it will stay for most of the weekend. Larry has been the big winner for the past few years, and he is out to defend his title as king of the contest. He knows that there will be stiff competition from George, W0UA, who will be at the controls of Colorado superstation K0RF. George has several new antenna configurations this year, and he is hoping to beat Larry for the Phone-only award. Who will win?

Meanwhile, Colorado Contest Conspiracy member W0YK is preparing to attempt to win the Mixed-mode category. Ed has been on the air for a while this afternoon, and he knows he's loud on the East Coast. That's good, because that's where most of his QSOs will come from.

Down in the cw bands, Tom, K5RC, has decided to single op this one on code-only. Tom has won this contest before, so he knows that he will have to stay on his toes to overcome competition from other cw fanatics. Tom has a good signal, thanks in part to his 7-element "Flashlight," up about 80 feet, and plenty of experience; still, winning for the country requires lots of hard work and some luck.

Out in Washington, the crowd at K7RI is preparing for a go at the multiop slot. They've got a couple of big tribanders and a fantastic location. But right behind K7RI is another seasoned crew at K9HMB. These guys have been operating multi-multi in the DX contests under various calls for the past few years. They know that teamwork is essential, especially in spotting multipliers. But they seem to have their act together — they found 163 by the end

of the contest, a fine total indeed.

The contest gets off to a good start. Larry and George both have their hands full of eastern stations, working 100 QSOs in the first 20 minutes. Poor George can hardly write fast enough; he fills his first 50-QSO log page in seven minutes. There are plenty of rare multipliers on this year, too, including SU, 6W8, 9H4, 9Q5, JT1, 4S7, 9K2, YK, JW, 4U1, ZB2, FO8, H44, PZ and CE0A. Thanks to all of the DX stations who make this contest interesting!

By 0700Z, the U.S. and Canadian stations have worked the last of their ground-wave and scatter contacts, and have headed off to bed. But things are just starting to roll in Europe. G5CMX gets off to a nice start with 4S7MX as

his first contact. His next hour is a mixture of European and Asian stations, with a few VK/ZL and African types thrown in for good measure. It isn't until 1100Z that he works AK1A, his first sleepy American.

It's interesting to note that while we consider

Top Five — DX

| Mixed Mode | | Cw | |
|------------|---------|-----------|---------|
| Call | Score | Call | Score |
| UB5IJK | 510,708 | EA2IA | 288,738 |
| G5CMX | 508,080 | KP4KK/DU2 | 247,548 |
| 4U1TU | 420,864 | WP4BDS | 208,824 |
| JAY7AA | 324,632 | PA0LOU | 205,588 |
| J1QPU | 305,210 | JA1YAD | 201,110 |
| Phone | | Multiop | |
| Call | Score | Call | Score |
| KB7IJ/KH2 | 653,380 | HK3A | 951,300 |
| DJ3HJ | 581,584 | XE1MDX | 750,656 |
| TG9GI | 466,944 | HP1XAW | 581,462 |
| DL8PC | 465,300 | LZ1KDP | 534,492 |
| JAYOWD | 448,240 | F6ECI | 534,480 |



KB0RC, better known as "old milk and cookies" around Hannibal, Missouri, operated K4VX to the number six position in the W/VE mixed-mode competition and the top mixed-mode position in the Midwest Division.

Top Ten — W/VE

| Mixed Mode | | Cw | |
|------------|-----------|---------------|---------|
| Call | Score | Call | Score |
| W0YK | 875,238 | K5RC | 440,300 |
| N7DF | 759,200 | K3LR | 387,090 |
| VE6OU | 756,496 | N5JJ | 381,920 |
| KH8XX | 736,788 | N4AR | 370,080 |
| N6CW | 712,378 | NF6H | 360,580 |
| K4VX | 708,834 | K6LL/7 | 357,642 |
| WB7FDQ | 629,800 | N4ZZ | 343,612 |
| AH6BK | 605,760 | N7CW | 329,226 |
| WB5VZL | 542,624 | W5JW | 320,896 |
| K8CX | 535,670 | W1WEF | 274,120 |
| Phone | | Multioperator | |
| Call | Score | Call | Score |
| N7DD | 1,016,478 | K7RI | 900,212 |
| K0RF | 897,024 | K9HMB | 854,055 |
| KM5R | 896,584 | W7WHB | 741,076 |
| K5JA | 874,560 | A1TB | 719,190 |
| AA5B | 809,784 | KC8AT | 700,988 |
| AK1A | 773,698 | W5RRR | 699,300 |
| A1GJ | 673,920 | K9MWM | 675,612 |
| KL7Y | 649,488 | KB4I | 655,620 |
| VE7BT | 628,056 | AB0I | 632,392 |
| A1GV | 606,585 | K8II | 626,528 |

*Assistant Communications Manager, ARRL
**Communications Assistant, ARRL



The Hudson Division multiop winners at WB2TSY are (l to r): WB2TSY, KD2I, WB2EGI and WB2WIK. WA2PID, the fifth op, isn't in the photo because he's behind the camera.

10 meters to be a band useful only from 1100Z through 0200Z or so, it is actually in use all the time somewhere in the world. Think how strange you'd feel getting up at 0700Z to work the contest, yet that's the time it starts for many of the world's hams.

The 10-Meter Contest is interesting in that it attracts so many different types of amateurs. Looking through the calls of the W/VE participants, you'll see the usual "big-gun" types. But you'll also see hundreds of calls you know have to belong to new hams and "casual" ops. You'll also see many call signs normally found in vhf contests, and others that appear in the latest DXCC Honor Roll listing. The variety of participants is one of the keys to the success of this contest.

The 1981 ARRL 10-Meter Contest was the best in terms of entries received. We have a grand total of 1652 logs listed in the next few pages (518 DX and 1027 W/VE), up from 1540 last year and the 1979 record of 1565. The high level of activity was reflected in the scores in every category. A look at the QSO and multiplier totals will confirm that an awful lot of folks took the time to operate a bit on 10.

The 1981 10-meter contest was the first for a new award. Larry Pace, N7DD, is serious about encouraging activity in this contest, especially in the coming years as the sun spots decline, so he has sponsored a plaque for the highest scoring phone-only station. This year W0UA, operator of K0RF, won the plaque because Larry declared himself ineligible. Larry says he will continue to sponsor the award, so watch the rules for this year's event.

That's about it for this contest. Please note that the scores for the SP stations are from Saturday only. All Polish amateurs were forced to leave the air on Sunday. The 1982 contest probably won't be quite like the last one, but the 10-meter diards will be in there slugging it out again. It's a bit early to start planning, but try to remember to stop by 10 meters the weekend of Dec. 11-12. It will be worth your while.

SOAPBOX

I will never forget the activity by the Polish stations in the contest on Sunday (JIACH). Great help for getting over "key fright" (KA0LCZ/T). I feel pretty good about my score, considering that my antenna is a monopole dipole tacked to my roof at 16 feet (N7CQT). If you are new at the hobby, or feel that your station is not big enough, the 10-Meter Contest is for you (KA8HIB). My high Yagi worked the best on DX QSOs, but the low tri-bander was best on the W/VE "scatter" contacts with the beam generally pointed between NW and NE (W9PNE). The last four hours of the contest were hell . . . trying to watch the 49er football game and work the contest (WD6FYJ). Working all 50 states was the highlight for me (AFIT). The contest is a lot of fun. I do, however, deplore the proliferation of over-driven speech processors. We should bear in mind that a heavily processed signal is harder to copy than a normal one, even though it may be louder (VE3TY). The band was unbelievably short

DX Continental Leaders

| Continent | Mixed Mode | Cw | Phone | Multitop |
|---------------|------------|-----------|----------|----------|
| Africa | — | — | EA8TY | 6W8HL |
| Asia | JA7YAA | JA1YAD | JA7OWD | UK0QAA |
| Europe | UB5JK | EA2IA | DJ3HJ | LZ1KDP |
| North America | H18LC | WP4BDS | T89H | XE1MDX |
| Oceania | VK6JS | KP4KK/DU2 | KB7JJKH2 | — |
| South America | — | PY1VOY | LU3FAN | HK3A |

Division Leaders

| Division | Mixed Mode | Cw | Phone | Multitop |
|----------------|------------|--------|--------|----------|
| Atlantic | K3EW | K3LR | K2ITG | KJ2Q |
| Central | W9LT | K9TUS | A19J | K9HMB |
| Dakota | KN0V | W0YCR | KB9SI | KB0BU |
| Delta | W5XZ | N4ZZ | WB5SKQ | N5FG |
| Great Lakes | K8CX | N4AR | WA4QQV | K8II |
| Hudson | K2TW | AG2X | W1GD | WB2T5Y |
| Midwest | K4VX | N0TT | KB0PPR | AB0I |
| New England | K1XM | W1WEF | AK1A | AA2Z |
| Northwestern | K7VIC | KB7G | KL7Y | K7RI |
| Pacific | KH6XX | N8OP | A16V | K7SFN |
| Roanoke | K4UWH | KA4BFT | WA4HII | AA4UK |
| Rocky Mountain | W0YK | W5JW | K0RF | KC0AT |
| Southeastern | N4KG | W4VQ | NU4Y | KB4I |
| Southwestern | N6CW | NF6H | N7DD | W6VLD |
| West Gulf | WB5VZL | K5RC | K5JA | W5RRR |
| Canadian | VE6OU | VE4YY | VE7BT | VE3TY |



Gastou, XE1GBM, is one of the operators of XE1MDX, the number five multitop station worldwide, in this contest.



Gay, WB5SKQ, turned in the top phone score in the Delta Division.

on Saturday afternoon; therefore, the rate was unbelievably high (KB0RC/K4VX/0). I can remember when I thought that WAS on 10 meters was impossible. This year I made it in one weekend. (W5IU). Nice to see so much activity on 10 meters. Great contest with only a minimum amount of agitation (WD5EWD). I'm on pins and needles to see if I beat any other phone-only scores (K7CU). My logs contain the new world's record for the number of dupes in a 19-hour period (80). I gave up on duping the log during the contest last year — obviously many others did too. Would anyone like to donate a personal computer complete with log-checking program? It would help speed up my QSLing also (WB1GQR). Conditions were so good that I didn't use my linear (AA6EE). I can hardly believe that I worked CE0AE on the first call, while he was calling "CQ" and getting no takers (K1NH). Too many ops either have poor receivers or don't listen for weak signals. Could have had another five or six multipliers if short-skip and backscatter stations that I heard Q-5 would have listened up for me rather than pausing only long enough for breath before continuing their *unanswered* strings of "CQ Contest!" (KS2G). When checking my contest entry, I was disappointed to find so many dupes (75 in 718 QSOs). My method of operation is to try to hold a frequency while working the pileup.

Therefore, it is the stations calling me who are causing the dupes. This problem has increased over the last few years. Perhaps an article on QST by a leading contest operator on various dupe sheet methods would help? (G3PVA). There once was a contender from Bly, Who cried, "QRL! QRM! . . . QSY!" And when the pile did, it left just a Lid, alone and wondering why (W7TC). We worked all states, including ND and KH6 . . . We think that daylight at this time in December is too short to work the Pacific area from Europe. It might be better to have this contest in February or, better yet, in the first half of April (I4JMY).

FEEDBACK

Refer to page 73 of July 1981 QST for the following correction to the 1980 10-Meter Contest. W2VJN (WA2ZKY, op.) should have been listed in the Northern New Jersey Section, not the Southern New Jersey Section. This makes him the top cw score in NNJ and in the Hudson Division.

1980 November Sweepstakes. See page 90 of May 1981 QST for the following correction. KB2M was not a participant in the K2XR multitop station on phone in the 1980 SS.

Scores

DX scores are listed by continent/country, alphabetically according to prefix. U.S./Canadian scores are listed by ARRL Section within a call area. Single-operator mixed-mode scores (denoted by the letter A) are listed first, followed by single-operator cw-only scores (indicated by the letter B), then the single-operator phone-only entries (shown as the letter C) and finally the multiplier scores in descending numerical order (shown as "D" stations).

Line scores show the call sign used; operator(s), if any; total score in points; number of QSOs; number of multipliers and a letter that denotes the entry class.

| DX | Asia | Europe | North America | Oceania | South America | U.S./Canada | |
|-----------------------|--------------------|-----------------------|-------------------|---------|-----------------|-------------|--------------------|
| HM1SX | 23,596-207-57-C | JA2OJ | 22,220-202-55-A | JA1DFQ | 87,562-401-83-B | JH7RZV | 5412-80-33-B |
| JA7YAA (JR7OMD, opr.) | 324,632-1308-124-A | JA1AAT | 21,216-136-7B-A | JA9CWJ | 64,476-398-81-B | JJ1OSP | 4556-65-34-B |
| J11QPU | 305,210-1327-115-A | JA1SGU | 17,818-149-59-A | JH7UJN | 53,700-356-75-B | JA7KM | 4528-70-21-B |
| J3HHTT | 163,464-834-98-A | JA3BRB | 18,988-134-62-A | JA2DCN | 51,040-316-80-B | JE1CKA | 4350-75-28-B |
| JH7UJU | 145,036-712-101-A | JH6TYD | 9840-123-40-A | JR3XEX | 46,472-314-74-B | JARCAQ | 2640-40-39-B |
| JABSQO | 125,580-690-91-A | JA4JKD | 5848-86-34-A | JJ1HEY | 37,772-266-71-B | JAB9YL | 1584-44-18-B |
| JH2CJW | 82,856-376-81-A | JAT0HP | 3300-50-35-A | JA2BP | 36,432-276-66-B | JH1CIN | 1152-36-16-B |
| JRTTJP | 57,720-365-78-A | JAT7CT | 2352-52-23-A | JA1OP | 21,324-189-58-B | JR1AHH | 442-15-13-B |
| JAEQC | 43,050-287-78-A | JG1WRN | 1292-34-19-A | JE3MWB | 18,488-169-54-B | JATOWD | 448,240-1724-130-C |
| JA1NKT | 41,712-253-79-A | JA1YAD (UE2QIZ, opr.) | 201,110-845-119-B | JA6ABG | 13,580-194-35-B | J11QOI | 258,944-1156-112-C |
| JH1MTR | 25,080-218-57-A | JA1BN | 140,812-743-94-B | JA1BN | 11,868-137-43-B | JH1AGU | 255,600-1065-120-C |
| | | J11ACI | 124,432-707-88-B | JE7BIZ | 10,148-116-43-B | JF1JLW | 64,428-413-78-C |
| | | JA7FWR | 77,448-461-84-B | JH3AIU | 8772-102-43-B | JM1NKT | 44,082-278-79-C |
| | | JH2QAY | | JA2SAP1 | 5472-72-38-B | JH1UUT | 38,340-270-71-C |

| | | | | | | | | | |
|---|--------------------|---|---------------------|------------------------------|--------------------|--|--------------------|---------------------------------------|--------------------|
| JA1ALX | 29,118- 211- 89-C | EA4BAF | 37,412- 199- 84-C | OK1ARI | 209,000-1045-100-A | UA3TDX | 143,862- 659-108-C | TG9GI | 466,944-1824-128-C |
| JA1BIU | 21,660- 184- 70-C | EA5ANR | 26,688- 139- 86-C | OK1KX | 30,716- 494- 58-A | UA3WA | 128,540- 733- 93-C | TG9WB | 43,550- 325- 87-C |
| JA1JGP | 20,992- 156- 60-C | EA7LM | 17,420- 134- 85-C | OK1KZ | 33,800- 240- 30-A | UW1AE | 78,560- 440- 87-C | TJ2LO | 27,390- 185- 83-C |
| JH0XOB | 18,526- 157- 59-C | EA2SG | 15,038- 103- 73-C | OK1MG | 26,730- 165- 81-A | UA3TN | 64,800- 405- 80-C | XE1HGJ | 346,800-1734-100-C |
| JJ3PLX | 10,418- 144- 57-C | EA7BYM | 13,600- 115- 80-C | OK1AQJ | 16,348- 134- 81-A | UV3DN | 26,820- 298- 45-C | XJ1JGJ (RE1J, opr.) | 422,710-119-124-C |
| JH8JA | 14,384- 128- 57-C | EA7AVW | 13,688- 118- 58-C | OK1DVK | 11,000- 110- 50-A | UK6LTI (UA63A + 3 oprs.) | 393,464-1438-137-D | XE1MDC (XE1s GBM, MMD, OW, OX, oprs.) | 750,858-2538-148-D |
| JA8QDU | 11,778- 128- 48-C | EA3BOV | 9828- 117- 42-C | OK3EA | 8148- 96- 42-C | UK3OAE (UA3s QFV, QGQ, QLL, QLM, DLW, oprs.) | 351,090-1245-141-D | ZF2AA | 4058- 57- 28-B |
| JA8LH | 11,110- 111- 48-2C | EA3C5S | 3488- 53- 33-C | OK3FO | 5400- 40- 35-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | ZF2AG (NBAG, opr.) | 49,680- 380- 69-C |
| QJ1CRA | 9102- 111- 41-C | EA2QJ | 2730- 39- 35-C | OK1AVD | 16,412- 811- 97-B | UK3AAC (UA3AMW + 1 opr.) | 117,754- 847- 81-D | NFTGBy9 | 7400- 100- 37-B |
| JR7UEW | 7175- 92- 39-C | EG1AOW | 1780- 44- 20-C | OK2BHW | 136,220- 640- 98-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | Oceania | |
| JA4JQT | 8888- 84- 31-C | EA5BZS | 1716- 39- 22-C | OK2BEW | 133,452- 652- 99-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5IJK | 510,708-1806-150-A |
| JA4JSR | 5148- 84- 31-C | EA4AZO | 1312- 41- 23-C | OK2BWH | 48,100- 325- 74-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BZ | 33,792- 264- 84-A |
| JE1PJR | 3328- 64- 26-C | EA3MM (EA3s BEN, GRX, CVD, E03AEF, oprs.) | 128,832- 717- 88-D | OK2BWS | 43,240- 424- 32-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UY5TE | 24,000- 240- 50-A |
| JM1AIX | 1784- 42- 21-C | EA3RCR (EA3s AIR, ALV, CDL, IH, JA1, OG, oprs.) | 121,718- 619- 98-D | OK2PAE | 35,984- 243- 74-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5GN | 18,144- 168- 54-A |
| JR2AQP | 392- 14- 14-C | EA8LA | 5108- 69- 37-B | OK3IF | 34,680- 255- 68-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5JGO | 7520- 80- 47-B |
| JA1AUV | 306- 17- 9-C | EA8GP | 42,160- 310- 66-C | OK2JX | 30,954- 214- 67-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BG | 445,726-1615-122-C |
| JA1ZSX | 128- 8- 8-C | EA8KT | 9000- 90- 50-C | OK3KYR (OK3DT, opr.) | 25,016- 224- 62-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BN | 18,144- 168- 54-A |
| JK1LRH | 128- 8- 8-C | F6EBA | 224,220-1010-111-A | OK3BA | 22,538- 191- 59-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BU | 7520- 80- 47-B |
| JH1FJK | 64- 7- 6-C | F6GCP | 150,938- 654-114-A | OK2EC | 15,510- 167- 47-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BV | 7520- 80- 47-B |
| JR1YYO | 50- 5- 5-C | F6GFX | 37,972- 223- 84-A | OK2EJ | 13,900- 139- 50-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BW | 18,144- 168- 54-A |
| JA1IT | 32- 1- 4-C | F6FQZ | 121,770- 708- 86-B | OK2JU | 13,900- 139- 50-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BX | 7520- 80- 47-B |
| JA9YBA (JA9s LJ, LN, OTX, JH9CAZ, oprs.) | 421,750-1687-125-D | F6EQV | 86,592- 528- 82-B | OK2KJ | 12,040- 140- 43-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BY | 7520- 80- 47-B |
| JA2YKA (JA2SSY, JG1GIF, JH6RPZ, oprs.) | 320,820-1394-115-D | F6EJV | 11,520- 118- 48-B | OK2KW | 18,000- 50- 16-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BZ | 33,792- 264- 84-A |
| JA1ZLO (JH8LQL, JH7PKU, JH8ELZ, JK1WSR, JR2UN, Q1, oprs.) | 10,838-1258-125-D | F6EJQ | 11,520- 118- 48-B | OK2LW | 17,152- 128- 67-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BC | 7520- 80- 47-B |
| JA9YAK (JA9s RAW, RWU, JH7QX, JH9FBO, JJ1A1H, oprs.) | 269,984-1140-118-D | F6EJG | 18,432- 96- 86-B | OK2MKS | 11,016- 108- 51-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BD | 7520- 80- 47-B |
| JA3YYZ (JA3TVQ, JF3PNO, JH3UHG, oprs.) | 176,346- 908- 97-D | F6EJC | 2392- 52- 23-B | OK3KAP (Multiopt, opr.) | 89,420- 522- 85-D | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BE | 2808- 52- 27-C |
| JH7YFR (JA7QXV, JR7s BPM, LVA, oprs.) | 47,480- 338- 70-D | F6EKF (F6BKR, opr.) | 302,796-1294-117-C | OK2KNN (Multipt) | 1872- 39- 24-D | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BF | 7520- 80- 47-B |
| JA7YQO (JH7s VVR, XUJ, JR7MZC, oprs.) | 20,700- 207- 50-D | F6EKG | 302,796-1294-117-C | ON8FT | 94,325- 597- 79-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BG | 7520- 80- 47-B |
| JT1BG | 3348- 54- 31-C | F6EKN | 12,878- 11- 58-B | ON4XG | 93,808- 570- 82-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BH | 7520- 80- 47-B |
| UA9ZBW | 69,038- 523- 88-A | F6EKL | 534,480-2040-131-D | ON4KST | 129,532- 811-108-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BI | 7520- 80- 47-B |
| UA9ASU | 125,184- 751- 83-B | F6EKM | 470,196-1678-141-D | ON8G5 | 106,296- 506-108-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BJ | 7520- 80- 47-B |
| UA9QBT | 47,450- 365- 55-B | F6EKN | 468,872-2008-117-D | ON8LU | 99,840- 94- 42-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BK | 7520- 80- 47-B |
| UA9QBB | 3068- 73- 21-B | G5CMX (NBET, opr.) | 598,080-1752-145-A | ON8BK | 7452- 81- 48-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BL | 7520- 80- 47-B |
| UA9P7 | 50,400- 420- 60-C | G4JKS | 132,090- 593- 111-A | ON7VP (+ ON6NW) | 81,008- 482- 83-D | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BM | 44,538- 291- 76-B |
| UA9SUA | 12,814- 148- 43-C | G3PVA | 113,448- 643- 87-B | OY1A | 32,384- 368- 44-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BN | 44,538- 291- 76-B |
| UK9QAA (UA9s GBB, oprs.) | 455,544-1998-114-D | G3TXF | 95,814- 520- 91-B | OY8R | 10,170- 113- 45-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BO | 44,538- 291- 76-B |
| UK9CBE (UA9s CBR, CCW, CFX, oprs.) | 344,560-1460-118-D | G3ESF | 85,510- 492- 85-B | OZ1CAH | 30,822- 251- 81-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BP | 44,538- 291- 76-B |
| UK9CAA (RA9CCN, UA9s CBM, CBW, CCD, CFI, CPU, oprs.) | 266,048-1277-112-D | G4FDC | 23,892- 181- 88-B | OZ1FRR | 23,400- 155- 75-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BQ | 44,538- 291- 76-B |
| UK9SAV (3 oprs.) | 22,736- 234- 49-D | G3GTF | 22,156- 191- 81-B | OZ8EI | 25256- 73- 38-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BR | 44,538- 291- 76-B |
| UK9KAB (UA9IZ + 1 opr.) | 8820- 147- 30-D | G3WOF | 18,432- 96- 86-B | OZ1AZZ | 10,808- 102- 52-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BS | 44,538- 291- 76-B |
| UD8CN | 2016- 48- 21-A | G4NDW | 13,178- 108- 81-C | OZ1DKG | 105- 42- 81-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BT | 44,538- 291- 76-B |
| UF6FFJ | 1408- 44- 16-B | G5EBA | 13,068- 121- 54-C | OZ1LO | 8348- 100- 39-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BU | 44,538- 291- 76-B |
| UF6FFH | 920- 23- 20-B | G3SWB (G4s AWY, JVG, oprs.) | 86,814- 477- 91-D | OZ8E | 3348- 54- 31-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BV | 44,538- 291- 76-B |
| UK6FGD (UF8s AW, FBX, FDB, oprs.) | 2836- 61- 23-D | G8YMY (G14FUM, opr.) | 26,840- 220- 61-C | OZ4RF | 85,938- 85- 68-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BW | 44,538- 291- 76-B |
| UK7PAL (UK7s PAE, FBY, PCZ, oprs.) | 190,624-1036-92-D | G4JDU | 98,576- 488-101-C | OZ1FTJ | 4258- 58- 38-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BX | 44,538- 291- 76-B |
| UK7GAA (3 oprs.) | 15,844- 233- 34-D | G4MRO | 91,052- 442-103-C | OZ1ZEA | 4104- 57- 36-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BY | 44,538- 291- 76-B |
| 457MX | 128,936- 773- 82-B | GW8GT (G3AOY, GW3s KYA, NUW, NWS, GW4s BLE, IGR, oprs.) | 418,152-1572-133-A | OZ2RT | 4000- 50- 40-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BZ | 33,792- 264- 84-A |
| OH1TDI4U | 1520- 40- 19-C | H43NU | 92,984- 451- 93-A | OZ2JY | 2550- 51- 25-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BC | 7520- 80- 47-B |
| 9K2BE (G4BWP, opr.) | 14,220- 158- 45-A | H43KNA | 58,308- 339- 88-A | OZ2TD | 2516- 37- 34-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BD | 7520- 80- 47-B |
| Europe | | H43HW | 39,388- 259- 78-A | OZ2VJ | 2148- 37- 21-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BE | 2808- 52- 27-C |
| CS1SL | 98,804- 594- 83-C | H43HZ | 3078- 57- 27-B | OZ2BZ | 1352- 26- 26-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BF | 7520- 80- 47-B |
| CT1AHU | 37,908- 234- 81-C | H43K7 (G3 oprs.) | 59,272- 478- 62-D | OZ8T | 950- 25- 19-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BG | 7520- 80- 47-B |
| CT1UA | 37,638- 194- 97-C | H89QA | 390- 15- 13-B | OZ8X | 796- 21- 18-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BH | 7520- 80- 47-B |
| CT2DW | 82,832- 408- 77-C | H89AAA | 275,250-1101-125-C | OZ5DD (OZ1s CTC, CWM, oprs.) | 119,800- 578-120-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BI | 7520- 80- 47-B |
| DL8RAI | 116,424- -108-A | H89AUS | 35,032- 302- 58-C | PA6GN | 256,698-1069-121-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BJ | 7520- 80- 47-B |
| DL8ZB | 58,692- 402- 73-A | IS5MX | 331,118-1348-123-C | PA6SKP | 12,210- 111- 55-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BK | 7520- 80- 47-B |
| DF8VE | 58,692- 338- 83-A | IT0UY | 121,138- 538- 81-C | PA6LOU | 205,588- 980-103-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BL | 7520- 80- 47-B |
| DL8YC | 28,704- 208- 69-A | IT0YU | 180,800- 180- 55-C | PA6QDU | 75,090- 117- 80-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BM | 44,538- 291- 76-B |
| DL8ZF | 16,704- 174- 48-A | IAJMY (+14s OUT, YNO, YSS) | 454,342-1908-119-D | PA6RT | 49,228- 217- 86-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BN | 44,538- 291- 76-B |
| DF2RG | 7224- 83- 43-A | IS0KNG | 37,114- 241- 90-C | PA2F0R | 13,530- 120- 55-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BO | 44,538- 291- 76-B |
| DL1TH | 26,828- 225- 66-B | JW9MY | 768- 24- 16-B | PA3ASC | 5658- 69- 41-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BP | 44,538- 291- 76-B |
| DK2QB | 21,800- 200- 54-B | LA4YV | 148,184- 672-111-A | PA2BJM | 6016- 76- 33-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BQ | 44,538- 291- 76-B |
| DA1SD (G2HPF, opr.) | 16,840- 157- 63-B | LA4EY | 7120- 88- 40-A | PA2BDC | 74,958- 403- 93-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BR | 44,538- 291- 76-B |
| DL1AM | 17,138- 128- 69-B | LA6ZH | 4896- 72- 34-B | PA2EJ | 26,940- 181- 70-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BS | 44,538- 291- 76-B |
| DL7JR | 13,248- 131- 48-B | LA7SI | 3808- 98- 28-B | PA2HTR | 19,564- 146- 67-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BT | 44,538- 291- 76-B |
| DF4CJ | 13,158- 129- 51-B | LA6DH | 560- 20- 14-B | PA2KDM | 17,052- 147- 58-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BU | 44,538- 291- 76-B |
| DF2MG | 10,520- 88- 39-B | LA4HH | 65,420- 365- 85-C | PA3BEV | 14,868- 126- 59-B | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BV | 44,538- 291- 76-B |
| DL3ME | 480- 15- 15-B | LA2TO | 53,808- 344- 70-C | PA4DX | 1584- 46- 17-C | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BW | 44,538- 291- 76-B |
| DK9BR | 390- 15- 13-B | LA2TY | 34,310- 235- 73-C | PA8AWI (+ PA3BOK) | 55,358- 310- 89-D | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BX | 44,538- 291- 76-B |
| DJ3HJ | 581,584-1784-183-C | LA5JX | 20,650- 175- 59-C | SM0DJ | 187,898- 782-123-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BY | 44,538- 291- 76-B |
| DL8PC | 465,300-1850-141-C | LA8AE | 13,860- 128- 55-B | SM5CA | 130,848- 698- 94-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BZ | 33,792- 264- 84-A |
| DK2MN | 847,980-1085-114-C | LA3UT | 6982- 63- 53-C | SM6BDS | 42,258- 287- 78-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | UB5BC | 7520- 80- 47-B |
| DL8VK (DK6WF, opr.) | 139,380- 890-101-C | LA2BA | 4148- 61- 34-C | SM6BV | 27,974- 197- 71-A | UK6LDN (UA6LFO, UVBDE, 77-D) | 37,996- 322- 59-D | | |

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| N8BVA/T AJ1M KA1GTR KA1OQ KA1TQ W1CTR KB1U (+ N1AF) KA1MP (+ AE1W, K1TOL, KA1s AWB, FMM, MP) 65,124-400-81-D | 520-16-13-B 86,480-460-94-C 88,448-368-93-C 49,202-337-73-C 29,436-222-86-C 4820-66-35-C 380,018-1630-116-D 380,018-1630-116-D | Western New York W2FUJ KA2HDQ KB2NU W2HGK KM2L KR2V WB2SWL WA2LEZ W2FTY KA2CGV KA2NJK WA2MNM WA2JXC WB2YOO WB2TKY WB2TKD KB2SE KB2E KB2B K2GXT (WB1ADR, opr.) KA2EPS WA2FSU WB2PE2 KJ2Q (+ WA2AZA, WB2MVF) 237,870-981-135-D | 72,072-387-81-A 63,712-362-88-A 50,650-328-90-A 31,302-216-81-A 38,448-267-72-A 15,300-153-50-A 6708-86-39-A 6424-73-44-A 62,310-334-93-B 22,512-193-56-B 176-9-8-B 223,020-828-135-C 190,960-680-111-C 70,816-384-97-C 31,302-216-81-A 39,340-185-82-C 25,200-200-83-C 15,000-150-50-C 11,562-152-38-C 6076-98-31-C 4080-68-30-C 3038-49-31-C KJ2Q (+ WA2AZA, WB2MVF) 237,870-981-135-D | WB4BKU KB4I (+ AA4GA, KC4s FX, LZ, N4RJ, WB4NMA) 655,620-2226-147-D K4XR (+ KA4E, K4CKS, WB4RU, WB4LJ) K4YDN (+ K4JB) 56,284-454-73-D | Kentucky N4AR N4TY NM4M W4YOK W4XT WA4QQV N4AD N4D4 W4CN (KC4WQ, KD4U, N4XM, N4R, N4OR, oprs.) 201,374-988-107-D W4DCRG (+ N4DIT) 173,138-767-117-D NAEE (+ KA4s BY, DUL, IS, PBY, TET, KC4J, OJ, TS, KD4BZ, KE4CL, N4s CCQ, ELQ, WA4AGH) 149,730-644-115-D N4FTH (+ KE4CC) 55,244-311-86-D | KC4QU (+ N4MO) 369,788-1302-142-D W4IY (KC4s IC, FI, KE4EV, WB4RDV, oprs.) K4RC (+ K4JST, KA4PNF, K4JJ, WD4CNG) 73,968-401-92-D 19,788-194-51-D | Arkansas KASLD W4OCG/5 K6V/5 K5MCM NSDY W5EIJ WA5NFC 5202-51-51-C 68,360-420-78-A 7722-99-39-B 8362-107-45-B 54,646-307-89-C 32,596-281-58-C 10,656-111-48-C 51-51-51-C | Louisiana W5XZ W5WG AC5R W5SSKC W5GFB W5B2JT N3KP KB5AS (+ K3JT) 867,584-2940-147-A 71,878-415-83-B 11,322-111-51-B 100,910-1715-137-C 100,454-552-91-C 4270-61-35-C 3380-42-40-C 321,708-1411-114-D | Mississippi KV5F W5SHKD N5DSK W5WCB W5UCY N5FG (+ WNSLJ, WD6EQP) 19,488-169-58-A 179,520-880-102-C 142,008-732-97-C 47,892-307-78-C 27,394-63-84-C 392,232-1662-118-D | New Mexico WA5DJJ W5JW K5XJ AA5B KC5DT NS5CP W5VNZ (+ K5HUI, W5DFJ) 24,300-242-50-A 320,896-1468-109-B 25,596-230-54-B 809,794-2934-138-C 89,520-440-79-C 84,540-552-86-C 513,894-2039-123-D W5DGNW (+ W5DAF) 68,000-500-68-D | Northern Texas WBSVZL K5FUV K9LA AD5Q W5IUPV AD5F K5NWX W5BROO N7BUL K5BUL K5BGFJ W5QF KA5Q KA5HKWN KM5R K5JA (K5ZD, opr.) 542,624-2188-124-A 251,329-1056-119-A 123,690-849-95-A 65,728-118-104-A 16,436-334-77-A 38,398-251-73-A 232,470-1096-105-B 144,328-793-91-B 122,672-745-84-B 71,620-504-70-B 16,436-334-77-A 25,594-188-67-B 9546-129-37-B 7200-83-36-B 896,584-3028-143-C | San Antonio K6BJK KB5YS KS6Q 88,060-410-83-C 22,738-203-56-C 20,952-194-54-C | Los Angeles N6HC N6HE K6AKLJN K6MB K6AFZJN K6EID N6BDWD N6BDA W6CN K6AA (KB6FT, KN6C, WB6HE, oprs.) 323,136-1566-102-D K6ELX (+ KA6OJ) 143,532-874-81-D N6COG (+ N6HO) 44,802-393-57-D | Orange W6TSE W6BAJW N6FB N6MFX W6BKZQ/N AC6H K6RA N6BK K6JCV W6TMD W6VLD (N6KN, WA6D, H6K, oprs.) 423,660-1842-115-A 15,648-180-48-A 6540-107-40-A 360,580-1425-121-B 152,780-780-95-B 60,450-428-65-B 54,884-385-62-B 9648-93-48-B 584,000-2338-125-C 311,992-1322-118-C 85,700-368-90-C WA6D, H6K, oprs.) 518,656-2028-128-D | Pacific KH8XX (AE8E, opr.) 736,788-2877-137-A AH8BK KH8H KH8J KH8M KH8GD K3TEZH6 736,788-2877-137-A 608,760-2574-120-A 13,332-158-43-B 1444-38-19-B 417,408-2174-96-C 38,168-274-68-C 12,850-115-55-C | Sacramento Valley W6CQH A1BV W6EFO (K6TU, opr.) 2990-52-23-B 806,585-2486-122-C 169,344-892-96-C 58,484-348-84-C 26,474-217-61-C | San Diego N6CWX K1TV W6ZT AA6EE N6ND W6ZL W6XJ (A66R, K6LJO, N6AV, WB6OKK, oprs.) 712,378-2710-131-A 140,430-755-93-B 52,772-314-79-B 14,100-141-50-B 247,072-1103-112-C 37,448-295-61-B W6XJ (A66R, K6LJO, N6AV, WB6OKK, oprs.) 479,028-2101-114-D | San Francisco K6ANP W2VQ/8 N6DNT/B WA6AU 56,308-419-80-B 12,816-177-36-B 6208-32-8-B 141,480-796-90-C | San Joaquin Valley K5RC W6SX N6AVJ N6BIB N6SJM W6BLFR KE6CZ W6BWEV W6RXX 26,334-231-57-A 72,136-504-71-B 13,288-151-43-B 6832-96-45-B 101,268-522-64-B 101,136-516-98-C 16,538-159-52-C 16,308-151-54-C 98-7-7-C | Santa Barbara W6TKF W6OUL K6BQK K6BQJ K6BQI W6JEA 57,584-483-61-A 6180-67-40-A 13,944-163-42-B 6832-96-45-B 8240-100-40-B 223,238-1053-106-C 44,180-345-64-C | Santa Clara Valley N6ER W6BCKT N6UW W6BOK K6JZ N6BZA N6CIP WA6HAD W6DJKHN K6BINGIT K6HJZ K6BHTCN K6HJZ N6NF W6BKBZ W6BGFJ W6YUJ W6BHPK K6BHDK W6DFJY K6YA (AG6D, K6MA, K6As LTI, MPK, K6BN, WB6A, W6RPA, W6As LII, ROM, WB6A, W6RPA, W6As 340,878-1878-101-D 489,954-2202-111-A 71,500-545-85-A 58,356-354-73-A 32,804-286-57-A 18,720-165-57-A 1480-157-40-B 228,440-1090-102-B 4712-69-31-B 62-81-26-B 4058-63-26-B 2712-44-24-B 340,878-1878-101-D 459,592-1981-116-C 442,446-1993-111-C 299,920-1304-115-C W6BGFJ W6YUJ W6BHPK K6BHDK W6DFJY K6YA (AG6D, K6MA, K6As LTI, MPK, K6BN, WB6A, W6RPA, W6As 340,878-1878-101-D 178,570-874-79-D K6AR (+ KA6s AFK, JIC) 28,224-252-58-D |
|---|---|--|---|--|---|--|---|---|--|--|---|---|--|---|---|---|---|--|---|--|---|

An Emergency Communicator's Checklist

Having participated as a radio operator during recent flood disasters, I learned the value of having a checklist prepared ahead of time. During the local emergency, one has too much "on the brain" to arrive at the disaster site *totally* prepared. But one can try.

Since one can often be harried at these moments, the list does, and will, supply a double check for "essentials," as well as other desirable equipment that has been found to be valuable in actual experience. Of course, this list is personalized for my individual situation, but I'm sharing it with others in the hope that its broadness will cover other situations as well.

The list consists of three sections. List A is radio equipment gear, and is self-explanatory. Your own specific equipment should be listed according to frequencies and capabilities, and scope of operation. A vhf scanner that can run off of a 12-V gel cell can be very valuable if your repeater goes down and an evacuation is underway without your knowledge (in addition to letting you know about police, fire, weather, highway department and other emergency conditions). In this regard, a battery-operated

broadcast band radio or TV (ac/dc) can also be of great help if you are stationed in a remote outpost or evacuation center. Likewise, a microphone/earphone combination headset can eliminate local noise problems, privatize communications and free your hands for writing or holding, as the case may be, and is highly recommended. Hand-held gear should

List B

Communicator's Checklist Operating Equipment

Antennas:

- mobile antennas: 2-meter mag mount, vhf 1/4- λ antennas.
- 5/8-wave portable with radials
- two 50-ft sections of coax with PL-259s
- coax patch plugs for amplifiers, tuners, preamps, etc. (5)
- BNC to PL-259 adapters (4)
- PL-259 to BNC adapters (4)
- portable hf antenna (vertical)
- portable hf longwire/dipoles
- hf antenna tuner and swr bridge
- hf mobile mount and antennas
- rubber duck antenna (vhf, uhf)
- 5/8-wave, telescopic hand-held antenna
- collapsible vhf quad with mast
- spare PL-259 connects and double SO-239 barrel connects
- male-to-female coax adapter
- masts
- radials
- other antennas
- insulators, guy wire, nylon cord, fishline and weight, stakes, ground clamps/rods, counterpoises, bumper-mount clamp, resonators, mast, gutter clips, braid, ground wire

Power

- ac generator and fuel
- extension cords
- 2-prong plug adapters to 3-prong (ac receptacle)
- 1-to-3 plug adapters (ac receptacle)
- solar-powered battery charger
- hand-held battery charger (mobile)
- hand-held battery charger from ac
- battery charger charging devices
- 12-V power supply for hf rig
- 12-V power supply for vhf rigs
- battery packs (extra)
- extra battery for car
- gel cell
- NiCads
- cigarette lighter adapter
- spare fuses for rig, ac lines and car
- mobile power cords/adapters/wire nuts, tape
- variable voltage ac-to-dc power supplies and plugs

Tools

- VOM (for batteries, etc.)
- soldering iron and solder, slotted screw driver, pliers, hammer, wire cutters, knife/stripper, Phillips screw driver, hookup wire, long nose pliers, wire nuts, tape, connectors
- splice kits, 1/4-in. phone jack plugs, mini plugs, RCA plugs and adapters
- alligator clips

List C

Communicator's Checklist Personal Gear

- Net Directory
- ARRL *Operating Manual, Public Service Communications Manual, Operating An Amateur Radio Station*
- ARES i-d, RACES i-d, Red Cross i-d
- driver's and Amateur Radio licenses
- money, checkbook, keys
- maps
- logbook, notebook, paper, pens, pencils
- thumb tacks, tape
- Q-signal list, numbered radiogram list, other operating aids
- phonetic alphabet
- radiogram pads
- cardboard signs, felt-tipped pens
- card table, folding chairs
- watch, clock (battery-operated)
- battery-operated broadcast receiver
- battery-operated ac/dc television
- flashlights, knife, portable area light (dc/battery-powered/ac)
- jumper cables, spare auto fuses
- chains for tires, antifreeze, check spare tires, gas, oil, radiator
- cones, orange or red jacket
- flares, hard hat
- spare batteries for flashlight/radio
- notepad, clipboard
- jug of drinking water (minimum 1 gallon)
- empty gas can, siphon, jack
- thermos, cup, bowl, utensils, toothpaste, deodorant, soap
- razor, toothbrush, floss, towel
- sleeping bag and pad or blanket
- tent, backpack, hatchet, ax
- warm clothing (extra socks), sweaters, boots, gloves, hat, or cool clothing (shorts, sunglasses)
- first-aid kit, insect repellent
- food, tea, etc.
- toilet paper, small shovel
- good raingear with hood and boots
- club roster, *Callbook*
- Repeater Directory*
- emergency-frequency list
- phone numbers of ECs, DECs, SEC, SCM
- phone numbers of key personnel or agencies
- tow-chain winch
- can/bottle opener
- binoculars
- candles, matches, stove
- compass
- personal comfort items
- battery-operated tape recorder with jacks to plug into your receiver
- gas mask or respirator, rubber gloves, rubber boots (for chemical spills)
- tools
- Hibachi stove and coal
- pocket full of dimes for pay-phone access

[Editor's Note: N1&A is an assistant emergency coordinator for West Contra Costa County and has been active in RACES, ARES and NTS since 1959. He is currently a participant in the Sixth Region Net, the Northern California Net, the West Contra Costa County ARES and RACES, and is actively engaged in setting up specific arrangements for facilitating the collection and relaying of Welfare traffic in and out of northern California.]

*Deputy Communications Manager, ARRL

List A

Communicator's Checklist Radio Equipment

- 2-meter hand-helds with batteries/ac adapters/chargers/mike
- 2-meter mobile and portable equipment/batteries/adapters/chargers
- 2-meter amplifier
- 2-meter preamplifier
- antennas (see List B)
- 6-meter gear
- hf mobile rig
- hf portable rig with ac power supply and 12-volt HD battery
- hf mobile and portable antennas (see list of antennas)
- 220-MHz rig
- power amplifiers, microphones
- earphones
- hand-key and battery-operated keyer with spare batteries
- antenna switch, tuner, bridges
- for mobile van: RTTY gear, ASCII gear, typewriters
- vhf/uhf scanner with emergency power supply
- general-coverage and MARS frequency receiver
- marine radio communications gear
- microphone/earphone headset combination
- all adaptors for mini plugs, RCA plugs, 1/4 in. phone-jack combinations, etc.
- ground bus
- braid
- wattmeter
- noise bridge/grid dip meter
- extension cords
- 3-to-1 power plugs
- wire nuts
- new equipment: _____

have low-power switches to conserve energy drain. High-frequency gear lessens dependence on repeaters, which may be down or overloaded. QRP hf gear is also readily available.

List B consists of operating equipment other than radio gear, such as antenna systems, power systems and tools (all of which are in great demand during an emergency). These items are easily overlooked. Long coax is often overlooked, too. If it is storming outside, or extremely cold, you cannot be expected to continue to monitor and operate in such an exposed condition for very long. To hit a repeater, many operators have found it necessary to go outside of the building they are stationed in (especially if it is concrete or steel). A little coax to a portable antenna, or to your mobile, may go a long way in making your assignment bearable. Home-built 2-meter verticals with a radial system and/or quads are easily made, and plans are readily available. A goodly amount of low-loss coax can team up with a good antenna (if placed at a reasonable height) to allow for simplex operation on 2 meters, thus freeing repeaters that are usually overworked. A long extension cord can allow you to operate your communications center in an efficient spot and eliminate lots of running. Long coax and barrel connectors permit hf operation indoors, utilizing antennas that are high off the ground. Three-to-one plug adapters for ac power allow you to charge all you NiCad packs at the same time, assuming you do not exceed the power ratings of the circuit or the adapter. A VOM can troubleshoot problems. All sorts of power adapters, antenna adapters, and mike and speaker adapters are often very useful, because portable emergency stations often consist of one amateur's antenna system, another's power supply, a third's rig, and so on; adaptability is always a key in making an emergency communications system work.

Finally, List C is of personal equipment, none of which is strictly "necessary" (except your FCC license or photocopy), but — depending upon the specific situation and the nature of the emergency, season, weather — will be of certain importance. These items may be stored in old suitcases or boxes, ready to go to the assigned site if so requested.

Being prepared enhances the amateur's ability to serve the public in times of emergency. And such public service provides a recognition and an elevation of our radio amateur fraternity in the minds of the general public and government officials, who will then know of our great potential and our willingness to help. — Donald Simon, N16A

FEEDBACK

The lead editorial in Public Service in May QST, entitled "The Three Seasons of January," contained a photograph that was taken by Joe Veras, N4QB.

PUBLIC SERVICE DIARY

□ Mendocino County, California — March 25-30. A railroad tank car carrying approximately 21,000 gallons of formaldehyde was found to be leaking in a freight yard, about 500 feet from Dolin Creek (which feeds the Russian River), thereby threatening the water supply for the counties of Mendocino, Sonoma and Marin. The Mendocino County Office of Emergency Services requested communications assistance from the county RACES organization. Amateurs were then stationed at an evacuation center for almost 100 residents who were evacuated from a senior citizens home near the spill. Radio amateurs also used the WA6WTT repeater to permit officials of the state Department of Water Quality Control and Department of Fish and Game to give instructions to the salvage company in Martinez. In fact, the repeater

was the only means of communication from the spill site — no telephone service was available. Because of the seriousness of the spill, the Sonoma County RACES organization was also activated, and they provided communications from the spill site via WA6WTT/R to the Sonoma County Seat in Santa Rosa. Both RACES organizations remained in service for six days, performing on-site communications for measurements and monitoring of river levels and rainfall following a bad storm that hit northern California over the weekend. (NA6T, SCM San Francisco)

□ Oklahoma City, Oklahoma — April 2. While mobile, N5CTR noticed fire coming from the roof of a nearby residence. He immediately called in the situation to officials over K5ELL/R. While waiting for emergency vehicles and personnel to arrive, N5CTR entered the building to see if any residents were still inside. During a second inspection, he found a wheelchair-bound woman still in an apartment and helped her to get out. (WB5OHK)

AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Franklin County, Ohio — March 13. A tornado struck an area in the southern part of the county, and EC W8BKO proceeded to the disaster area to conduct a "windshield damage assessment" at the request of the Red Cross. The Central Ohio ARES Net was activated over K8DDG/R, with W88NTR as net control. W88NTR also furnished a telephone link to the Red Cross until W8BUW arrived at the Chapter House to provide the radio link. Fortunately, there were no injuries caused by the storm. (W8BKO, EC COARES)

□ Choctaw County, Oklahoma — April 2. A tornado swept through the area, causing extensive damage but no major injuries. Within minutes after the storm passed to the north of the town of Hugo, Choctaw County ARES members and civil defense members arrived on the scene. They combined efforts in storm spotting, debris removal and damage estimates, as well as providing communications for the Oklahoma Baptist Disaster Relief Agency. W5FUE set up a portable station at the local junior high school and helped school officials reroute buses. (WB5TTU, AEC Choctaw Co.)

ARRL SECTION EMERGENCY COORDINATOR REPORTS

□ For April, 40 SEC reports were received, denoting a total ARES membership of 21,732. Sections reporting were AL, AB, AZ, CO, CT, ENY, IN, KS, ME, MI, MN, MO, NE, NH, NLI, NC, NFL, NTX, OH, OK, ON, ORG, PAC, RI, SV, SDG, SJV, SCV, SC, SFL, STX, TN, UT, VT, VA, WV, WMA, WNY, WPA and WIS.



Sunnyvale, California, ARES members demonstrated Amateur Radio during Earthquake Preparedness Day. From left, Emergency Coordinator WA6BAX, Barry Hazer (emergency preparedness coordinator for the city of Sunnyvale) and W6TWU. (Photo courtesy WA6BAX)

REPEATER LOG

According to reports received between April 21 and May 21, the following repeaters were involved in the delineated public service events.

| | Weather Emergency | Criminal Activity | Vehicular Emergency | Public Safety Search and Rescue | Public Safety Fire | Power Alerts | Grids/Alerts | Total | | |
|--------|-------------------|-------------------|---------------------|---------------------------------|--------------------|--------------|--------------|-------|---|-----|
| K1CA | | | | | | 1 | | 1 | | |
| W1XJ | 1 | | | 2 | | | 5 | 8 | | |
| K2JD | | | | | | 1 | | 1 | | |
| K2SA | | | | | | 1 | | 1 | | |
| WA2TTP | | | | | | 1 | | 1 | | |
| W2VL | | | | 42 | | | | 42 | | |
| WR3AGJ | | | | | | 1 | | 1 | | |
| N3BFL | | | | 2 | | | | 2 | | |
| W3EUP | | | | | | 1 | | 1 | | |
| WA3JDX | | | | | | 1 | | 1 | | |
| WR4AMJ | | | | 2 | | | | 2 | | |
| WA4BKF | | | | | | | 1 | 1 | | |
| WD4CJJ | 1 | | | | | 1 | 1 | 3 | | |
| KA4CLL | 1 | | | | | 1 | 1 | 3 | | |
| K4DXZ | 1 | | | | | | | 1 | | |
| W4HHB | | | | | | 1 | | 1 | | |
| WA4HBM | 1 | | | | | | | 1 | | |
| WB4LET | | | | 2 | | | 4 | 6 | | |
| NN4N | 2 | | | 2 | | | | 4 | | |
| WB4QES | 1 | 1 | | 11 | 1 | | | 14 | | |
| WA4SWF | | | | | | 2 | 1 | 3 | | |
| KY4T | | | | | | 1 | 1 | 1 | | |
| K4TQU | | | | | | 1 | | 1 | | |
| VE5KE | | | | | | 1 | | 1 | | |
| WB6ADZ | | | | | | 1 | | 1 | | |
| WD6AWP | | | | | | 1 | | 1 | | |
| WB6BJO | | | | | | 1 | | 1 | | |
| WB6PS | | | | | | 1 | | 1 | | |
| K6LY | | | | 1 | | | | 1 | | |
| WB6QEV | | | | 1 | | 1 | | 2 | | |
| W6UU | | | | | | | 1 | 1 | | |
| K7CTS | | | | 1 | | | | 1 | | |
| KC7FA | | | | | | 1 | | 1 | | |
| KA7IZZ | | | | 2 | | | | 2 | | |
| K7OMR | | | | 2 | | 1 | 1 | 4 | | |
| WR8AJL | | | | | | 1 | | 1 | | |
| N8BZS | | | | | | 1 | | 1 | | |
| K8DDG | | | | | | 3 | | 3 | | |
| W8FG | | | | | | 1 | | 1 | | |
| WA8ULB | | | | 6 | | | | 6 | | |
| WA8VDZ | | | | | | 1 | | 1 | | |
| K8WNJ | | | | | | 4 | | 4 | | |
| WA9THF | | | | | | 1 | | 1 | | |
| WR9AEV | | | | | | 2 | 1 | 3 | | |
| WR9AFS | | | | | | 1 | | 1 | | |
| WR9AFT | 1 | | | | | 1 | | 2 | | |
| WD9BQM | | | | 2 | | 3 | 1 | 6 | | |
| W9DEJ | | | | | | 1 | | 1 | | |
| WB9FFI | | | | | | 1 | | 1 | | |
| WB9HSI | | | | | | 1 | 1 | 2 | | |
| W9ILO | | | | | 1 | | | 1 | | |
| W9KJL | 3 | | | | | 7 | 1 | 11 | | |
| WB9SBH | | | | | | 1 | | 1 | | |
| W9VQR | | | | | 1 | | | 1 | | |
| Total | 12 | 1 | 0 | 80 | 2 | 1 | 36 | 33 | 1 | 166 |

NATIONAL TRAFFIC SYSTEM

Herve, KV5U, has succeeded W0EJD as manager of TWN/c2. N2CER is assistant manager, 2RN/c2. KE4OI is assistant manager, 4RN/c2. Certificates: 2RN/c2 — W2AHV KA2BHR N2CER WB2EAG WA2FJJ K2GCE KB2HM WB2IDS WB2IQJ WA2KOJ VE4LG/W2 WB2MCO W2MLC WB2OW W2RQ WA2SPL N2SU KF2T WB2TDN K2USA (N2CXX, op.) WB2VUK W2XD N2XJ. 9RN/c2 — WB4APC KA4BCM WD4BSC K9CGS KA9CPA W9HOT W9XGM WA4JTE W9JUI KC9KQ WB9MIK W9NXG WB9PKL WA9UJK W9URQ WB9WGD. 2RN/c4 (annual issuances in parentheses) — N2BNB N2CON W2XS K2ZM WB2ASG (first); N2XJ N2BDW N2AKX KB2KW WD5DEA KG2D KD2V KS2G WB2IDS WB2VVS WB2JCE W2LW KA2BHR KA2KVZ KA2GSL (second); KS2L W2AHV W2AET W2QNL W2Z0J N2APB WA4JRP KA2CLT AA2H AA2Y AG2R KF2T WB2MCO (third); K2PH K2GCE WA2CUW WB2ZCM WB2EAG W2GWS W2XD (fourth); WB2BNY WA2SPL (fifth); K2VX W2WSS WB2EUF WB2QIX (sixth); N2YL WA2CJY (seventh); W2BIW (eighth); W2MLC WA2ICB (ninth); W2ZEP (eleventh); W2FR W2TZ (twelfth); W2RQ (thirteenth); W2MTA (fourteenth).

April Reports

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------|----|------|------|-----|-------|-------|---|
| Cycle Two | | | | | | | |
| Area Nets | | | | | | | |
| EAN | 30 | 1024 | 34.1 | 883 | 92.2 | | |
| CAN | 30 | 377 | 29.2 | 550 | 100.0 | | |
| PAN* | 48 | 668 | 14.5 | 451 | 75.0 | | |
| Region Nets | | | | | | | |
| 1RN | 59 | 326 | 5.5 | 332 | 85.3 | 96.7 | |
| 2RN | 80 | 329 | 5.5 | 319 | 88.0 | 100.0 | |

| | | | | | | |
|-----|----|-----|------|-------|-------|-------|
| 3RN | 30 | 157 | 5.2 | .400 | 98.0 | 96.7 |
| 4RN | 60 | 723 | 12.1 | .470 | 78.0 | 96.7 |
| RN5 | 30 | 395 | 13.2 | .361 | 98.8 | 100.0 |
| RN6 | 60 | 574 | 9.5 | .360 | 90.0 | 76.7 |
| RN7 | 83 | 957 | 11.5 | 1.110 | 92.2 | 76.7 |
| 8RN | 54 | 376 | 6.9 | .382 | 67.8 | 96.7 |
| 9RN | 60 | 373 | 6.2 | .347 | 100.0 | 100.0 |
| TEN | 30 | 192 | 6.4 | .189 | 84.4 | 100.0 |
| ECN | | | | | | 86.7 |
| TWN | 57 | 305 | 5.4 | .370 | 59.0 | 71.7 |

| | | | | | | |
|-------------|------------------|-----|--|--|--|--|
| TCC | | | | | | |
| TCC Eastern | 105 ¹ | 857 | | | | |
| TCC Central | 68 ¹ | 309 | | | | |
| TCC Pacific | 91 ¹ | 474 | | | | |

| | | | | | | |
|-----------------------------|----|------|------|-------|-------|--|
| Cycle Four Area Nets | | | | | | |
| EAN | 30 | 2045 | 68.2 | 1.691 | 98.3 | |
| CAN | 30 | 1175 | 39.2 | 1.047 | 100.0 | |
| PAN | 30 | 1371 | 45.7 | 1.403 | 99.4 | |

| | | | | | | |
|--------------------|----|-----|------|------|-------|-------|
| Region Nets | | | | | | |
| 1RN | 56 | 672 | 12.0 | .580 | 92.1 | 100.0 |
| 2RN | 90 | 644 | 7.2 | .571 | 98.0 | 96.7 |
| 3RN | 60 | 390 | 6.5 | .580 | 100.0 | 100.0 |
| 4RN | 56 | 711 | 12.7 | .563 | 88.3 | 96.7 |
| RN5 | 60 | 773 | 12.9 | .566 | 93.1 | 100.0 |
| RN6 | 60 | 821 | 13.7 | .452 | 100.0 | 100.0 |
| RN7 | 60 | 722 | 12.0 | .969 | 99.3 | 100.0 |
| 8RN | 53 | 433 | 8.2 | .483 | 83.0 | 96.7 |
| 9RN | 60 | 653 | 10.8 | .555 | 98.0 | 100.0 |
| TEN | 60 | 399 | 6.7 | .405 | 88.1 | 100.0 |
| ECN | 60 | 284 | 4.7 | .410 | 86.0 | 100.0 |
| TWN | 60 | 578 | 9.6 | .489 | 93.3 | 96.7 |

| | | | | | | |
|-----------------------|------------------|--------|------|--|--|--|
| TCC | | | | | | |
| TCC Eastern | 101 ¹ | 648 | | | | |
| TCC Central | 57 ¹ | 483 | | | | |
| TCC Pacific | 108 ¹ | 961 | | | | |
| Sections ² | 6488 | 28,115 | 4.3 | | | |
| Summary | 7893 | 50,276 | 6.4 | | | |
| Record | 9642 | 56,155 | 19.1 | | | |

*PAN operates both cycles one and two.
 †TCC functions not counted as net sessions.
 ‡Section and local nets reporting (231): AENB AEND AENH AENJ AENN AENV AENW AENY ATNM (AL), ABN ACN ASN SSN (AK), ATEN HARC (AZ), NCN NCTN (CA), CN CPN NVTN RSN WCN (CT), DEPN DTN SEN (DE), FAST FMSN FMTN FPON FPTN GN MOEN MEN NFPN PEN QFN QFNS SPARC SWFTN TPTN (FL), BSN IMN MTN WR7ABY (ID/MT), ILN (IL), IGN IPN ITN QIN (IN), KPN KSN QKS QKS-SS (KS), 11ARES 13ARES 3ARES 4ARES 5ARES 6ARES BARES CARN CCEN KEN KNTN KRN KSN KTN KYN KYPN LCARES MKPN PAEWPN PAWN SEKEN TSTMN (KY), LAN LRN LSN LTN (LA), EM2MN EMRI EMRIPN EMRIS HHTN NEEP (MA/RI), MENN MMN MTN WRIN (MB), AEN CMEN MPSN PTN SGN SPN (ME), MACS MITN MNN QMN UPN (MI), MSN MSPN MSSN MWXN (MN), ACE NEPE (MO), MTN (MS), MNARES NCHN NE40 NE75 MPPN NNN NSN SBARES WNN (NE), GSFM GSPN MCEN NHN NHSN (NH), MGN NJN NJPN NJSN NJVN OBSTN NJVN SOCTN TCETN (NJ), NSN CDN CNYTN EPN HYN SLJPN NYPON NYS NYS/M OCTEN SDN STAR WDN (NY), CFARS CMN CNCTN JFK M2MEN NCSBPN PCTN RARS TRN (NC), CN CSN (NC/SC), ALERT BARF BN BRN CLARCARES HCARES LCNWOARES MCTN OBMN OSN OSSBN OSSN TATN (OH), OFON OLZ OPEN OTW (OK), KTN LN OPN OSN OSND (ON), BSN MPARES ORARES OSN PDXARES PTTN SOFM WCN (OR), D3ARES D5EN D4ARES EPA EPAETN LCARES NWPATMTN PPN PWAARES WARCUTN WPA WPAPTN WPMATMN (PA), BR2MN DPD2MN LC2MN SCNTN SCSSBN YC2MEN (SC), SATN (SK), TNCWN TNPN TNVHFN TSPN (TN), TEX TSN TTN (TX), BUN UCN (UT), STARES SVEN VN WARC (VA), VTN (VT), EWTN NTN NWSBPN PST6 SCARES WARTS WSN (WA), WVFN WVN WVNDN WVNN (WV), CCTMN (WY).

1 — NET
 2 — SESSIONS
 3 — RATE
 4 — % REP.
 5 — % REP. TO AREA NET
 6 — AVERAGE

N5s AMH AMK EFG, WA5EQQ, KB5TC, WB5s NKC YDO, K5s BNH KJN, W9s JUJ NXG, WB9WGD. Pacific Area (W0HXB, Director) — KV5U, W5JOV, K6s OVA UYK, KM6I, KN6C, KT6A, KU6D, N6s AED FTQ GIW, W6FAS, KF7R, K07V, W7s DZX GHT VSE, WA7WQE, WB7s DZX TQF WOW, K0DJ, KB0MB, N0s ACW CXY, W9s EJD HXB, WB0MTA, WD0AIT, VE6CHK. *Cycle Four* — Eastern Area (W2CS, Director) — W1s EFW QYY TM, N1NH, WB1CPF, W2s GS FR GKZ XZ ZOJ, WA2SPL, N2YL, AH2M, KF2T, W3s ATQ FAF PO, W3SGZU, W4UQ, K4ZK, N4K6, WA4CCQ, WB4s PNY UHC, AB4V, W8PMJ, K8JQ, WB8MTD, AF8V, N8XX, VE1WF. Central Area (W5GHP, Director) — W4WXH, K5s GM TL, N5TC, W5s RB TFB, KB5W, WB5s CXY NXG, WB9UYU, AE0R, K0EZ, W6s AM HI. Pacific Area (K0DJ, Director) — W5KH, N6FTQ, W6s EOT OA VZT, KN6C, KT6A, K7s HLR KSA, KD7I, KN7B, W7s DZX EP GHT LYA VSE, WA7GYQ, WB7NHR, W7AKX, K0s BN DJ, KC0D, W0s HXB LQ OGH, WD0AIT, VE7ZK.

Independent Nets (April 1982)

| | | | |
|------------------------------|-----|-----|------|
| 1 | 2 | 3 | 4 |
| Amateur Radio League Society | 30 | 916 | 281 |
| Central Gulf Coast Hurricane | 30 | 181 | 2045 |
| Clearing House | 30 | 78 | 342 |
| Early Bird | 30 | 801 | 363 |
| Empire Slow Speed | 30 | 85 | 398 |
| Hit and Bounce Slow | 30 | 114 | 309 |
| IMRA | 26 | 570 | 1260 |
| Midwest RTTY | 30 | 36 | 233 |
| Mission Trail | 30 | 195 | 1291 |
| North American SSB Traffic | 25 | 111 | 217 |
| Pico | 168 | 298 | 2273 |
| Southwest Traffic | 30 | 90 | 1284 |
| 75-Meter ISSB | 30 | 442 | 1006 |
| 7290 Traffic | 48 | 770 | 3328 |

1 — NET
 2 — SESSIONS
 3 — TRAFFIC
 4 — CHECK-INS

Public Service Honor Roll April 1982

This listing is available to amateurs whose public service performance during the month indicated qualifies for 60 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 30; (2) Checking into phone/RTTY nets, 1 point each, max. 30; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned NTS liaison, 3 points each, max. 12; (6) Delivering a formal message to a third party, 1 point each, no max.; (7) Handling an emergency message, 5 points each, no max.; (8) Serving as emergency coordinator or net manager for the entire month, 5 points, max. 5; (9) Participating in a public service event, 5 points, max. 5. This listing is available to Novices and Technicians who achieve a total of 40 or more points.

| | | | |
|-------------|---------|----------|--------|
| 224 | 119 | 102 | N6AWH |
| WB5YDD | KM9B | WB1GXZ | WB2PKG |
| WD4ALY | KA9DLY | K37D | N7AKX |
| 197 | 117 | 101 | 95 |
| WB7WOW | WB4EVS | VE3HTL | VE3HL |
| 174 | WA5RVT | K3JL | W0DBIY |
| K5CXP | 115 | WD4CQNC | K11M |
| 185 | W8YCV | W1D4CQNC | KT6A |
| AJ5F | 113 | KA8CPS | W4ANK |
| 181 | W2GLH | N8DTZ | W4ANK |
| WD8LRT | W00YH | K4JST | 94 |
| 137 | W5DTR | KA2KVZ | VE3DPO |
| WB3GZU | 112 | 100 | K3CR |
| KE4OI | W1EOF | KA4GFU | 93 |
| 136 | WDBRHU | AK1W | VE3WM |
| NG4J | KB2HM | KY4U | W5JOV |
| WB2MCO | 111 | 99 | KA4ASZ |
| 135 | W9D9ESZ | KB5W | K7GKX |
| N5EAY | 110 | N16A | WB7TQF |
| 134 | KT6D | W8GGX | 92 |
| W9JUJ | K4ZK | K8KQJ | WA4QXT |
| 130 | W19J | W2MTA | W4OGG |
| WA4PFK | N7BGY | KA1BJY | W5CTZ |
| TCC Eastern | WB1HIH | K2VX | N5EFG |
| TCC Central | KC9CJ | 98 | KA9HPQ |
| TCC Pacific | 107 | N5AMK | WB0QBZ |
| Summary | WD4COL | N2XJ | WA4EIC |
| 128 | W5DTR | NP4D | 91 |
| KA1ON | AG2R | WD4AWN | KA1T |
| 127 | 106 | WB4WYG | KA4AUR |
| N4EDH | K2GCE | W2BIW | KA2BHR |
| 126 | WB2IQJ | 97 | 90 |
| W0OTF | 105 | VE3GT | KA8JQG |
| 125 | K6YD | K1JHC | KB4OZ |
| KA3CDQ | W4WXH | W9DM | K5TL |
| 124 | W4CKS | KZ4K | W5GHP |
| N2AKZ | KA8AID | WA4CCK | W5KLV |
| 122 | W4GPL | W6NTN | KB0MB |
| KK5B | 104 | W2AET | AF8V |
| W1IDK | W2XD | WP4AOH | N8DSW |
| KA5CL | 96 | 89 | 89 |
| 121 | 103 | W7LNE | KA4EV |
| W2AHV | N4BZH | W0OGH | W0OGH |
| WA1TBY | WA4JDH | W2EDDO | W2EDDO |
| | K4VVK | N9BYK | N9BYK |
| | N2APB | KA9IHR | W7GHT |

| | | | |
|--------|--------|--------|----------|
| W8HUJ | W8HX | W3DKX | 63 |
| 88 | 79 | N9ATP | AE1T |
| WB8JGW | N1NH | KM6I | KB8MX |
| WB8SYA | N4DZW | KA4BBA | WB4AID |
| W2ZOJ | K04TY | KB3XO | 62 |
| KA5DLV | W4LXB | VE5AAT | N3ADU |
| 87 | N2BNB | VE5HG | WD5GKH |
| W1TN | N2CER | 69 | KA5AZK |
| WA4SRD | 78 | KA7AID | KA2HCB |
| WB7EMO | WB7OEX | WB1ABQ | N2BLX |
| AC3N | WA4EYU | N1RI | 61 |
| N8BQK | N5BT | NAUF | KB2KW |
| 86 | KA2GOH | WA2CUW | W9QBH |
| KD4PJ | 76 | 68 | W9TLU |
| 85 | KA7ELI | N7BGW | W9JJI |
| WA7LGN | N4PL | WB8YD | K7GV |
| W0LAE | WA5QFD | WB4FDT | WA7IHS |
| WD8MIO | W1RWG | K3RZR | WB4NTW |
| W5VMP | WB2IDS | KA1BBU | NSAMH |
| WBVPW | 75 | N2BDW | KG9B |
| WB2OWO | KA4SAA | 67 | WA8DHB |
| 84 | KA5CXW | KS2G | WB9GOB |
| KC5SF | KN8C | WUUMH | KC4HN |
| VE3GOL | KB3UD | KV5N | KA4IUM |
| WB3FKL | N7DNG | WA8HGH | WB1CRH |
| 83 | 74 | WD9FRI | WA2KQJ |
| WA2YBM | KA5HDT | WB8YDZ | KA2GSX |
| W5WZ | KB3DT | WB8PIM | KP4DJ |
| WB4WII | WB8KBW | K1NAN | K09CL |
| N5TC | 73 | N18PD | 60 |
| KF8J | KL7T | WA3EHD | KA2NMA |
| KC5NN | WB5MMI | K0SI | W8EK |
| WA1VRL | KA5RI | 66 | 59 |
| W2YJR | N8AUH | KA4MGR | WB3HWX/T |
| 82 | KB5UL | WA4XP | 50 |
| K9BVE | K5PC | KA2N | WB2TWO/T |
| WD5JYI | 72 | WA7DPK | 49 |
| WB8MTD | K0DJ | WA3WQP | N2CPX/T |
| W3VA | VE3JRT | 65 | 48 |
| 81 | KY4K | WD0AIT | N8BZC/T |
| KA4BCM | KA3GJT | N14S | 44 |
| WA2ARC | N7CSP | WA6QCA | N8DADT |
| KF4U | 71 | AK2E | KA8NCR/N |
| KA4MGQ | K5OAF | WB5LBR | 43 |
| NW4O | VE3KK | WB7JA | KA9BGIN |
| W6CPB | WD4BSC | KK9N | 41 |
| N2BOP | WB4TZR | WA8GMT | N2CSX/T |
| 80 | W1KK | KY5J | 40 |
| K1OSM | 70 | KA8BNW | KA5MSP/N |
| K0JCF | K4IWW | K3QXC | |
| | W4HON | W0UDC | |

Brass Pounders League April 1982

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

| | | | | | |
|--------|-----|------|------|-----|------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| W3CUL | 698 | 764 | 1222 | 18 | 2702 |
| KA9CPA | 50 | 1265 | 214 | 879 | 2408 |
| W0WYX | 0 | 688 | 0 | 688 | 1336 |
| WA0HJZ | 30 | 848 | 36 | 564 | 1472 |
| W9JUJ | 2 | 598 | 559 | 28 | 1187 |
| WA4JDH | 2 | 492 | 449 | 2 | 945 |
| W5SHN | 46 | 355 | 386 | 14 | 801 |
| W7DZX | 10 | 389 | 384 | 3 | 786 |
| KE4OI | 2 | 357 | 380 | 31 | 750 |
| N0BOP | 30 | 390 | 187 | 163 | 750 |
| WD4HIF | 5 | 351 | 345 | 33 | 734 |
| W0ACH | 4 | 340 | 344 | 0 | 688 |
| W7VSE | 5 | 330 | 287 | 10 | 632 |
| WA2SPL | 40 | 248 | 319 | 19 | 626 |
| N16A | 43 | 262 | 299 | 15 | 619 |
| WB7WOW | 11 | 272 | 252 | 76 | 611 |
| KT6A | 8 | 301 | 284 | 12 | 605 |
| WB5YDD | 9 | 289 | 264 | 55 | 597 |
| W3VR | 201 | 108 | 265 | 9 | 583 |
| WB3GZU | 30 | 240 | 260 | 39 | 569 |
| W8GGX | 4 | 259 | 254 | 39 | 556 |
| K8NCV | 28 | 241 | 281 | 5 | 533 |
| NG4J | 26 | 269 | 201 | 29 | 525 |
| K6UYK | 138 | 210 | 164 | 7 | 519 |
| WD9ESZ | 15 | 182 | 309 | 10 | 516 |
| WA1TBY | 7 | 236 | 251 | 20 | 514 |
| WD8MIO | 82 | 163 | 225 | 35 | 505 |

Multipointer stations:
 K3NSN 1488
 WD4HO 32
 841
 250
 500
 352
 800
 352
 400
 744

BPL for 100 or more originations plus deliveries:
 N5EAY 178
 K7GV 123
 NN4I 116
 KA8CPS 113
 WD4COL 104

Multipointer station:
 W1YK 145

| | |
|-----------|-----------|
| 1 — CALL | 4 — SENT |
| 2 — ORIG. | 5 — DEL. |
| 3 — RCVD. | 6 — TOTAL |

Transcontinental Corps

| | | | | |
|-------------------|-----|------|------|------|
| 1 | 2 | 3 | 4 | 5 |
| Cycle Two | | | | |
| TCC Eastern | 120 | 88.0 | 1314 | 857 |
| TCC Central | 90 | 75.6 | 618 | 309 |
| TCC Pacific | 120 | 75.8 | 903 | 474 |
| Summary | 330 | 79.8 | 2835 | 1161 |
| Cycle Four | | | | |
| TCC Eastern | 120 | 88.0 | 1296 | 648 |
| TCC Central | 60 | 95.0 | 944 | 483 |
| TCC Pacific | 120 | 90.0 | 1908 | 961 |
| Summary | 300 | 90.3 | 4148 | 2092 |

1 — AREA
 2 — FUNCTIONS
 3 — SUCCESSFUL
 4 — TRAFFIC
 5 — OUT-OF-NET TRAFFIC

TCC Roster

The TCC Roster (April) Cycle Two — Eastern Area (N2YL, Director) — K1s GE EIC, N1BHH, W1s QYY XX, AH2M, K2s KIR PH, KB2HM K02H, N2s CER LY, W2s GS XD ZOJ, WB2s IQJ MCO, K3JUZ, WB3GZU, WA4CCK, WB4PNY, AF8V, W8PMJ, WB8YDZ, VE1WF, VE3s GOL HTL, Central Area (W9JUJ, Director) — K4VM, KA4MZ, W4OGG, WD4HF, W5s CTZ KLV TFB,

Operating News

Conducted By John F. Lindholm,* W1XX

Ham Radio Horoscope

ARIES (March 20-April 19): Diamond, your birthstone, reflects your multi-faceted interest in Amateur Radio. You have ASCII, packet and slow-scan capability, and build all your own gear. You are ambitious, and operate a full 48 hours in the DX Contest. However, you are impulsive, and tend to be short-fused with those calling on the DX station's frequency.

TAURUS (April 20-May 20): Some people see you as a DX hog, but you are just persistent. You keep calling DX stations long after they have gone QRT. This technique sometimes pays off, however, because they hear you when they come on again the next day. You insist on pointing your beam longpath when propagation dictates shortpath.

GEMINI (May 21-June 20): Cross-band operation is your thing. Being ambidextrous, you use split earphones on two different bands in the contests. You insist on using only twin-lead for transmission lines. You are a 10-10 club member. Your operating skill has earned you membership in the A-1 Operator Club.

CANCER (June 21-July 22): Your ruling planet is the moon. You work EME. Being conservative, you always ask if the frequency is in use before calling CQ. You tend to procrastinate, however, leaving the quad to be repaired the day before the contest.

LEO (July 23-Aug. 22): Your ruling planet is the sun. You never miss an auroral opening

on vhf. You are proud and won't work DX on lists. Your determination pushes you to the top in contests. Your insatiable appetite motivates you to call in every DX pileup, even though you are on the DXCC Honor Roll.

VIRGO (Aug. 23-Sept. 22): You are always the first to have the latest line in equipment. Your ruling planet is Mercury. You never send cw at less than 45 wpm. You are neat and orderly. You prefer to work DX on lists. You maintain a computer file of every QSO you ever had, so you can call Rufus by name even though you only worked him once 25 years ago.

LIBRA (Sept.23-Oct.22): Your sign is the scales. You are constantly adjusting the balanced modulator in your transceiver. You are artistic and have problems facing reality. You won't admit that the station you called came back to someone else, so you go back to him anyway giving him a report, and your name and QTH. Meanwhile, he works three other stations.

SCORPIO (Oct. 23-Nov. 21): You operate mostly MARS circuits. However, you are shrewd and unethical. You're the type that starts rumors to throw the rest off track, like getting everyone to listen on 14,250 when the DX is really on 14,220. Being independent, you'd rather call "CQ Toledo" with traffic rather than use the National Traffic System.

SAGITTARIUS (Nov. 22-Dec. 21): Your

sign is the archer. You always zero beat perfectly. You are direct, truthful and optimistic. Your favorite frequency is .52 simplex. You never send 599 in a contest. And you have been heard to call "CQ Europe" from your San Jose QTH in the middle of the afternoon on 160 meters.

CAPRICORN (Dec. 22-Jan. 19): Your sign is the goat. You check in regularly with the old goats' roundtable on a-m. Your flower is the white carnation. You always wear a pink sportcoat to the radio club meetings. Since you are diplomatic, you hold an official observer appointment. You have 99 countries confirmed.

AQUARIUS (Jan. 20-Feb. 17): You have upgraded your license on the first try each time. All your construction projects survive the initial smoke test. Your rotator never gets stuck, and the indicator meter is right on. Because you are so popular, you are president of your radio club.

PISCES (Feb. 18-Mar. 19): You are generous and will give up the frequency to the Maritime Mobile Net. Your modesty directs you to turn off your amplifier and fish for DX running QRP. You have Okino-Torishima confirmed on five bands.

[Based on "Ham Radio Horoscope," *Amateur Radio*, journal of the Wireless Institute of Australia, Nov. 1981, p. 33.]

SCM ELECTION NOTICE

To all ARRL members in the Missouri, Southern New Jersey, Quebec, South Carolina, Western Pennsylvania, Eastern Massachusetts, Saskatchewan, Nebraska and New York City-Long Island sections: You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures on that petition. No member may sign more than one petition. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)

Communications Manager, ARRL
225 Main St., Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next two-year term of office.

(Signature . . . Call . . . City . . . ZIP . . .)

An SCM candidate must have been a member of the League for a continuous term of at least two years and a licensed amateur of General Class or higher (Canadian Advanced Amateur Certificate) immediately prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, September 10, 1982.

*Whenever more than one member is nominated in a

single section, ballots will be mailed from Headquarters on October 1, 1982, returns counted November 23, 1982, and SCMs elected as a result of the above procedures will take office January 1, 1983.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition for a two-year term beginning January 1, 1983.

If no petitions are received for a section by the specified closing date, such sections will be resolicited

in January QST. An SCM elected through the resolicitation process will serve a term of 18 months.

Vacancies in any SCM office between elections are filled by appointment by the communications manager.

You are urged to take the initiative and file a nominating petition immediately.

John F. Lindholm, W1XX
Communications Manager

5-Band WAS

Awards issued January 15, to May 12, 1982

| 990 | 1010 | 1030 | 1050 | 1070 |
|-------------|-------------|-------------|-------------|-------------|
| 990 KC0FJ | 1010 KB2EO | 1030 KB0S | 1050 NN4Q | 1070 AK2H |
| 991 KY4X | 1011 A13R | 1031 N6EBU | 1051 WA4JTB | 1071 WB3AMO |
| 992 KB1H | 1012 KB9US | 1032 OA4OS | 1052 AK1E | 1072 KC9OF |
| 993 K4YI | 1013 WA2TRZ | 1033 KI6O | 1053 WA1WTP | 1073 WA7NXL |
| 994 KB0G | 1014 W3EYF | 1034 KB7N | 1054 N5KW | 1074 KS2G |
| 995 N1API | 1015 K8VVF | 1035 K9QXK | 1055 WD8MGG | 1075 W9IAL |
| 996 OK3CGP | 1016 WA8OVC | 1036 K5VYT | 1056 WB0ZJE | 1076 WA2JDT |
| 997 W7HAH | 1017 KF8A | 1037 WD4DZH | 1057 VE4AT | 1077 KL7JFY |
| 998 KB4ET | 1018 WD8IIA | 1038 AE1Q | 1058 KW5K | 1078 KH3AB |
| 999 NE4F | 1019 KA0AYN | 1039 KB9AW | 1059 KJ2N | 1079 KD0F |
| 1000 | 1020 | 1040 | 1060 | 1080 |
| 1000 W31CM | 1020 KA7BTQ | 1040 GI3VJ | 1060 KB0BL | 1080 WA0HUU |
| 1001 W5GVP | 1021 K0KCY | 1041 KO2K | 1061 KC7DN | 1081 KU2A |
| 1002 KL7JAI | 1022 ON5NT | 1042 KC4IF | 1062 KD9M | 1082 KC2BW |
| 1003 K1RB | 1023 K1GSK | 1043 WD0CFZ | 1063 N8JK | 1083 KC5M |
| 1004 WD0FNZ | 1024 KC3X | 1044 KB8BS | 1064 KK2M | 1084 W8KLC |
| 1005 K5HT | 1025 WD5EDR | 1045 KB3BG | 1065 WB1FAK | 1085 W6FQF |
| 1006 KT5F | 1026 OK1AWZ | 1046 W5HKA | 1066 AJ7V | 1086 W0YNZ |
| 1007 KA1ACC | 1027 KD7Z | 1047 WD9ELT | 1067 KB7YA | 1087 NA4D |
| 1008 AD7S | 1028 KC4FU | 1048 KB4I | 1068 KC5OT | 1088 KI7W |
| 1009 K4LNO | 1029 VE4SK | 1049 KI8G | 1069 KM0W | |

*Communications Manager, ARRL

REPEAT SCM NOMINATING SOLICITATIONS

Since no petitions were received for the Vermont section as a result of notices in the January and February QST, nominating petitions for this section are herewith resolicited. See the above notice for details on how to nominate.

SCM APPOINTMENT

In the South Carolina Section, James G. Walker, WD4HLZ, has been appointed to complete the term (until December 31, 1982) of Richard McAbee, W4MTK (resigned).

WIAW NOTE

The complete WIAW summer operating schedule appears in April QST, page 84. A WIAW schedule also is available on request from ARRL Headquarters. Please enclose an s.a.s.e. See the "Contest Corral" section of QST for times and dates of WIAW Code Proficiency Runs.

APRIL CD PARTY HIGH SCORES

The QSO numbers of the top-scoring stations, listed below, in both the cw and phone portions of the Open April CD Party indicate a slight decline in participation from the above-average numbers of the 1981 Open. This condition only made those operators whose scores appear below dig a little harder to maximize their rates to earn a spot among the top scoring stations. No matter, though; aside from the contest aspect, the April Open gives us a chance to get on the air and meet other members of the "ARRL Family." That's reason enough in itself to drop in for a few QSOs.

Complete results will appear in the summer edition of QCD, which will be sent to everyone who sent in an Open CD Party Log.

Listings below indicate final score, QSOs, multipliers, hours and ARRL Section. — Mark Wilson, AA2Z

CW

| | |
|-----------------|----------------------|
| K8LL | 41,230-665-82-10-AZ |
| N5JJ | 40,200-670-60-10-STX |
| K5TA | 38,626-623-82-10-NM |
| KN5H | 38,626-623-82-10-STX |
| N2IC/D | 37,440-824-60-10-CO |
| K8CC | 33,744-554-61-10-MI |
| K1XA | 32,770-565-58-10-CT |
| W6SX | 30,444-516-59-10-LAX |
| K9KM | 30,044-518-58-10-IL |
| KF0H | 29,000-500-58-10-IA |
| AG7M | 27,724-478-58-10-WA |
| W9OP | 26,158-451-58-10-WI |
| NE6I | 25,134-426-59-10-LAX |
| WA9EKA | 24,472-437-56-10-IL |
| AJ6V | 24,131-409-59-10-SCV |
| W5AC (NG6Y, op) | 22,388-386-58-10-STX |
| WB1HH | 21,728-388-56-10-WMA |
| W9NEC | 21,318-374-57-10-IL |
| KB5UL | 20,087-379-53-10-NTX |
| K3CR | |
| (WD8PUH, op) | 19,936-356-56-10-WPA |
| W1WLW | 19,936-356-56-9-EMA |
| VE3UOT | |
| (VE1BCZ, op) | 19,883-337-59-8-ON |
| K3NB | 19,765-335-59-EPA |
| W4YE | 19,314-333-58-10-VA |
| WA4UIH/5 | 19,008-352-54-10-LA |
| WA0AVL | 18,753-329-57-10-IL |
| K8MR | 18,205-331-55-5-OH |
| WA5NUK | 17,670-310-57-5-LA |
| W4WKQ | 15,162-266-57-10-NFL |

Phone

| | |
|-------------------------|----------------------|
| N6BT | |
| (WA6VEF, op) | 67,308-948-71-10-SCV |
| K6LL | 59,570-851-70-10-AZ |
| WB5VZL | 51,380-734-70-10-NTX |
| N1EE/2 | 36,584-538-68-10-NLI |
| KB7SE | 33,524-493-68-10-MT |
| NE6I | 33,462-507-68-10-LAX |
| W4WKQ | 31,218-473-66-10-NFL |
| N5AF | 25,544-412-62-10-STX |
| AF1T | 18,176-284-64-10-NH |
| K3NB | 17,400-290-60-6-EPA |
| K5WVX (K5CM, N5KW, ops) | 20,770-335-62-5-OK |

Amateur Radio Satellite Schedule

| Date (UTC) | AMSAT-OSCAR 8 | | Soviet RADIO 5 | | Soviet RADIO 6 | | Soviet RADIO 7 | | Soviet RADIO 8 | | |
|------------|------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|
| | Ref. Orbit, Mode | Time (UTC) | EQX W. Long. (Deg.) | Time (UTC) | EQX W. Long. (Deg.) | Time (UTC) | EQX W. Long. (Deg.) | Time (UTC) | EQX W. Long. (Deg.) | Time (UTC) | EQX W. Long. (Deg.) |
| 1 July | 22,022A | 0132 | 95 | 0107 | 123 | 0151 | 135 | 0055 | 121 | 0121 | 126 |
| 2 July | 22,036A + J | 0137 | 96 | 0102 | 123 | 0136 | 132 | 0046 | 120 | 0119 | 126 |
| 3 July | 22,050J | 0141 | 97 | 0058 | 123 | 0120 | 130 | 0036 | 119 | 0116 | 127 |
| 4 July | 22,063J | 0002 | 72 | 0051 | 123 | 0105 | 128 | 0026 | 118 | 0113 | 128 |
| 5 July | 22,077A | 0007 | 73 | 0046 | 123 | 0049 | 125 | 0017 | 117 | 0110 | 129 |
| 6 July | 22,091A + J | 0011 | 74 | 0040 | 123 | 0034 | 123 | 0007 | 116 | 0107 | 130 |
| 7 July | 22,105X | 0015 | 76 | 0035 | 124 | 0019 | 121 | 0157 | 145 | 0104 | 130 |
| 8 July | 22,119A | 0020 | 77 | 0030 | 124 | 0003 | 118 | 0147 | 144 | 0102 | 131 |
| 9 July | 22,133A + J | 0024 | 78 | 0024 | 124 | 0147 | 146 | 0137 | 143 | 0059 | 132 |
| 10 July | 22,147J | 0029 | 79 | 0019 | 124 | 0131 | 143 | 0128 | 142 | 0056 | 133 |
| 11 July | 22,161J | 0033 | 80 | 0014 | 124 | 0116 | 141 | 0118 | 142 | 0053 | 134 |
| 12 July | 22,175A | 0037 | 81 | 0008 | 125 | 0100 | 139 | 0108 | 141 | 0050 | 135 |
| 13 July | 22,189A + J | 0042 | 82 | 0003 | 125 | 0045 | 136 | 0059 | 140 | 0047 | 135 |
| 14 July | 22,203X | 0046 | 83 | 0157 | 155 | 0030 | 134 | 0049 | 139 | 0045 | 136 |
| 15 July | 22,217A | 0051 | 85 | 0152 | 155 | 0014 | 132 | 0039 | 138 | 0042 | 137 |
| 16 July | 22,231A + J | 0055 | 86 | 0147 | 155 | 0158 | 159 | 0030 | 137 | 0039 | 138 |
| 17 July | 22,245J | 0059 | 87 | 0141 | 156 | 0142 | 157 | 0020 | 136 | 0036 | 139 |
| 18 July | 22,259J | 0104 | 88 | 0136 | 156 | 0127 | 155 | 0011 | 135 | 0033 | 139 |
| 19 July | 22,273A | 0108 | 89 | 0131 | 156 | 0111 | 152 | 0001 | 134 | 0030 | 140 |
| 20 July | 22,287A + J | 0113 | 90 | 0125 | 156 | 0056 | 150 | 0150 | 164 | 0028 | 141 |
| 21 July | 22,301X | 0117 | 91 | 0120 | 156 | 0041 | 148 | 0141 | 163 | 0025 | 142 |
| 22 July | 22,315A | 0121 | 92 | 0115 | 157 | 0025 | 145 | 0131 | 162 | 0022 | 143 |
| 23 July | 22,329A + J | 0126 | 94 | 0109 | 157 | 0010 | 143 | 0122 | 161 | 0019 | 143 |
| 24 July | 22,343J | 0130 | 95 | 0104 | 157 | 0153 | 170 | 0112 | 160 | 0016 | 144 |
| 25 July | 22,357J | 0134 | 96 | 0059 | 157 | 0138 | 168 | 0102 | 159 | 0013 | 145 |
| 26 July | 22,371A | 0139 | 97 | 0053 | 157 | 0122 | 162 | 0053 | 158 | 0011 | 146 |
| 27 July | 22,384A + J | 0000 | 72 | 0048 | 157 | 0107 | 163 | 0043 | 157 | 0008 | 147 |
| 28 July | 22,398X | 0005 | 73 | 0043 | 158 | 0052 | 161 | 0033 | 156 | 0005 | 148 |
| 29 July | 22,412A | 0009 | 75 | 0037 | 158 | 0036 | 159 | 0024 | 156 | 0002 | 148 |
| 30 July | 22,426A + J | 0013 | 76 | 0032 | 158 | 0021 | 156 | 0014 | 155 | 0159 | 179 |
| 31 July | 22,440J | 0018 | 77 | 0027 | 158 | 0005 | 154 | 0004 | 154 | 0156 | 180 |
| 1 Aug. | 22,454J | 0022 | 78 | 0021 | 158 | 0149 | 182 | 0154 | 183 | 0153 | 181 |
| 2 Aug. | 22,468A | 0026 | 79 | 0016 | 159 | 0133 | 179 | 0144 | 182 | 0151 | 182 |
| 3 Aug. | 22,482A + J | 0031 | 80 | 0011 | 159 | 0118 | 177 | 0135 | 181 | 0148 | 183 |
| 4 Aug. | 22,496X | 0035 | 81 | 0005 | 159 | 0103 | 175 | 0125 | 180 | 0145 | 183 |
| 5 Aug. | 22,510A | 0040 | 82 | 0000 | 159 | 0047 | 172 | 0115 | 179 | 0142 | 184 |
| 6 Aug. | 22,524A + J | 0044 | 84 | 0154 | 189 | 0032 | 170 | 0106 | 178 | 0139 | 185 |
| 7 Aug. | 22,538J | 0048 | 85 | 0149 | 190 | 0016 | 168 | 0056 | 177 | 0136 | 186 |

Orbit predictions by Project OSCAR K1HTV, KA1GD and W9KDR. To keep abreast of the latest developments, tune in the regular phone and cw bulletins over W1AW, or the AMSAT nets. Tuesday — East Coast and Mid States at 9 P.M. and West Coast at 8 P.M. local time on 3850 kHz. Saturday — International at 2200 UTC on 28,878 kHz. Sunday — International at 1800 UTC on 21,280 kHz and 1900 UTC on 14,282 kHz. OSCAR 9 orbits are no longer listed — because of its low altitude, long-range predictions are not always accurate. Use WIAW and AMSAT Bulletins for weekly updates. Q8 modes of operation are Monday and Thursday — Mode A, Tuesday and Friday — Modes A + J. Wednesday is reserved for authorized experiments or recharge of the batteries. Do not operate through the OSCAR or RADIO satellites on Wednesday UTC. Do not use more power than is needed to operate through the OSCAR or RADIO satellites. Your downlink signal should never be stronger than the satellite's telemetry beacon. Reduce your uplink power to prevent overload causing 10 dB attenuation of received signals. Advise operators whose signals are stronger than the telemetry beacons.

Orbit numbers will not be used for the Radio satellites.

| Satellite | Period (min.) | Increment (deg.) | Inclination (deg.) | Height (km) |
|-----------|---------------|------------------|--------------------|-------------|
| OSCAR 8 | 103.1709 | 25.7949 | 98.79 | 919 |
| RADIO 5 | 119.5555 | 30.0157 | 82.95 | 1682 |
| RADIO 6 | 118.7174 | 29.8061 | 82.95 | 1632 |
| RADIO 7 | 119.1966 | 29.9260 | 82.94 | 1654 |
| RADIO 8 | 119.7640 | 30.0679 | 82.95 | 1681 |

RADIO 3 and RADIO 4 orbital data will not be listed because these satellites are for Soviet experiments. QSLs and telemetry reports should be sent to Box 88, Moscow.

Spacecraft Frequencies

| | Uplink | Downlink | Beacon |
|---------------|---------------------|---------------------|----------------|
| OSCAR 8 | | | |
| Mode A | 145.850-145.950 MHz | 29.400- 29.500 MHz | 29.402 MHz |
| Mode J | 145.900-146.000 MHz | 435.200-435.100 MHz | 435.095 MHz |
| RADIO 5 | 145.910-145.950 MHz | 29.410- 29.450 MHz | 29.330/450 MHz |
| RADIO 6 | 145.910-145.950 MHz | 29.410- 29.450 MHz | 29.410/450 MHz |
| RADIO 7 | 145.960-146.000 MHz | 29.460- 29.500 MHz | 29.340/500 MHz |
| RADIO 8 | 145.960-146.000 MHz | 29.460- 29.500 MHz | 29.460/500 MHz |
| RADIO 5 ROBOT | 145.826 MHz | 29.331 MHz | |
| RADIO 7 ROBOT | 145.835 MHz | 29.341 MHz | |

RADIO 3 and RADIO 4 are for experiments only to be announced by USSR.

OSCAR 9
 Hf Beacons — 7,050, 14,002, 21,002 and 29,510 kHz. On-off keying with Morse telemetry. Interspersed with a carrier or continuous carrier.
 Vhf Beacon — 145.825 MHz nbfm ± 5 kHz. ASCII, Baudot, voice, atsk and Morse.
 Uhf Beacon — 435.025 MHz nbfm ± 5 kHz. ASCII, Baudot, voice, atsk and Morse.
 S-Band Beacon — 2401.0-MHz nbfm ± 10 kHz. ASCII, Baudot, voice, atsk and Morse.
 X-Band Beacon — 10,470-GHz steady carrier. S- and X-band beacons use lncp.

Mode J Club: Become a member of the Mode J Club. Complete eight Mode-J contacts. QSL cards are not required. Just list the call sign of each station worked, date, orbit number and station equipment used. Send this information along with \$3 in U.S. funds, a one-time charge to cover the certificate and newsletter costs, to Mode J Club, c/o Larry Roberts, W9MXC, 3300 Fernwood, Alton, IL 62002.

OSCAR 8 QSL: To receive an OSCAR 8 QSL card, send a copy of the telemetry from the 29,402- or 435,095-MHz beacons. Please send your report, along with s.a.s.e., to ARRL Hq.

Further information on the radio amateur satellite program can be obtained free of charge from ARRL Hq. The OSCARLOCATOR package is now available: \$7 U.S., \$8 elsewhere.

Contest Corral

A Roundup of Upcoming Operating Events



Conducted By Mark J. Wilson,* AA2Z

JULY

1

Canada Day Contest, June QST, page 94.

7

WIAW Qualifying Run, 10-35 wpm, at 0200Z July 8 (10 P.M. EDT July 7). Transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 147.555 MHz. Underline one minute of the highest speed you copied, certify your copy was made without aid, and send to ARRL for grading. Please enclose your full name, call (if any) and complete mailing address. A large s.a.s.e. will help expedite your award/endorsement.

10-11

IARU Radiosport Championship, May QST, page 82.

17-18

International QRP Contest, sponsored by the World QRP Federation, from 1500Z July 17 until 1500Z July 18. Single ops must take at least one 8-hour off-time. Cw only. Classes: (1) single op and (2) multiop; A = fixed station, up to 2 W inp.; B = fixed station, up to 10 W inp.; C = portable station, up to 2 W inp.; D = portable station, up to 10 W inp.; E = any station, more than 10 W inp. Exchange serial number, signal report and class (1D, 2A, etc.). Suggested frequencies: 1.810 3.560 14.060 21.060 28.060. QRP stations count 1 point per QRO contact, 2 points per QRP contact. Work stations once per band. Multiplier points: 1 if same country, 2 if same continent, 3 if different continent. Call areas within a country also count as multipliers. Multiply QSO points per band by total multiplier points for that band. Add band scores together for final score. Crystal-controlled stations (max. 3 crystals per band) double points. Awards. Mail logs within 6 weeks. Fixed stations mail to: S. Hari, DK9FN, Spessartstr. 80, D-6453 Seligenstadt, FRG. Portables mail to: W. Dickerson, WA2JOC, 352 Crampton Dr., Monroe, MI 48161.

QRP Summer Contest, sponsored by AGCW-DL, from 1500Z July 17 until 1500Z July 18. 160-10 meters, cw only. Classes: A = less than 3.5 W inp., single op; B = less than 10 W inp., single op; C = less than 10 W inp., multiop; D = all stations more than 10 W inp. (may only work QRP stns.); E = SWLs. Class C stations may operate 24 hours; others must take 9-hour break. Exchange signal report, serial number and inp. pwr. (add X if crystal controlled; class D stations send QRO). Work stations once per band. All operation on each band must be crystal or vfo controlled. Max. 3 crystals for crystal-controlled bands. Count 1 point for QSOs in own country; 2 points for same continent; 3 points for different continent. Call areas in JA PY VE VK W ZS count separately. Count 1 multiplier per country and one per DX QSO. Figure score for each band separately and add for final score. Crystal-controlled bands count double. Awards. Mail logs (include 1 IRC for results) by Aug. 28 to: S. Hari, DK9FN, Spessartstrasse 80, D-6453 Seligenstadt, FRG.

Worldwide DX SSTV Contest, sponsored by A5 magazine, from 0000Z July 17 until 2400Z July 18. 80-10 meters. Call sign and video reports must be in "video" form. Mugshots can count only once. Slower clock-rate speeds are encouraged in either 128 16.5-second or 256 32-second time bases. Color work must contain a minimum of 2-color overlay to qualify with standard RGB frame transmissions. Motion SSTV must have a minimum of 2 frames sent with automatic receive switching circuitry or manually operated switching by the receiving operator, and 64 x 64 "quadrant" storage of no less than 4 separate pictures with replays. Single and multiop. No cross-band contacts. Work stations once per band. Suggested frequencies: 3.845 3.990 7.220 7.290 14.230 14.340 21.340 21.440 28.680 50.150. Count 5 points per SSTV 2-way QSO with own country, 10 for DX. Stations with more than 25 DX contacts add 25 bonus points; more than 50, add 50 points; more than 100, add 100 points. Other bonus points: mugshots, add 1

point; slow-speed, add 2 pts.; quad-frame, add 3 pts.; motion SSTV, add 4 pts.; high resolution, add 5 pts.; color, add 10 pts.; 6M, x2; 10M, x2; 15M, x2; 40M, x3; 80M, x3. Awards. Mail logs by Aug. 1 to: A5 Contest Manager, P.O. Box H, Lowden, IA 52255-0408.

21

WIAW Qualifying Run, 10-35 wpm at 2300Z (7 P.M. EDT). See July 7 listing for more details.

24-25

CW County Hunters Contest, sponsored by the CW County Hunters Net, from 0000Z July 24 until 0200Z July 26. Work stations once per band. Portables and mobiles may be worked again as they change counties. Stations on county lines count for 1 QSO, multiple multipliers. Exchange serial number, category (P or M for portables or mobiles), signal report, and state and county for U.S. stations, country or province for others. Suggested frequencies: 3.575 7.055 14.070 21.070 28.070. Count 1 point per QSO with fixed stations, 3 points for portable or mobile stations. Multiply QSO points by total U.S. counties worked. MOB. and port. stations calculate their scores for each state operated from, as well as overall, for awards purposes. Awards. Mail entries by Sept. 1 (include large s.a.s.e. for results) to: Jeffrey Bencher, W9MSE, 673 Bruce St., Fond du Lac, WI 54935.

HA-DX Contest, sponsored by PRASZ (Hungary), from 0000-2400Z July 24 (cw portion) and 0000-2400Z July 25 (phone portion). Single-op, single- and multi-band, and multiop, multi-band categories. Exchange signal report and serial number. Count 1 point per QSO with own country, 2 points for own continent, 5 points for other continent and 10 points per HA7 QSO. Multiply by total DXCC countries worked per band. Mail entries by Sept. 1 to: PRASZ, P.O. Box 36, Budapest, Hungary.

JULY 31-AUG. 1

ARRL Midnight Special, from 0300-0500Z Aug. 1 (11 P.M. EDT July 31 until 1 A.M. EDT Aug. 1). First hour 40 cw, second hour 80 phone. Work stations once per band. Suggested frequencies: 7.040-7.075 and 3.890-3.925. Exchange your age and antenna type (dipole, V, beam, etc.). Score equals number of QSOs — no multiplier. Mail entries by Aug. 10 to ARRL Hq. Include s.a.s.e. for results; top scorers will be listed in QST.

Illinois QSO Party, sponsored by the Radio Amateur Megacycle Society, from 1800Z July 31 until 2300Z Aug. 1. Rest period from 0500-1200Z Aug. 1. All bands, cw and phone. Work stations once per band and mode. No repeater QSOs. Frequencies: cw — 60 kHz up from low end; Novice — 25 kHz up from low end; phone — 3.975 7.275 14.275 21.375 28.675. Exchange signal report and QTH (county for IL stations; state, province or country for others). Count 1 point per QSO (except 2 points for Novice/Tech. QSOs). IL stations multiply by total states (max. 50), provinces (max. 10) and DXCC countries (max. 5) worked. Others multiply by total IL counties worked. IL portables and mobiles add 200 to score for each county where 10 or more QSOs were made. Non-IL stations take extra bonus multipliers for each group of 8 QSOs with the same county. Awards. Mail logs by Sept. 15 (include large s.a.s.e. for results) to: RAMS/K9CIU, 3620 Oleander Ave., Chicago, IL 60634.

AUGUST

3

West Coast Qualifying Run, 10-35 wpm at 0400Z Aug. 4 (9 P.M. PDT Aug. 3). W6OWP prime, W6ZRI alternate. Frequencies are approximately 3590/7090 kHz. See July 7 listing for more details.

7-8

ARRL UHF Contest, this issue page 73.

YO DX Contest, sponsored by the Romanian AR Federation, from 2000Z Aug. 7 until 1600Z Aug. 8. 80-10 meters, phone and cw. No crossmode QSOs. Classes: single op, single- and multi-hand; multiop, multi-band. Exchange signal report and ITU zone. YO stations will send two letters indicating their county. Count 2 points per QSO with own continent, 4 points for different continent and 8 points for YO stns. Multiply by sum of YO counties and ITU zones work-

ed per band. Mail entries by Sept. 8 to: RARF, P.O. Box 05-50, R-76100 Bucharest, Romania.

12

WIAW Qualifying Run, 10-35 wpm at 0200Z Aug. 13 (10 P.M. EDT Aug. 12). See July 7 listing for further details.

14-15

European DX Contest (WAEDC), cw, sponsored by the Deutscher ARC, full 48-hour period, 80-10 meters. (Note: phone Sept. 11-12, RTTY Nov. 13-14). Single op, all band and multiop, single transmitter classes. Multi-single stations must stay on a band for at least 15 minutes, except for a quick QSY to work new multipliers. Single ops operate max. 36 hours; take the 12-hour off time in 1 to 3 periods. Non-EU stations work EUs only. Exchange signal report and serial number. W/K stations also send state. Work stations once per band. Count 1 point per QSO. Count 1 point per QTC (explained later). Multiply by number of EU countries worked per band. The multiplier on 80 may be multiplied by 4; the multiplier on 40 by 3; the multiplier on 20-15-10 by 2. A QTC is a report of a confirmed QSO that has taken place earlier in the contest and later sent back to an EU station. QTCs can only be sent by non-EU stations. A QTC contains the time, call and QSO number of the station being reported. A QSO can be reported only once, and not back to the originating station. A maximum of 10 QTCs to the same station on all bands is permitted. You may work the same station several times to complete this quota. Only the original QSO has QSO point value. Keep a uniform list of all QTCs sent. QTC 3/7 indicates that this is the third series of QTCs sent and that 7 QSOs are reported. Certificates. Bands with more than 200 QSOs must include dupe sheets. Use separate logs per band; log 40 QSOs or QTCs per page. Deadlines: cw — Sept. 15; phone — Oct. 15; RTTY — Dec. 15. Mail to: WAEDC Committee, Postbox 1328, D-895 Kaufbeuren, Germany.

New Jersey QSO Party, sponsored by the Englewood ARA, from 2000Z Aug. 14 until 0700Z Aug. 15 and from 1300Z Aug. 15 until 0200Z Aug. 16. Phone and cw. Work stations once per band and mode. No cw QSOs in phone band. Suggested frequencies: phone — 3.900 7.235 14.280 21.355 28.610; cw — 1.810 3.535 7.135 7.035 14.035 21.100 28.100. Suggest phone activity on even hours; 15 M on odd hours (1500-2100Z); 160 M at 0500Z. Exchange serial number, signal report and QTH (county for NJ stations; ARRL section or country for others). NJ stations count 1 point per W/VE QSO, 3 points for DX. Multiply by sum of ARRL sections worked (max. 74). Non-NJ stations count 1 point per NJ QSO and multiply by total NJ counties worked (max. 21). Awards. Mail logs so they are received by Sept. 11 (include large s.a.s.e. for results) to: Englewood ARA, P.O. Box 528, Englewood, NJ 07631-0528.

KCJ Single Operator CW Contest, sponsored by the Keymen's Club of Japan, from 1200Z Aug. 14 until 1200Z Aug. 15. Single op all-band or single-band, cw only. No crossmode, crossband, multiop, repeater, satellite or non-cw QSOs. Exchange signal report and two letters indicating continent. JA stations send two-letter code indicating prefecture. Count one point per JA QSO and multiply by total JA prefectures worked per band. Awards. Mail logs by Sept. 19 (include IRC for results) to: K. Takamitsu, JA9FT, 4-16-22 Izuminomachi, Kanazawa, Ishikawa 921, Japan.

21-22

Alaskan QSO Party

22

WIAW Qualifying Run

28-29

All Asian DX Contest, cw
Alabama QSO Party
Occupation Contest

SEPTEMBER

11-12

ARRL VHF QSO Party

*Assistant Communications Manager, ARRL

Section Activities

Coordinated By Jim Clary, WB9IHH

A-1 OPR ↗ EC ↗ DXCC ↗ RCC ↗ WAS ↗ STM ↗ OES ↗ ORS ↗ NM ↗ SCM ↗ ARES ↗ OVS ↗ SEC ↗ OBS ↗ TCC ↗ OO ↗ NTS ↗ WAC ↗ CP

CANADIAN DIVISION

ALBERTA: SCM, E. Roy Ellis, VE6XC — SEC: VE6XC. ASCM: VE6AMM, STM/NM (ATN) ANM (APSN): VE6ABC. ECs: VE6AGH, VE6AFO, VE6AMM, VE6AHC, VE6FV, VE6AB, VE6ASL, VE6AVV, VE6AVV reports on his activities in fighting brush fires in his area. All local radio systems were used but came up a bit short. Assessment of communications is underway. A new provincial ham roster by NARC expected end of May. Traffic: VE6CHK 209, VE6ABC 26, VE6ARN 5, VE6AMM 4, VE6XC 4.

MANITOBA: SCM, Peter Guenther, VE4PG — ASCM: JP, SEC: HK, STM: RO, NMS: VJ ACX TE NM HW. Spring signs everywhere. As soon as band conditions part better mobiles will be more common. Charlie, VE4GB, is back from the south, and Hutch, K3ZVH/VE4, is also back. We regret the loss of Arnold, VE4IX, and his leadership on the Gopher Creek Field Day will be missed. MERN QNI 898, QTC 38, sess. 30, WRIN QNI 142, sess. 6, MTN QNI 258, QTC 84, sess. 30, MNN QNI 394, QTC 31, sess. 30, CTN QNI 117, QTC 29, sess. 28, Traffic: VE4RO 105, VE4PG 78, VE4AJE 41, VE4TE 30, VE4YE 20, VE4JA 18, VE4AAD 15, VE4FK 10, VE4NE 4, VE4TL 4, VE4ADS 3.

MARITIME — NEWFOUNDLAND: SCM, Don Welling, VE1WF — ASCM: VO1FG, NMS: VO1JN VE1WF, SEC: VE1E, Hospital VE1BWW, Silent Keys VE1BI and VE1BTV, VE1BSE off to NWT and VE1EJ to Ontario for the summer. VE1PZ to Singapore for a year. VE1BWG moving to BC. Fredericton ARC provided comms for the Fredericton Flying Club in the Challenge Cup Air Race. Don't forget the Maritime Ham Convention on August 20-22 in Charlottetown. PEI, Emergency Measures Organization and amateurs in New Brunswick are organizing, hope to have more on this later. APN sess 30, QNI 84, QTC 47, time 4QD, Traffic: VE1WF 323, VE1LCR/RO 21, VE1ALU 18, VE1XF 18.

ONTARIO: SCM, Larry Thivierge, VE3GT — ASCM: VE3GOL, SEC: VE3GV, ASTM: VE3GT. After 10 successful years as the EC for Metro Toronto, VE3GFN is stepping down to devote more time to his traffic handling and computer activities. He was active and responsible for organizing many events in the Toronto area, including liaison with the Red Cross through VE3RCO, as well as participation in the Mississauga Evacuation. Thanks Mike for all your time and help. Replacing Mike will be VE3-OB: welcome to the ARES team Dave. Members of the Dunnville ARC set up a demonstration for the Niagara Regional Amateur Conference. Training Part were VE3S KYO MFS MFE ISD FYU PZC and MFF. VE3HLF is attending military college and is one of the organizers of VE2CMR. The shift of the Laurentian Net to 40 meters (7070 kHz) will be permanent due to the success of the net there. Homebrew night for the Burlington ARC saw VE3LVS and VE3LUI win first and second prize respectively. VE3S BI CBA and BSA sporting new antennas. VE3DVE coordinating the communications activities of the Niagara Peninsula ARC as they prepare for the 100th Royal Canadian Henly Regatta, August 4 - 8 with the special event station operating August 4-8. This writing, approval awaits for the call CH3ROW. Special QSL cards will be available. Congratulations to VE3JSA on obtaining his Advanced. Keep July 10 open for the 8th Annual Ontario Hamfest to be held at the Milton Fairgrounds. Traffic: VE3HTL 282, VE3KK 264, VE3GOL 193, VE3HJG 190, VE3GT 148, VE3CYR 141, VE3DPO 128, VE3GNW 103, VE3KZ 87, VE3KXB 82, VE3JRT 77, VE3VM 62, VE3BVG 43, VE3WG 42, VE3JSM 41, VE3FPJ 23, VE3AJN 21, VE3DUK 19, VE3VED 18, VE3DZH 13, VE3EFX 13, VE3BZB 12, VE3FGV 7, VE3KX 5, (Mar.) VE3GFN 72, VE3GFV 11.

QUEBEC: SCM, Harold Moreau, VE2BP — SEC: VE2DEA, STM: VE2PJ, NMS: VE2PJ VE2FSA. New appointees: VE2GAG as OBS and VE2CU as ORS. VE2EVX, VE2PJ and VE2GFH received their Advanced certificate. Avec regret, je dois vous annoncer le deces de VE2BTW et VE2KB. Traffic: VE2GQ 221, VE2PJ 61, VE2V 50, VE2GAG 34, VE2FSA 34, VE2BP 30, VE2EK 22, VE2FSA 15.

SASKATCHEWAN: SCM, W. C. (Bill) Munday, VE5WM — STM: VE5QY, SEC: VE5II, NMS: VE5DO VE5HG VE5OI VE5MP. This looks like the year of special prefix for Saskatchewan. The MJARC started things off with "CG", followed by RARA with "XK" and to commemorate the CRR-L-ARRL Midwest Convention, the SARC will be signing "CJ". You will soon need a program to know who you are working. It is with regret I announce that a charter member of the SARC, VE5UB, has become a Silent Key. Members of the Regina and Moose Jaw Amateur Radio Clubs assisted the SK Special Olympic Society and provided communications during a Super Stroll from Regina to Moose Jaw. Traffic: VE5HS 48, VE5HJ 20, VE5WM 10, VE5AAT 11, VE5UX 8, VE5AAW 2.

ATLANTIC DIVISION

DELAWARE: SCM, Harold K. Low, WA3WY — STM: W3DKX, SEC: W3PQ, PSHR: WA3WY K3JL W3DKX. It is with deep regret that I must announce the passing of KR2U (Jersey Bill). He was very active in all club events of DARC and will be very much missed. Two new upgrades in DARC are KA2ONA to General and her mother, KC2LD to Extra. Don't forget Del. Hamfest Aug. 15. Plan to attend. DTN meets Monday thru Friday at 8:30 local on 3:05. DEPN same freq. 8:00 local on Saturday. We can use more check-ins. DTN QNI 336, QTC 47, DEPN QNI 50, QTC 12, SEN QNI 32, QTC 25, Traffic: W3QO 91, WA3WY 55, W3DKX 43, N3AKC 43, W3BDUG 33, K3JL 28, WA3PWT 21, W3WD 19, W3FEG 11, N3AXH 10, KA5DJI 9, K3ZXP 2.

EASTERN PENNSYLVANIA: SCM, Carl W. Pfeil, W3VA — SEC: WA3PZO, STM: K3JSZ, DEC: AA3C K3QXC K3BQW N3BFL N3CJP W3EEK.
Net Freq. Time/Day QNI QTC Sess. Mgr.
EPAEPTN 3917 6 P.M. Dy 490 233 30 WA3EH
EPA 3610 7:10 P.M. Dy 435 225 58 AA3B
PFTN 3958 5:00 P.M. Dy 251 254 30 WA3WQP
PTTN 3610 6:30 P.M. Dy — — — — K3JSZ
Local & vhf nets reporting (QNI QTC Sess.): D3ARES 207

21 4; D5ESN 55 7 4; D6ARES 30 18 5; LACRES 48 8 4; MCAREC 15 0 5; PWAARES 58 0 4; WARC 49 11 4; BPL K3NSN. Co reports: N3BFL W3QO W3AF W3GV W3WKE QNI 385, G3EBZ K3BQW W3CL W3GD WA3E W3QNE W3BCAL, OVS: N3BFL W3GQA, PSHR: AA3C K3ZXC K3ADJL K3AGJZ K3BJUD K3BXO K3BU N3BFL W3GQA W3VA WA3EHD WA3WQP W3BFPK W3B3FYT. New appointment: KB3BDZ to NM for Lackawanna Co. ARES Net. New call signs: KC3AD (N3CMF) KC3AN (WB3FJ). New gear: KB3DA & W3FM new keys. W3EEK & W3BCRM new TS830s. W3PTM a TR9130, WA3ZCJ a TR2500, W3BCAI a R1000, W3B3FYT a SB220. Congrats to W3EEK & WA3PZO for being elected as Directors to the Penn-Jersey Repeater Council. WA3WQP announces that the PFN will operate at 5:30 P.M. local time for the summer months. KB3XO finally made WAS. W3CL slowly recuperating after being hospitalized for surgery. Columbia Amateur ARC members did a FB job providing communications during the recent emergency in the Benton area. K3AL reports Old Timers Night at Lashigh Valley ARC was a big hit. 16 members of AREC, Red Rose and Ephrata rpts. supplied communications for the Lancaster Unit American Cancer Society's "A Day in May" event. K3AKN, EC Junlata Co. reports Tri County Rpt. Assn. held recent Amateur Radio demonstration and bake sale. KB3LF enjoyed CD Party (cw) and sez supermodified HW-8 QRP rig almost completed. K3NSN advises that all traffic was handled with ZDS & 4X4 due to Falkland and Mid East problems. The Penna State Senate recently commended the Mid-Atlantic ARC and its members for their dedication and service to the community. AA3B reports that the Penn Wireless Assn. made a fine showing in the past SS contest. K3BWB W3AMQ W3AQCN & W3LUD were honored at the York ARC 50th anniversary dinner. W3ABC was the guest speaker. K3SWZ worked all PA counties. K3BHL will be in "YO" land for another year. W3JS was promoted to Major in the PA Air Nat. Guard. Traffic: K3NSN 3627, WA3WQP 234, W3PXP 168, KA3GJT 150, W3FAF 133, KB3UD 124, W3VA 97, W3BFPK 92, AA3B 90, KB3XO 86, K3ADJL 73, WA3EHD 77, W3BKUJ 67, W3TVM 62, K3BFL 48, W3DIP 41, K3QXC 27, K3BQW 27, N3BFL 20, K3AQN 18, K3BU 14, K3EJG 12, W3LD 10, WA3CKA 8, W3CL 8, W3B3FYT 8, K3KXW 7, K3YD 7, AF3Z 7, W3PTM 5, N3BAY 4, K3EBZ 4, WA2WXMJ 4, K3AKN 2, W3BCAI 2, W2HK 2, AA3C 2.

MARYLAND — DISTRICT OF COLUMBIA: SCM, Carl R. Medrow, W3FA — STM: W3BGZU, SEC: WA3TA, DEC: W3BLTA. The FAR's new slate: W3BJUD, pres.; N3AKD, WA4ACM and WA3EUI v.p.s.; W3M4JF, corr. secy.; W3RXJ, corr. secy.; K3AO, Treas. Tnx to W2GHK for his long years of service to the Foundation. W3ZNV is our most regular reporting EC. KC3D joins the QCWA. W3CDO made all the social events and heard lots and worked some DX on 15M. N5EAZ73 is USAF MARS. W3MSN and wife took a sea voyage to SA. He celebrated his 75th birthday at sea. W3BJK is balancing a new rig against a big vacation. W3JK wants more operating time, but foregoes travel keeps getting in the way. KA3HLK has got his DX with the new rig and from a row house yet! K3ORW has stepped into the liaison breach. K3MYL reports the Washington County 2M net is reorganizing and still going strong. W3LDD has almost given up counties for DX. KB3NL needs a climber to get his 13 el 2M beam up. W3UT takes on all the traffic nets. W3BFFK keeps us posted on all central Maryland activities. KA3QDQ is doing a great job with the MTN and publicity. KB3WL is getting his mountain hf station ready for the contests. WA3VPL is prepping the Severn School for the Fd. Son N3CJZ works his first W3PY net, makes a lot of off bowling and back to hammering. KB3AP got a little antenna work done. Ham Arundel News reports W3MAH voted an AARC honorary lifetime member. K3KJZ the Club DX Contest winner, and KA3GWH passed the NJSN training course and is a qualified instructor. The action is with the nets: Net/Manager, Sessions/Traffic QNI Average. MDC/PON/W3QY 5/10/18.5, W2Mtr/K3MVL 5/0/25, WR/PON/W3B3FK 21/19/17.4, MTN/K3ACQDQ 21/23/4.0, MERN/W3B3ZU 31/184/29.9, with W3B3FK the Topper. Others KA3ARH/W3B3ZU W3HTB/W3A3HW and W3LDD. Traffic: W3BGZU 569, W3VA 144, K3ORW 114, W3CDO 111, W3UT 90, K3BFL 75, W3B3BL 18, W3ZNV 18, KC3D 16, W3ZV 12, W3DQI 10, W3AKJT 6, W3LDD 6, W3APV 6, N5EAZ73 2.

SOUTHERN NEW JERSEY: SCM, Bill Luebkekmann, WB2LCC — SEC: W2HOB, STM: WB2LOC. A bill to amend NJS 2A-127-4, permitting radio amateurs to install receivers operative on police and fire frequencies in their vehicles without having a permit from the local chief of police, has been reintroduced into the New Jersey legislature. In prior attempts to pass such legislation, similar bills were either vetoed or not acted upon. New Jersey State Senator H. James Saxton (R-8th District) has introduced S-1135 at the request of W2XQ. In late March, the bill was assigned to the Transportation and Communications Committee of the Senate. Hopefully, with a new governor, we can get this bill passed and signed this time. NJ amateurs should watch this bill's movement through the legislature and lend support, through contacting their legislators, at the appropriate times that it will be voted upon in the Senate and the Assembly. Should the bill be presented to the Governor for signature, another letter-writing effort and support of the ARRL would be necessary. I'll keep you informed, and thanks to W2XQ for the above information supplied to me verbatim. Traffic: WB2IQJ 435, N2CER 245, W2BPKG 146, WA2CUW 66, KM2E 46, KB2GE 36, W2ZO 35, KA2GTE 28, W2GFM 18, KA2GSL 16, WB2LOC 15, KA2BKF 8, KA2KTR 7, WA2TA 7.

WESTERN NEW YORK: SCM, William W. Thompson, W2MTA — SEC: W2BCH, STM: W2ZQJ, ASCM: W2GLH, DEC: WA2AIV KA2BHR WA3B3UF WA2DZH W2BNAQ. Emergency Coordinators; Leadership is needed in all counties WNY. ECs needed Cattaraugus - Chautauque - Essex - Fulton - Hamilton - Herk - Schoharie - Schuyler - Seneca - Yates. Are you an ARES member? If

not, why not sign up; see your county EC; support your local vhf net. Happenings: CVARA reads own news in the column; K2QR joins EME ranks; N2BQV has RTTY/ASCI; SLVARES comms Run for Life; Southern Tier Hamfest has 1100 attendees in sunny Owego; Oswego ARES comms Run-for-Hope; Tioga hams comm Candor-to-Owego Carole Race; RAGS hams comm Fun-to-Run; BARA's new trustee of W2OW is N2HR; Tompkins County ARA comms White Water Derby; SVARA hosts seminar on cable TV diplomacy; GRAM spreads word with PR booth at Genesee Country Mall. FCC Consumer Assistance tel. (717) 337-1212. Reports: OVS - W2SGJ, WA2RXB 6M aurora, K2QR EME, OO - W2MME 4; OBS - W2GLH K2KWK.

| Net | Freq. | Time/Day | QNI | QSP | QND |
|---------|---------|----------|-----|-----|-----|
| NYS1* | 3677 | 1000M-S | 171 | 77 | 23 |
| NYS2* | 3677 | 1000/Sn | 34 | 18 | 4 |
| THIN | 3913 | 1600/Sn | 37 | — | 4 |
| NYPON* | 3913 | 1700/Dy | 703 | 359 | 30 |
| NYSPTEN | 3925 | 1800/Dy | 669 | 60 | 30 |
| ESS | 3590 | 1800/Dy | 398 | 85 | 30 |
| OCTEN* | 34194 | 1830/Dy | 484 | 29 | 26 |
| Q Net | 3191 | 1830/Dy | 443 | 6 | 30 |
| STARIE* | 9939 | 1830/Dy | 46 | 18 | 16 |
| WDNIE* | 04164 | 1830/Dy | 578 | 108 | 30 |
| NYSI2* | 3677 | 1900/Dy | 406 | 260 | 30 |
| OSWARES | 75/15 | 1900/Sn | — | — | 4 |
| OACN | 3494 | 1930/Sn | — | — | 4 |
| SLVARES | 3191 | 1830/Sn | 37 | 0 | 4 |
| JGARCIN | 10/70 | 2000/Dy | 514 | 13 | 30 |
| OARCN | 25/85 | 2000/W | 59 | 0 | 4 |
| VHFTHIN | 04/64 | 2000/Sn | 61 | — | 4 |
| WIN | 04/64 | 2000/M | — | — | 4 |
| WNYECN | 3955 | 2000/Sn | — | — | 4 |
| BRVSN | 055/655 | 2100/Dy | — | — | 30 |
| Chemung | 10/70 | 2100/Sn | — | — | 4 |
| CNYNT | 90/30 | 2115/Dy | 477 | 48 | 30 |
| STAR/L* | 325/925 | 2130/Dy | 60 | 14 | 19 |
| WDN/L* | 04/64 | 2130/Dy | 908 | 184 | 30 |
| NYSI3* | 3677 | 2100/Dy | 318 | 18 | 30 |

*NTS nets. OCTEN March 624-70-31. PSHR: W2AET N2APB KA2BHR N2BL W2GLH KA2GOH KA2BHC WB2DS WA2KJO W2MTA WB2OWO W2ZQJ. NO BPL Traffic: W2MTA 390, WB2DS 245, WB2OWO 201, W2ZQJ 201, KO2H 195, W2AET 154, N2APB 118, KA2BLT 114, W2GLH 114, WB2QIX 90, KA2GOH 89, W2FBR 75, KA2BHC 75, KA2BHD 62, KA2BCH 58, KA2BHR 53, AF2K 53, KG2D 52, N2BLX 38, WA2KJOJ 24, NZARD 22, WA2MSZ 22, N2ABA 21, WA2AIV 21, WB2SGI 14, WB2NAO 12, KA2BDD 10, WA2RHO 6, WB3CUF 4, K2QR 4, K2RN 3, K2VR 3, (Mar.) W2B5GJ 21, WB2V3J 1, KA2GOH 46, (Dec.) W2B2V3J 3, KA2LHO 2.

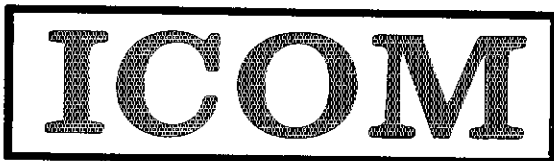
WESTERN PENNSYLVANIA: SCM, Otto L. Schuler, K3SMB — ASCM & STM: N3EE, NMS: AC3N N3ADU N3ADU W3BJJ W3B3EFO W3B3JK. Net Freq. Time/Day QNI QTC kHz Time/Day
WPACW 30 378 189 3585 7:00 P/Dy
WPAPTN 30 653 127 3983 8:15 P/Dy
WPAZMTN 30 400 83 146.28/88 6:00 P/Dy
NWPAAZMTN 30 425 4 (146.0/84 9:00 P/Dy
PFN 30 251 254 3958 5:30 P/Dy
New Novices KA3IYZ (XYL of N3ALL), KA3JAD KA3IYZ; Generals KA3JFM KA3HJA KA3HBB; Tech KA3IQY; Advanced N3BKU KA3HEJ. WB3LJA is now KB3XT. Congrats to all this month the Walk America (March of Dimes). Amateurs in many places provided vital communications for the walk. Here in the Pittsburgh area, despite the Dayton Hamvention and we received a big thank you for our help. We need more people on the traffic nets; surely a couple of hours a week (is not asking a lot, and it is a real experience. The training can be vital in emergencies. Also the thanks received from the recipients of certain messages from families is worth all the effort. Another thought: When you are doing these things you are performing the basic amateur services. To those sending new club officers, upgrades, etc., please give calls. We do not have space for more. Traffic: N3ADU 458, AC3N 203, K3CPL 151, W3EGJ 127, KB3DT 106, W3IA 80, W3JW 76, WA3QNT 69, N3FM 68, KA3EJC 67, N3CKO 62, W3AMB 53, W3SMV 51, KA3JIM 50, WA3JUNX 37, KA3BGC 34, W3IQD 33, W3MML 23, N3BKU 20, KB3UO 20, WB3NGO 18, W3KZM 15, W3BGUK 14, N3KB 10, K3LTV 10, K3NXP 8, K3TUA 8, K3QV 8, W3T3N 6, AB3X 4, W3AHH 3, W3L0D 1.

CENTRAL DIVISION

ILLINOIS: SCM, Larry M. Keenan, K9ORP — SEC: W9QBH, STM: W9J5R, ASCM: WD9EBQ.
Net Freq. Time/Day QTC Sess.
ILN 3890 2300/0300 Dy 263 56
IL Phone 3915 2130 Dy 145 30
NCPN 7210 1215 Dy 42 28
NCPN 3915 1700 Dy 60 26
IEN 3940 1400 Sn 2 4
ITN 3705 1900 Dy 77 27
9RND 100% stations: W9HOT W9NWX W9BWDG K9BYE DR9 (CA AND) 100% stations: WB9BGD W9HOT W9NWX. Reminer Memorial Station had a QTC of 8 during 4 sess. WB9EY: For the month starting with the July report, appointees should report to David E. Lattan, WD9EBQ, Rte. 1, Box 48E, Makanda, IL 62958. The Southern Illinois Amateur Radio Society provided communications for 4 consecutive weekends in April: Student Wellness Lifestyling Run, Archway Walk-a-thon, Battle of Makanda Junction Civil War Re-enactment (attended by 10,000 people), Camp Olympia (handicapped and retarded persons) Walk/Run-a-thon, and Jackson County Heart Fund Walk-a-thon. Hats off to the dedication that is necessary for that kind of community involvement. The Ham Club bulletin reported 22 members of the Hamsters Radio Club were declared "X" rated by the FCC in the previous year, and since that time an additional 16 members have been also declared as such. This rating has the approval of the U.S. Government. Congratulations are in order because "X" rated amateurs means Amateur Extra Class licensees. The

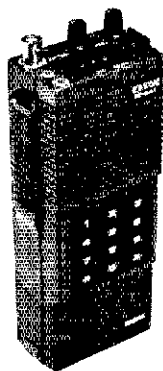


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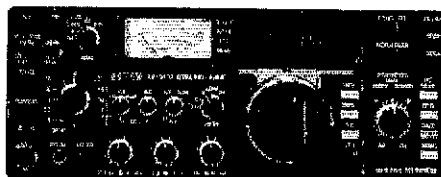
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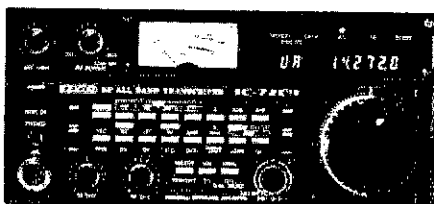
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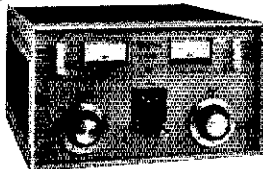
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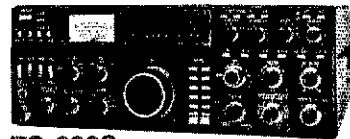
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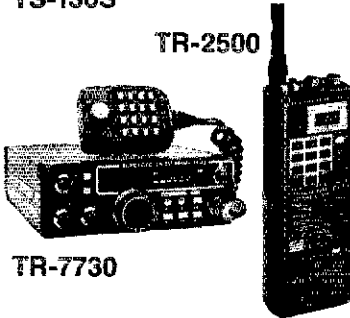
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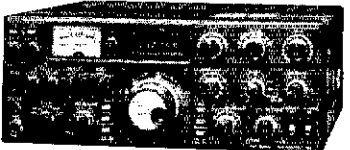


TS-130S



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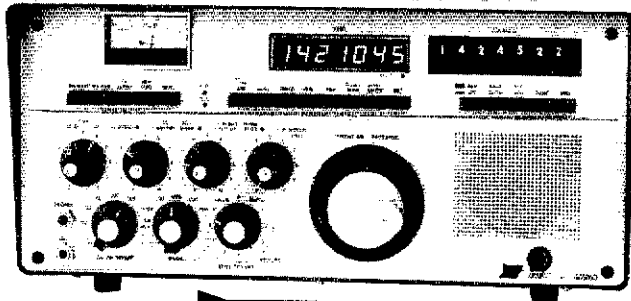
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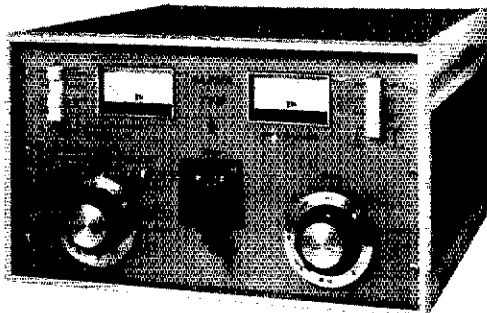


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PAYNE RADIO

Hamfesters Hamfest will be on August 8 at Santa Fe Park Willow Springs. At the show and tell session of the Central Illinois ARC, W9EX produced a 1950-vintage 1400-watt vacuum tube that was used industrially in an induction heater. It was taken out of service because of massive TVI back then because the 1400 watts was the power it takes to light up the filament. During the month of April, K9ORP conducted a class for the McLean County ARES members about Amateur Radio during emergencies. There were 24 graduates of the 4-week Tuesday-evening class. Knox County ARC has a new repeater funded by that club and Warren County amateurs. K8GVI of Skokie is recipient of the Presidential Achievement Award. The Fox River Radio League Hamfest will be August 22 at St. Charles. After hearing reports about motel shortages and traffic problems, WB9RLX is taking deposits for a chartered bus to the Dayton Hamfest for next year from the Central Illinois area. If you are interested at all, contact him. At the Centralia Hamfest on May 2nd, Southern Illinois amateurs met Central Division Director W9PNN as well as the old and new SCM (K9ORP and W9EBQ respectively). In addition, six ECs discussed advanced plans for relaying weather information across the state. Bulletins: W9EBQ 203. Traffic: K9VE 237, W9HTQ 227, W9JLJ 165, K89J 147, W9JE 77, KN8BA 87, W9RJW 57, W9TLU 59, W9DZC 43, K9SW 10, W9KR 31, W9OK 27, W9HLX 27, N9DR 26, W9YAS 26, N2GO 27, W9QBH 17, W9LNO 16, W9HBI 15, K9ORP 14, W9CJB 9, W9RLX 8, W9EBQ 6, W9SSP 2, W9ARM 2, (Mar.) K9JTD 65, W9HBI 24, W9QBH 20, (Feb.) W9TLU 227, W9HBI 15.

INDIANA: SCM, Bruce Woodward, W9UMH — SEC: W9UMH, STM: W9JLJ, NMS: ITN - W9QYJ, QIN - W9GQX, ICN - W9GCSZ, VHF - W9PMT, IWN - K9DCX, IPN - W9WKM.

| Net | Freq. | Time/UTC/Dy | QNI | QTC | QTR | Sess. |
|-----|-------|----------------|------|-----|------|-------|
| ITN | 3910 | 1330/2300 | 2086 | 384 | 1914 | 80 |
| QIN | 3856 | 1430/0100/0400 | 787 | 364 | 1723 | 89 |
| ICN | 3708 | 0015 | 94 | 24 | 547 | 30 |
| IPN | 3910 | 2130 | 1393 | 101 | 740 | 30 |
| IWN | 3910 | 1310 | 1600 | 109 | 30 | |

Hoosier vhf nets: QNI 4404, QTC 150, QTR 6328, bulletins 38 for 18 nets. D9RN 100%, 373 QTC 60 sess. IN stns W9JLJ K9CGS KJ9J W9BMMK W9URQ 9RN 100%, 653 QTC in 1175 minutes. IN stns W9JLJ W9QLW W9EJ N9AEJ W9GQX W9XJ KJ9J N9HZ K9WVWJ W9UYU W9QCF K9K9, CAND 100%, 887 QTC, in 30 sess. IN stns W9JLJ W9QLW. Appointments: W9BRVN EC for Tippecanoe Co. N9CQD EC for Shelby Co. Silent Keys: W9NXX W9HWH W9DLF, W9DLF was my uncle, holder of the IRCC Outstanding Amateur Award, net manager of the Indiana Phone Net, Official Relay Station, and in general a believer in public service. He will be greatly missed by all. I am pleased to see the club news letters using the news release. Additional news letters received this month: Washash Valley ARA Bandspread, K9VDQ ed.; Michigan City ARC Harbor Beam, W9LBE ed.; Grant County ARC Amateur News, W9YHF ed. Thanks for your support and the fine job you all are doing. April 3 could have been much worse. One tornado did touch down in Peru, IN. W9BFNR, EC Miami Co, W9EJC K9SBW K9CA K9FMZ and W9YKM provided communications support for the disaster. Our SKYWARN program is going very well this spring. I wish to thank the Centralia, Greenup, Robinson and Danville, IL, repeaters for providing information for their neighbors to the east. I wish to thank W9MJ, W9GQH and K9IBB for the link to Indianapolis. 3910 worked very well during our last alert. I plan to continue using it during weather alerts. The Indiana Phone Net has decided to continue as an independent net. The new net manager is W9WKM. I am sure it will continue to play an important role in the Indiana traffic system. Traffic: W9JLJ 1187, W9FC 369, W9QLW 227, KJ9J 202, W9UYU 138, W9EJ 119, KM9B 113, W9OYJ 105, W9UMH 88, W9URQ 83, W9QCF 76, K9HJH 71, K9FZX 55, W9PMT 53, W9WKM 53, K9N 48, K9DCX 46, K9BRN 45, W9JAA 39, K9K 37, K9WVW 29, W9BMMK 25, N9AEJ 22, W9BWI 22, W9BYV 22, W9QJK 21, K9PFO 18, N9PIS 18, W9AGVY, W9JZV 18, N9CQD 15, N9COS 14, W9DWD 10, W9OHX 9, W9RTH 9, W9ATG 8, K9DIY 8, K9FVN 7, W9UEM 5, N9BLK 5, N9AST 3, K9D 3, K9OUP 3, W9BDP 2, W9UPI 2, K9WI 1. (Mar.) W9FC 376, W9UYU 275.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: W9CAK, STM: K9UTC, BWN 3984 1215Z QNI 1195, QTC 1369 W9YPPY, BEN 3985 1800Z QNI 679, QTC 241 W9ESM, W9BN 3985 2300Z QNI 1102, QTC 411 W9ESZ, WNN 3723 000Z QNI 172, QTC 29 K9HPQ, W9SN 3645 0030Z QNI 183, QTC 44 N9BYK, WIN-E 3682 0100Z QNI 416, QTC 211 W9YCV, WIN-L 3682 0400Z QNI 338, QTC 173 K9LGU, XPO 3925 1831Z QNI 311, QTC 37 W9AKY, NVTN 341 94 0030Z QNI 512, QTC 37 W9YPPY, Gr Bay 72:12 0545Z QNI 10, QTC 2 W9BMRK, W9VNTN 31:51 0030Z QNI 372, QTC 42 N9AGL, K9EQJ, W9BUKZ Advanced, K9BLG, K9JFK, etc. Techs. All nets in Wisconsin are doing real well, thanks to all who support them. WNA picnic is September 11 at Northwood Co. Park. KA9LLN KA9HXN KA9IGN have General, KA9HOW W9DUX KA9CDR have Extra. WIN-L certificate to W9BCC, W9BN certificate to N9CRO. WNN certificate to KA9LXP, KA9EIC has Extra and is now KM9N. Sorry to report W9LNV, W9NHS Silent Keys. W9YMM is now KC9NH. New Novices in the Shawano area are KA9MZR and KA9MZS. KC9KJ is now KN9P. W9JWS's wife Mavis was a sky diver but broke her ankle in a fall. Sorry Mavis. BPL to KA9CPA and W9ESZ. W9IAL received DXCC. Sorry to hear W9NB had heart attack, but he doing well. All well. Duqu. Traffic: KA9CPA 2408, W9ESZ 516, W9CXY 341, K9GDF 303, K9FHI 188, W9DND 165, W9YPPY 164, W9WVYS 153, K9KQ 143, K9CJ 134, W9IEM 128, N9BYK 114, W9DFRI 105, K9HPQ 85, K9IKR 85, N9AUG 80, W9KTF 62, W9LDO 61, K9LGU 60, W9UCL 56, W9SIC 55, W9SO 55, N9BDL 54, W9ESM 54, W9UW 50, K9BN 48, W9BMRK 47, N9BCX 44, K9GB 43, K9UTQ 43, W9ZTY 42, N9APT 41, K9HDF 39, W9JGA 39, K9JPS 39, K9GG 35, K9GYD 34, K9GJW 32, W9JWS 32, W9YVC 32, K9GO 29, W9BKT 28, K9AKG 27, W9BPK 25, W9SP 24, W9SPL 21, ADX 21, W9BIM 20, K9EMF 19, K9EC 18, N9CP 16, K9IHF 14, K9ANV 12, K9C 12, W9DXW 12, K9NP 12, K9FM 9, W9IHW 9, K9MFV 5, W9AJW 3, W9RTP 3.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, W9HOX — STM: AD9S. Congrats to the following upgrades: Adv - KC9PD KC9QQ KC9RL; Gen - KA9EQH KA9NIS. Welcome to the hobby: KA9NJO KA9NRU KA9NRV KA9NLS. Thanks for the very nice evenings at the Anoka ARC and the 3-M

Robot extends \$100 cash rebates!

Generals Get HF SSTV

The FCC has amended its rules to allow general class amateurs to operate SSTV on any frequency where they are authorized voice transmission. The action by the Commission occurred on November 24, and becomes effective February 22, 1982.

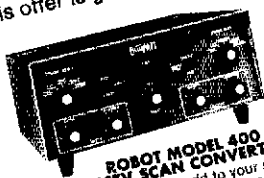
Robot celebrates FCC ruling on use of SSTV on General Class Phone Bands

\$100 CASH REBATE
ON ROBOT 400 SSTV SCAN CONVERTER

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WHEN THE 400 AND 800 ARE PURCHASED TOGETHER.

With the new FCC ruling approving SSTV on the General Class Phone Bands, and with our \$100 rebate, now is the perfect time to add slow scan TV to your station. Purchase a Robot 400 or 800 from your Robot dealer and receive a check from the Robot factory for \$100. If you buy both the 400 and 800 together, you get an extra \$50, or a total rebate of \$250. This offer is good through May 31, 1982.

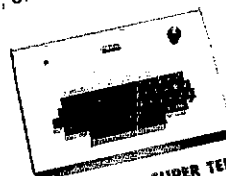


ROBOT MODEL 400 SSTV SCAN CONVERTER
Simple to operate, easy to add to your station. All connections to your transceiver are with ready made connecting cables. No modifications required.

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| List price | \$795 |
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For Baudot/ASCII, Morse and SSTV graphics. The Robot 800's built-in demodulator equals or exceeds the performance of those found only in expensive stand-alone terminal units.

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World leaders in Slow Scan TV, Phone Line TV and Image Processing Systems.

Above is reproduction of original rebate ad as it appeared in May 1982 magazines.

The response to our \$100 Cash Rebate on Robot 400 Scan Converters and Model 800 Super Terminals was truly impressive. More Robot SSTV Scan Converters and Robot terminals were purchased than in any like period in our history.

To encourage the continued growth of SSTV on the General Class Phone Bands, Robot is extending our \$100 Cash Rebate offer on our Model 400s and 800s another 60 days to July 31, 1982.

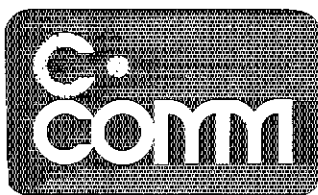
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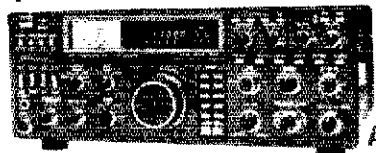
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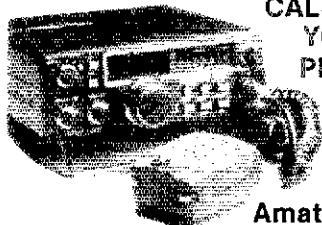


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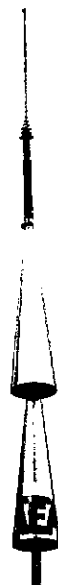


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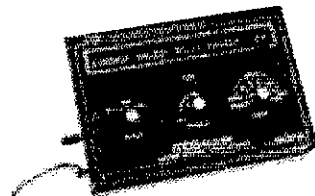


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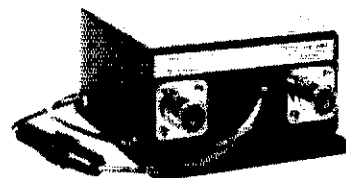
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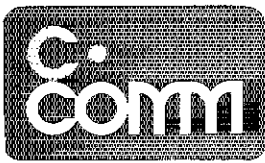
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Automatic antenna change over
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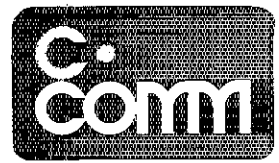
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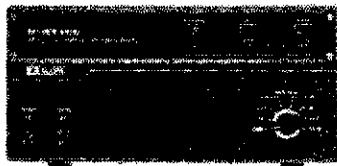
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**NEW! AT-500
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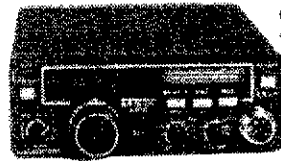


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MINICOM IC-25A

Full featured 2m FM transceiver in a very compact package. 25W too!



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Measures 2"(H)x5½"(W)x7"(D). Dual VFO's with band scan and memory scan with automatic resume after preset delay or carrier drop. Encoding microphone also included. 5 memories with priority channel. Tuning rates 5KHz (A VFO) or 15KHz (B VFO).

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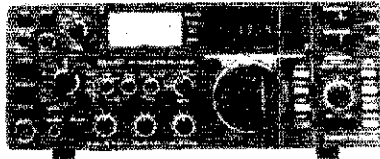


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\$1349.00

Available with all accessories

NEW FROM ICOM, IC-740

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Contains the most asked-for features in a HF base station. 160 thru 10M amateur band coverage, 10-100W output. Many features including adjustable noise blanker, pass band, tuning, notch filter, adjustable AGC, squelch, optional FM and optional internal AC supply.

IC-3AT/IC-4AT

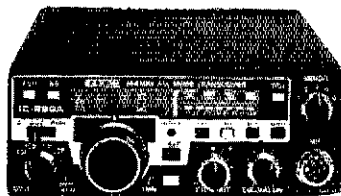


A 220MHz or 450MHz hand-held based on the very popular IC-2A/2AT. Compatible with all 2A accessories. IC-3AT (shown) with 16 button encoder.

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**IC-290A 2M ALL MODE
TRANSCEIVER**



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\$429.00

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5 memories with priority and scan/squelch on SSB. Dual VFO's for FM operating ease. Encoding microphone included.

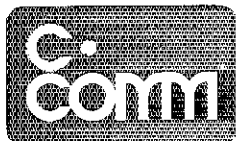
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**THE VERY
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Am. Net \$239.50
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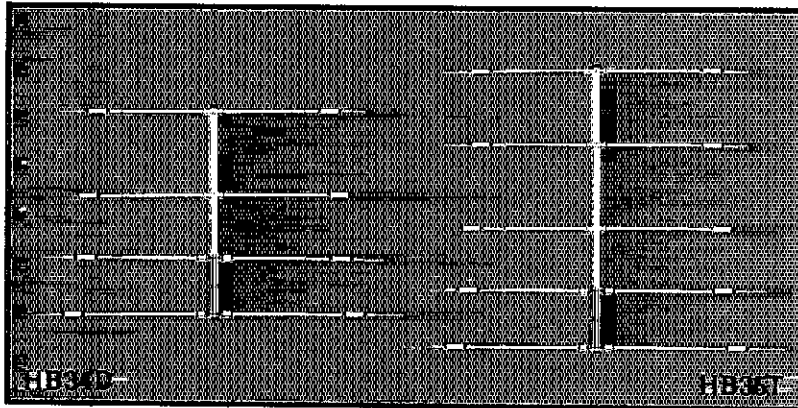
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| Bands | 10/15/20 | 10/15/20 | 10/15/20 | 10/15/20 |
| Elements/Band | 55 4 | 4 4 4 | 4 4 3 | 3 3 3 |
| Max Pwr PEP | 3KW | 3KW | 3KW | 3KW |
| VSWR | 1.5 | 1.5 | 1.5 | 1.5 |
| Impedance Ohms | 50 | 50 | 50 | 50 |
| Max E1 Length | 22' | 22' | 22' | 22' |
| Boom Length | 14'-7" | 18'6" | 18'5" | 13'-2" |
| Turn Radius | 18'10" | 18'9" | 15'10" | 18' |
| Wind Area Ft ² | 7.93 | 6.62 | 6.04 | 4.73 |
| Wind Load (lbs.) @ 80mph | 160 | 132 | 121 | 102 |
| Boom Diameter | 2" | 2" | 2" | 2" |
| Max Size | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" |
| Weight Lbs | 52 | 38 | 34 | 27 |
| Max Wind MPH | 100 | 100 | 100 | 100 |
| Balance | Yes | Yes | Yes | Yes |
| Furnished | Yes | Yes | Yes | Yes |
| Gain dbd | CALL FACTORY | | | |
| F/B Ratio | CALL FACTORY | | | |
| Price | \$329.95 | \$239.95 | \$209.95 | \$174.95 |

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Club. A good group of hams. The Anoka club meets the 2nd Monday at the Anoka Co. Court House. The 3-M Club meets at the 3-M complex the 2nd Thursday. Join and enjoy. Flash: The Dakota Division Convention will be in Moorhead Sept. 17-19. See WB0BIN for info and reservations. CU there. W0RHI is a Silent Key and missed by all. WD0BPS is new Hennipin Co. EC; give him your support. Fairbault Swap Fest - June 12. Range Hamfest - July 18 at Grand Rapids. CU there.

| Net | Freq. | Time | QNI | QTC |
|--------|-------|------------|------|-----|
| MSPN/E | 3929 | 5:30 P.M. | 1179 | 208 |
| MSPN/N | 3945 | 12:10 P.M. | 509 | 355 |
| MWXX | 3929 | 8:15 P.M. | 480 | 355 |
| MSN/L | 3685 | 6:30 P.M. | 333 | 132 |
| MSSN | 3710 | 7:00 P.M. | 105 | 17 |
| MSN/2 | 3685 | 10:00 P.M. | 168 | 97 |

Traffic: WA0TFC 398, WB0HOX 392, W0HZU 241, KB0MB 218, KA0EY 211, KA0JUX 168, W0MFW 144, W0DM 143, AD0S 106, KA0IAQ 104, K0JCF 78, W0DFX 70, KC0T 67, W0PNE 47, WB0NZB 44, N0CLS 41, KC0NF 40, W0WRL 34, WA0AIN 32, KN0J 17, N0JP 15, KC0Z 15, KA0JCO 14, WD0BGS 9, KA0HLP 9, N0BSG 7, K0MVF 6, KB0VV 3, N0DFR 3.

NORTH DAKOTA: SCM, Lois A. Jorgensen, WA0RWM - ARRL Dakota Division Convention will be at Moorhead, MN, on Sept. 17-19, sponsored by Red River ARC. For details check QST or contact WB0BIN. Remember to get your 610 in at least 2 weeks prior to event schedule at Bismarck on Sept. 8; I have 610s if needed. Theodore Roosevelt ARC officers are WD0DAI, pres.; WD0EMY, v.p.; WD0DAW, sec/treas. The NDSU ARC officers are WB0PKG, pres.; WD0GOL, v.p.; KA0MYE, sec/treas. We of ND want to welcome and congratulate our new Division Director, K0TO. We will get the pleasure of meeting him at the Convention. Congrats to KA0BAV upgrade to Adv. New calls are W0AYA now K0CMO, W0WWSO now K0SG, W0BYVY now K0COM. Congrats to W0SHD and wife, KN0A and wife on their new harmonics. We extend our sympathy to the family of W0SHM. Traffic: WA0RWM 50, KA0FSM 34.

SOUTH DAKOTA: SCM, Erwin Helmbuck, K0OTZ - It is with deep sorrow that I report the passing of W0NEO. Ross was Mr. Hamdon in South Dakota. He contributed a great deal to Amateur Radio in the state, including organizing nets, handling a great deal of traffic and generally doing more than his part to get the job done. Ross was an inspiration to all of us and will be greatly missed. For those interested in making contact with some displaced Dakotans you might try 14.235 at 1830Z or 3844 at 0300Z as there are a bunch that normally get together there. Stan W0IT is active on the satellites and has been heard with a good signal. K0UDZ's moon-boost was mentioned last month. Traffic: K0AIE 108, W0HOJ 78, W0KJZ 43, WA0VRE 42.

DELTA DIVISION

ARKANSAS: SCM, Dale Temple, W5RXU - SEC: W5SIGF. This month I want to solicit recommendations and ideas on how to better operate the Arkansas Weather Net during severe weather. The 75M band leaves much to be desired from a noise standpoint but offers good coverage. Two meters offers excellent noise conditions, but is limited in range. Linking repeaters would work well but requires extreme cooperation among repeater users. Perhaps the best of all worlds would be District Emergency Coordinators located in such a manner that they could copy two repeaters simultaneously and act as relay. The K5KDR 146.341.94 repeater in Little Rock will continue to be the Primary Weather Net Repeater as relays are needed. Contact W5SIGF if you are interested.

LOUISIANA: SCM, John Meyer, N5JM - ASCM: KC5SF. STM: W5GPH. The DDXA has K5LM turning the gavel over to K5RSG the new presy; N5NO, vp.; W5UIH, secy, and W5YFO tres. Congrats to W5EXJ named "Instructor of the Year" by ARRL for helping hundreds to get their tickets over the past 35 years. Moonboost and other esoterica comes to Baton Rouge July 30-Aug. 1 when the Central States VHF Society convvenes. Contact W5LBT for details. Ah, for the simple days of yore when a "Twoer" on 145.350 a.m. did the trick; now it seems that the Lafayette gang is suffering from CATV-FI on 8424. Such is progress. Holiday in Dixie - week comm. vinted assisted by the Shreveport group who also plan a hamfest on Aug. 7-8. Welcome to these new ORS appointees: W5VMY ACSR N5BVF KA5HDT WA5PRI K5WOD W5BNCM W5BNXM WA5TQA N5CFL WA5LHL W55ILX W5DJFY K5KOD K5LYA K5OZ AE5V K5SL WA4MUW/5 W5SAWJ W5BTPG K5SVX K5ABD W55IKT.

| Net | Freq. | Time | Mgr. |
|-----|--------|----------------|--------|
| LAN | 3615 | 7 & 10 P.M. Dy | |
| LTN | 3910 | 6:30 P.M. Dy | N5ANH |
| LSN | 3703 | 7:30 P.M. Dy | W5CWCW |
| LRN | 3587.5 | 6:30 P.M. Sn | |

Traffic: W5LQ 223, W5GHP 197, K5TL 183, KA5HDT 113, KC5SF 103, W5TWW 59, W5VMY 53, W5LBT 43, N5ANH 34, W5CWCW 17, WA5TQA 11, N5JM 2, WA4YU 2.

MISSISSIPPI: SCM, Paul Kemp, KW5T - SEC: K5ONE. STM: K5WV. Freq. Coord. W0SDGI. Summer doldrums setting in early this year. Not much to report this month. Enjoyed seeing everyone at the Jackson Hamfest. FCC considering expansion of 14-MHz band. Be sure and file comments on this important issue. N5EEJ has fine letter for all new Novices in the section. Let him know if there is a Novice in your area who may need additional assistance. K5ONE is going to be in contact with all ECs and DECs in the near future. Any needs or thoughts, get in touch with him. GAND (W5DKJ) QTC 877, sess. 30. MS rep 100%. DRNS (W55UL) QTC 395, sess. 30. MS rep 100%. W1TN (K5AF) sess. 30. QNI 167, QTC 89. M5BN (W0SEY) sess. 30. QNI 2338, QTC 84. MN (W5BVM) sess. 30. QNI 703, QTC 13. G5EN (K5WV) sess. 15. QNI 378, QTC 11. CAEN (KA5AGD) sess. 4. QNI 78, QTC 0. RACES (K5GEE) sess. 4. QNI 36, QTC 0. MSN (KA5GGG) sess. 19. QNI 109, QTC 14. NEMWV sess. 4. QNI 76, QTC 0. Traffic: K5WV 370, NSAMK 361, K0AOF 131, KT5Z 56, W5WZ 31, W5HKW 16, W5LSG 10, KD5P 8, KT5T 3.

TENNESSEE: SCM, John C. Brown, N04Q - STM: K4YOL. SEC: K4TKQ. The hamfest season is half over, and we have only about three of them on schedule as of now. If your favorite hasn't been held, I am sure it will soon. The season for adverse weather is about at its midpoint also. That means that extra care and effort are needed to make sure the lightning won't come in to the shack and leave you off the air. That includes the insurance coverage in the unlikely event that it does. Inspection of the towers as well as guy wires should be made carefully at least twice each season. Six net managers did not get in their reports this time. Come on

Owners of the TEN-TEC OMNI say it all and much better than we here at the factory could...

Had Century 21 and was more than happy with performance—am upgrading soon so I decided to stay with an excellent American made product.

KA4FJE

As present owner of TEN-TEC 544, I have been very happy with it. Now that I need a rig for a 2nd QTH—it, of course, must be a TEN-TEC.

WA2YHF

This is my third TEN-TEC rig. This new one is best yet! Triton IV is now back-up to new Omni C.

AD1P

This is a wonderful rig with all the serious Ham should need. All reports remark of clean keying and good quality SSB.

N4LS

It is a well thought out piece of equipment. I especially like the QSK and the convenient controls.

W8NOT

I was impressed with your reputation for providing good service and satisfying the customer.

W4JSP

In almost 27 years of Hamming, this is the best rig I've ever owned. Thank you all very much!

W7WKH

Super piece of equipment!!

N3RG

The transceiver has been on the air for 5 days, and I am more than satisfied. It is in my estimation a superb product and does exactly what I expected it to do. Signal reports are most flattering.

N2CER

Fantastic Rig, and I use on SSB ONLY.

KB9VB

I decided on TEN-TEC because of the excellent service policy of your company.

WA4RRC

I'm impressed! Will need time to take proper advantage of all of its good features. This should give the "Rice Burners" a real goal to shoot for!

W8UGT

Very fine Radio. I'm proud to be an Omni-C owner.

WD4SFY

The Omni is a beautiful transceiver. Worth every penny!

KJ5G

The Omni C is a joy to operate. My first contact was Romania.

W4REW

Numerous comments over the air pertaining to product and quality of service were very complimentary.

W5VYT

A prominent local amateur told us, "I have never met a man who bought a TEN-TEC and didn't like it." Also we wanted to buy American.

AJ0S N0CEQ

I have many friends on the air (cw) that are well pleased with TEN-TEC equipment. Especially favored among

I am extremely pleased with the OMNI-C. I have owned the best (Collins, Drake, etc.) but this product has them all beat for sheer performance and operator convenience. You are to be congratulated for producing such an outstanding piece of equipment—right here in the U.S.A!

W9SC

I'm very pleased, after 14 years of DX'ing and contest operations and many more different rigs, this one tops them all. Super RX!

KJ2H CX1BBV

I've owned the Triton 1, then the Triton 4, now the Omni-C. Is there any other rig?

W1ZQI

Have had a Triton IV the past four years. I would not own anything but TEN-TEC. Super rigs and fantastic service.

W5TI

Had Omni-C, then tried most other rigs on market—went back to the best—The American made Omni-C.

KC5WC

I have previously owned Triton IV. Now have Omni-D Series B, your prompt and courteous attention to minor problems in the past together with fine equipment induced me to buy this one.

N5CN

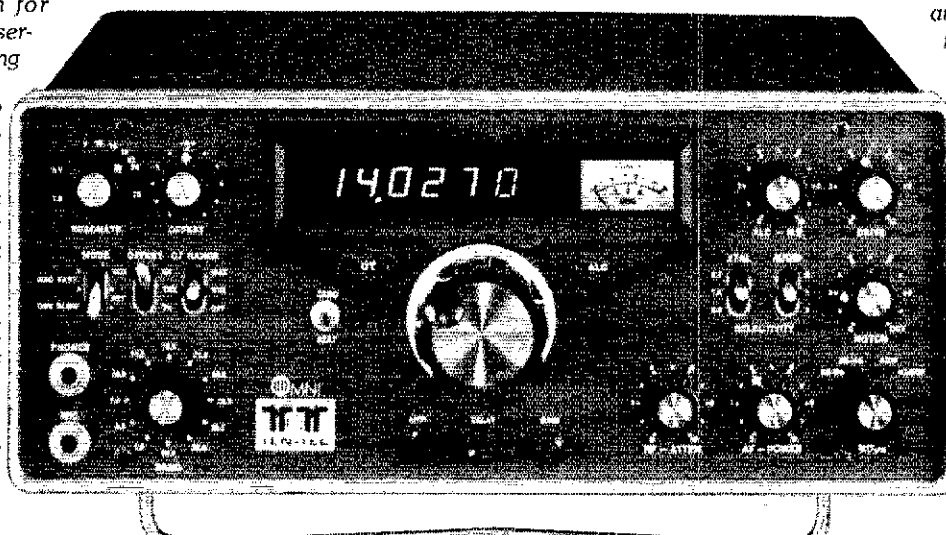
Decision was on previous experience. Traded in a 544 on this rig & the only thing I would have traded that one for is another TEN-TEC—Great rig!

WD4NZP

Fantastic rig!! Mark me down as a TEN-TEC fan for life!!

KA5GKO

Straight talk from owners of TEN-TEC OMNI...



the rig that filters the crowd.

cw operators is the QSK full break in feature.

W5QNT

This XCVR has to be the ultimate "rig." I am waiting for the matching amp (the Hercules) it is on order.

K8IST

I owned a TEN-TEC Triton IV which was a sweet rig. It was natural to upgrade to another TEN-TEC.

KA4GYU

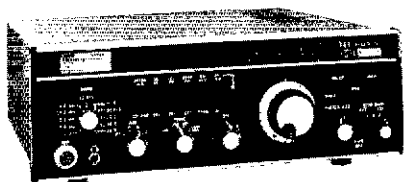
My decision was based mainly on over the air reports of TEN-TEC owners and also reported good factory service if any troubles with rig did occur.

W7GOY

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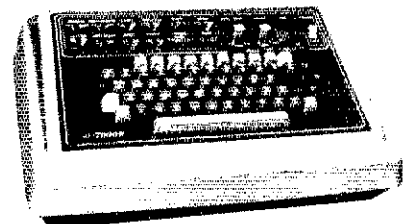
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| SL-500 500 Hz CW filter | | 59 ⁹⁵ | 54 ⁹⁵ |
| SL-1000 1 KHz RTTY filter | | 59 ⁹⁵ | 54 ⁹⁵ |
| SL-1800 1.8 KHz SSB/RTTY filter | | 59 ⁹⁵ | 54 ⁹⁵ |
| SL-4000 4 KHz AM filter | | 59 ⁹⁵ | 54 ⁹⁵ |
| SL-6000 6 KHz AM filter | | 59 ⁹⁵ | 54 ⁹⁵ |
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| 7073 Hand microphone w/plug | | 29 ⁹⁵ | |
| 7077 Desk microphone w/plug | | 49 ⁰⁰ | 45 ⁹⁵ |

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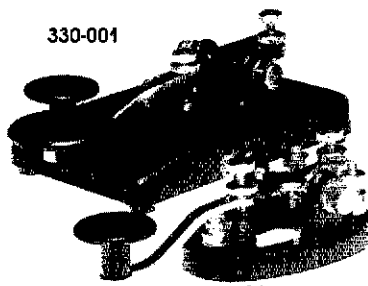
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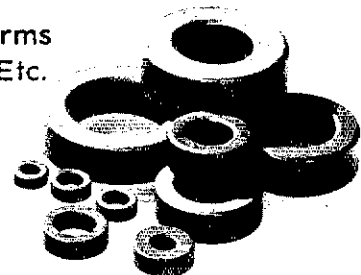
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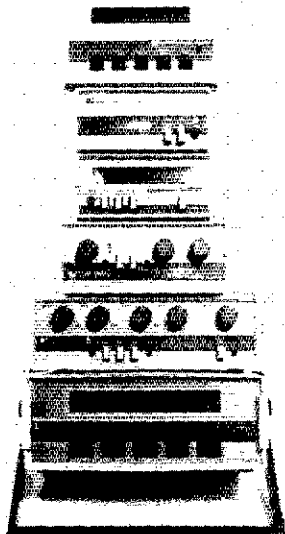
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KA8GGZ 25, WD9HDZ 25, WB8SJE 25, N8DAD 24, W8RG 24, N8CJS 22, KA8HGH 22, WD8EKI 21, WD8RGS 20, W8VOA 20, WB8MR 18, WB8M 18, W8SIG 18, WB8HHZ 18, W8BJD 18, WB8KWD 18, W8SIG 18, WB8HHZ 18, KA8NXD 15, W8ZM 15, WA8ZID 14, WD8JUP 12, W8OOL 12, WB8HL 10, KA8DGO 10, KA8GMF 10, KA8KFW 10, WD8NEC 10, K8VOY 10, N8BGZ 9, WD8DJR 9, W8SYTQ 9, AF8C 6, WA8HED 5, WD8OYK 5, N8AJU 4, WD8MFX 4, AF8O 4, WA1QAA 3, WB8NHV 2, KA8PHB 2 (Mar.), N2NS 132, WB8NCD 58, WB8YTD 53, K8CJZ 32, N8AHE 18, W8ZM 14, WD8D08 8, WB8YD 8, WB8LZN 6, AF8O 8.

HUDSON DIVISION

EASTERN NEW YORK: SCM, Paul S. Vydareny, WB2VUK SEC; KB2KM, STM; WA2SPL, ASCM; KB2TM, NI (CW); W2APB, WB2AG, W2WSS, NI (SSB); WB2MCO, K2KQC, NI (RTTY); W2ODP, NI (FM); WB2ZCM, N2BDW, K2ZVI, WB2HDU, W2IQK, due to job commitments, will not be active. Good luck Carl. We will miss you! Ulster Co. RACES and OMARC including KB2GA, W2FMY, N2FS, N2BHQ, WA2WOL, WA2KPF, KB2L, W2IQU, W2LW, WB2BGS, KA2IKJ, and W2XL, provided communications for a 10 KM marathon. Rip Van Winkle ARC provided communications for a Bike-a-thon in Greene Co. Albany ARA welcomed three new members including KA2KDG and reports W2IXA as Silent Key. Orange Co. ARC would like to swap newsletters with other clubs. Contact N2CGK, W2WSS in *ESS Bulletin* makes some good comments about our distinctive status as hams and says that we should get involved in at least a few activities which are "in the public interest." WECA has been busy with many public service activities but not enough members are interested enough to help - sounds familiar, doesn't it! W2YJR is working on his cw to upgrade. WB2MCO helped with March of Dimes Walk-a-thon. BPL: WA2SPL, PSHR; WB2MCO, KA2KVZ, K2ZM, WB2VI, WA2YBM, W2YJR, N2BDW, AK2E, KB2KW, WB2TWQ, N2CPX, N2CSX, Traffic: WA2SPL 626, KA2KVZ 276, WB2MCO 273, W2C6 270, AG2X 126, K2ZM 121, WA2JBO 93, W2BIW 84, N2BDW 68, K2ZVI 53, AK2E 48, W2YJR 43, WB2OHR 41, AA2Y 31, K2MI 29, N2YV 27, W2SWA 20, WB2TWQ 20, N2CPX 18, WB2SON 16, WA2CJY 12, N2CSX 11.

NEW YORK CITY - LONG ISLAND: SCM, John H. Smale, K2IZ - SEC; WA2KKJ, STM; YB2BDY, Net. Mgr. NLI CW 3630 1900/2200 K2GCE NLI/NP 3928 1815 KS2G NLS 3720 1930 WB2EUF NCVHF 6,04/64 2100 MWTH N2BZL BAVHF 7,915/315 2030 M-F N2BMF SCVHF 4,775/37 2030 M-F WA2ARC LIMARC 6,25/85 2100 F N2BZL ESS 3590 1800 W2WSS NYS 3677 1900/2200 KA2CTU NYS 7077 1000 M-S WB2EAG

Note: All times are local. Please try and help out by checking in whenever you can. Plan now to attend the Hudson Division Convention being held Oct. 29-31 at the Playboy Club at Great Gorge, New Jersey; time is running out. Congrats to W2DBQ who received 50-year awards from ARRL, OTC and QCWA. The crew from LIMARC did their usual outstanding job with the L.I. Marathon, and they extend their thanks to all who helped with the communications. KA2KJ is now EC for Manhattan and WA2KKJ almost has someone hooked for the Bronx. Here's hoping. Congrats to KA2GFA, WA2UWF, WA2KKJ and the many others who helped with Suffolk County Special Olympics. N2BSH upgraded to Advanced, N2CBL is now KC2OD. W2ZM is now NCS for NLI late on Thurs. New Jersey: from Jim's 180 Radio Club course taught by KE2N are KA2OYQ, KA2OYS, KA2OYT, KA2OYC, KA2PGQ. The following stations made the PSRR list for Feb: N2AKZ, WB2BNY, N2CON, KS2G, K2GCE, KA2GFU, WB2EUF has had to drop out of an active role in NLI due to family commitments but he will still be around when time permits. KS2G has added a 30 watt amp to his 2 meter H.T. for his recent trip "mobile 4" in Virginia. The following stations received Section Net certificates: W2LWB, W2LPA, K2GCE, W2DBQ, N2CON, W2AHV, KK2T is moving to a new QTH in Forest Hills, and he and his wife are expecting harmonic number one traffic: W2AHV, W2GK, 134, W2APC 36, W2APC 56, W2BDC 45, KS2G 23, K2IZ 22, KA2NMA 21, WB2IWI 13, KR2B 4, (Mar.), KR2B 11, WB2IDP 4.

NORTHERN NEW JERSEY: SCM, Robert Neukomm, KB2WI, ASCM; W5DTRZ, SEC; YB2YUF, STM; W2XD, NI; W2CC, AG2R, N2BNB, N2BOP, KA2GQK, KA2HNO, WB2IQJ, W2PSU.

| Net | Freq. | Time | Sess. | QNI | QSP |
|--------|---------|---------------|-------|-----|-----|
| NJPN | 3950 | 6 P.M. Dy | 34 | 466 | 187 |
| NJNE | 3695 | 7 P.M. Dy | 30 | 357 | 143 |
| NJNL | 3695 | 10 P.M. Dy | 30 | 264 | 101 |
| NJSN | 3735 | 6:30 P.M. Dy | 30 | 260 | 154 |
| OBTTN | 72/12 | 8 P.M. Dy | 30 | 535 | 117 |
| TCETN | 855/255 | 7:30 P.M. Dy | | | |
| NJVN | 49/49 | 10:30 P.M. Dy | 31 | 381 | 79 |
| NJRTTY | 147.51 | Autostart | | | |

W2CC announces that the New Jersey QSO Party will be held from 2000 UTC Saturday August 14 to 0700 UTC Sunday August 15 from 1300 UTC August 15 to 0200 UTC Monday August 16. Suggested frequencies: 1810, 2535, 3900, 7035, 7135, 7235, 14035, 14280, 21160, 21355, 28100 and 28610. Exchange QSO NR, RST and ARRL Section or Country (NJ stations send country). Congrats to KA2DZX on getting his General ticket. KA2MNF is now N2DJ8. WB2NQV reports a resolution has been prepared to designate the last week of June as Amateur Radio Week in New Jersey. This will be the fifth year in a row for this honor. Some of the clubs supporting the annual March of Dimes Walk-America events were: Cherryville Repeater Association, Bridgewater RACES, Harton Valley Radio Club, Sussex ARC, Penn-Jersey, Morris County, Middlesex County, District Emergency Coordinator for Monmouth County, WA7DPK, and SEC WB2VUF held an Emergency Communications Symposium to encourage better coordination between ARES, RACES, and MARS groups. Congrats to KC2MM on earning an OBTTN certificate. N2BNB reports Sussex ARC provided communications for a Riding Club Horse Show. PSRR: W5DTR, KB2HM, AG2R, W2XD, K2VX, N2XJ, KA5DLV, N2BOP, N2BNB, WA7DPK, KA2GSX, WB3HWX. Traffic: AG2R 248, K2VX 237, N2XJ 209, KB2HM 197, W2XD 164, W2RQ 72, KA5DLV 71, N2BOP 68, W5DTR 58, N2BNB 43, WB2RMJ 36, N2BLV 1, WA7DPK 25, KC2AK 23, K2GCE 28, W2CC 20, W2CC 20, W2UH 20, N2BNC 18, WB3HWX 16, W2IU 14, KA2JMH 14, WA2GKG 6, (Mar.) N2SU 23.

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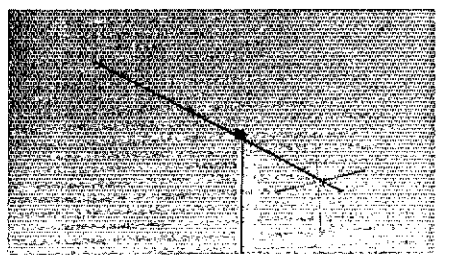
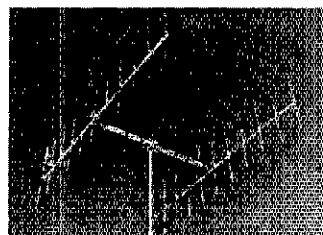
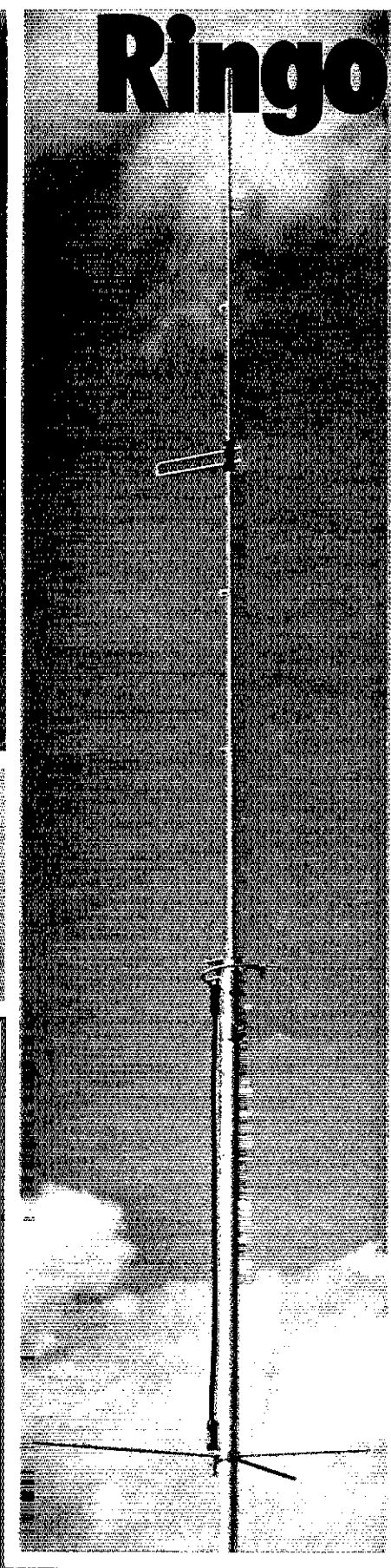
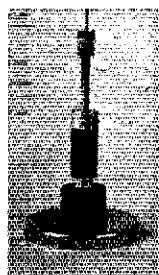
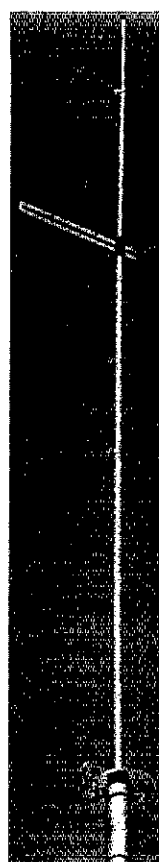
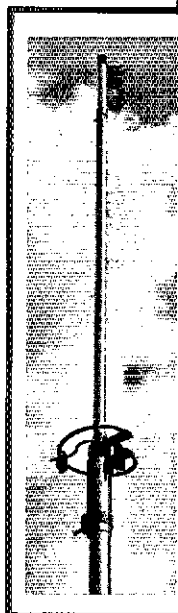
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| A147-22 | 145.5-148 MHz | 22 Element |
| 214-FB | 145.5-148 MHz | 14 Element |
| A220-7 | 220-225 MHz | 7 Element |
| A449-6 | 440-450 MHz | 6 Element |
| A449-11 | 440-450 MHz | 11 Element |

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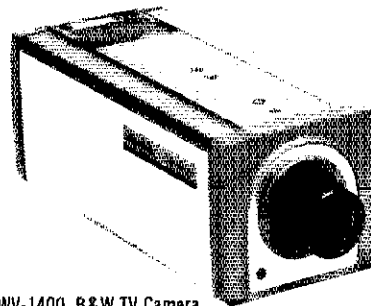
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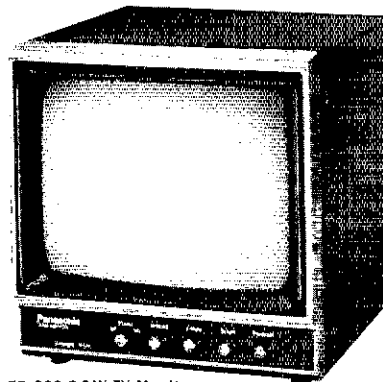
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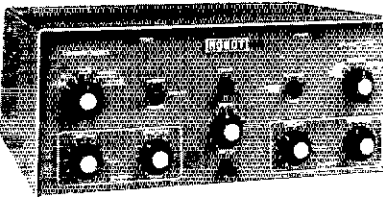


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MIDWEST DIVISION

IOWA: SCM, Bob McCaffrey, K0CY -- SEC: W0RPK. STM: KA0X. NMS: W0YLS WA0AUX W0D0H W0B0AVV. Let's have an eyeball at the National Convention, support this fine effort by CVARC. See you there. I received 7 radiograms saying they read this column, hummmmm. Ft. Dodge has new autopatch, K0JGH received good media PR for the Ottumwa SKYWARN Program. KA0X, our STM, attended Mt. Pleasant for a traffic program. Welcome to trafficker W4JL who will add to our NTS scheds. KA0LSF now Advanced; KA0LUZ and KA0LML new Generals. The ISU club, WA0KHF, sponsored a very successful VEISHA Demo. Mt. Pleasant staying on top of proposed tower ordinances. W0LFF celebrating 50 years in hamming by obtaining his WAS; at this rate, can he make all countries? PM Net will go informal for the summer. WA0GUU has a new TS-830. A0KX sporting a new IC-720. Our sincere condolences to W0YFY for the loss of his XYL.

| | | | | | | |
|-----------|-------|-----------|------|------|-----|-------|
| Net | Freq. | UTC | Days | QTC | QNI | Sess. |
| 75M Phone | 3970 | 1730/2300 | M-S | 2124 | 150 | 52 |
| ICN | 3713 | 0000 | TThS | 101 | 43 | 13 |
| TLCN | 3540 | 0030/0300 | Dy | | | |
| PM Net | 3978 | 2130 | M-F | 124 | 11 | 21 |

Some interest in RTTY net let me know. Looking for better support of the ITEN, especially during the SKYWARN season. Let me hear from you!!!! Traffic: WA0AUX 313, KA0X/AE0R 217, W0SS 170, K0GP 148, KA0JQG 133, W0D0HND 57, K0CY 55, WA0KHF 39, KA0LUZ 36, W0LUFF 28, W0BW 26, KA0ADF 26, W0B0AVV 25, KA0GBG 22, K0B0Z 20, W0VCW 16, W4JL 13, W0B0M 12.

KANSAS: SCM, Robert M. Summers, K0BFX -- SEC: W0KJL. STM: W0OYH. I guess the spring wx has arrived. The reports sure did come in rather slow this month. In fact quite a few of you must have forgotten completely! Gardening and getting restless waiting for the hamfest season to begin will be a good enough excuse, for this month only though. PSHR has not seemed to attract too many of you. Perhaps we can get W0OYH to give us more info through other channels in the near future. Net reports: KS SSB Net, KSBN, 3920 kHz, 0030Z Dy, KA0CJF, mgr. QNI 1151. QTC 107. KS Phone Net, KPN, 3920 kHz, 1245Z MWF and 1400Z S-Sn, KA0CJF, mgr., QNI 378. QTC 30. KS WX Net, KWN, 3920 kHz, 0012Z Dy, WA0LBB, mgr., QNI 320. QTC 37. KS CW Net, KCS, 3930 kHz, 0100Z Dy, W0B7EM, mgr., QNI 373. QTC 65. KS Slow Speed and Notice Net, QKS-SS, N0BDD, mgr., 3735 kHz, 0130Z MWF, QNI 50, QTC 4. The Central States Tlc Net, CSTN, (Old KS Post Office Net), 7253 kHz, 1830Z M-S and 3955 1430Z Ss, WA0OMB acting net mgr., QNI 1752, QTC 147. Bring a friend along to the hamfests this year and don't forget the National Convention in July. Traffic: W0HI 139, W0FRC 128, W0QMT 104, W0OYH 91, W0FIR 85, W0B0EN 63, W0HJ 42, W0B0LP 27, K0B0X 25, W0AM 21, W0FDJ 19, W0PB 18, KA0E 14, K0C0L 11, W0R0B 8, W0KJL 4, W0MI 2.

MISSOURI: SCM, L. G. Wilson, K0RWL -- ASCM: W0OTF. STM: KM0L. SEC: N0AJI. A hearty congrats to all the following: to WA0RVK who was honored as Ham of the Year by the Ozark Amateur Radio Society; to WA0NXX and WA0YD who just became grandparents of a new baby boy; KA0NNE and KA0NMM on new licenses; KA0LSA on new Tech, and K0S0M on new Extra. The Callaway Amateur Radio League recently published computerized beam headings in their newsletter. Great idea, fellows. The Missouri Valley Amateur Radio Club now possesses a new TS-520S and with the know-how of the clubs president, the Heart of America Radio Club's Galaxy are working better than ever. The Eastern Ozark Amateur Radio Club placed a station on the air from the Boy Scout Jamboree in Farmington.

| | | |
|--------|-----|-----|
| ACE | 38 | 2 |
| H0BN | 39 | 31 |
| MEOW | 674 | 57 |
| CMEN | 114 | 2 |
| NEMOE | 107 | 4 |
| MOSSBN | 617 | 100 |

The Kansas City DX Club participated in the Dayton Hamvention again this year with a program in the contest forum. I gave our notorious cw pile-up contest to 93 unsuspecting souls. Thanks to the guys in Ohio who keep inviting us back. We love it! Traffic: K00AS 158, W0OTF 147, W0BMA 130, K0C0L 113, K0PCK 87, K0KJ 73, W0BUD 71, K0SI 61, W0N0B 50, N0DDZ 28, KM0L 17, K0RWL 5.

NEBRASKA: SCM, Shirley M. Rice, KA0BCB -- SEC: N0AIH. STM: W00BQ. Our sympathy to friends and family of W0EWZ who became a Silent Key. Hats off to W0CCN & Alma for nice article abt QSL Bureau in JARL-News. Hastings ARC did a FB job on special event station. New Novice: KA0JF. Tech: W00KJ. Adc: W0BZY. W00AES KA0JLH. New appointments for EC: KB0VY KA0ELI WA0VU. NE Storm Net Mgr. KA0CGF replacing WA0LOY, who resigned after 16 yrs. WA0LOY received Certificate of Merit for services. N0AIH issued Certificate of Merit to W0GEQ for EC services and WA0BOK for 100% participation 1981. Congrats to W0B0GB for making PSHR in April. Hope every ARES group has a fun FD. Will be on 2M as we cross NE to and from Cedar Rapids. Traffic: W0B0GB 58, K0DKM 45, W0H0P 30, W0ZNI 23, KA0C0B 16, W0NIK 9, W0B0GWR 7, W0PCC 7, W0WKP 6, W0DJU 2.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, Pate Kemp, KA1KD -- STM: K1EIC. SEC: K1WGO. ASEC: KA1AMK K1AH.
Net Freq. Local Time QTC QNI Mgr.
CN 3640 1900/220 246 354 K1EIR
CPN 3965 1800 Dy/1000 (Sn) 87 218 W01AIU
NVTN 28/88 2130 61 270 WA1ELA
WCN 78/18 2030 70 378 W1DPR
RTN 13/73 2100 66 268 W01CPF

High QNI: CN - K1UQE W1QJM W01GXZ. With the summer upon us all ops should take a good look at their station's lightning protection system. New appointments: W1FY-0V8 W0DPR-0RS. Call changes: KA1DVS now N1CBI and N1BST now K1TD. Congrats to 0V8 W1FY who has received WAS via Satellite #64. More CT reps are needed for the New England RTTY Net. Contact W1YNE for info. The New England Emergency Net also needs our support. Contact K1BZD for details. Instructors please note that effective May 6 you now have 60 days to return Novice exams. The FCC is asking for your input on the possibility of expanding phone sub-bands and reallocation of frequencies. Make your views known. ECARA's Echo Net is back 50,538 Sunday at 0930 local time. Congrats to W1EQ who recently received his 60 year pin from the CQWA. All section appointees are reminded to contact their SCM when their

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★ SPECIALS OF THE MONTH ★

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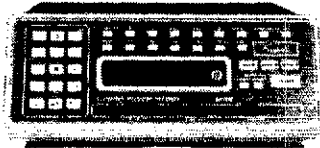


2W IN — 20W OUT

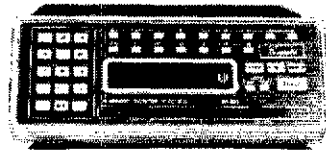
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 d) 380-514 MHz Space 12.5 kHz
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 b) 380-514 MHz 1.0uV S/N 12 dB AM a) 26-180 MHz
 1.0uV S/N dB b) 380-514 MHz 2.0uV S/N 10 dB
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 AM ... More than 60 dB at +10 kHz

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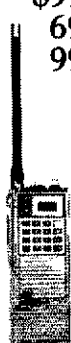
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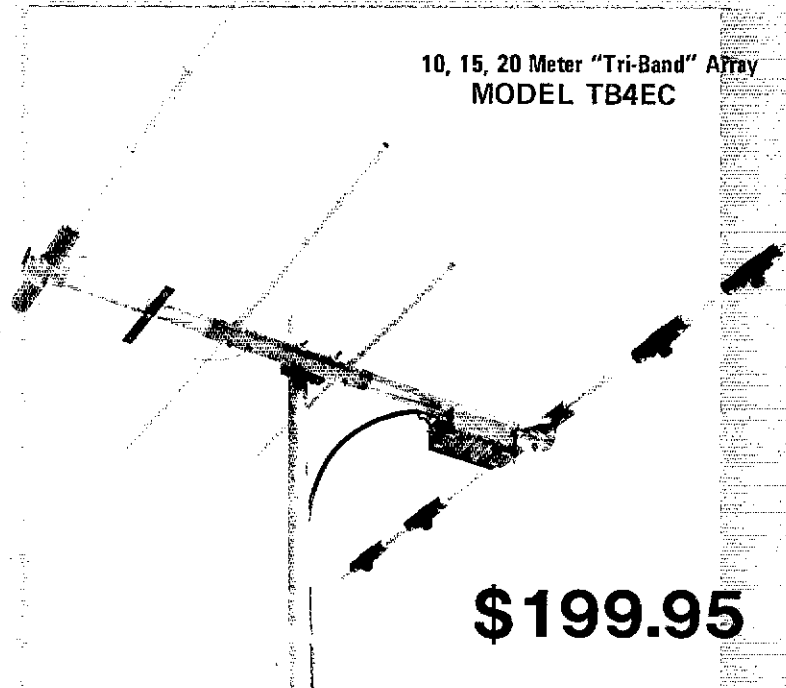


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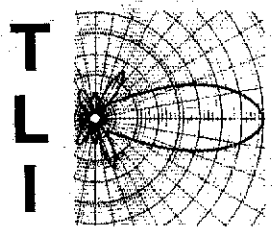
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certificates are in need of endorsement. WPKN-FM, 89.5 MHz, offers SWL program every Fri. evening at 7:00 P.M. Recent upgraders to General include: KA1GPG KA1EXB, N8AXA/1 is looking for scatter studs 6m-220. OO KA1ML is looking forward to his new tower and 4-el beam. FARA's Dogwood Festival Special Events Station was a success putting WB1CQO in the log book of many deserving operators. WB3LFG/1 and WA1GNA are keeping busy on SSTV. W1HEO has finally captured no. 40 for his WAZ. Welcome new Novices on the air: KA1IAB, KA1JLU, WB1DXZ is gearing up for 2-meter RTTY. WA1MNS active with CAP Traffic: W1EWF 242, WB1GZ 142, KA1QJ 118, WB2PJU 115, N1BPD 71, W1XX 69, KA1BHT 52, WB1CRH 48, K1UQE 46, K1EUW 45, W1BDN 41, KA1BED 27, WB9HH 23, KA1KD 17, W1DPR 10, W1CUH 7, W1QV 7.

EASTERN MASSACHUSETTS: SCM, Rick Beebe, K1PAD - STM: WA1TBY, SEC: WA1BLG, ASCM: K9HI.

| Net | Freq. | Time | loc | Dy | QNI | QTC |
|--------|-------|--------------|-----|----|-----|-----|
| EMRI | 3.658 | 1900/2200/Dy | | | 438 | 371 |
| EMRIPN | 3.949 | 1730/Dy | | | 290 | 232 |
| EM2MN | 23/63 | 2000/Dy | | | 428 | 139 |
| NEEPN | 3.945 | 0830/Sn | | | 482 | 187 |
| HHTN | 04/64 | 2230/Dy | | | 73 | 20 |
| EMRISS | 3.715 | 2030/Dy | | | 202 | 103 |

I saw many EM hams at the Deerfield (NH) Swapfest as usual. Attendance was large and the wx cooperated as usual. A meeting called by div. dir. W1HHR was held in Newton on May 1. Had an interesting talk by JH1VRQ, a new ARRL Hq. employee, who told us that 90% of JARL membership is comprised of "no code" licensees (about 750,000 hams). They have privileges below 30 MHz (except 20 meters) and max power to antenna of 40 watts. Someone asked what kind of operators they made and the answer was "no different than anyone else." This is food for thought. Quannapowitt club runs a net every Thurs at 7 P.M. on 29.1 MHz. Greater Lawrence club finished Novice class and started General class. Eastern Mass 2 Meter Net now on 144.63/145.23 and looking for liaison stations. Massachusetts club had a hands-on demo of repeater hardware by AE1P and K1RAK. Middlesex club has new diodes in the power supply which is hoped to help coverage a bit. Falmouth club celebrated 50 years of ARRL affiliation with a dinner attended by director, W1HHR, who made the presentation. W1GPO also got a nice award from the club for all of his hard work over many years on the repeater (148.055/655). Norwood club dedicated an entire meeting to the successful graduates from their Novice class. Capeway club had their annual ladies nite dinner. Wellesley club planning another big June vhf contest effort. W1EGE organizing the Mt. Equinox hill climb again this year. Honeywell 1200 radio club is participating in radio teleconferencing thru their 147.72/12 repeater. Algonquin club new officers: K1ZFH, pres.; WA1YHE, v.p.; KA1MX, sec.; WA1UDH, treas.; W1BK, act. mgr. Framingham club had its annual dinner dance. Colonial Wireless planning for Lions Club road race. Bitterica club had talk by K1DQ on the W2RQ 15 transmitter FD effort last year. They made over 11,000 contacts. Traffic: WA1TBY 514, KA1BJ 153, KA1ON 150, KA1BBU 124, WA1LPM 121, W1DK 120, N1AJJ 94, WA1DXT 80, W1DMH 78, KA1MI 74, N8TM 58, KD1B 51, W1DMH 40, KA1EMO 38, KA1GBS 38, W1ATX 32, K1BZD 18, W1CE 12, WA1FNM 12, K1LCO 4, KA1R 3. (Mar.) KA1BJ 142, W1CE 5, W1DA 2. (Feb.) W1DA 4.

MAINE: SCM, Cliff Lavery, W1RWG - SEC: K17JG. STM: AK1W, Acadia Radio Amateurs annual meeting elected: K17JG, pres.; KA3EVN, v.p.; WA7BFY sec/treas. Group is helping with display at Maine Coast Mall.

| Net | Freq. | Time | Sess. | QTC | QNI | NM |
|-------|-------|-------------|-------|-----|-----|------------|
| AN | 12/73 | 3 P.M. loc. | Sn | 53 | 57 | WA1YNZ |
| PTN | 3528 | 2300 D | | 187 | 508 | W1DX |
| SGN | 3940 | 2100 M-S | | 27 | 123 | 991 K1GUP |
| SPSN | | | | 13 | 6 | 129 KA1AVU |
| CMEN | 10/70 | 0000 | | 9 | 11 | 131 W1WCI |
| RACES | 3990 | 1230 Sn | | 4 | 2 | 52 W1RWG |

Traffic: AK1W 208, W1KX 192, N1BJW 104, W1AHM 103, W1RWG 82, W1HDC 74, K1NAN 60, KA1AVU 28, WB1E1 28, W1BMX 20, W1WCI 19, K17JG 19, KA1TJ 14, KA1GCW 12, WA1YNZ 9, KA1E1W 9, N1BME 7, KA1ENL 7. **NEW HAMPSHIRE:** SCM, Robert C. Mitchell, W1NH - SEC: AK1E. NMS: N1NH K1OSM W1VTP. The NH Slow Net new listing is Mon., Wed. and Fri. at 8 P.M. local on 3547. AK1E is NCS. Welcome all. K1M's brother Tom now KA1DN. Back from sunny California. W1GUX is more active on traffic nets. Congrats to Army, KA1HLG, the new Miss 1st of New Hampshire. W1N1JE now K1IX. KA1CGT has a new Ten-Tec Argosy. New Amherst Club officers: N1BKF, pres.; AC1J, v.p.; N1BHD, sec.; WB1DZT, treas. New Stratford County EC is K1ACL. New club officers Great Bay club are KA1GZV, pres.; N1AYT, v.p.; N1BHB, sec.; WA1PEL, treas. W1BYS back from Florida. July 11 at Manchester Airport, 3rd largest Electronic Flea Market per W1KGZ & K1WPM. Numerous rigs on 2 that scan; don't forget to indicate what frequency you're on. Deerfield was the best ever with many old and new friends meeting each other. Don't forget ARRL convention October 2-3 at Boxboro, MA. Enjoy summer. PSHR: K1M W1TN K1OSM N1NH W1BYS Traffic: W1TN 238, K1M 168, K1OSM 118, AK1E 115, K1ALN 110, K1B 89, N1KX 89, W1GUX 68, K1YMH 65, KA1IFKM 58, KB1A 56, KA1B 52, W1VTP 48, W1ALE 41, W1MHX 33, WA3BZM 24, KA1GO 12, WA1HOB 12, KA1G1J 11, KA1HUW 11, K1ACL 11, WA1PEL 8, K1HI 6, W1NH 5, W1BYS 3, N1AKS 2.

RHODE ISLAND: SCM, Gordon F. Fox, W1YNE - SEC: KA1EHR. STM: KC1G, NM RIEM2MTN WA1QSL reports 22 sess., QNI 179, QTC 27. RI Teleprinter Net had set-back due to 805 machine being kind of sick. Should be back in operation by now. Cooperative agreement with U.S. Weather Service being worked out and should be fully operational soon. Plan calls for a TTY machine and give a 2200-MHz receiver to be installed at Hillsgrove for receipt of weather observations from ARES members. Welcome back to old-time K1AOS and also new tlc handler KA1DR1. Traffic: W1E0F 419, KDK 51, KA1EHR 48, KA1EPP 41, KA1DRI 32, AETS 24, KA1SO 21, WA1CSO 14, K1AOS 9. **VERMONT:** SCM, Bob Scott, W1RNA - SEC: WB1ABO. STM: N1ARI. Sixth annual Connecticut Valley FM Assn. hamfest/flea market on Sept. 26 at King Ridge Ski area. Charlotte hamfest Aug. 14 - 15. Nice to hear the natives returning from the south back on the local airwaves again. ARES membership increasing. Anyone interested contact the SEC for detailed info. Re my previous comments on "junk" tlc. Comments ran 20 to 1 in agreement with me, and the 1 came second-hand. The others were direct. W1KRV - welcome back after being off for 20 yrs. VTN 27/105/41; VPN 47/2/5; RFD 47/7/88; Carrier

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| A50-6 50 MHz 6 Element Beam | 80.88 |
| A144-11 144MHz 11 Element | 37.00 |
| DX120 144 MHz 20 Element Colinear | 60.65 |
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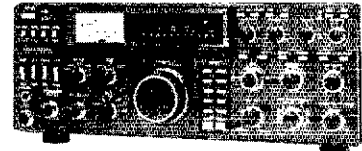
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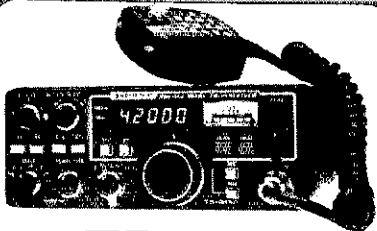
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 Power Pocket Mobile Unit for IC2A \$189

26/443/33; GMN 26/461/41; VSB 30/493/88. Traffic: K1BOB 144, AE1T 124, W1RNA 89, KA1GID 88, NIARI 68, WB1ABQ 57, W1KRV 16.
WESTERN MASSACHUSETTS: SCM, William J. Hall, W1JP SEC: WB1HH, 5TM: WJUD, AGM: W1YI. On May 1 I was privileged to again meet with NE Director, W1HR, and his cabinet of NE SCMs and Division Advisory Committee members. Purpose is to prepare Sully for ARRL Board meetings and to discuss matters pertaining to the Division. Need your input for future meetings. AB1Z reported on E. Mass. use of 145.895 alert frequency. Full report on Yankee Rowe exercise prepared by WB1HH and will be sent to QST. W1UKR returns to area with OM W1KUL to retake Monday NCS slot on WMPN after wintering in Florida. K1PUG sez his bees are keeping him busy. KA1IOV passed his Novice code test before his 10th birthday and written test right after. Proud dad, N1BZG reports that he himself worked 117 countries in 7 weeks on his 33 months after getting General ticket. Congrats to W1YK gang who held open house at WPI and earned BPL for effort. PSHR: WB1HIH K1JHC KA1T W1KK, Traffic: W1YK 308, (BPL), KA1T 301, WB1HIH 144, KA1ODC 128, W1UD 107, K1JHC 97, W1KPK 62, K1IYJ 43, KA1WV 31, K1PUG 28, KA1ZV 24, WA1OPN 20, W1JP 17, WB1ESN 7, W1ZPB 7.

NORTHWESTERN DIVISION

ALASKA: SCM, Richard Henry, AL7O - ASCM/SEC: AL7AC, 5TM: WJ7H. Congrats to KL7T on achieving PSHR. Petersburg repeater on the air 1 May on 146.35/96. South Peninsula ARC forming in the Homer area; affiliation is pending. KL7NO reporting 6M auroral reflection work into WKZL land. KL7LA/KL7JK now active on RTTY and looking for tic schedules. WJ7AU is a newly licensed YL Novice on Kodiak. A need exists for ECs in western Alaska; if interested contact AL7AW or AL7AC. KL7QF is a new OBS on Kodiak Island, NL7G doing a great job editing the ADXA newsletter. Enjoyed a recent trip to Kodiak where I had a chance to address SPARK. Traffic: KL7T 50, KL7LA 35, KL7JKW 23, KL7LO 18, KL7EKZ 12, W6SJJ 12, KL7RU 5.
IDAHO: SCM, Norman E. Spidell, K7RT - Happy to be part of the Idaho Section Team. Many thanks to W7JMH for his past work as SCM. Looking for EC volunteers who would like to work closely with SCM/SEC in a statewide effort to provide better emergency communications. Congrats to the Treasure Valley group in the Homer area; affiliation is pending. KL7NO reporting 6M auroral reflection work into WKZL land. KL7LA/KL7JK now active on RTTY and looking for tic schedules. WJ7AU is a newly licensed YL Novice on Kodiak. A need exists for ECs in western Alaska; if interested contact AL7AW or AL7AC. KL7QF is a new OBS on Kodiak Island, NL7G doing a great job editing the ADXA newsletter. Enjoyed a recent trip to Kodiak where I had a chance to address SPARK. Traffic: KL7T 50, KL7LA 35, KL7JKW 23, KL7LO 18, KL7EKZ 12, W6SJJ 12, KL7RU 5.

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NET Freq. Time Sess. QNI QTC
 Farm 3935 8 P.M. Dy 30 1720 28
 IMN 3635 8 P.M. M-F 22 184 83
 CD 3990 8:10 A.M. M-F 22 784 30
 Traffic: W7GHT 293, W7JMH 66, K7RT 12.
MONTANA: Les Belyea, N7AJ - Upgrades reported: To K7XK, K7IK, K7AD, W7DEO, W7KKK, K7ADQO, K7KIN, K7JINJ, To Gen. W7MAC WB7QCA. To Tech, KA7MAH KA7MAI. New Novice, KA7NDN. Congrats to all. The Montana Section Net meets at 1630Z for the summer on 7240 kHz. RACOM (Repeater Advisory Committee of Montana) met in Great Falls and elected: K0PP, chm; K77KB, vichm; K7B7E, sec. The Lower Yellowstone ARC cw contest winner was WB7PAP, second-N7BMR, third-WA7GVT. KD7Q from Livingston is the proud owner of a new hot-air balloon. Southeastern Montana ARC held their 27th annual Fathers Day picnic in Miles City and was very well attended. WB7BA and crew are old timers. Traffic: WB7DZX 267, WB7WVW 30, N7AIK 27, KB7SF 1.

OREGON: SCM, William R. Shrader, W7QMU - STM: W7VSE, SEC: K7AWG.
 Net Time/Day Freq. QNI QTC NM
 OCN 0230/0600Z Dy 3587 542 489 KA7ELI
 BSN 0145Z Dy 3908 950 34 W7FO
 OARES 0115Z Dy 3993.5 639 100 W7HLF
 OARES 0230Z Dy 3993.5 29 2 W7HLF
 WCN 0300Z Dy 3702 494 318 W7FRKU
 PTTN 0300Z Dy 148.76 470 62 W7LRB
 LBLARES 0300Z Dy 146.79 729 11 W7ZJU
 MPARES 0300Z Th 147.02 182 0 W7ZAF
 SOF T 0245 T 146.79 182 0 W7DU
 Pdx-ARES 0300Z Dy 147.32 188 24 K7AWV
 Late reports from March: LBARFS QNI 255, QTC 16; Linn Co. 314; MPARES 279. D. Upgrades: N7DAF (EXTRA); N7ODI N7DCC N7CGN N7A1E (Adv.); KA7JOF WB7ONA (Gen.). New calls: N7DXI K7C7O N7DUJ K7R7O KA7MQH KA7MOF KA7MQB. McMinnville AR Club is one year old. Congrats to the whole bunch. WA7KSW and WB7AWO tied the knot to share hamshacks. Annual Klamath Falls picnic July 10-11 at PPL Park in Keno. Lane Co. Ham Fair at National Guard Armory in Eugene on 17-18 July. Sunset Empire Club going full bore on Lightship project; should be operational in May. Traffic: W7VSE 632, K7GV 261, K7NB 243, W7ZB 208, N7BGG 198, WA7LGN 175, W7LNE 167, KA7ELI 165, WB7MO 89, WA7MS 95, WB7OEX 57, K7Y 48, W7TC 45, W7QMU 41, KA7AID 40, N7B7W 25, W7HLF 23, K7WWR 11, W7DAN 1. (Mar.) K7NB 195, W7DAN 42, K7VM 19.

WASHINGTON: SCM, Joe Winter, WA7RWK - ASCM: KD7G. SEC: K7SH, STM: W7GB.
 Net Freq. Time (Z) QNI QTC Sess. Mgr.
 WARTS 3970 0200 2855 270 W7SFT
 NWSSB 3945 0230 722 57 30 W7JHR
 SCARES 147.18 0330 W 29 3 4 KA7AML
 NTN 3970 1930 843 61 31 W7VL
 FWTN 146.64 0130/0530 98 63 54 WA7CBN
 PSTS 145.33 0130/0830 148 83 80 W7IEU
 WSN 3590 0245/0545 722 238 60 W7GB
 EC mtg in Yakima May 1 was well attended and productive. WA Sect. ARES adopts proposed Net RT Freq. 145.895. Please honor 24 hr. quiet time for ARES/RACES Emerg. alerting. See Feb. QST, p. 83 for story. W7JIE presents talk on Intr. Watch at BEARS mtg. and is recruiting mbrs. OOs K7GU and W7JIE are active; other OOs keeping their work secret. Clallam Co. Evergreen ARS busy on 4 walk/bike/run events. N7CT and W7BUN active as OBS. HAMS club officers: WB7AIV, pres.; WA7OJI, v.p.; KA7ETZ, secy/treas. KA7CBP reports 33 hams provided medical comms. for Spokane's Bloomsday Fun Run with 22,210 runners. AD78 heads up West'n WA Fair AR hobby booth for RCT Sep. 11-28. KYAFU assisting, lots of workers needed. 33 hams provide comms for Tacoma Walk-a-thon and 35 hams work in 5 bike-a-thon routes. Mt. Baker ARC holds awards

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 • **DUP**
 • **CALL**
 • **PRIORITY**
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 • **RIT**
 • **M-R**
 • **W**
 • **MEMORY**
 • **MIC**
 • **1kHz**
 • **OFFS WHITE**
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ICOM 290A Features

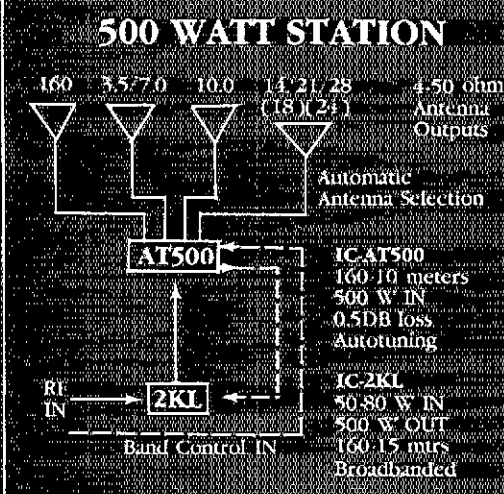
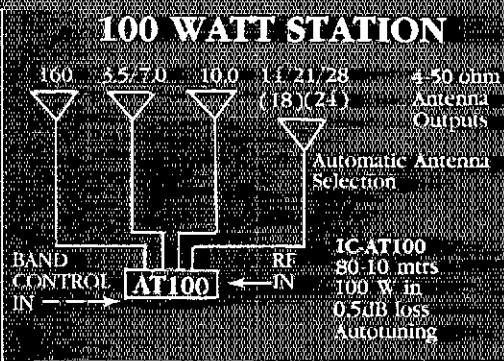
• **144MHz All Mode Transceiver**
 • **15.6kHz SSB**
 • **Stop on busy or squelch**
 • **ICOM 290A**
 • **144MHz All Mode Transceiver**
 • **15.6kHz SSB**
 • **Stop on busy or squelch**
 • **ICOM 290A**



The Systems

Custom Complete Your HF Station

| | BAND CONTROL | RF OUT | BAND CONTROL | RF OUT | BAND CONTROL | RF OUT |
|---------------------------------------|-----------------------|--|--|-----------|---------------|-----------|
| | IC-720A | | IC-740 | | IC-730 | |
| | WIDA | | WIDA | | WIDA | |
| | INSTALLED | | INSTALLED | | INSTALLED | |
| FREQ COVERAGE (MHz) | 1.8-2.0 | 3.5-4.1 | 1.8-2.0 | 3.5-4.1 | 3.5-4.1 | 7.0-7.3 |
| | 6.9-7.5 | 10.0-10.5 | 7.0-7.3 | 10.0-10.5 | 11.0-11.35 | 18.0-18.5 |
| | 13.9-14.5 | 17.9-18.5 | 11.0-11.35 | 18.0-18.5 | 21.0-21.35 | 24.5-25.0 |
| | 20.9-21.5 | 24.5-25.1 | 21.0-21.35 | 24.5-25.0 | 28.0-29.7 | |
| | 28.0-30.0 | | 28.0-29.7 | | | |
| GEN. COVERAGE RCVR | 100kHz-30MHz | | | | | |
| RCVR SENSITIVITY (10dB QUIETING) | 0.3uv | 0.15uv (w. PREAMP) | 0.15uv (w. PREAMP) | | | |
| RCVR SELECTIVITY (-6dB SSB/CW) KHz | 2.4/0.8 (PBT) | 2.4/1.3 (PBT) | 2.4 (IF SHIFT) | | | |
| RCVR SELECTIVITY KHz (-6dB CW NARROW) | 0.5 | 0.270 | 0.600 (140Hz w. AUDIO FILTER) | | | |
| PWR SUPPLY VOLTAGE | 12VDC | 12VDC | 12VDC | | | |
| ICOM SUPPLY | PS15 | PS15 OR | PS15 | | | |
| | | OPTIONAL INTERNAL SUPPLY | | | | |
| WEIGHT (lbs) | 16.5 | 23.1 (w. INTERNAL SUPPLY) | 14.1 | | | |
| SIZE (mm) HxWxD | 111x241x331 | 111x286x374 | 91x211x275 | | | |
| FILTER OPTIONS | FL32-9-0.5 | FL44-0.455-2.4 | FL30-9.0-PASSBAND TUNING | | | |
| MODEL/FREQ. WIDTH (#) (MHz) (KHz) | FL34-9-5.2 | FL45-9.0-0.5 | FL41-0.455-2.4 | | | |
| | | FL53-0.455-0.25 | FL45-9.0-0.5 | | | |
| | | FL54-9.0-0.27 | | | | |
| OTHER OPTIONS | ALL FEATURES STANDARD | MARKER (EX241) FM (EX242) KEYER (EX243) BUILT-IN POWER SUPPLY (EX238) | MARKER (EX195) EDA (EX202) CW AUDIO FILTER (EX203) TRV (TRANSVERTER SWITCHING UNIT) (EX205) | | | |



- MB5 Mobile Mount
- BC10A AC Memory Backup
- FM10 Scanning Mic (740, 730)
- SM5 Desk Mic
- HP-1 Headphone
- AH-1 Autobandswitching Mobile Antenna

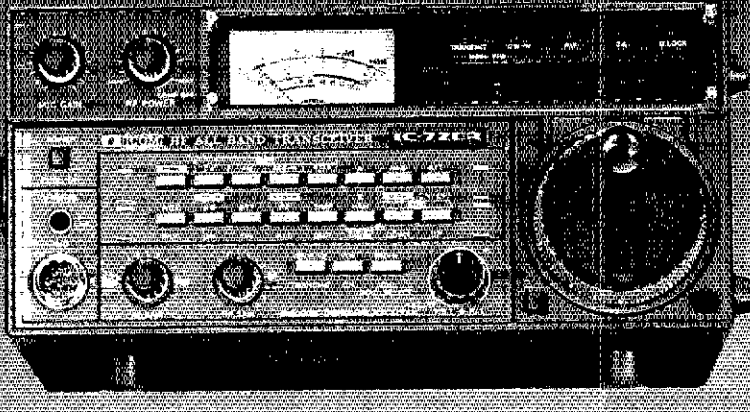
The World System

ICOM HF

Three Choices—Three Great Radios

IC-720A

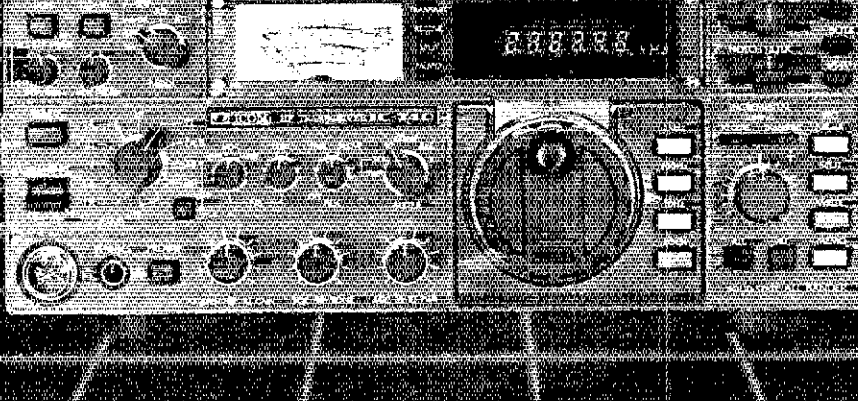
Listen to signals from around the world with a 100 KHz — 30 MHz receiver. Talk with a 160 — 10 meter transceiver ready to go. WARC-9 bands, dual VFO's — split operation, ICOM's DVM (Direct Read Mixer) passband



tuning, speech compressor, 100 watts, SSB, CW, AM, RTTY (FSK), computer compatible tuning, 12 volt operation, all features standard except CW & AM narrow filters. ICOM system accessories are available for a complete station.

IC-740

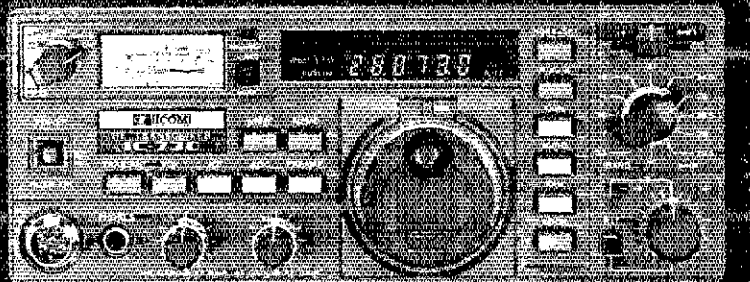
Versatility plus ICOM's newest addition to HF offers features most asked for by ham operators: 160 — 10 meters, variable noise blanker and AGC with off position, IF shift and passband tuning, automatic SSB mode



selection, notch filter, switchable CW filter, 8 memories, SWR meter, XLT, speech compressor, 100 watts and 12 volt operation. Options are FM, automatic keyer, internal AC power supply and 5 IF filters. ICOM system compatible.

IC-730

Go portable, mobile with ICOM's small HF. ICOM system compatible, 100dB dynamic range, +19.5dBm intercept point, receiver utilizing ICOM's DUAL SSB, CW, AM, dual VFO's — split operation, one memory per band, CW, SSB filter



options, 100 watts, 12 volt operation.

ICOM system. The same accessories work with all three HF transceivers — IC 2KL auto band switching broadband audio linear amplifier, AT 500 or AT 100 auto band switching auto tuning, internal meters, IC PS15 power supply, IC MIA memory backup, IC SP3 external speaker, IC MW1 beam whip, IC M11 auto band switching mobile antenna, IC MBS mobile mount and IC SM5 desk microphone (condenser type).



ICOM Presents the Minicom IC-25A

Imagine..25 watts/5 memories/2 scanner systems in a 2" H x 5½" W x 7" D 2 meter transceiver!

A very small package with a 25 watt punch, the IC-25A is a full featured FM transceiver for the space conscientious operator. Nearly the same size as an automotive AM radio, the IC-25A will fit in places usually considered impossible for a one piece 2 meter transceiver. The IC-25A is no lightweight when it comes to features:

- 5 memories. Store your favorite frequencies.
- Priority channel. Monitor your most important frequency.

- 25 watts high/1 watt battery saving low power.

- Touchtone™ mic standard, no extra cost...to work your favorite autopatch repeater.

- Full band scan/programmable scan (set your own limits)/memory scan...all with automatic resume after preset delay or carrier drop.

- 2 VFO's with data transfer standard.

- 2 tuning rates 5KHz (A VFO) or 15 KHz (B VFO)

- Nor/Rev switch for instant monitoring of repeater inputs.

- Memory back up power supply option holds memory when attached.

Actual Size.
(Clip this actual photo out and try it in your car.)



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ICOM



Food for thought.

Our new Universal Tone Encoder lends its versatility to all tastes. The menu includes all CTCSS, as well as Burst Tones, Touch Tones, and Test Tones. No counter or test equipment required to set frequency—just dial it in. While traveling, use it on your Amateur transceiver to access tone operated systems, or in your service van to check out your customers' repeaters; also, as a piece of test equipment to modulate your Service Monitor or signal generator. It can even operate off an internal nine volt battery, and is available for one day delivery, backed by our one year warranty.

- All tones in Group A and Group B are included.
- Output level flat to within 1.5db over entire range selected.
- Separate level adjust pots and output connections for each tone Group.
- Immune to RF
- Powered by 6-30vdc, unregulated at 8 ma.
- Low impedance, low distortion, adjustable sinewave output, 5v peak-to-peak
- Instant start-up.
- Off position for no tone output.
- Reverse polarity protection built-in.

Group A

| | | | |
|---------|----------|----------|----------|
| 67.0 XZ | 91.5 ZZ | 118.8 2B | 156.7 5A |
| 71.9 XA | 94.8 ZA | 123.0 3Z | 162.2 5B |
| 74.4 WA | 97.4 ZB | 127.3 3A | 167.9 6Z |
| 77.0 XB | 100.0 1Z | 131.8 3B | 173.8 6A |
| 79.7 SP | 103.5 1A | 136.5 4Z | 179.9 6B |
| 82.5 YZ | 107.2 1B | 141.3 4A | 186.2 7Z |
| 85.4 YA | 110.9 2Z | 146.2 4B | 192.8 7A |
| 88.5 YB | 114.8 2A | 151.4 5Z | 203.5 M1 |

- Frequency accuracy, $\pm .1$ Hz maximum - 40°C to + 85°C
- Frequencies to 250 Hz available on special order
- Continuous tone

Group B

| TEST-TONES: | TOUCH-TONES: | BURST TONES: | |
|-------------|--------------|--------------|-----------|
| 600 | 697 1209 | 1600 1850 | 2150 2400 |
| 1000 | 770 1336 | 1650 1900 | 2200 2450 |
| 1500 | 852 1477 | 1700 1950 | 2250 2500 |
| 2175 | 941 1633 | 1750 2000 | 2300 2550 |
| 2805 | | 1800 2100 | 2350 |

- Frequency accuracy, ± 1 Hz maximum - 40°C to + 85°C
- Tone length approximately 300 ms. May be lengthened, shortened or eliminated by changing value of resistor

Model TE-64 \$79.95



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Is this new KDK FM 2030 the best 2 meter FM radio in the world?



"...best...in the world?"

That's a pretty strong claim considering the competition.

Let's look at some of the features . . .

- KDK continues the tradition of being the ultimate in VHF FM mobile operations. We make maximum use of multiple function, multiple shaft controls and only three sets of knobs are located on the front panel. Still many new features have been added, such as digital RIT, reverse button, memory channel readout number and more!

- The new KDK 4 bit microprocessor chip has in-house developed software which makes all these new features possible. Plug in modules are used for CTCSS tone and diode matrix duplexing.

- We gave it a very heavy textured paint finish on the case and mounting bracket that is highly resistant to scratching! No more micro-thin paint finishes!

- Modern styled front panel with dials intelligently arranged so you can best utilize the multi-function, easy to handle controls.

- Good audio with the famous KDK audio output capability of 1.5 watts . . . you can't blow out our audio IC!

- RF power is a good, clean no spurious signal of 25 watts on high and 5 watts (adjustable) on low.

- Frequency coverage 143.005 - 148.995 mhz. S/N better than 35 db at 1 uv input. Better than .2 uv at 12 db SINAD. Squelch sensitivity better than .15 uv. Bandwidth at -6db: ±6khz, at -60db: ±16khz. Image ratio better than 70db. Double superhetrodyne. Transmitter uses variable reactance frequency modulation with maximum deviation set at ±5khz.

- Nicads for memory retention built in, nothing extra to buy. Disconnect the FM2030 from the power source and the memories remain!

\$309

INTRODUCTORY PRICE!
Includes Tone Pad Microphone
and all accessories. Shipping: \$5.00 eastern U.S.A. \$7.50 western U.S.A.

- Easy to use mobile mount with instant disconnect knobs for fast, simple removal. DC Cable and mounting hardware, spare fuse, external speaker plug and complete simplified instruction book includes circuit diagrams and even complete alignment instructions! No extras to purchase!

- Control functions: Select memories, show memory channel number, or select memories and show frequency of channel, or dial frequencies with two speed selectable control. Instant choice of either 5 or 100 kHz tuning steps. Programmable band scan limits and memory scan.

- Frequency shown in 5 bright LED digits. LED indicator shows when signal is received (unsquelched), LED indicator shows transmit.

- Modern LED bar meter shows signal strength of received signal and on transmit shows relative output power.

- Microphone includes tone pad, and up and down buttons to change dial frequency or memory channels.

- A standard microphone with up-down buttons only is available separately.

- The FM 2030 is basically as easy to use as a crystal receiver with rotary switch frequency selection for full "eyes-on-the-road" mobile operation.

- And, in case we forgot to mention it, we are proud to continue our famous KDK quality and ruggedness!

- Smaller case size: 55mm (2 3/16") high, 162mm (6 3/8") wide 182mm (7 3/16") deep.

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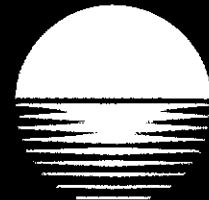
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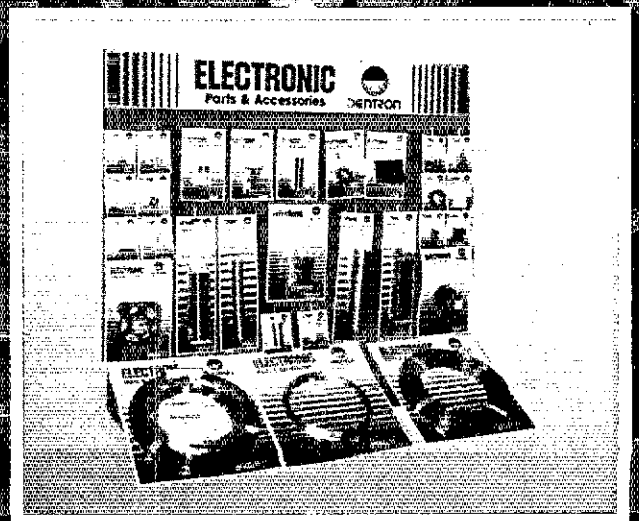
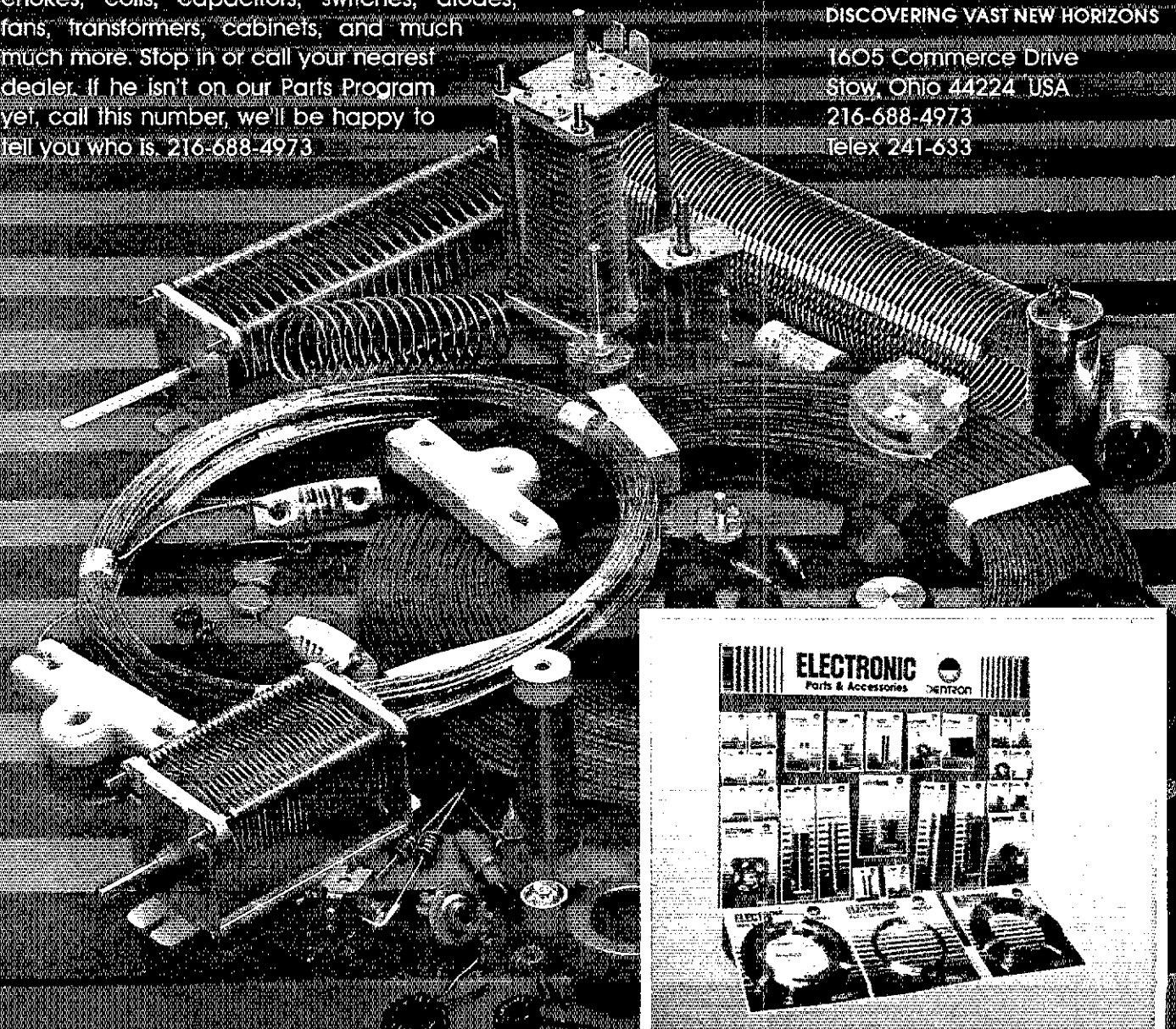
If you've ever started from scratch or done your own repair and rework, you know that finding the right parts can be a frustrating experience. Dentron has put an end to parts frustration. Our new Parts and Accessories Center brings relief to all you creative tinkers. Everything you need is right there when you need it; chokes, coils, capacitors, switches, diodes, fans, transformers, cabinets, and much much more. Stop in or call your nearest dealer. If he isn't on our Parts Program yet, call this number, we'll be happy to tell you who is. 216-688-4973



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VHF/UHF Line of the 80s FT-480R/FT-680R/FT-780R SC-1 Station Console

NEW!



- Dual VFO System for covering unusual repeater splits or separate TX/RX Frequencies during weak signal work.

- Microprocessor-controlled multimode Transceivers with three mode-optimized synthesizer step selections.
- Up-down Scanning, Priority Channel, and four Memories with Memory Scan.
- FT-480R coverage 143.5 - 148.5 MHz, FT-680R coverage 50 - 53.99 MHz, FT-780R coverage 430 - 439.99 MHz. Coverage may differ in other countries.
- Satellite operation provided using FT-480R and FT-780R. Transmit frequency may be varied while transmitting to follow Doppler Shift.

- Scanning microphone provided for instant QSY with fingertip control. YM-48 (option) provides two tone operation for autopatch work.
- Blue fluorescent display for maximum visibility.
- Red - Yellow - Green LED Signal Strength/Relative PO Meter.
- Optional SC-1 Station Console includes quartz LCD Clock, AC Power Supply, DTMF 16 Button Pad, Scanning Controls, and XCVR A & XCVR B Microphone Switching.
- Optional Accessories: FP-80A AC Power Supply, FTS-64E 32 Tone CTCSS/Burst Encoder, YM-34 Desk Microphone, YM-38 Desk Microphone with Scan Switches.

Look to the future with the most complete line of VHF Multimode Transceivers available — The Line of the 80's . . . from Yaesu!

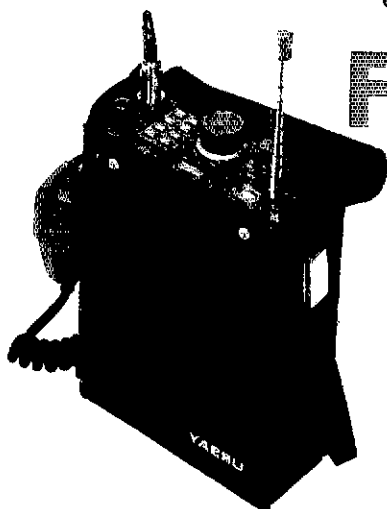
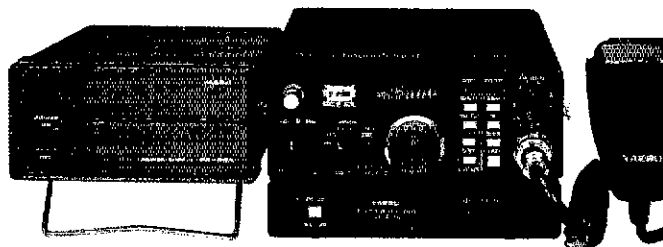
FT-290R

NEW!

2 METER MULTIMODE PORTABLE

- Completely self-contained, battery powered 2 meter multimode Transceiver with Telescoping Antenna.
- Microprocessor control for operating convenience usually found only in base station equipment.
- Dual VFO System with two synthesizer steps per mode. Use one VFO for the FM band and the second VFO for SSB, if you like!
- Ten memories, priority channel, and up/down scanning of band or memories for busy or clear channels.
- Built in Noise Blanker, RIT, Hi/Low Power Switch and Battery Condition Meter. Lithium memory backup battery with estimated 5 year life.
- Optional MMB-11 Mobile Bracket, FL-2010 10 watt Amplifier, LCC-90 Leather Case, NiCd C-Cells, YM-49 Speaker/Microphone and CTCSS Boards.

Don't miss those great DX openings this year! The FT-290R and FT-690R are ready whenever (and wherever) you are!!!



FT-690R

6 METER MULTIMODE PORTABLE

- Repeater splits of ± 1 MHz built in for FM work.
- Use with FT-290R accessories, including YM-50 16 Button Tone Encoder Microphone and NC-11B Battery Charger. Use FP-80A AC Power Supply for base station work. FL-6010 Amplifier available outside USA.
- LCD Display with night light for excellent visibility.
- 2.5 watts RF Output on SSB/CW, 800 MW Output on AM.
- Synthesizer steps optimized for mode in use.

YAESU
The radio.



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FT-ONE

A BOLD ADVENTURE IN ENGINEERING!

WORLD CLASS GENERAL COVERAGE TRANSCEIVER



- General Coverage on Receive, with Transmit capability on present and proposed amateur bands.
- All solid state for long-term reliability.
- Ten digital VFOs with A-B selection for unmatched contest flexibility.
- Keyboard frequency entry for instantaneous band change, plus fine tuning in 10 Hz steps via Tuning Dial or Scanner.
- Cascaded Filtering available for SSB and CW modes for outstanding ultimate attenuation (600 Hz and 300 Hz Filters optional).
- Full CW break-in, even crossband if you wish! Optional Electronic Keyer Board available.
- Wide Receiver Dynamic Range, specified at 95 dB in CW Bandwidth.

- PIN Diode RF Attenuator for adjustment of noise figure on noisy bands.
- IF Shift with variable bandwidth control allows you to preset IF bandwidths and passband center frequencies for maximum interference rejection.

- Audio Peak/Notch Filter for razor-sharp selectivity.
- AC and DC Supplies built in.
- One Year Factory Warranty.

- Noise Blanker using all-new circuitry with threshold control.
- RF Speech Processor for increased talk power.



FT-707

COMPACT SOLID STATE TRANSCEIVER TOP OF THE LINE PERFORMANCE, AT HOME OR AWAY!

- All Solid State, with individual Low Pass Filters for each band providing excellent Harmonic Attenuation.
- 80 through 10 Meter operation, including the new 10, 18 and 24 MHz bands.
- Variable IF bandwidth using cascaded crystal filters for excellent interference rejection and ultimate attenuation.
- Wide Receiver Dynamic Range provided by doubly-balance Diode Ring Mixer.
- Optional FV-707DM provides 12 memories with scanning in 10 Hz steps.
- CW-wide and CW-narrow Selection using optional 350, 450 or 600 Hz Crystal Filters.
- Optional FP-707 AC Power Supply, FC-707 Antenna Coupler, MR-7 Mounting Rack, YM-35 Scanning Microphone (Scan Function with FV-707DM).

The FT-707 is the ideal traveling companion, yet you need not sacrifice performance away from home. Ask your Authorized Yaesu Dealer for a demonstration today!

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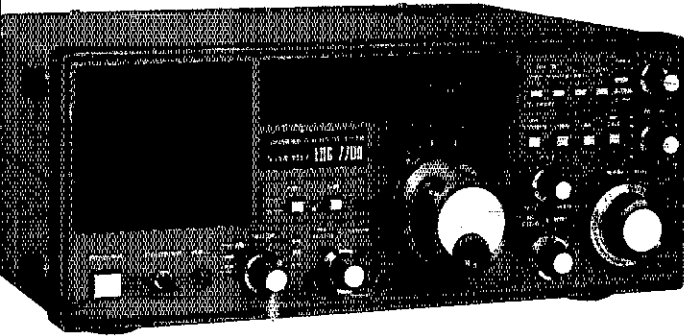


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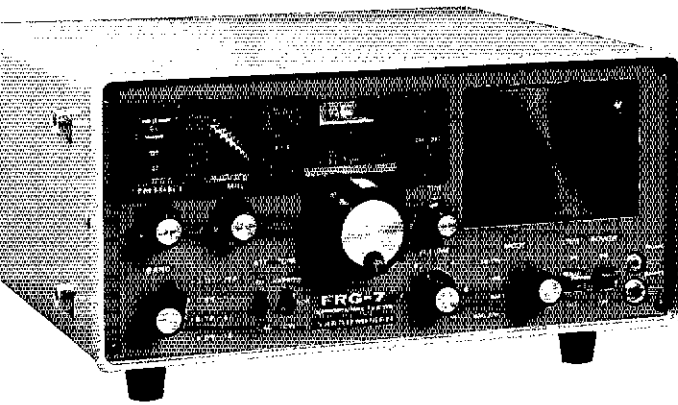
FRG-7700

DELUXE HF COMMUNICATIONS RECEIVER



- 150 KHz through 29.99 MHz coverage on AM, SSB, CW and FM
- Three AM bandwidths for changing interference conditions on crowded shortwave broadcast bands.
- Built-in Quartz Digital Clock with timer for control of station accessories.
- Tape Recorder Output Jack on front panel.

- Noise Blanker and AGC Selection controlled from front panel.
- Optional memory unit allows storage and recall of up to 12 frequencies — no more frantic dial twisting at I.D. time!
- Optional Accessories: FRV-7700 VHF Converter, FRT-7700 Antenna Tuner, FF-5 500 KHz Low-Pass Filter, DC-7700 DC Kit, YH-77 Headphones and QTR-24D Deluxe World Clock.



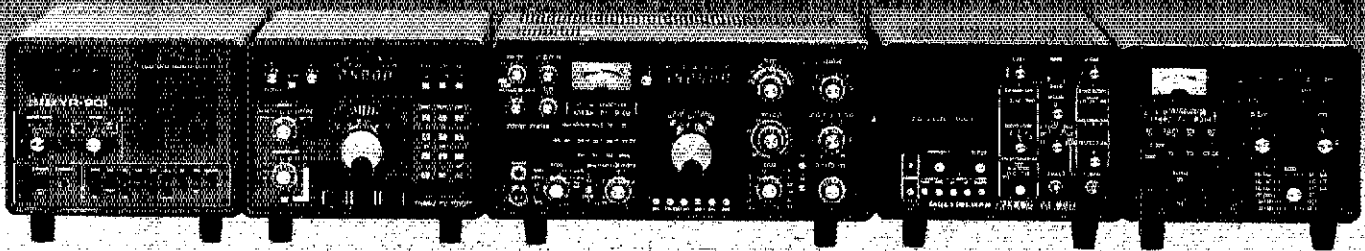
FRG-7 HF COMMUNICATIONS RECEIVER

- Top-selling Shortwave Receiver provides high performance at a reasonable price.
- 500 KHz - 29.99 MHz using Wadley Loop Synthesizer for excellent stability.
- Audio Filter for enhanced reception under difficult conditions.

- Built-in Tunable Preselector for excellent out-of-band interference rejection.
- Front panel Tape Recorder Jack plus Headphone Jack.
- Dial Lamps may be switched off for reduced power consumption.

FT-101ZD MK III

COST-EFFECTIVE DX PERFORMANCE!



- 160-10 Meter coverage on SSB and CW. AM or FM Unit may be added as optional accessory.
- Variable IF bandwidth, using cascaded crystal filters for excellent interference rejection.
- Audio Peak/Notch Filter for razor-sharp selectivity.

- CW Wide-Narrow Selection using optional 350, 450, or 600 Hz CW Filter.
- RF Speech Processor and Adjustable-Threshold Noise Blanker are built in.
- Worldwide Power Capability provided by Multi-Tap Power Transformer, covering 100/110/117/200/220/234 VAC.

- Rugged 6146B Finals with RF negative feedback.
- Optional Accessories: FV-101DM Scanning VFO with 10 Hz Synthesizer and Memory, FTV-901R VHF/UHF Transverter, FC-902 Antenna Coupler, SP-901P Speaker/Patch, DC 101Z DC-DC Converter, FA-9 Cooling Fan, complete line of Microphones.

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FT-230R: QUITE A SIGHT! (AND EASY TO SEE, TOO!!)



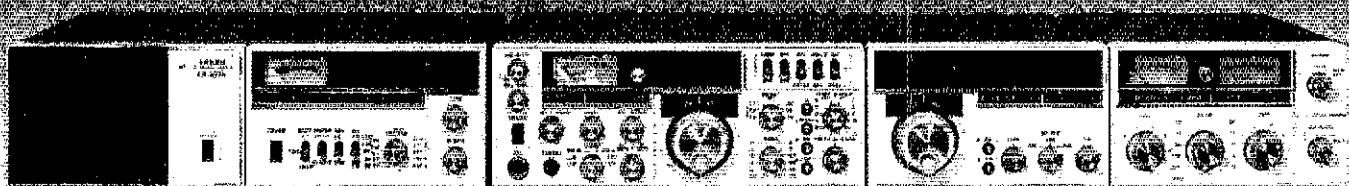
- LCD five-digit frequency readout with night light for high visibility day or night.
- Two VFOs for quick QSX across the band.
- Ten memory slots for storage and recall of favorite channels.
- Selectable synthesizer steps (5 kHz or 10 kHz) in dial or scanning mode.
- Priority channel for checking a favorite frequency for activity while monitoring another.
- Unique VFO/Memory Split mode for covering unusual repeater splits.
- Up/Down band scan plus memory scan for busy or clear channel. Scanning microphone included in purchase price.
- Full 25 watts of RF power output from extremely compact package.

**Two Meter Mobile Rig
with an easy-to-read
frequency display**

- Built-in automatic or manual tone burst.
- Optional synthesized CTCSS Encode and Encode/Decode boards available.
- Lithium memory backup battery with estimated lifetime of five years.
- Optional YM-49 Speaker/Microphone and YM-50 DTMF Encoding Microphone provide maximum operating versatility.

FT-107M SOLID-STATE HF TRANSCEIVER

**BROADBAND PERFORMANCE
FOR EASE OF OPERATION**



- All Solid State, 160-10 Meter Transceiver equipped for SSB, CW, FSK and AM operations.
- 12 Frequency Memory System with Digital Memory Shift providing scanning capability. (Scanning Microphone optional).
- Excellent VSWR Turndown Characteristics: 75% Power Output at 3:1 SWR.
- Variable IF bandwidth using Cascaded Crystal Filters, Audio Peak/Notch Filter built in.
- Diode Ring Mixer for strong IMD performance. Low-Noise Premix Crystal Local Oscillator.

- Digital plus Analog Frequency Counter Readout. Digital Display utilizes true frequency.
- Built-in RF Speech Processor and IF Noise Blanker.
- Choice of optional internal or external AC Power Supply.
- Optional 350, 450, and 600 Hz CW Filters.
- Optional Accessories: FV-107 External VFO, FTV-107R VHF/UHF Transverter, FC-107 Antenna Coupler, SP-107P Speaker/Patch, SP-107 Speaker.

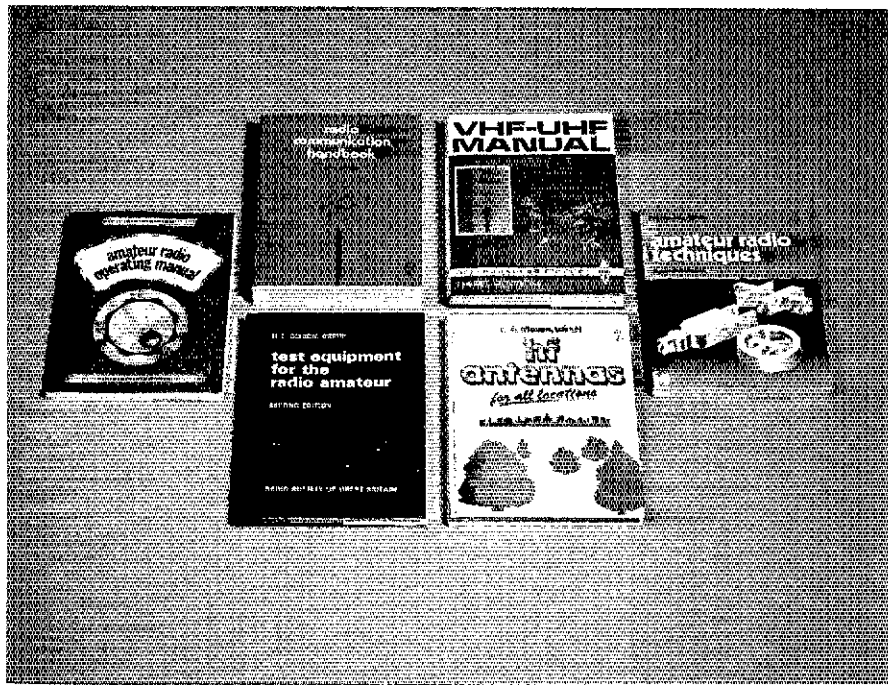
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PUBLICATIONS FROM THE RADIO SOCIETY OF GREAT BRITAIN

VHF-UHF MANUAL by Dain Evans, G3RPE and G.R. Jessop, G6JP. You will find the *VHF-UHF Manual* jam-packed with practical theory and construction projects for the region above 30 MHz and extending into microwave regions. In fact there are 70 pages contained in the microwave chapter alone! Receivers and Transmitters for these bands are covered in 181 pages. The balance of this 349-page book contains chapters on Propagation, Tuned-circuits, Space Communications, Filters, Test Equipment, Antennas, and a handy Data section. (Since this is a British publication, there is little coverage of the 6-meter band, but many of the 4-meter band projects can be adapted by the experienced amateur for use on 6-meters.) 3rd Edition. Copyright 1976. Hardbound \$17.50.

AMATEUR RADIO OPERATING MANUAL by R.J. Eckersley, G4FTJ. Get the British side of operating. Besides such chapters as Setting Up a Station, Operating Practices and Procedures, DX, Contests, RTTY and Mobile, Portable and Repeater Operation, the reader will find information in the Appendices most useful. There are continental and regional maps which show the prefixes assigned to each area and listing of countries showing ITU callsign allocations, callsign systems for each country, notes on foreign amateur operation, address of licensing administration and the name and address of the National Amateur Radio Society. 189 pages. Copyright 1979. 2nd Edition. Softbound \$10.00.

AMATEUR RADIO TECHNIQUES by Pat Hawker, G3VA. Contains 800 diagrams and 364 pages of circuit ideas and devices which the author has gathered during 22 years of writing the *Technical Topics* columns in *Radio Communication*. It is not a text or handbook, but an idea book — RSGB's version of ARRL's *Hints and Kinks*, but on a larger and more in-depth scale. Copyright 1980, 7th Edition. Soft cover \$12.50.

TEST EQUIPMENT FOR THE RADIO AMATEUR by H.L. Gibson, G2BUP. A great addition to the library of the Radio Amateur who builds his own equipment. Beside covering measuring techniques, you will find a wealth of test equipment which you can build yourself. Construction projects range from simple dummy loads and attenuators to a 150 MHz digital frequency counter and timer. You will find simple signal sources for 1296 and 2304 MHz and 10 GHz. Chapter titles and number of pages devoted to each: Current and Measurement—23, Frequency Measurement—23, Wavemeters—19, RF Power Measurement—9, Aerial and Transmission Line Measurements—9, Noise Measurements—8, Components, Valves and Semiconductors—12, Signal Sources and Attenuators—12, Oscilloscopes and Modulation Monitors—8, Power Supplies—3, and Reference Data—8. Copyright 1978. 2nd Edition. Hardbound \$11.00.

HF ANTENNAS FOR ALL LOCATIONS by L.A. Moxon, G4XN. Contains 264 pages of practical antenna information. This book is concerned primarily with small wire arrays, although construction information is also given on a small number of aluminum antennas. Chapters include: Taking a New Look at hf Antennas; Waves and Fields; Gains and Losses; Feeding the Antenna; Close-spaced beams; Arrays, Long Wires, and Ground Reflections; Multiband Antennas; Bandwidth; Antenna Design for Reception; The Antenna and Its Environment; Single-element Antennas; Horizontal Beams; Vertical Beams; Large Arrays; Invisible Antennas; Mobile and Portable Antennas; What Kind of Antenna; Making the Antenna Work; Antenna Construction and Erection. Copyright 1982, 1st Edition, Hardbound \$12.00.

RADIO COMMUNICATION HANDBOOK 5th Edition. You probably have the ARRL *Radio Amateur's Handbook* in your library. Now you can have a second source of authoritative radio frequency and electronics information at your fingertips. Contains 23 chapters (778 pages); Principles, Electronic Tubes and Valves, Semiconductors, HF Receivers, VHF and UHF Receivers, HF Transmitters, VHF and UHF Transmitters, Keying and Break-in, Modulation Systems, and RTTY, Propagation, HF Aerials, VHF and UHF Aerials, Mobile and Portable Equipment, Noise, Power Supplies, Interference, Measurements, Operating Techniques and Station Layout, Amateur Satellite Communication, Image Communication, The RSGB and the Radio Amateur, and General Data. Now in one paperback volume. Copyright 1982, \$22.00.

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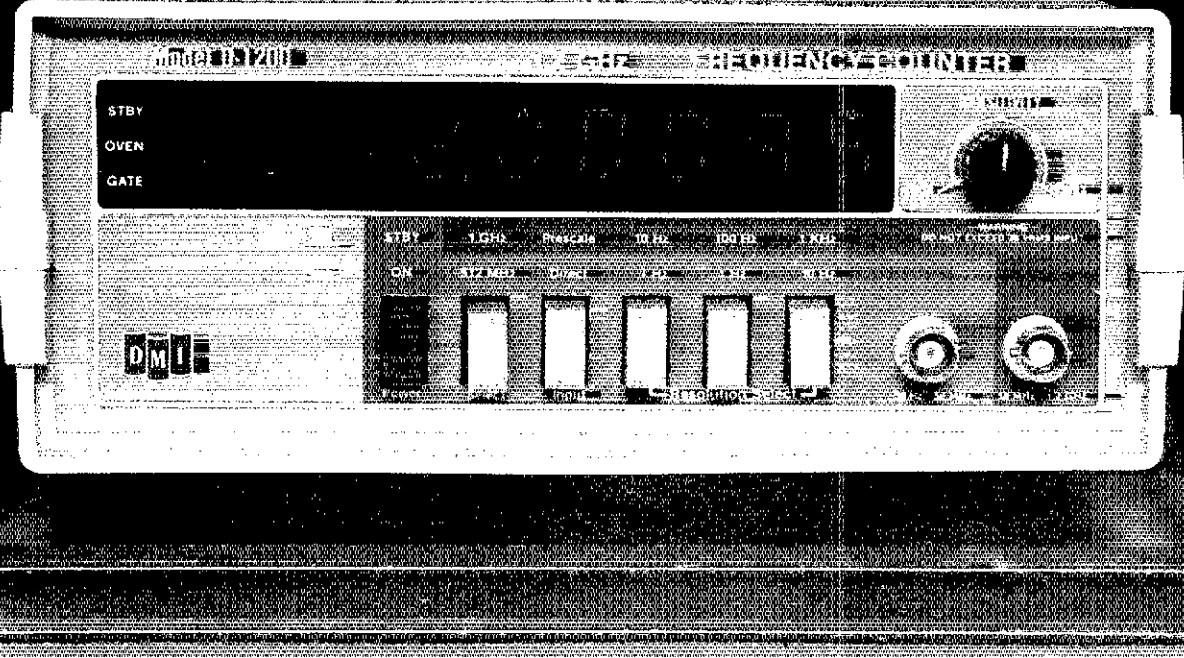
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 to 1 GHz — the 500 series includes a .1 PPM (17° to 35°C) TCXO —
 combined with the compact size and portability when a BAC-9
 rechargeable battery pack is added. The 500 series becomes the
 perfect addition for any tool box, car, boat, or ham shack — plus
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 MHz, 10 Hz to 500 MHz, and the D510 will resolve 10 Hz to 1 GHz.
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| MODEL | PRICE | FREQUENCY RANGE | ACCURACY OVER TEMPERATURE | READ OUTS | SENSITIVITY TYP. | | POWER REQ. |
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| D500 | \$149.95 | 50 Hz-512 MHz | .1 PPM 17°-35°C TCXO | 5 | 75 to 50 MV | 20 to 50 MV 50 to 100 MV 1 GHz | 8-15 VDC 300 MA AC-12 PEO-FOH 110 VAC |
| D510 | \$179.95 | 50 Hz-1.0 GHz | TIME BASE | 5 | 75 to 50 MV | 16 to 80 MV 80 to 75 MV 1 GHz | 8-15 VDC 300 MA |
| D612 | \$399.95 | 50 Hz-1.2 GHz | .1 PPM 20°-40°C PROPORTIONAL | 5 | 75 to 50 MV | 16 to 80 MV 80 to 75 MV 1 GHz | 8-15 VDC 300 MA |
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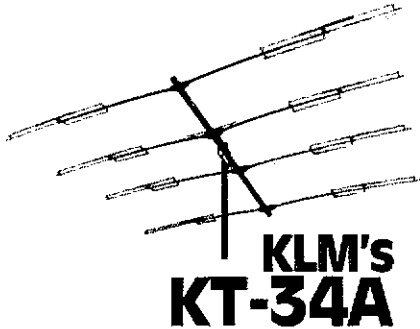
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banquet. 12 hams run comms for MOD Walk-a-thon. RA of Skagit Co. provide AF display at SAR exhibit in Skagit Val. Mall; KB7NR and WA7MSQ provided the PR from WWDXC. W7YF suggests trying for 3 major JARR awards: All Japanese Dist's (AJD), Japan Century Cities (JCC), Worked All Japan (WAJA). Get the list from JARR. WWDXC now 650 mbrs strong. Clark Co. ARC (W7AIA) Fort Vancouver Hamfair a huge success. AEP7 WB7FDE N7BEY et. al. head up to Mt. St. Helens OSC Party, operating W7AIA from Clark College. WB7NAU rpt. KA7MYW a 5th grader is now a ham. Congrats Adams. Lower Col. ARS W7DG awards WB7UUP "Ham of the Year." Congrats Ray. LCARA buys a new Kenwood TS830. W7ZHZ receives ARRL DX award for 300 countries. 25 LCARA hams work the walk-a-thon & bike-a-thon. Hundreds of ARES mbrs. and other hams worked on nearly 89 bike-a-thon routes and many walk-a-thons in the section; final count not yet in. Activity is high and growing in other public serv. events. Your help is needed, so see your EC or club chairperson. Congrats to new ORSs K7BFL KR7F and N7DNG. W7FJZ upgraded and is now K57I. We shall remember W7GMC and WB7ALV, now SKs. The Yakima Hamfest was a fine event. Traffic: W7DZX 186, WB7WV 81, WB7QF 28, K57I 237, N7ARY 228, K7GZX 199, K7JW 180, N7CSP 157, W7LG 156, KR7F 126, W7GB 119, WA7BDD 118, W7HNA 116, N7DNG 93, K7CTP 82, W7IEU 74, NTANE 70, WA7JEB 59, W7BUN 39, N7DDP 28, KC7NA 25, K7BFL 24, W7APS 14, W7ERH 8, K7OZA 6, K7OXL 5. (Mar.) W7ERH 7.

PACIFIC DIVISION

EAST BAY: SCM, Bob Vallo, W6RGG — ASCMs: W6ZF N6DHN VE2AQV/W6. SEC: W6LKE. Congrats to N6BA on his 15th BPL and 6th straight PSHR appearance. Don is also new STM of EB. Welcome to new NM W6VOM. Two NTS Nets looking for more check-ins are DFNB, 7276 at 1045 and 1530 local time, and NCN, 5850 at 1900 local time with a slow speed session at 2030 local time. Alameda County RACES provided communications for the March of Dimes Superwalk in Alameda, Fremont, Hayward and Oakland. W6BSQ coordinated the 25 members and 6 volunteers who made it happen. LARK is planning for FD; their "Klutz-of-the-Month" for April is WD6GTP. MDARC's auction was a great success. They are tackling the CATV RFI problem head-on and have been most successful in their dealings with their local CATV company. SBARA held their 1st annual "Cork Pop." Those who remember what happened say it was a great event. EBARC members very active in public service events. Their members KA8ICI and KE8NI recently upgraded. HARC's latest Novice class had 13 students under the direction of WD6CAZ. Traffic: N6A 619, WB6UZX 27.

NEVADA: SCM, Ralph E. Covington, W7SK. SEC: WA7KCD. ASCM: KA7Q. STM: W7BS. Tri Club swap meet in Reno on 13 June at Davis Creek Park was a great success. W7BS reportedly under the weather but with sun and clear skies we should see him up and back to par. K7WLY still doing fine job as western Nevada Emergency Coordinator. Look for him each Thursday evening on 01/81 at 7:30 P.M. with the emergency net in Reno. W7SK attending Fresno hamfest. W7CKH still conducting Elmer classes in Henderson. We are saddened to learn of the passing of W7LHQ. Nevada Sagebrush Net weeknights 7 P.M. Pacific time on 306 kHz. Traffic: N7AKX 376, W7BS 43, W7BKO 11, W7CX 4, W7SK 4.

PACIFIC: SCM, Army Curtis, AH6P — SEC: KH6B. ECs: Hawaii - AH6K, Kauai - KH6S, Maui - KH6I, Oahu - KH6NP, Guam - KH6ITL, Aloha and hapa ada to all of the Pacific. Maui's new autopatch is up and working and giving the Maui folks a chance to test their keypads. The Maui repeater did a fine job supporting communications for the Super Walk America. The recent RIMPAC military exercise resulted in some very interesting cw on the top end of 20 meters, believed to come from the Russian ship monitoring the exercise. AH6J used the Kulani autopatch to report an auto accident. We still need stations to handle traffic on phone, cw, RTTY or ??? Please contact me to find out how you can help. Traffic: KH6JJP 54, AH6K 1.

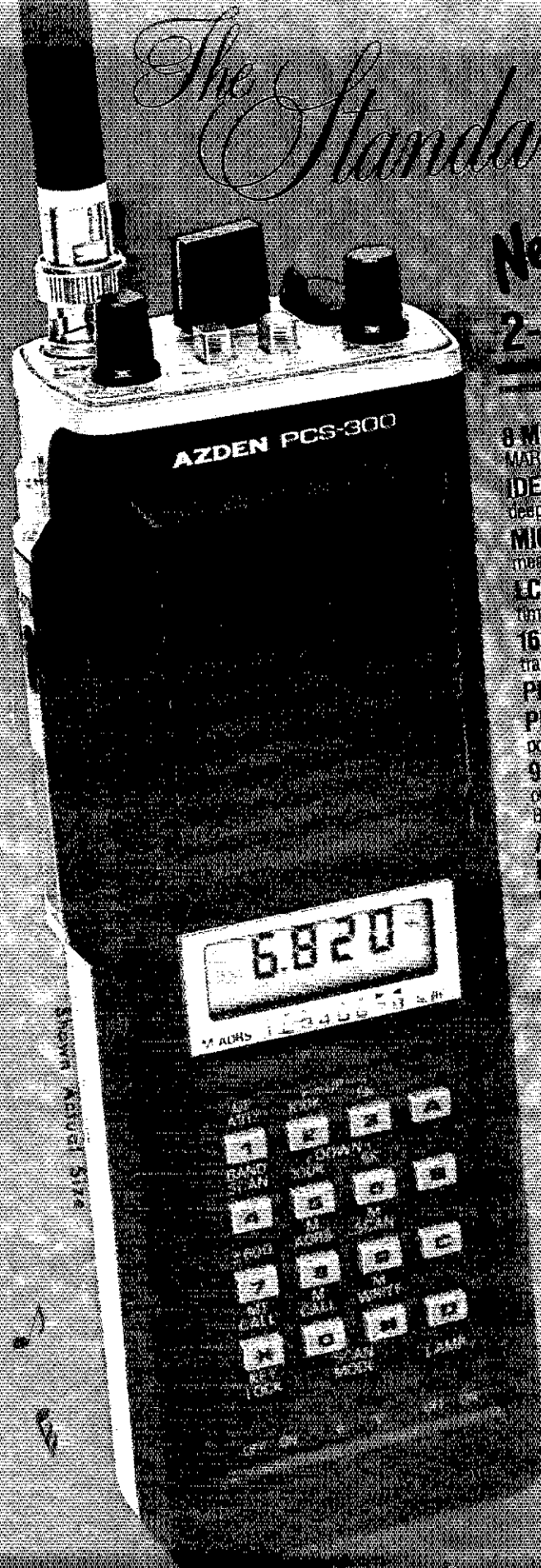
SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — SEC: N6AUB. ASCM: K16T. Over 1000 attended the 10th annual Sacramento Hamfest by the North Hills RC. Welcome to KC7IW6, the new EC for Nevada Co., and the newly formed Amateur Radio Emergency Service of Nevada Co. Congrats to N6CJZ on his Advanced ticket and N6AUB on making PSHR. The Shasta Cascade ARS meets on the 2nd Sat. of the month at 7:30 P.M. at the Financial Savings and Loan in Redding. Sacramento ARES and others provided communications for the Sacramento Hobile-Cat Fleet 17 Breakaway Regatta at Folsom Lake. Yolo Co. ARES provided communications for the Davis Petal Push. SHARP (Sacto. Sheriff) conducted a successful search for a lost child in Rancho Cordova. W6HNA demonstrated satellite TV at the meeting of the Sacramento ARC. Traffic: N6AUB 74, W6RSP 20, N6EPG 4, KE8NO 3.

SAN FRANCISCO: SCM, Bob Smith, NA6T — Humbolt ARC and FWRA provided communications for the Kinetic Sculpture Race. W6BZUC will provide a slide presentation about her work at Palmer Station in KC4 land at the May MARC meeting. MARC and SCAR operated military stations for Armed Forces Day. VOMARC is testing the MPU controller for their 10M rpt. Sonoma's breakfast meetings sound like fun, re: W6KTT. W6BUBA won the Homebrew Contest at SCAR. New alerting system for RACES in Sonoma Co. is being tested. SCM will speak on CATV at May SFRC meeting. TMX to N1AL and the SCAR for the help in Sonoma Co. CATV battles. Keep listening on 145.250 MHz and report interference to the CATV committee. See you all on FD at the Redwood County Contest Club Traveling Field Day Show from Mendocino Co. Traffic: W6NL 458, W6IPL 192, K6TP 113, W6RNL 66, K6TJW 83, W6BRT 25, W6GGR 9, NA6T 9, W6MJT 4.

SAN JOAQUIN VALLEY: SCM, Charles McConnel, WBDPD — SEC: WA8YAB. STM: N6AWH. ASCMs: W6TRP K6YK NF6K. Endorsements: EC WA6DZV, OO W6BBLV N6YD. New officers of the San Joaquin Net are: W6WHM, mgr.; K6IFL, sec.; WA6OVE, asst. sec. The net meets Mon. - Sat. on 3918 kHz at 6 P.M. The Fresno ARC is raising money for a 220-MHz repeater. KA6CYN KA6REC KA6SHA and KA6SWP are Tech. N6AWH is Adv. K6BYA is Extra. KA6REC now N6GPN. K6CBS and W6ZNL have DXCC. W6DPD has WAZ. N6FLK has an TS-120S. N6GJN has a TR-8000. WA6OVE has an FT-101X. K6BBI is working DX. More activity is needed on NCN from the SJV. NCN meets nightly on 3830 kHz at 7 P.M. and 8:30 P.M. local time. This is the Section Net for the SJV. Plan to attend the ARRL Pacific Division

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New AZDEN® PCS-300 2-M Handheld FM Transceiver



8 MHz COVERAGE • 142 to 149.995 MHz in 0.05 MHz steps, including CAP and VARS.

IDEAL SIZE & WEIGHT DISTRIBUTION • 7.5" high by 2.5" wide by 1.4" deep, 1.4 lbs.

MICROCOMPUTER CONTROL • All frequency operations are done by means of a microcomputer keyboard with additional keys.

LCD DISPLAY WITH TIMED LAMP • Draws minimal current. Lamp times out automatically after 20 seconds.

16 KEY AUTOPATCH • Keyboard works as a touchtone pad while transmitting.

PL TONE SWITCH • Actuates optional subaudible tone module.

PROGRAMMABLE "ODD SPLITS" • Transmit and receive in any possible frequency combination. Heter in seconds.

9 CHANNEL MEMORY WITH SCAN • Eight addressable channels and one externally accessible up/down channel retain frequency and standard offset. Backup drain is a scan 10 microamps.

AUTOMATIC INCLUSIVE OR EXCLUSIVE PROGRAMMABLE BAND SCAN • Limits may be reset in seconds. Scans either inside or outside the limits.

BUSY AND VACANT SCAN MODES • Scan for either an occupied or empty frequency.

KEYBOARD LOCK • Prevents accidental change of frequency or scan status.

TRANSMIT LOCK • Avoids unintentional transmission.

DIGITAL S/R/F AND MEMORY ADDRESS METER • Shows relative signal strength on receive, relative power on transmit. Also shows memory address.

HIGH OR LOW POWER • 5 watts high, 1 watt low. Low power is continuously adjustable from 0.5 to 1 watts.

TRUE FM • Not phase modulation. Uncolored audio quality.

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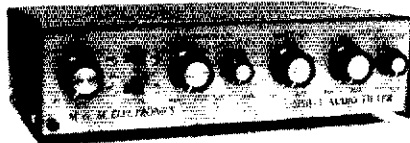
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Convention in October in Santa Cruz. Traffic: 9A9WH 103, WA6YV 44, WD6FRS 14, WD6PD 9, W6SX 9, WA6JDB 5.

SANTA CLARA VALLEY: SCM, Jettie Hill, W6RFF — SEC: W6BZF, STM: W6ZRJ. W6BOTS busy with NCN and RN6 but will have moved to AZ by now. WVARA had W6BHP to talk on "How-To of Emergency Communications" and K6AEP spoke on "Slow Scan TV." KA6PXV and K6BTB are moving to Germany. K6JHK is the new sectyreas for Gabilan ARC. GARC will provide communications for the Gilroy Garlic Festival. K6GK (ex-K6GVL) now an extra and will go thru another call change. K6AYB lost his antenna in a high wind. FARS held their annual "Homebrew Night." N6BT spoke before PAARA on "Contesting-CW Operating techniques." Memorex ARC decided not to operate Field Day, but to start plans early for next year. W6YBV and W6KZJ very active on NCN, RN6 and PAN. W6ZRJ published another issue of NCN Relay. W6KZJ, W6BOTS, W6YBV and K6YKG made NCN Honor Roll on cw. Northern Calif. Net meets at 7:00 and 8:30 P.M. local on 3630 and at 7:30 on WA6EUI/R on 145.41 — 600. W6PKB is new trustee for SLAC ARC. Guest speakers at SCCARC were W6SZN, A6G and N6TV who covered the COVW DX Contest, 1981, at the SCCARC. New members: W6GKJ, W6GKJ, K6BMP, K6KMG, W6QL, WA6REH is now K6TKR and moved to Washington. New public service chairman for SCVRS is K6AAOV and new members are N6G5, KD6KB, K6KOH, W6NCO, WA6VOG. The OOS group was busy with communications for the Santa Clara County Bike-A-Thon. LERA ARC heard a talk by WA6WEB on Micronet. WA3ZLK is now K6LL. On July 1 the new SCM will take office, so please send your activity reports to him. A copy of all club bulletins also should be sent to the new SCM. Club bulletins should also be sent to me as Vice Director and to W6ZM. Traffic: W6KZJ 232, W6YBV 217, W6BOTS 77, W6RFF 33, (Mar.) W6KZJ 158, W6ASH 16.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Ian C. Black, WD4CNR — STM: W4EAT. SEC: NB4L.

| Net | Time | Freq. | Sess. | QTC | QNI | NM |
|------|------------|-------|-------|-----|------|--------|
| CMN | 1245Z | 3.927 | 30 | 193 | 698 | W4EAT |
| CN | 0100/0400Z | 3.574 | 58 | 343 | 571 | AB4S |
| JFKN | 2330Z | 3.923 | 29 | 120 | 871 | WB4WII |
| THEN | 0130Z | 3.923 | 30 | 183 | 1097 | WA4OBR |
| CSN | 2300Z | 7.115 | 29 | 35 | 193 | KA4AUR |

Hope everyone as proud of our section as I am. More vhf nets, active and reporting; more ARESes, more forming and busy; EC program going on; and reports of club activity pouring in to this QTH. If this keeps up I'm gonna need a new secty. Only kidding D.A. A major fire in Hazlewood, N.C. gave a newly formed ARES group a chance to go into action. And what a job they did! KA4JZZ NCSed the crew for 8 hours or so while they provided comms for various county agencies during phone outage and mass evacuation. Well done all. Walk-a-thons and bike-a-thons monitored this month by many clubs. Understand KD4PJ and co. gonna monitor the wx next time. Does a microwave oven dry out a handheld? New newsletters here this month: High Point ARC; Smokestack from W4ARS. Apparently not all members of High Point Club own books so they're having a club meeting place out of Cattlemans Assn. bldg. Western Carolinas Smoke Test had ads, tech articles, good art work and all this in living color. W2JDB sent us a radiogram from The Roanoke Valley ARC. That group monitored a walk-a-thon that raised \$15,000 for various church organizations in the area. A new DX Bureau chief in Charlotte K4MQG; good luck, Gary. Thought nobody every read these columns. Apologies to WB4WII and K4FTB for misplacing their tlc totals last month; just wanted to see if you were paying attention fellas. Traffic: WD4AT 349, WD4CNR 314, KD4PJ 285, WB4WII 185, W4EAT 158, AB4S 138, NB4L 118, WA6SRD 95, WA4OBR 89, KU4W 82, NT4K 74, WB4CYN 60, WD4LRG 60, WA4OJU 49, KA4KJ 44, N4CJ 39, N4CYG 37, K4IWW 32, NE4J 29, NC4M 28, KC4M 27, WD4LO 25, KA4LKF 20, W4RVE 16, KZ4A 11, W6PJS 11, KA4ATK 10, K4FTB 9, WD4HTE 8, WD4EQ 5, N4CCK 4, NJ4L 2. (Mar.) NJ4L 16.

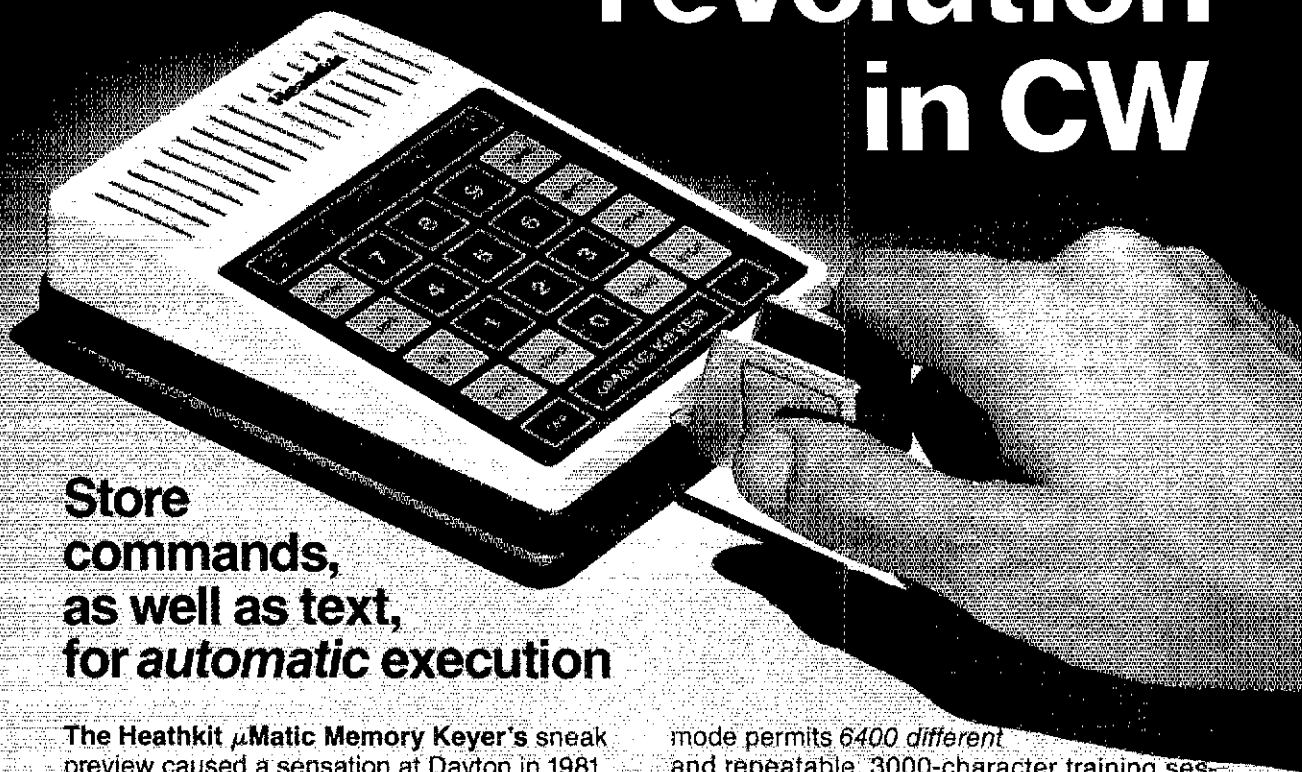
SOUTH CAROLINA: SCM, Jimmy Walker, WD4HLZ — ASCM: WB4UDK. SEC: K4SUG. STM: WA4NK. NMS: K4PFC KC4LA KA4AUR. A salute to W4MTK for the time he has devoted to the section. Let's keep the momentum going. Spartanburg ARC commanded by March of Dimes "WALKATHON." The Greater Pee Dee Severe Weather Net reports tornado to National Weather Service. SCSSB Net roster mailed to all members. K4LRM and W4DFI looking for photos to include in the SCSSB scrap book. Good to see everyone at Greenville Hamfest. Checkin/traffic: SCSSB 1282/122, SC Noon Time 310/81, CN 571/343, Blue Ridge 2165/95, Greater Pee Dee 1013/112, Western SC 450/30, York County ARES 295/48, Newberry County ARES 77/6. Traffic: K4ZN 186, W4ANK 184, KA4AUR 128, K4ZB 75, W4FMZ 67, W4NTO 82, KA4LRM 54, K4FRX 42, WA4MIY 24, WB4UDK 18, NN4N 15, K4LYN 11, N4EE 2, W0RT 1.

VIRGINIA: SCM, Phil Sager, WB4FDT — ASCM: K3RZR, STM: KY4K. SEC: WB4UHC. Chief OO: W4HU. Chief OVS: N4CD.

| Net | Freq. | Time | Mgr. |
|------|-------|-------------|------------|
| V5BN | 3947 | 6 P.M. | W4NWM |
| V5N | 3705 | 6:30 P.M. | K4JNK |
| VN | 3880 | 7 & 10 P.M. | K4JSTW3ATQ |
| VLN | 3947 | 10:15 P.M. | WD4ALY |

Virginia amateurs! If an emergency or disaster should strike your city or town, do you know how your communications abilities can best be utilized? Do you know who your local emergency coordinator is? Do you know how to efficiently handle formal written messages? If your answer to any of the above questions is "no," then take a few minutes off from your ragchewing, DXing, building or whatever and learn about the Public Service aspects of Amateur Radio. First, you should join the Amateur Radio Emergency Service by registering with your local Emergency Coordinator. The name and address of your local EC can be had by writing me, ARRL HQ, or our SEC, WB4UHC. If you want to learn how to handle formal written messages, check in to one of the above nets and ask the net manager (NM) for further information. There are also many two-meter traffic nets in the state. Congrats to K4VVK new VSN net manager. Correct a sentence in last month's column to read "N4YE and N4EBU are each getting married." WD4LY coaching Little League. K4FD new president of Northern Virginia Radio Club (W4PAV). All clubs should invite Bill Grenfell, W4GF, to give his talk on pioneer Amateur Radio. Bill demonstrates a working spark-gap transmitter in his presentation. Remember the Berryville hamfest August 8, and the VA State Convention in Virginia Beach October 9-10. Traffic: K4JST 456, W3ATQ 381, WB4PNY

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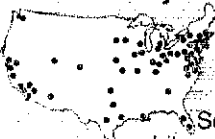
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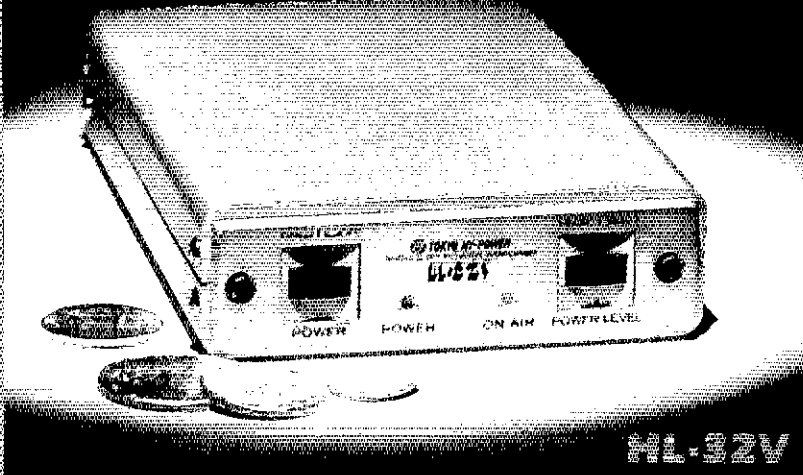


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362, NN4I 304, WA4CCK 263, WA4LJ 259, WD4ALY 253, WD4FTK 228, K3RZR 189, K2AK 150, KA3DTE 133, KY4K 132, K4KDJ 124, KA4JUM 114, WB4FDT 108, K4JM 108, W4UQ 98, W4YO 98, W4NWM 88, WB4KIT 87, NW4O 86, K0JH 83, WB2RBA 86, W4HIR 60, W3BBN 58, KB4OG 51, W4LXB 49, KC4HN 46, NT4S 41, AA4AT 40, K4VWK 36, W4NFA 34, WA1VRL 32, KB4PW 31, WB4KSG 30, K4RC 29, N4EPO 25, W3BBO 25, KA4JXZ 24, NT4U 23, WB4MAE 19, N4EBU 18, WB4ZTJ 17, KB4WT 16, W4PVA 13, WB4DQZ 12, WB4ODZ 12, WB4RWY 12, NC4B 10, N4BLX 9, K4MLC 9, N4LFC 9, W4LHC 9, W4FAT 7, W4OKN 7, WB2OMZ 7, W4AVS 7, W4ADU 5, K4WV 5, W4DM 4, W4TZC 3, WA4EQW 1, N4YE 1. (Mar.) WD4FTK 285, WB2RBA 97, KB4PW 44.

WEST VIRGINIA: SCM, Karl S. Thompson, K8KT — SEC: K8QEW. STM: K8RG. Rpl. Coord.: K8LG. TSAC's annual hamfest July 25 at Wheeling Park. WV state ARRL Conv. July 3-4 at Jackson's Mill. KFC planning to operate FD from Lick Knob again this year. K8HAL now Gen. and active on phone nets. K8ZM N8LW K8BS WD4ALW N8DTN K8RWF K8MLP K8NUN assisted the American Lung Assn. in the Clean Air Classic. Net times local.

| Net | Freq. | Time/Day | QNI | OTC | Sess. | Mgr. | |
|-----------|--------|----------|-----|-----|-------|--------|------|
| WVFN | 3990 | 6:00 | 542 | 104 | 30 | K8MHR | |
| WVFN | 3567 | 7:00 | 108 | 38 | 28 | K8DX | |
| WVMD | 3587 | Noon | 515 | 37 | 30 | WB7FP | |
| WVNN | 3730 | 6:15 | 53 | 25 | 23 | WDBLDY | |
| WV 6M | 51.150 | 8:00 | 139 | 2 | 27 | K8CGU | |
| Hillbilly | 14.290 | 1600Z | Sn | 141 | 15 | 4 | W8YP |
| KFC 2M | 87/47 | 8:30 M | 73 | 15 | 4 | WD4KHL | |
| KARC 2M | 28/88 | 8:30 Sn | 90 | 1 | 4 | WD8AEW | |

Traffic: K8DG 81, K8QEW 46, N8AJC 34, K8KT 33, K8MHR 32, K8GHF 30, WB7FP 25, K8CQR 22, K8CB5 11, N8CFX 9, W8CKX 7, K8IBO 7, K8ZM 6, W8CAL 4.

ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Lawrence E. Steime, W0ACD — SEC: K3PJU. STM: W0AIT. NMs: W0HXB W0LAE W0AIT W0EJD W0ARYL. The month of April was a very busy month for the amateurs of Colorado Section. Approximately 170 operators provided communications for the 9 Health Fair where 51,488 Colorado residents received free health check ups; among these 32,559 had blood tests taken at a very minimal cost. This is the 3rd year that Amateur Radio operators gave of their time to provide needed communications for this public service event. The March of Dimes and Mile High Marathon was assisted by many amateurs as well. The Colorado Council of Amateur Radio Clubs has available a number of printed circuit boards and box kits for the double duckie direction finder from July 81 QST. These were donated by one of the amateurs and can be made available to interested amateurs of Colorado. These little directional antennas are useful in helping to find stuck microphones, Fox Hunts, and unknown signals. Nets: HNN 30 sess., QNI 1603, QTC 141, INF 213, QNF 1174, Columbine 29 sess., QNI 1126, QTC 116, INF 243, QNF 1162, CWN 30 sess., QNI 205, QTC 199, QNF 686. Traffic: W0HJZ 1472, W0WYX 1336, N8BQP 750, W0ACH 888, W0ACD 332, K0DJ 323, W0EJD 313, K8QZ 190, W0AIT 140, W0LAE 115, W0NFW 27. (Mar.) N0CX 248.

NEW MEXICO: SCM, Joe T. Knight, W5PDU — SEC: W5ALR. STM: K5UJ. RMs: W5UNO K5LI W5VFO. Southwest Net (SWN) meets daily on 3583 at 1930 local and handled 208 msgs with 223 stations in. New Mexico Roadrunner Net (NMRRN) meets daily on 3939 kHz at 0100Z and handled 85 msgs with 1075 stations in. New Mexico Breakers Club meets daily on 3939 kHz on 0630 local and handled 81 msgs with 853 checkins. Yucca 2 Mtr Net, 147.78/18, handled 32 msgs with 754 checkins. Caravan Club 2 Mtr Net, 147.68/06, handled 6 msgs with 88 checkins. Sorry to report the passing of W5DMT, NM state policeman and active participant in many SAR missions. NM Bean Feed was a huge success. Our congrats to MVARC. Good to have K9FGM our Div. Dir. and W0ACD as CO SCM. At the Bean Feed. Traffic: W5DAD 350, K5UJ 253, K5DUV 154, W5JOV 96, K5LI 81, W5ENI 72, W9OBV 48, W5MIY 14.

UTAH: SCM, Leonard M. Norman, W7PBV — SEC: W7BZJ. STM: W7COX. W1MU at West Yellowstone, August 6-7-8, 1982. Advance information available from K4KRC, tel. 1-208-358-8742. K4KRC, K4KRC in on 34-94, 28-88 and 3935. OARC meets regularly third Wednesday each month. KB7XO pres.; W8TRWL, v.p.; N7CVB, sec.; K7SDN, treas.; W7ADK, 1st dir.; W8KP, 2nd dir.; W7FVQ, equipment mgr. N7ARE N7DBD and W7BZB organized a group to provide communications for the March of Dimes Telerama between the Osmond Studios in Orem and other locations in the SLC valley. UARC operates two 2M repeaters W7RFT, soon to become W7SPR, operating on 18/78 from 7.5k Lake Mountain east of Orem. W7SPR operating on 01/81 from 9k Farnsworth Peak 20 east of Murray. Traffic: K7HLR 181, W7KHE 165, W7MEL 91, W7UJP 18, W7BZJ 17, W7COX 12, W7PBV 10.

WYOMING: SCM, Dick Wunder, W7WFC — SEC: W7EIN. STM: W0OGH. Congrats to Sweetwater ARC for the fine club newsletter that they publish, W7TK is home recovering from surgery and getting fine. Recent upgrader includes W7LW, W7LW, W7LW, W7LW to Advanced; K7HCO K7HOU to General; K7ADB to Tech.; K7JMO K7DNE to Novice. Congrats to all. WY Cowboy Net held 22 sess. with 691 QNI, 17 QTC. WTN held 29 sess. with 155 QNI, 100 QTC. WY Jackalope Net held 26 sess. with 567 QNI, 3 QTC. WTN is progressing very nicely and W0OGH would like to encourage everyone to check in and bring your traffic to this net. Traffic: W7NHH 210, W0OGH 172, W7LCF 149, K7TFW 88, K7SLM 64, N7DIL 20.

SOUTHEASTERN DIVISION

ALABAMA: SCM, H. H. Wheeler, W4IBU — SEC: N4DMA. STM: W4AIZ. ASCMs: N4DRV KA4WVU. Congrats to N4DMA on excellent article, "The Three Seasons of January," which appeared in May GST. I'm sure none of us will forget the first couple of weeks in January very soon. New club officers around the state are as follows: KD4ZO is now prez. of the Cullman club. The Selma club reports KE4HI as prez., N4CCR as v.p., N4GRN as Sec., and KA4CFY as treas. The Birmingham Club elected new officers, effective in July, as follows: WD4IE, prez.; KC4LV, 1st v.p.; KE4ID, 2nd v.p.; WA4BHS, 3rd v.p.; KA4GR, sec.; KA4GR, treas.; W4RNP, Dir.; W4YD, pub. dir. I believe there might be a benefit if a council of clubs were organized in our state. I also agree with the STM, W4AIZ, that statewide 2-meter coverage is possible. It may require two, three or four more repeaters to fill the gaps between the north and south. Enjoyed meeting y'all at the Birmingham Hamfest. If I missed

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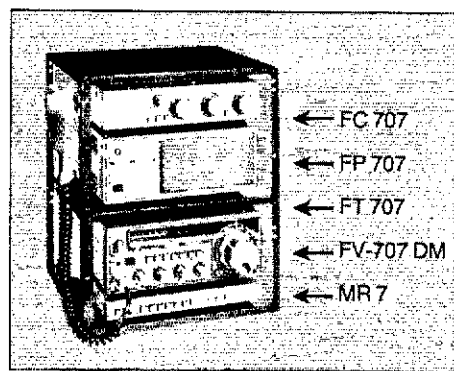


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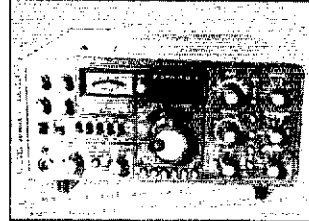
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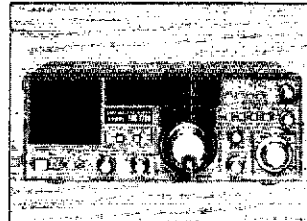
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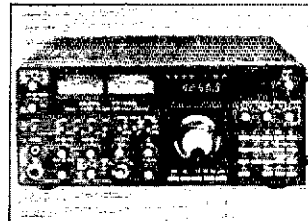
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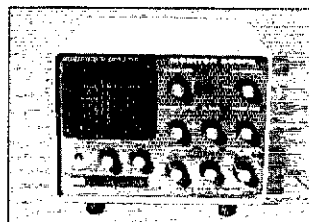
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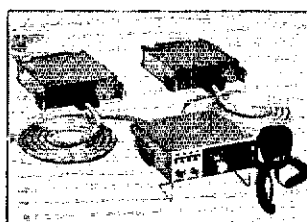
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LIST 320.00
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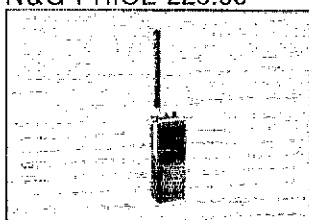
FT-290-R 2-METER
ALL MODE LIST 399.00



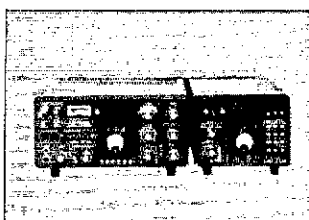
FT-720 SYSTEM
U.H.F. - V.H.F.



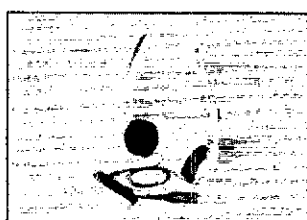
CW-RTTY SYSTEM
YK-901 LIST 175.00
YR-901 LIST 730.00



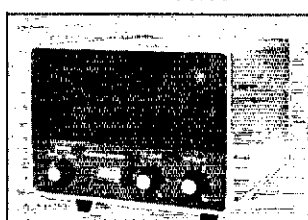
FT-208 R FT 708-R
LIST 359.00



FT-101 ZD-III LIST 925.00
FV-101 DM LIST 359.00



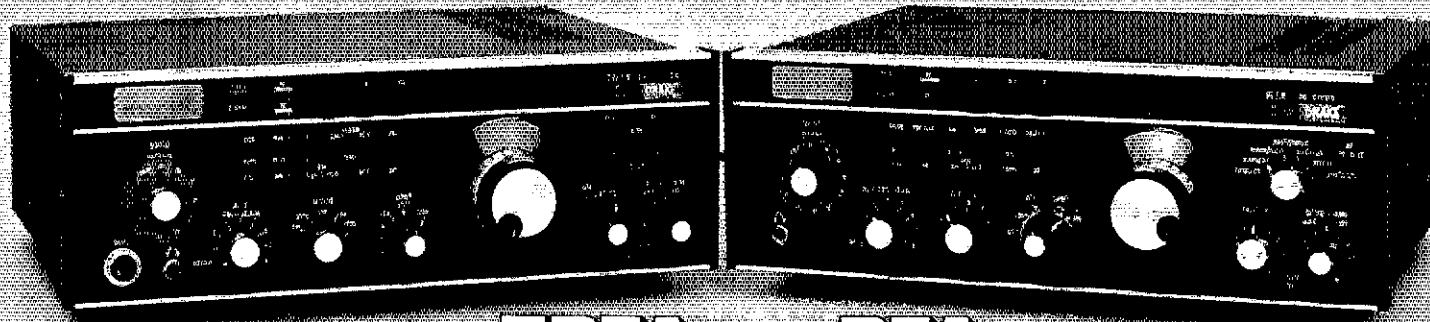
YH-77 HEADPHONE
LIST 15.00



SP-101 PB LANDLINER
N&G PRICE 75.00

ALL PRICES ARE SUGGESTED RETAIL PRICES • PLEASE CALL FOR QUOTES.

The ultimate team...the new **Drake "Twins"**



The **TR7A** and **R7A** offer performance and versatility for those who demand the ultimate!

TR7A Transceiver

- **CONTINUOUS FREQUENCY COVERAGE** — 1.5 to 30 MHz full receive coverage. The optional AUX7 provides 0 to 1.5 MHz receive plus transmit coverage of 1.8 to 30 MHz, for future Amateur bands, MARS, Embassy, Government or Commercial frequencies (proper authorization required).

- **Full Passband Tuning (PBT)** enhances use of high rejection 8-pole crystal filters.

New! Both 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity are standard, plus provisions for two additional filters. These 8-pole crystal filters in conjunction with careful mechanical/electrical design result in realizable ultimate rejection in excess of 100 dB.

New! The very effective NB7 Noise Blanker is now standard.

New! Built in lightning protection avoids damage to solid-state components from lightning induced transients.

New! Mic audio available on rear panel to facilitate phone patch connection.

- **State-of-the-art design** combining solid-state PA, up-conversion, high-level double balanced 1st mixer and frequency synthesis provided a no tune-up, broadband, high dynamic range transceiver.

R7A Receiver

- **CONTINUOUS NO COMPROMISE 0 to 30 MHz** frequency coverage.

- **Full passband tuning (PBT).**

New! NB7A Noise Blanker supplied as standard.

- **State-of-the-Art features** of the TR7A, plus added flexibility with a low noise 10 dB rf amplifier.

New! Standard ultimate selectivity choices include the supplied 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity. Capability for three accessory crystal filters plus the two supplied, including 300 Hz, 1.8 kHz, 4 kHz, and 6 kHz. The 4 kHz filter, when used with the R7A's Synchro-Phase a-m detector, provides a-m reception with greater frequency response within a narrower bandwidth than conventional a-m detection, and sideband selection to minimize interference potential.

- **Front panel pushbutton control** of rf preamp, a-m/ssb detector, speaker ON/OFF switch, i-f notch filter, reference-derived calibrator signal, three agc release times (plus AGC OFF), integral 150 MHz frequency counter/digital readout for external use, and Receiver Incremental Tuning (RIT).

The "Twins" System

- **FREQUENCY FLEXIBILITY.** The TR7A/R7A combination offers the operator, particularly the DX'er or Contester, frequency control agility not available in any other system. The "Twins" offer the only system capable of no-compromise DSR (Dual Simultaneous Receive). Most transceivers allow some external receiver control, but the "Twins" provide instant transfer of transmit frequency control to the R7A VFO. The operator can listen to either or both receiver's audio, and instantly determine his transmitting frequency by

appropriate use of the TR7A's RCT control (Receiver Controlled Transmit). DSR is implemented by mixing the two audio signals in the R7A

- **ALTERNATE ANTENNA CAPABILITY.** The R7A's Antenna Power Splitter enhances the DSR feature by allowing the use of an additional antenna (ALTERNATE) besides the MAIN antenna connected to the TR7A (the transmitting antenna). All possible splits between the two antennas and the two system receivers are possible.

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



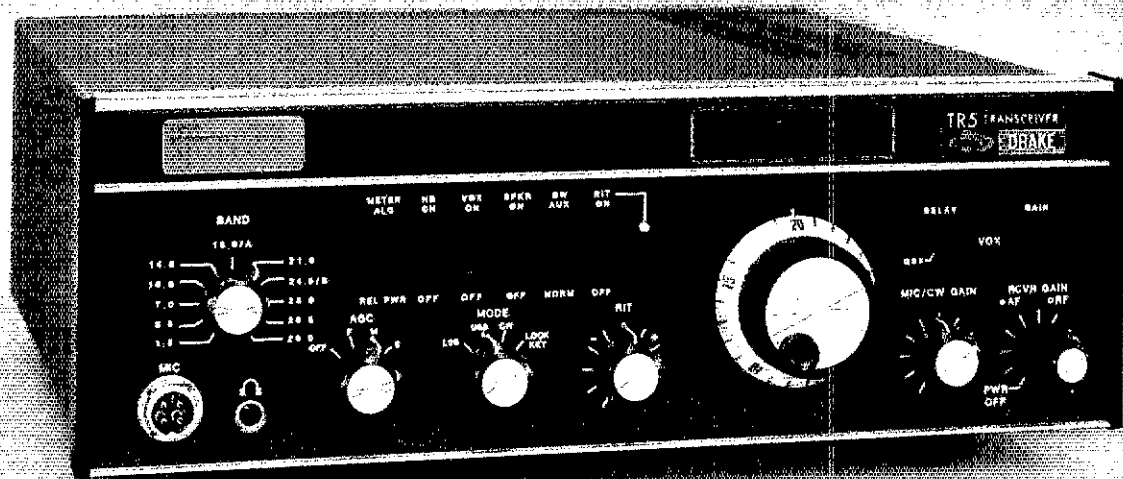
See your Drake dealer or write
for additional information.



COMING SOON: New RV75 Synthesized VFO
Compatible with TR5 and 7-Line Xcvrs/Rcvrs

- Frequency Synthesized for crystal-controlled stability • VFTO (Variable Rate Tuning Oscillator*) adjusts tuning rate as function of tuning speed
- Resolution to 10 Hz • Three programmable fixed frequencies for MARS, etc. • Split or Transceive operation with main transceiver PTO or RV75

New Drake TR5 Transceiver



far above average!

COMING SOON:
RV75 Synthesized VFO
featuring the Drake "VRTO"

- Frequency Synthesized for crystal-controlled stability
- VRTO (Variable Rate Tuning Oscillator*) adjusts tuning rate as function of tuning speed.
- Resolution to 10 Hz
- Three programmable fixed frequencies for MARS, etc.
- Split or Transceive operation with main transceiver PTO or RV75

* Patent pending

With the new TR5
versatility and value are spelled D-R-A-K-E...

DYNAMIC RANGE

The dynamic range of the TR5 is unexcelled by any transceiver in its class. The TR5's greater than 0 dBm third order intercept point (85 dB two-tone dynamic range) at 20 kHz spacing can be achieved only by the use of a passive diode-ring double balanced mixer. Drake was the first to bring this technology to the Amateur market with a high-level mixer in the TR7.

RELIABLE SERVICE

When you purchase a TR5, or any Drake product, you acquire a product of the latest production techniques, which provide reliable performance.

Yet with a product as sophisticated as one of today's transceivers, after-sales service is a must. Ask any Drake owner. Our Customer Service Department has a reputation second to none.

ACCESSORIES

Drake is the only Amateur Radio manufacturer who offers a full complement of accessories to satisfy almost every desire the HF Amateur may have. This wide selection allows any operator to assemble a station which meets his needs, and assures compatible interfacing and styling instead of a desk full of equipment with a variety of styling and poor operation as a system.

KILOWATT AMPLIFIER

Everyone wants to be heard! The accessory L75 and its 3-500Z (1200 watts PEP input) and a decent antenna will do the trick. This rugged self-contained amplifier/power supply will put the TR5 on an even footing with the best of them.

ENGINEERING

The TR5 and all Drake Transceivers, are backed by the best in engineering. The TR5 is the result of an extensive engineering effort, combining proven past techniques and ideas with new state of the art concepts.

As a result, the TR5 will not be superseded by a new model every six months. It represents a true radio communications value that will provide many years of operating enjoyment.

See your Drake dealer
or write for
additional information.

R. L. DRAKE COMPANY



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

Features, availability and prices subject to change without notice or obligation.

Still More Usable Antenna For Your Money...

PLUS 30 Meters!

That's right, Butternut's new Model HF6V offers you more active radiator on more bands than any other vertical of comparable height at any price. The HF6V's exclusive Differential Reactance Tuning™ circuitry lets the entire 26-foot antenna work for you on 80/75, 40, 30, 20 and 10 meters, and a loss-free linear decoupler provides full quarter-wave unloaded performance on 15 meters. Better still, the HF6V can be modified—without surgery—for the remaining WARC bands when the time comes. Here are just a few of the features that make the HF6V the ideal WARC antenna for your new WARC station:

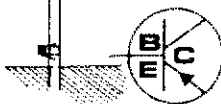


- ★ Completely automatic bandswitching 80 through 10 meters, including 30 meters (10.1—10.15 MHz); 160 through 10 meters with optional TBR-160 unit
- ★ Retrofit capability for 18 and 24 MHz bands.
- ★ No lossy traps to rob you of power. The HF6V's three resonator circuits use rugged HV ceramic capacitors and large-diameter self-supporting inductors for unmatched circuit Q and efficiency
- ★ Eye-level adjustment for precise resonance in any segment of 80/75 meters, including MARS and CAP ranges. No need to lower the antenna to QSY between phone and c.w. bands.
- ★ For ground-level, rooftop, tower installations, no guys required.

For complete information concerning the HF6V and other Butternut products, contact your dealer or write for our free catalog.

Suggested amateur net prices:

| | |
|---|----------|
| Model HF6V (automatic bandswitching 80-10 meters) | \$159.00 |
| Model TBR-160 (160 meter base resonator) | 39.50 |
| Model 30MCK (30 meter conversion kit for HF5V-II, HF5V-III) | 29.50 |
| Model RMK-II (roof mounting kit with multiband radials) | 41.50 |



**BUTTERNUT
ELECTRONICS
CO.**

GARY AIRPORT BOX 356E Rte. 2
SAN MARCOS, TX 78666

you, I want to see you at the next ones. Support Your Club!! W4CKK gave Alabama 100% representation on the CAND net. Alabama was represented on the RN5 net in 100% of the sessions by W4AJDH W4CKK W4WJF N4BEN W4IBU. Traffic: W4AJDH 945, W4CKK 145, W4ALXP 101, K4AOZ 54, W4IBU 45, WD4DH 22, W4AJPK 17, KY4H 14, WB4TVY 12, W44HRV 10, W4WJF 8, K4HJX 6, W44DEA 4, W4DGH 3, W8M 3.

GEORGIA: SCM, Eddy Kosobucki, K4JNL — ASCM: K4VHC. SEC: W44XE. ASEC: K4SWJ, STM: W4WXA. Chief OBS: W4BIA. It's great to see the club and amateur in the section in the deeply involved in so many public service and emergency activities. This is the true spirit of Amateur Radio. Also, the effort that is put into your monthly newsletters, bulletins etc. is absolutely outstanding. Many tnx to the people who take time to put these into print. I have on many occasions sent some of these to the League for their observation. W4GH, GSSBA pres., invites all to Madison on July 17th for the annual association picnic. This is a family affair, so this is a FB way to keep out of the hamfest dog house. Our many tnx to K4EV for the excellent job as GSN NM. Due to other activities he had to resign as of this writing. W4WXA is still looking for a replacement, so if you're interested contact him. The Coastal Area Repeater is now being operated by K4AOC. pres.: K4ARX. v.p.: W4UGG. sec.: W4BEN. treas.: W4FDH, act.: AB4B and W4AKUC. engineers. This group recently provided communications for the St. Patrick's Day Parade & the Wesley Community Center Walk-a-thon. The Colquitt County HRS, even though a small club, constantly reports various activities. We have several appointees who have not been reporting monthly. For those guilty please let me hear from you by the 5th of each month. If any in the section desire a League appointment, remember that you must belong to the ARRL. If your local club or group conducts a net, please send me the QNI and CTC. I will then report it with my monthly reports. Please do this by the 5th of each month. Have a nice summer. Traffic: W4WXA 264, WB4NTW 175, K4EV 58, K5TF 53, K4NM 47, AA4RF 43, K4JNL 23, W4HON 22, W4BIA 20, N4BIM 8, AA4E1 8, W4FIZ 8, WB4LBM 8, N4UZ 8, K4AATM 6, K4BAI 2, AK4T 2. (Mar.) N4UZ 12, WB4APG 7, K4PIK 6.

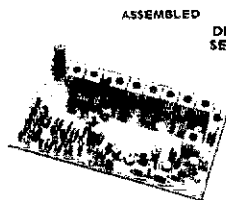
NORTHERN FLORIDA: SCM, Billy F. Williams, N4UF — Marion Co. ARES provided emergency communications during severe floods and storms in Ocala area. The group ran 23 reconnaissance missions at request of CD, took part in 10 rescue missions and helped in evacuation of mobile home park. DEC W4UEA reports 31 hams took part. Seminole Co. ARES and Volusia Co. SKYWARN also active. K4AQQ won 160M ARRL contest for NFL. New AECs for Leon Co. are W44DSW and W44MLE. KC4N earned DXCC cert. Tri-county ARC provided comm. for Crested City parade and run. GARS assisted at Gatorland with KF4W K4BAG W4AUF0 K4JUF and W4TKE taking part. K44WNU now Gen. Lots of FD activity planned. KD4NT in charge of OARC effort and AB6I for LMARS. K44WRJ now Tech. She's only 8-years old. W4OHC is head of GCARC rpt committee. BARS had exhibit at Scout World at Jax NAB. W4MLE handling tnc with 3 watts when not operating from club station WD4IIO at Clover Leaf Farms. NOFARS, RANGE and OPARC provided comm. for Scottish Games and Navy Run. ACARG has membership drive: contact WD4MJS for info if you live near St. Augustine. Softball "mini world series" tied at 2 games each after OPARC beat NCR 4-3 in 5th. In a tie with KF4W W4AUF0 for Santa Rosa Co. Gateway GCWA held going away dinner for W4JL and K4KUU who moved to Iowa. HB-129 is on hold until possible special session this summer on law enforcement bills. Contact your legislator and let him know that you oppose state restrictions on your right to own a rcvr. KC4MM now NY4E. Sorry to hear that W44WPO is a Silent Key. We have 32 ORS stations in the section who report traffic totals to me. If you would like to become one drop me a line. Also, there are some openings for OC. Traffic: WD4IIO 144, WD4HF 734, N4PL 478, W4EDH 338, W44EY 190, W4Moy 170, W4JL 131, KF4U 128, WB4TZR 123, W44QXT 114, WB4GHU 109, KA4MGO 95, W4KIX 90, WB4ADL 80, KB4T 79, N4BZ 66, KE4PO 45, N4ADI 41, N4UF 40, W44STZ 39, N4GIY 33, W4DTV 31, K4DHX 24, WD4GUZ 19, WB4DT6 18, WB4FJY 18, W3IDO 16, WB4WOO 15, KA4MGR 14, W4ILE 12, WB4YQP 7, N4EVS 3. (Mar.) KF4U 98, WD4GUZ 87, W4KIX 66, WD4MLQ 42, WB4FJY 19, N4EVS 4.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — ASCM: W4KGJ. SEC: KB4OW. STM: W44PFK. Although this is April's report, we have two newsworthy items in May. On May 6 we had the big hurricane evacuation drill. ARES and RACES groups as well as government groups at all levels in a 5-county area around Tampa Bay went through the communications and decision-making process expected to be followed in the event a hurricane should require evacuation of low areas in these counties. A few hospitals and nursing homes drilled with real or simulated (made-up) patients being moved. Amateur Radio provided some of the most reliable communications between Emergency Operations Center where government equipment failed because it had not been used in a long time and nursing homes, shelters, etc., where no normal radio communications exists. Civil Air Patrol and REACT also had communications assignments and did exemplary jobs in their areas. As we write this, another communications emergency is in progress at Morton Plant Hospital in Clearwater where telephone failure is causing trouble. Radio amateurs of Clearwater Amateur Radio Society, Metropolitan Repeater Association and St. Petersburg Amateur Radio Club are providing contact between 12 important stations within the hospital complex. KB4OW reports South Brevard Emergency Net provided communications for a March of Dimes event in April. W4LVA reports supporting March of Dimes. KE4OI reports Lakeland Repeater Association supplied radio communications for a March of Dimes Walkathon April 24 with 16 radio amateurs taking part. K44GUS says Dade Emergency Net held special emergency net April 7 for Dade County's Dayton Hamvention and has added a Signal One to his station equipment. Congrats, George! K5IHH acquired a new ICOM phone patch and speaker this month. K4KE reports their new "smart controller" is in service on the Florida Power Club repeater 147.80/00. K4SCL has a new ALF PAL 9000 direction finder. Still checking it out. W44GYR is home from college for the summer. K4IA sent in his SAR early because he is going on 2 weeks vacation. W4VIP and KA4TGZ just returned from a nice vacation in Germany and Austria. K4JRM burned out the second set of traps so now uses separate dipoles for 7 and 14 MHz. If he burns

Hi Pro

LB-VHF-UHF REPEATERS
SOON TO BE FCC TYPE ACCEPTED

Hi Pro RECEIVER AND TRANSMITTER NOW USED IN ALL HI PRO REPEATERS



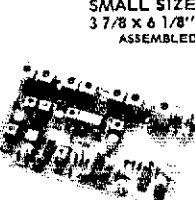
SMALL SIZE
3 7/8 x 6 1/8"

HI PRO TRANSMITTER
DESIGNED FOR REPEATER SERVICE WITH EXCELLENT AUDIO, STABILITY, HARMONIC REJECTION, AND LOW SIDEBAND NOISE

ADJUSTABLE POWER OUTPUT — UP TO 5 WATTS FROM THE EXCITER BOARD COOL OPERATION

HI PRO RECEIVER
THIS RECEIVER IS THE HEART OF THE REPEATER AND BOASTS SUPERIOR SQUELCH ACTION NEEDED FOR THIS TYPE OF SERVICE. EXCELLENT SENSITIVITY, STABILITY AND SELECTIVITY.

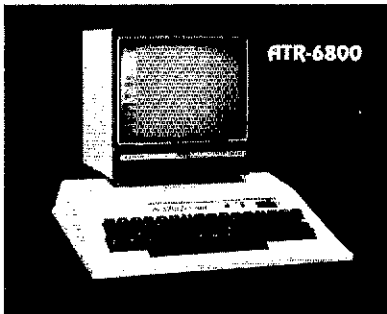
USE THIS RECEIVER TO REPLACE THAT TROUBLESOME RECEIVER IN YOUR PRESENT REPEATER.



SMALL SIZE
3 7/8 x 6 1/8"
ASSEMBLED

ASK ABOUT OUR NEW COMPUTER CONTROL SYSTEMS WITH VOICE SYNTHESIZER TWO MODELS TO CHOOSE FROM.

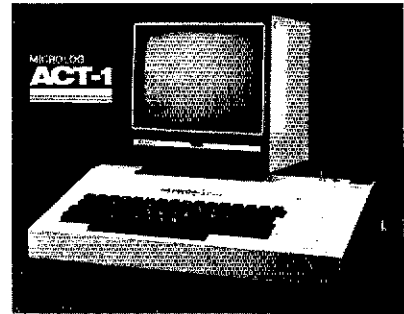
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MICROLOG

INNOVATORS IN DIGITAL COMMUNICATION

AMATEUR RADIO COMMUNICATION AT ITS FINEST



Both Systems Provide

You won't find as much well thought out programming, circuitry, and features anywhere, at any price! The ATR-6800 combines the best of both worlds, an easy to use video system for CW/RTTY/SSTV with automatic station control and a stand-alone computer with expandable memory & full instruction set in Motorola assembly language. Add the BASIC language option package and you'll have the unique combination of an RFI proof computer and ultimate RTTY/CW HAM station. And don't forget "easy to use." All of us at Microlog are RADIO ACTIVE on RTTY, so there's a lot of personal attention to detail and ease of operation. "Stick-on" command listing and video status display will get you on the air quick and sounding like a pro.

- SIMPLE DIRECT CONNECTION to your Transceiver.
- COMPLETE SYSTEM, built-in Demodulator & AFSK Modulator with keyboard programmable tone pairs.
- SPLIT-SCREEN operation with keyboard selectable line location.
- LARGE, TYPE AHEAD text buffer.
- TEN, programmable message memories, plus ID's WRU & SELCALs.
- RANDOM CODE generator & hand key input for practice.
- Baudot 60 to 132 WPM.
- ASCII 110 & 300 baud.
- SYNC-LOCK MODE for improved ASCII operation.
- RECORDER INTERFACE FOR "BRAG-TAPE" or recording off-the-air.
- CODE CONVERTED Printer output in Baudot or ASCII.
- SSTV/GRAPHICS transmit.
- FULL 63 KEY Computer grade keyboard.

There's a certain thrill to using efficient, reliable digital communications equipment on the air. That's the fun of RTTY. Spice up your Amateur Radio operation with the silent video system that does it all, the Microlog ACT-1. Even if you own a home computer and are considering an out-board interface/program, remember, we've put it all in one RFI tight enclosure that's ready to go as soon as you power up. And, with the "Battery-backed" mem-

ory option, you won't even lose your pre-programmed messages if there's a "blink" in the A.C. The ACT-1 has features that the competition doesn't even have on the drawing board! Check for yourself, you could spend a lot more and still come up short.

ATR-6800 vs ACT-1 The most often asked question we hear is "What's the difference between the ATR & the ACT-1?" The ACT-1 is a dedicated system for RTTY/CW/SSTV. It provides all the functions and features you need for a multi-mode station. Along with this superior "ON-the-AIR" performance, the ATR-6800 extends your operation into the realm of automatic station control and computer programming. Plug-in applications modules expand the ATR's memory to add new HAM oriented programs which are enabled by simple keyboard commands. By adding the BASIC option package, you'll have pre-programmed full community mailbox, contest dupe sheet, personal station log, message editor, BASIC computer language and 16k of battery-backed (non-volatile) memory. We also provide a subroutine list so that you can write programs to directly control the ATR-6800 in easy to use BASIC language. The ATR-6800 then is the expandable, "do everything" system where your imagination is the only limit! The ACT-1 is designed for the HAM who needs the essentials of a complete video system for digital communications.

TECHNICAL SPECIFICATIONS ATR-6800 & ACT-1

INPUTS
Speaker Audio 100mv min.
Digital TTL - Keyer, Hand Key
**RS232 ±12V, 330 Ohm Source

OUTPUT TO TRANSMITTER FOR CW/RTTY/SSTV
+ Voltage Keying +40VDC @ 300ma Max.
- Voltage Keying -150VDC @ 50ma Max.
**Mercury Relay 200VDC of 2 amp (20VA Max.) N.O. & N.C.
TR Change Over ATR - Relay ±30V @ 2 amp N.O. & N.C.
ACT-1 - Transistor ±12VDC @ 300 ma. GND on XMT

AFSK Tones, Range Keyboard Programmable 500 Hz to 3000 Hz
AFSK Tones, Level Mic Compatible 30-50mv Audio
Slow Scan Mic Compatible Audio Sync 1200 Hz, Black 1500 Hz, White 2300 Hz

MISCELLANEOUS CONNECTIONS
RS 232 ±12VDC, 330 Ohm Source Impedance, Negative Mark
Printer Driver ATR -
• Hi-speed RS-232 upto 2400 Baud
• Six-speed Baudot & ASCII Floating Relay for Current Loop Switching
ACT-1 -
• Six-speed Baudot & ASCII Transistor Switch +40VDC @ 100 ma.
• Optional Hi-speed ASCII RS232 @ 2400 Baud.

Tape Recorder Mike = 100 mv Audio
"Brag Tape" Speaker = 200 mv Audio
Scope Horizontal and Vertical Outputs to Scope for RTTY Tuning Aid

Morse Speed Tracking Automatic or Speed Lock

VIDEO OUTPUT
1 Volt Peak to Peak, Negative Sync Composite Video (American Standard)
European standard available upon request.

VIDEO FORMAT
Normal 24 lines, 40 characters per line
Zoom 12 lines, 20 characters per line
Black on White or White on Black Keyboard selectable
Display Split Screen Any location Line 0 (Off) to Line 20, Keyboard selectable

SSTV 3 lines, 6 characters per line + graphics

TEST MESSAGES: Quick Brown Fox and RYRY's in Baudot, U-U in ASCII, VVV in Morse.

SYNC: Transmits "Blank-Fill" in RTTY and BT in Morse when Text Buffer is empty and unit is in transmit. Keyboard command on/off.

UN-SHIFT on Space: Automatically shifts back to "LETTERS" upon receipt of transmission of space. Keyboard command on/off.

REAL-TIME CLOCK: Keyboard set, always on screen display, hours, minutes, seconds. Can also be inserted in transmit text buffer by keyboard command.

WORD WRAP AROUND: Prevents splitting words at the end of a line. Works in receive as well as transmit.

CODE PRACTICE: Random 5 char generator sends at any speed you set via the keyboard. Hand key input allows use in code practice oscillator that will also read your sending!

STATUS DISPLAY can be called up to show the condition and control commands for 20 programmable parameters, such as AFSK tone freqs, UNOS, printer, etc. Useful as a "HELP" command in case you misplace the manual. There's also a constant "TOP-LINE" display of Time, Mode, Speed, & Code in use.

DETECTION MODES
Direct Phase correlation detector with AGC controlled bandpass filter (100 Hz nominal width - 800 Hz center frequency)
Demodulator Computer program enhanced dual tone demod. Primary tones fixed @ 2125/2295 Hz, Secondary tones variable @ 500 - 3000 Hz.
RS232 compatible half duplex or full duplex up to 9600 Baud

****Terminal**

DATA RATES
Morse 5-198 WPM Keyboard selectable in 1 WPM steps. Auto speed tracking or speed on receive.
All standard 45, 50, 57, 74, 100 Baud (60, 66, 75, 100 and 132 WPM)
110 & 300 Baud normal & synclock using internal Modem. ATR adds speeds up to 9600 Baud
R seconds per frame

OUTPUT OPERATING MODES
Character outputs when typed
Word sent after "Space Bar"
Line sent after "Return"
Send entire contents of text buffer

TUNING INDICATORS
Audio Ref. Tone 800 Hz Keyed Regenerated
Visual LED on Mark (Keydown)
Scope Tuning ellipse for RTTY

PROGRAMMABLE MEMORIES
10-40 character messages (400 total) or
10-80 character messages (600 total) battery backed
15 characters maximum in standard ID and 17 in RTTY ID
WRU: Up to 16 characters
Selective Call: ATR - 4 memories, up to 16 characters each.
ACT-1 - 2 memories for printer on and printer off

****COMPUTER CAPABILITY**
Memory Standard unit has 4000 bytes of RAM for user program. Basic package adds 16K.
Language Basic or Motorola M6800
Commands Input; Output; Load; Go with Break Point; or Normal
Tape Interface Up to 16 characters
Store Programs on Audio Cassette

POWER
115 VAC, 60 Hz 60 VA Max. Act-1. 30 VA Max (230 VAC, 50 Hz optional)
12 volt version available
External input for charging expanded battery backed memory. 6-15VDC @ 10 ma. max.

MECHANICAL
ATR-6800: Size 14 3/8" W x 12 1/4" D x 4 1/4" H
Weight 15 lb
ACT-1: Size 17 8 W x 3 H x 9.5 D
Weight 7 lb.
ATR-6800 & ACT-1: Color Beige Top, Black Base
Material AL5052 Aluminum Alloy

*Standard on ATR, Optional on ACT-1
**Standard on ATR, Not available on ACT-1

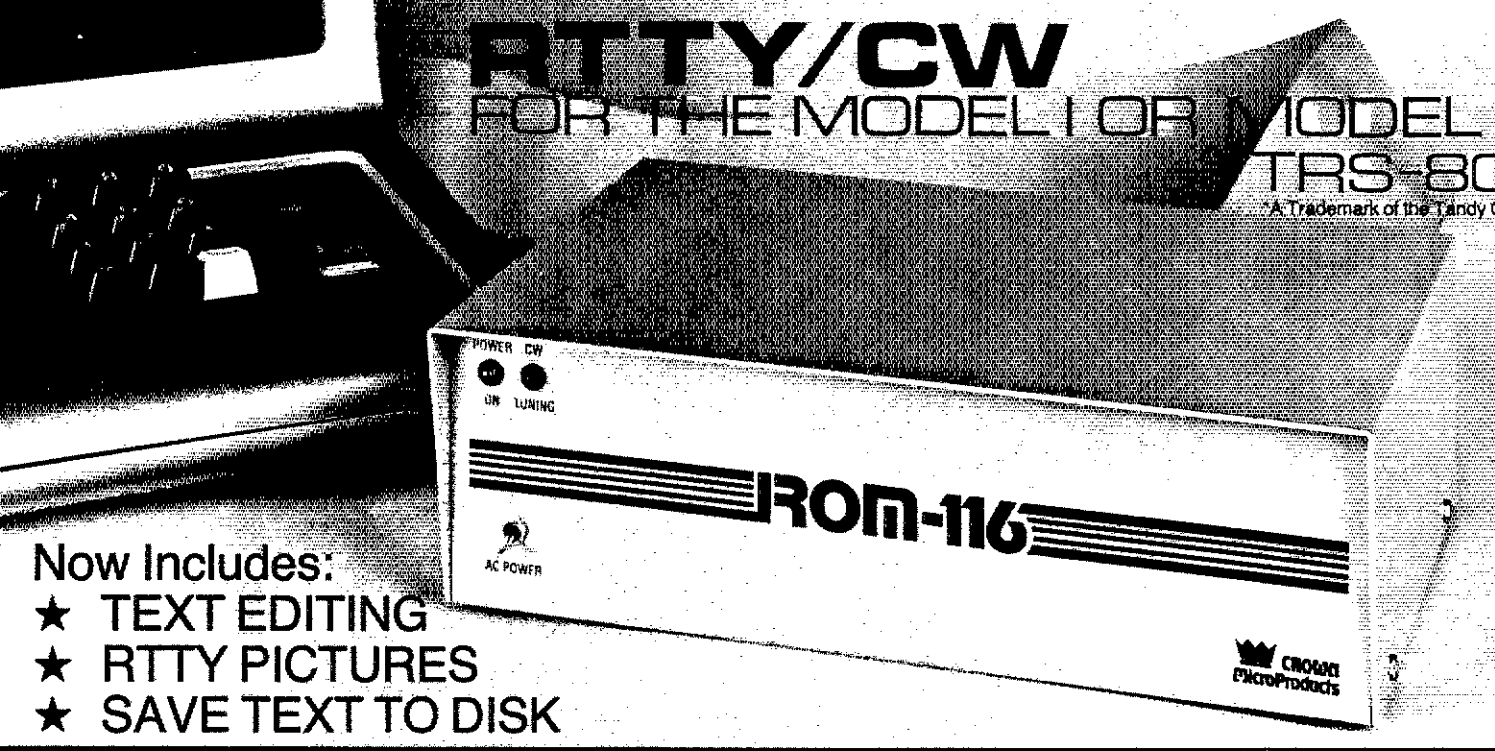
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RTTY/CW

FOR THE MODEL I OR MODEL III

TRS-80

A Trademark of the Tandy Company



Now Includes:

- ★ TEXT EDITING
- ★ RTTY PICTURES
- ★ SAVE TEXT TO DISK

EXCLUSIVELY DESIGNED

Crown Micro Product's ROM-116 RTTY Operating System was designed for use with the Radio Shack TRS-80 Model I or Model III Microcomputer and easily interfaces the TRS-80 Microcomputer to the amateur operator's terminal unit or amateur equipment. With the software provided, the TRS-80 can be used for sending and receiving RTTY in either ASCII or Baudot as well as CW.

CUSTOM METAL CABINETRY

The ROM-116 is housed in an attractive 10 x 7 x 3 inch grey cabinet. The cabinet contains a terminal strip for interfacing the TTL and RS-232 input and output signals; controlling the transmitter and audio input for the CW decoder. Also provided on the back panel is a two prong connector for the 60 MA. loop and a DB-25 connector (RS-232 or 20 MA.) for connecting to an ASCII printer or modem.

FEATURING:

- Two Serial Ports
- Fourteen Buffers
- Automatic CW/ID
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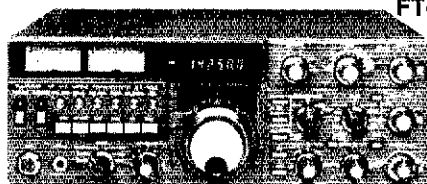
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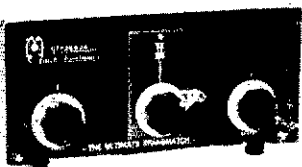
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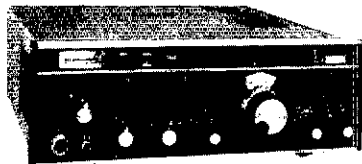
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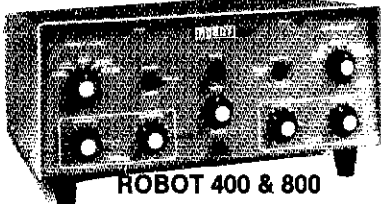
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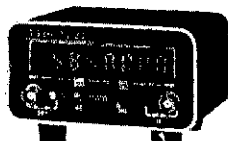
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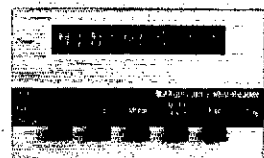
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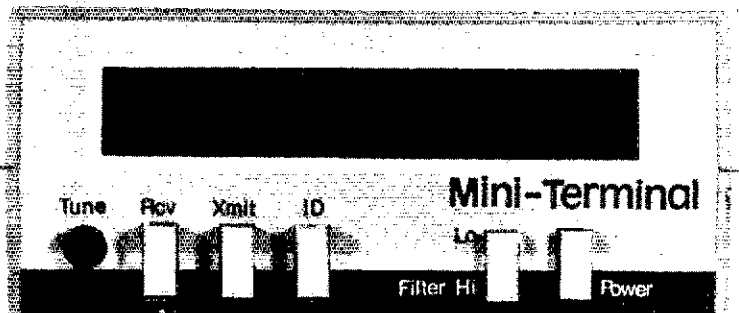
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up that no. 10 antenna wire, I'm gonna get suspicious. Believed to be our newest and youngest Novice is KB4AWJ. Sarah Johnson, 8-1/2-year-old daughter of AA4WJ. Bill is acting like a proud papa with a new baby! Can't say that we blame him. Congrats Sarah and Bill. Also congrats to Sarah's 9-year-old girlfriend who made it at the same time. Sorry I don't know the name and call. Traffic: W3CUL 1702, KE4O 1750, W6VR 585, K4SIL 405, WA4PFK 400, VE3BSY 383, WD4COL 347, K4ZK 325, K4TH 300, KY4U 262, W4NFK 228, WD4AWN 170, WA4HXU 167, WB4WYG 155, KE4O 153, WB4AID 146, K4EUK 142, WB4PIB 140, W4GPL 138, WA4EIC 136, WD4CHO 120, KA4ASZ 117, N4ET 103, NJ4O 102, WB8ZY 88, KE4DA 72, KA4FZI 64, WB4MPJ 56, W4DL 54, K4IA 52, W3TLV 40, W4IRA 36, WB4GCK 34, K5IHH 32, WB4FVN 30, W4LVA 30, KM4G 28, KA4BBA 27, KC4OT 24, W4WYR 20, AA4WJ 19, WA4LQO 16, KB4OW 17, KA4CPS 12, AA4BN 7, W1DLP 4. (Mar.) N4KB 70, N2WV 7. WEST INDIES: SCM, Julio Negroni, KP4CV — WINC NCS WP4AOH reports NP4L and WP4AOH received a Certificate of Merit for consistent attendance in March to WINC. This certificate will be issued monthly to station with more QNI and more QTC. NP4L is Puerto Rico's first amateur female Extra Class operator. Kall in an active DXer operating on 15 and 20 M cw and is also NCS on WINC. Congrats Kall for your interest and assistance to NTS operations in WI section. PRARC held its 43rd annual convention on Villas del Abey, Salina on April 25. A good attendance and lively proceedings were highlights of the event. New appointments: WP4BCV OVS PSHR; NP4D WP4AOH KP4DJ. Traffic: NP4D 211, WP4AOH 184, KP4DJ 69, NP4L 32, WP4BPD 18, KP4EDL 10, KP4ABK 8.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Erich J. Holzer, N7EH — STM: W7EP. NMs: WA7FDN WA7KOE, W7LVB reports the following officers for the London Bridge RA: W7YHC, pres.; KA7KMN, v.p.; WB7EXY, secy.; KA7BTC, treas. New call in Lake Havasu - KA7NGW. The following upgrades were reported: KA7MDY KA7OIL W7UCX KA7MGO KA7FTZ and KA7KMN. The following call sign changes were reported: W7BGG to KQ7F, WB7OQM to KD7Y and WB7CHH to KC7CS. Plans for the Ft. Tuthill Hamfest, to be held July 31 thru Aug. 2, are progressing well. ARA and TD members provided communication for the American Cancer Society's Great Arizona Bike Ride. Participants were: WB7VOM WB7ESO K7KYW KA7LVZ KB7KZ KC7HU WB7TWM KA7DAC KA7FTZ KA7DTS KA7FOO WA7FDN KA7FPK AJ7C K7ESA and WA6HII. Several medical emergencies were handled in a very professional manner by these communicators. W7YS reports operating from the original site of "7YS"; also some 40M QSOs were made using gear built by K7RBR. W7WGW reports the following handled emergency comms. recently: N7CDB, N7VW, N7BDY, WB7UTI, WB7EDK, W7HNS and KA7DNY. W7KMA reports that WA7LVB became first A7 ham to earn 6M WAC. ARA reports that W7JDH became a U.S. physicist. Superintendent ARC visited K7UGA's shack in March. ATEN: QNI 879, QTC 149. Traffic: W7EP 124, K7NTG 111, W7LVB 85, K7UXB 54, WA7KOE 36, K7NMQ 28, W7LWB 17, W7OIF 15, KE7W 14, N7EXL 11, WA7NXL 6, K7GLA 3.

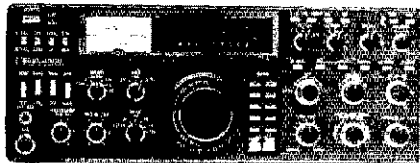
LOS ANGELES: SCM, Stan Brokl, N2YQ — SEC: N6UK. STM: K5DY. W6HCS spoke to the Southern CA Emergency Services Assn. on "The Potential of Solar Power in Emergency Communications." N6HE just returned from VK/ZL land; Ray is helping his MARS net learn procedures. W6GCZW participated in the Tri-Valley Special Olympics. W6INH has a new TS-830S with scope, VFO and spkr. San Fernando Valley ARC, W6SD, held a Chinese auction in April which was a big success. U7AC K6AA and Dr. Fingerg, a USC phys. prof., talk on lasers. The Romona Radio Club, which meets the third Monday of each month at 546 W. Broadway in San Gabriel, is looking for new members. The Club station K6SIR is on every Monday on 146.55; for further information, check in. The Southern CA DX club was host this year at Visalia for the big DX Convention. N6AR K6SMF N6IC W6PJX and W6GC were prime movers in an outstanding convention with top DX speakers and prizes. The City of Los Angeles Emergency Operations Board on April 19 approved a working understanding and guidelines for use of Amateur Radio during declared emergencies. This is the first time in over 20 years that a city has accepted Amateur Radio help at an official level. ARES in the Los Angeles Section is growing. Join NOW. Traffic: K6UYK 519, W6INH 160, WA6OCM 94, KT6D 94, N6DZQ 69, WA6LVO 46, W6GCW 26, K6CL 23, W6NKE 16, N6BCY 2, W6RO 2. (Mar.) W6FAS 64, WA6LVO 37, N6BCY 13.

ORANGE: SCM, Fried Heyn, WA6WZO — ASCM: WA6WZN. SEC: W6UBQ. STM: KN6C. Led by Orange County EC W6RE (Red Cross/RACES liaison) many hams provided communications for the Anaheim firestorm which left 1500 persons homeless and 15,000 telephones out of order; the following is a partial list of hams that manned Red Cross HQ, shelter, incident command, Anaheim EOC, Anaheim Memorial hospital, etc.: K6BI, K6BDA, K6BG, K6BHV, K6BTO, K6BTR, N6HJ, W6DEP, W6BCE, W6ULLU, N6BMD, W6BCT, W6BGC, WA6HNO, W6BBI, N4VN, N6AXN, VE7DL, W6DCB, N6BN, W6MBA, W6BQD, W6BPT, May 6 ARES, with the support of the Orange Co. clubs, provided communications for the Cancer Bike-a-thon and also the Gordon Bennett Balloon Race which included a WestCoast ARC Booth from which KN6C originated about 100 messages. The So. CA AR Computer Club provided computers as well as radio support. Inland Imperial RTTY network awarding a Night Owl certificate from KA6HJK and W6LGL by sharing pictures after 11 P.M. on the club RTTY repeater, W6BZIR 145.72/12. New officers: So. Orange ARA: WA2TMB, pres.; ARA: KA6B/JF, secy.; WA6QCA, treas.; Hesperia ARA: W6HDI, chairman; WA6OLD, vice chairman; W6BBI, secy./treas.; UC: Irvine ARC: CX9AGW6, pres.; W6WVJ6, 1st v.p.; WA6PXK, 2nd v.p. AMSAT 2-meter sbsb net changed freq. to 145.805 MHz still 7:30 A.M. daily. Coachella Valley ARC repeater K6EO/R now on 145.625/025 MHz. Orange Co. has activated the dialing of 911 for routing emergency calls. I sadly report OO WA6MGI a Silent Key — a close friend, active in CLAMMARC.

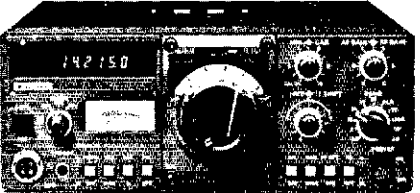
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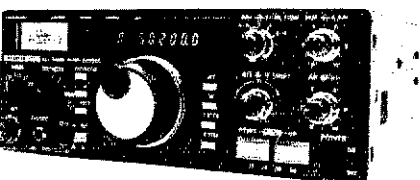


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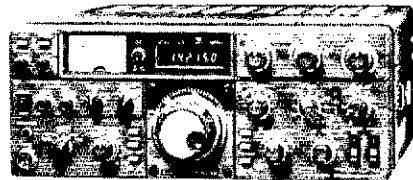


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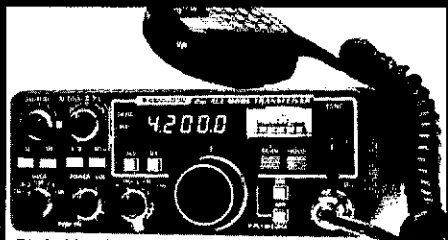
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- CNA 2002 2.5KW Auto Tuner \$425.00
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MON-FRI 9AM-6PM • SAT 9AM-3PM

Write for our new and used equipment list

SAN DIEGO: SCM, Arthur R. Smith, W6INI — STM: N6GW, SEC: W6INI, ARES is in its 7th year of supporting the Calif. Dept. of Forestry's Red Flag Patrol. The Patrol is activated whenever fire-hazard weather conditions exist. Volunteers are needed from all areas of San Diego County. For info contact: W6INI (273-1120), N6CQW (697-2337), WD6CSS (424-5785), WA6EYX (745-4069). Escondido ARS reports a membership of 114. Club cw net meets nightly at 1900 on 28.84 MHz. Palomar ARC is now incorporated and has non-profit status. North County Tlc. Net continues to grow with 185 msgs handled in 29 sess. in April. Net meets daily at 2000 local time on 146.1373 MHz. ARES has formed a Rapid Response

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SMALL LOT TRAP DIPOLES

78' Total Length, Complete with Balun, Wire, Insulators, Support Rope. Legal Limit.

| MODEL | BANDS | LGTH | PRICE |
|----------|------------|------|---------|
| TSL 8040 | 80, 40 | 78' | \$49.95 |
| TSL 4020 | 40, 20, 15 | 40' | \$47.95 |
| T8040 | Traps Only | | \$19.95 |
| T4020 | Traps Only | | \$19.95 |

SMALL LOT SHORTENED DIPOLES

Half-Size Dipoles Using Loading Coils. Complete with Balun, Wire, Insulators, Support Rope. Legal Limit.

| | | | |
|---------|-------------|------|---------|
| SL-8010 | 80, 40, 20, | 75' | \$59.95 |
| | 15, 10 | | |
| SL-160 | 160 | 130' | \$36.95 |
| SL-80 | 80 | 63' | \$35.95 |
| SL-40 | 40, 15 | 33' | \$34.95 |
| S-160 | Coil Only | | \$17.95 |
| S-80 | Coil Only | | \$17.95 |
| S-40 | Coil Only | | \$17.95 |

FULL SIZE PARALLEL DIPOLES

Full-Size, Single Feedline. Complete with Balun, Wire, Insulators, Support Rope. Legal Limit.

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|----------|----------------|------|---------|
| FPD-8010 | 80, 40, 20, | 130' | \$49.95 |
| | 15, 10 | | |
| FPD-4010 | 40, 20, 15, 10 | 63' | \$44.95 |

NEW! PORTABLE VERTICAL! IDEAL FOR

APARTMENTS, CAMPING, TRAILERS!

Folds to 5' Package. No Radials Required. Fully Assembled. Full Legal Limit. 1:1 VSWR

| MODEL | BANDS | HGHT | PRICE |
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| PV-8010 | 80-10 | 13' | \$59.95 |

PROVEN DESIGN - GOTHAM ALL BAND

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|-------|-------------------|-----|---------|
| V-160 | 160, 80, 40, 20, | 23' | \$39.95 |
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| V-80 | 80, 40, 20 | 23' | \$37.95 |
| | 15, 10, 6 | | |
| V-40 | 40, 20, 15, 10, 6 | 23' | \$35.95 |

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Team to respond to disaster situations when time is critical, for example, a mass casualty disaster. New officers for the 220 Club of San Diego are: W6GJC, Pres; W6INI, v.p.; W6B5SH, sec.; N6AYJ, treas. ARES net on 446.0 MHz (2000 local, each Saturday) growing steadily with total of 19 members. Poway ARS has an ever-growing group involved in public service due to efforts of KA6EN. Traffic: KT6A 805, W6HJU 373, KM8I 287, KU6D 221, N6AT 47, N6GW 4. (Mar.) K6AE 7.
SANTA BARBARA: SCM, Robert N. Dyruff, W6POU — Gov't use of ARES increases. Some OES offices receive equipment for disaster use via ARES. May 14-15 State OES drill use: W6AWW, W6GJI, W6GJA, W6GJL, K6CJL (SBAR) and K6QIF (SVI) to cover CA northern link to capitol opening thru coop. W6B0EVR (Lompoc), W6LQIR (King City), K6GZK/R (San Jose), W6POU elected Dir. of So. Cal. Emer. Svcs. Assn. to increase AR tie. SLO Co. Ecs W6B8IY. W6MSG set monthly ARES meetings 1st Tues. monthly at CDF Hq. N6BUJ advises Diablo Canyon nuclear accident warning system test (W6MSG coord.) set Oct. 20 - many hams needed. SKYWARN training by NWS for 20 ops hosted by N6FSF. Morro Bay 3-day Fireman's Muster due Sept. W6ENR is new pres. of Central Coast ARC Santa Maria. All-nite 3BAP Co. Co. downed plane search used DFLers from SAARIC/AARES. Comms locs by N6AIA, W6LQO plus NCSs W6BESU, W6B2QJ and 15 ops EC W6BLLMX held ARES recruiting bkfst. W6B6EY led 14 ops for Special Olympics comms at Camarillo State Hosp. K6YD edits Zero Beat newsletter for the many SCN traffic nets. Traffic: K6YD 171, W6ZRR 99, W6JGS 59, W6JTA 45.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Phil Clements, K5PC — SEC: W5GPO, STM: W5VMP, ASGM: WA5QFD, NMS: A65I, AASJ, KASMAJ, W5DJYJ, K5CFX. As we look back on millions of dollars in tornado damage here in our section this spring, let us all pause a moment to give ourselves a well-deserved "pat on the back." This year, ARES was ready for action; 2000 members strong, each knowing what was to be expected, went out and performed like professionals! I know of not one SKYWARN group that did not get activated at least once this season, and many of us worked "overtime" out there looking skyward. The important thing is that the responses after the disaster occurred were absolutely fantastic. All out well-laid plans seemed to fall into place; the SEC and I were notified immediately after each incident, the proper people were immediately put into action, and each task we were called upon to do was handled in a most expeditious and professional manner. For public safety and government officials that we served had nothing but praise for ARES and the commendable job done. This was no accident; months and months of drilling, training, and PR work can pay off for you overnight. It just takes one disaster in a lifetime to make it all worthwhile. To all of you that gave service above and beyond the call of duty and those of you who were standing by on the net freqs. and helping to keep them clear, a sincere thank-you for a job well done. For those of you who have made a commitment to become active in ARES, now is the time to contact your local Emergency Coordinator and volunteer your services and equipment. If you do not know who your EC is, or to note my address is on the bottom of page 8 in this issue of QST in the mail or via radiogram. I will put you in touch with your nearest EC or District EC. There are still a few counties that have no resident EC. W5GPO will be more than happy to talk with anyone interested in getting started. I hope that the accounts of all our activities are in this issue, if not, I'm sure that they will appear in the near future, PSHR: K5AZK, A5JF, N5BT, WA5QFD, K5V5J, W5VMP, K5KB, K5SNN, N5EEY, K5BUL, KA5MSP, K5PC, W5DJYJ. Traffic: N5EEY 463, K5BNH 286, K5B5 232, N5BT 183, K5AZK 147, W5DJYJ 108, K5PC 103, A5JF 96, WA5QFD 81, K5BUL 74, K5SNN 69, W5GPO 54, N5EMJ 41, W5ERT 39, K5CFX 38, W5VMP 35, WA5E2T 13, K5V5J 11, K5HGX 10, KA5MSP 10, W5PBN 6.

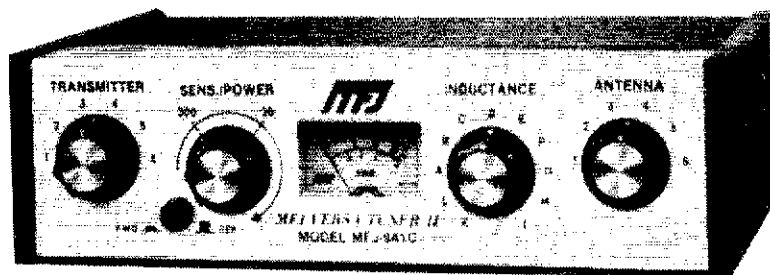
OKLAHOMA: SCM, Leonard Holler, WA5FSN — K5CFM, K5DJR, K5KJH, W5B5ZP are new EC appointments, filling some important gaps. Have seen a number of public service activity reports about various "drills," "walks" etc. We are always happy to see these. Sooner Traffic Net is by no means an "Oklahoma Only" net with regular QNI from Kansas, Missouri, and Nebraska, and frequently Texas and Arkansas, with many QTCs handled by these fine people. Need to improve your cw?? Why not try OLZ. Some of the finest cw operators in the nation can be found here, and they will welcome you and help you. KA5FUU has a note in QST. W5LGL was honored by the 7290 Traffic Net with the "Whitney Nugget!" for her outstanding help on the net this past year. My personal congratulations. Along these same lines: W5REG has been named a "Great White Father" by the ISSB Net CU at Ham Holiday, July 24-25 in Oklahoma City. Traffic: K5CXF 233, W5RB 144, K5V5X 134, K5B5E 123, KA5CXW 114, W5AS 111, W5BEC 106, W5SELG 91, WA5OUV 72, W5VXU 68, W5EAY 60, WA5FSN 48, W5DIF 45, W5SSG 39, W5VLW 35, W5EZO 25, W5VOR 22, W5BNC 19, N5IN 13, K5C5O 5, W5BLSW 3, W5LJ 1.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR — STM: N5TC, SEC: WA5GCP, OVS: WA5KR. As we worked 36 countries on 6 meters, with 22 confirmed, South Texas Emergency Net meeting in annual convention at Alice elected W5GET, NCS, K5GCK, alternate NCS; K5JKV, public relations officer; W5KLV, secy/treas. Williamson Co. ARC going great guns with radio classes; 11 students awaiting arrival of Novice exams; instructors are K5KL, KA5IAJ, N5CNG, N5BSO, W5D5QH, K5SP, N5DZT, new DEC for Galveston Co. K5DJ (ex-N5EHO) new EC for Galveston Co. W5BFBV new EC for Matagorda Co.; K5M5M new EC for Orange Co. AB5X took part in statewide civil defense communication exercise. W5AAH worked public demonstration station in Lake Jackson at Brazos Mall. ORSOKS K5KRI has made PSHR 12 consecutive months as Technician station. OBS ops busy; W5KLV had 121 readings on 10 nets; W5AAH had over 50 readings on 8 nets. Southern TX DRN5 stations represented 100% on CAND by K5DJX, N5CRU, W5SHN, W5KLV, W5BYDD, N5AMH, K5V5W, W5TFB, K5BTC, K5KJN, W5CTZ. Southern TX also represented 100% on DRN5 by N5AMH, W5KLV, W5BRT, W5SHN, W5CTZ, N5CRU, N5DAA, W5TUK, W5TFB, W5PON, W5VLT, W5BYDD. BPL this month by W5SHN and W5BYDD. Traffic: W5SHN 801, W5BYDD 597, W5TFB 484, W5KLV 303, W5CTZ 290, N5AMH 186, K5VN 171, W5BRT 143, N5TC 101, W5M5M 81, W5B5M 59, K5M5M 59, N5CRU 59, W5KR 34, K5AZR 29, AB5X 28, W5B5KH 23, K5K5H 18, K5DJ 9. (Mar.) K5GM 74, W5AAH 67, AB5X 16. (Feb.) K5VN 161.

MFJ ANTENNA TUNERS 16 MODELS

MFJ-941C 300 Watt Versa Tuner II

Has SWR/Wattmeter, Antenna Switch, Balun. Matches everything 1.8-30 MHz: dipoles, vees, random wires, verticals, mobile whips, beams, balanced lines, coax lines.



Ham Radio's most popular antenna tuner. Improved, too.

\$89⁹⁵ (+ \$4)

Fastest selling MFJ tuner . . . because it has the most wanted features at the best price.

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

Run up to 300 watts RF power output. SWR and dual range wattmeter (300 & 30 watts full scale, forward/reflected power). Sensitive meter measures SWR to 5 watts.

Flexible antenna switch selects 2 coax lines, direct or through tuner, random wire/balanced line, or tuner bypass for dummy load.

12 position efficient airwound inductor for lower losses, more watts out.

Built-in 4:1 balun for balanced lines. 1000V capacitor spacing.

Works with all solid state or tube rigs.

Easy to use, anywhere. Measures 8x2x6", has

SO-239 connectors, 5-way binding posts, finished in eggshell white with walnut-grained sides.

4 Other 300W Models: MFJ-940B, \$79.95 (+ \$4), like 941C less balun. MFJ-945, \$79.95 (+ \$4), like 941C less antenna switch. MFJ-944, \$79.95 (+ \$4), like 945, less SWR/Wattmeter. MFJ-943, \$69.95 (+ \$4), like 944, less antenna switch. Optional mobile bracket for 941C, 940B, 945, 944, \$3.00.

MFJ-900 VERSA TUNER

MFJ-900

\$49⁹⁵ (+ \$4)



Matches coax, random wires 1.8-30 MHz.

Handles up to 200 watts output; efficient airwound inductor gives more watts out. 5x2x6".

Use any transceiver, solid-state or tube.

Operate all bands with one antenna.

2 OTHER 200W MODELS:

MFJ-901, \$59.95 (+ \$4), like 900 but includes 4:1 balun for use with balanced lines.

MFJ-16010, \$39.95 (+ \$4), for random wires only. Great for apartment, motel, camping, operation. Tunes 1.8-30 MHz.

MFJ-949B VERSA TUNER II

MFJ-949B

\$139⁹⁵ (+ \$4)



MFJ's best 300 watt Versa Tuner II.

Matches everything from 1.8-30 MHz, coax, randoms, balanced lines, up to 300W output, solid-state or tubes.

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

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

6 position antenna switch on front panel, 12 position air-wound inductor; coax connectors, binding posts, black and beige case 10x3x7".

MFJ-962 VERSA TUNER III

MFJ-962

\$229⁹⁵ (+ \$10)



Run up to 1.5 KW PEP, match any feed line from 1.8-30 MHz.

Built-in SWR/Wattmeter has 2000 and 200 watt ranges, forward and reflected.

6 position antenna switch handles 2 coax lines (direct or through tuner), wire and balanced lines.

4:1 balun, 250 pf 6KV cap, 12 pos. inductor. Ceramic switches. Black cabinet, panel.

ANOTHER 1.5 KW MODEL: MFJ-961, \$189.95 (+ \$10), similar but less SWR/Wattmeter.

MFJ-10, 3 foot coax with connectors, \$4.95.

MFJ-984 VERSA TUNER IV

MFJ-984

\$329⁹⁵ (+ \$10)



Up to 3 KW PEP and it matches any feedline, 1.8-30 MHz, coax, balanced or random.

10 amp RF ammeter assures max. power at min. SWR. SWR/Wattmeter, for.ref., 2000/200W.

18 position dual inductor, ceramic switch.

7 pos. ant. switch. 250 pf 6KV cap. 5x14x14".

300 watt dummy load. 4:1 ferrite balun.

3 MORE 3 KW MODELS: MFJ-981, \$239.95 (+ \$10), like 984 less ant. switch, ammeter.

MFJ-982, \$239.95 (+ \$10), like 984 less ammeter, SWR/Wattmeter. MFJ-980, \$209.95 (+ \$10), like 982 less ant. switch.

MFJ-989 VERSA TUNER V

MFJ-989

\$329⁹⁵ (+ \$10)



New smaller size matches new smaller rigs — only 10-3/4Wx4-1/2Hx14-7/8D".

3 KW PEP. 250 pf-6KV caps. Matches coax, balanced lines, random wires 1.8-30 MHz.

Roller inductor, 3-digit turns counter plus spinner knob for precise inductance control to get that SWR down.

Built-in 300 watt, 50 ohm dummy load.

Built-in 4:1 ferrite balun.

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Introducing the HyGain TH7DX.

Solid state rigs demand a new standard of performance in antenna design.

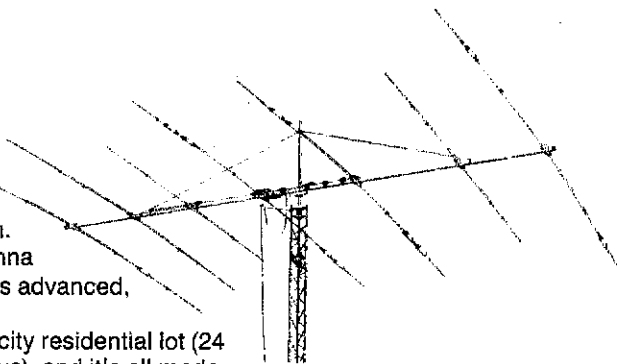
And HyGain has it: the new TH7DX, The Solid State Beam.

The TH7DX is the first antenna specifically for use with today's advanced, solid-state broadband rigs.

It's small enough to fit on a city residential lot (24 foot boom/20 foot turning radius), and it's all-mode — SSB, Slow Scan, CW, and RTTY.

Most importantly, the TH7DX covers 10, 15, and 20 meters, from band-edge to band-edge, with an SWR below 2:1, so you can load your solid state rig to full rated output without the use of time-consuming tuners.

Forward gain and front-to-back ratio is just as good as the superb TH6DXX — and the patterns hold at the edges of the band. This broadband performance



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Madison makes it easy to go state-of-the-art. We have special package prices when you buy a solid state rig and the new TH7DX solid state beam to go with it. Call today for a quote on any of these fine rigs and the TH7DX combination.

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is made possible by the new dual-driven element system used on the TH7DX.

If you got a solid state rig, get the Solid State Beam — the new TH7DX from HyGain. And . . . get it from Madison.

Madison not only has the TH7DX in stock, we have it at the lowest prices anywhere. Suggested List \$499.00. Call Madison today for a quote.

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Details in April QST p. 55

Ham-Ads

(1) Advertising must pertain to products and services which are related to Amateur Radio.

(2) The Ham-Ad rate is 85 cents per word. A special rate of 25 cents per word applies to hamfest and convention announcements, to individuals seeking to dispose of or acquire personal equipment, and to other advertising which, in our opinion, obviously qualifies for the individual rate.

(3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8-1/2" x 11" sheet of paper.

(4) Closing date for Ham-Ads is the 20th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received August 21 through September 20 will appear in November QST.

(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A last name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in QST advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

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QCWA Quarter Century Wireless Association is an international nonprofit organization founded in 1947. You are eligible for membership if licensed 25 or more years ago, and presently licensed. It is not necessary to have been licensed the entire 25 years. Members receive QCWA publications and participate in QCWA activities. Come grow with us! Write QCWA, Inc., 1409 Cooper Drive, Irving, TX 75061.

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CERTIFICATE for proven, two-way radio contacts with amateurs in all ten USA areas. Award suitable for framing and proven achievements added upon request. SASE brings TAD data sheet. W6LS 2814 Empire, Burbank, CA 91504.

YAESU OWNERS — join your International Fox-Tango Club — now in its eleventh year. Calendar year dues still only \$8 US, \$9 Canada, \$12 airmail elsewhere. Don't miss out — get 1982 top-rated FT Newsletters packed with modifications monthly, catalog of past modifications, free advertisements, technical consultation, FT Net (Saturdays, 1700Z, 14.325MHz), more. Go Fox-Tango! To join, send dues to FT Club, Box 15944, W. Palm Beach, FL 33406.

IMRA International Mission Radio Association Helps missionaries by supplying equipment and running a net for them daily except Sunday, 14.280 MHz, 1900-2000 GMT. Br. Bernard Frey, 1 Pryor Manor Rd., Larchmont, NY 10538.

THE Veteran Wireless Operators Association, a non-profit organization of communications people founded in 1925, invites your inquiries and application for membership. Write V.W.O.A., 118 River Drive — Bay Ridge, Annapolis, MD 21403.

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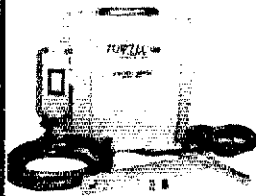
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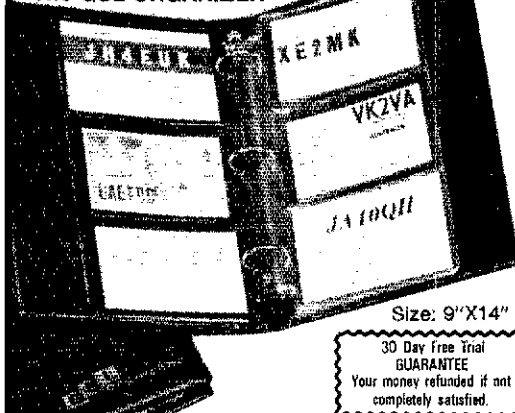


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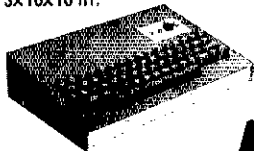
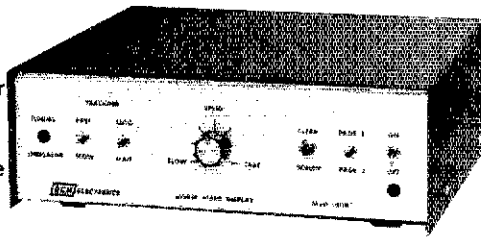
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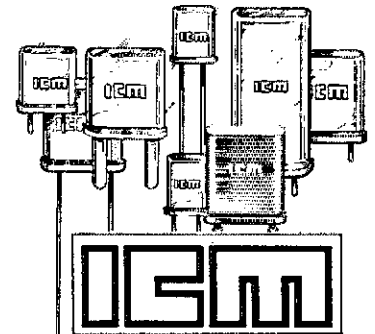
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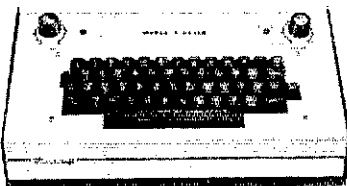
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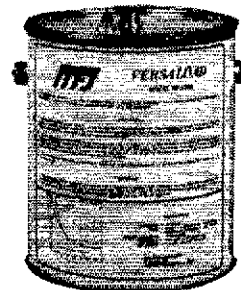
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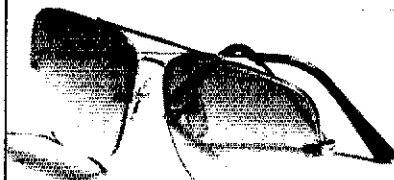
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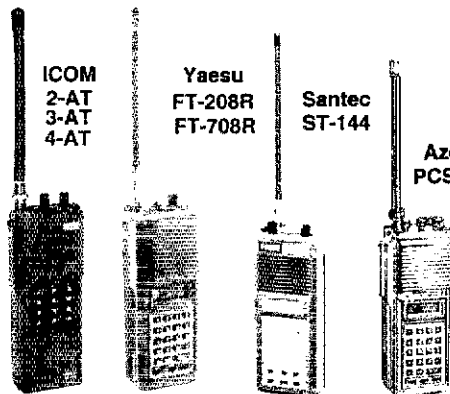
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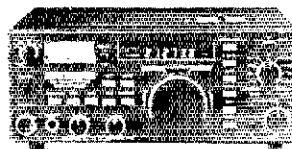
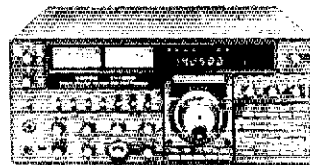
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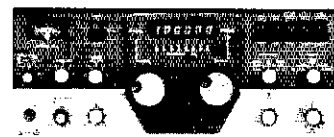
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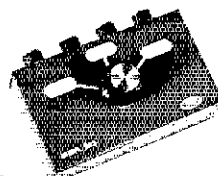
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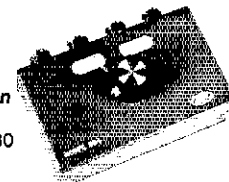
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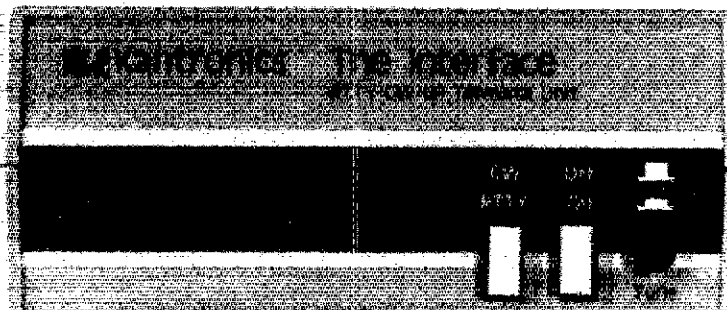
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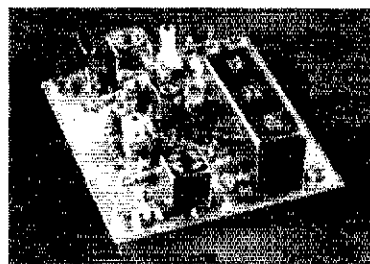
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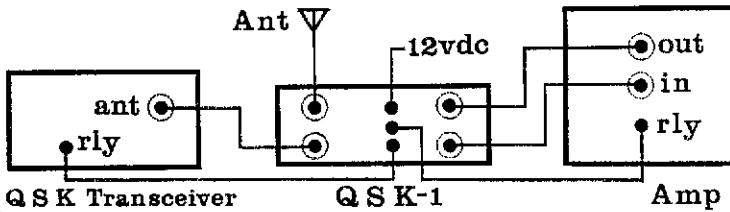
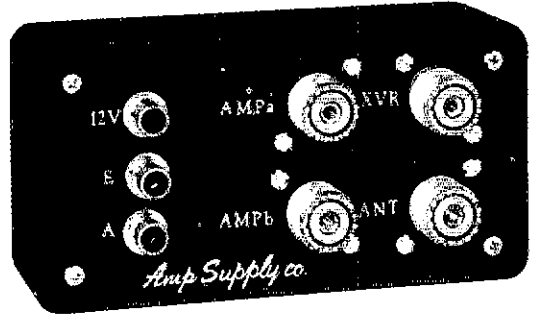
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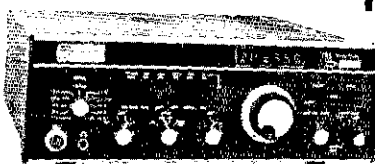


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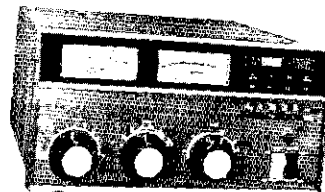
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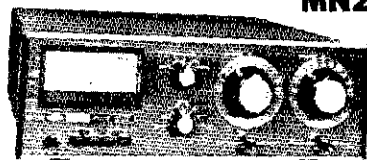
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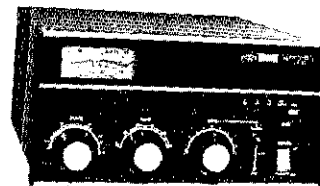
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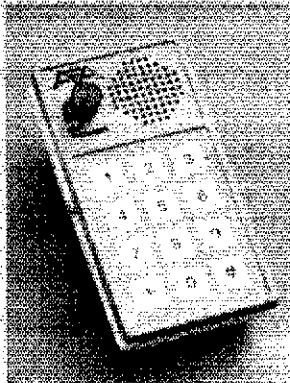
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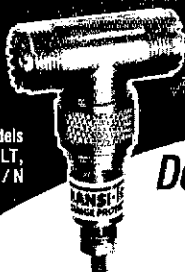
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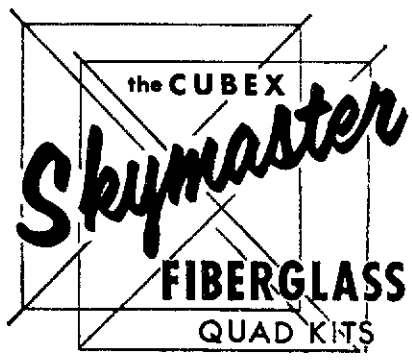
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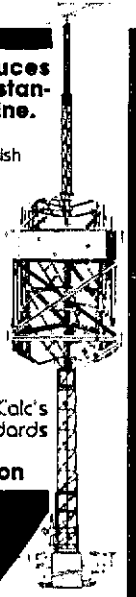
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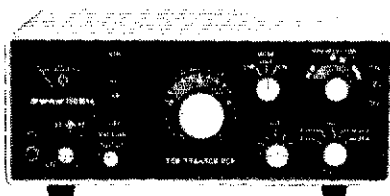
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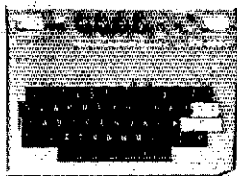


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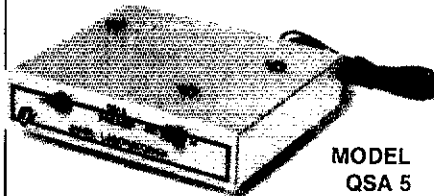


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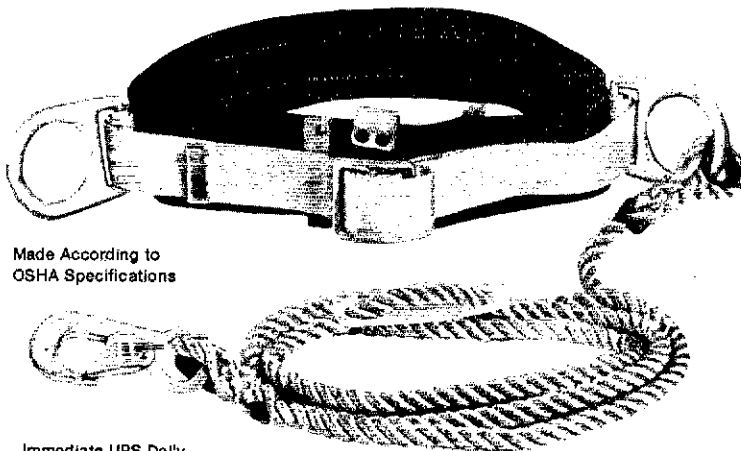


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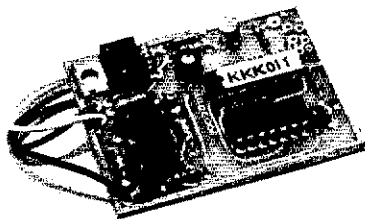
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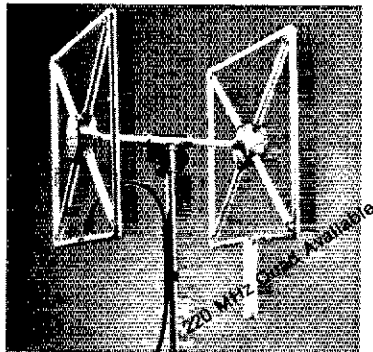
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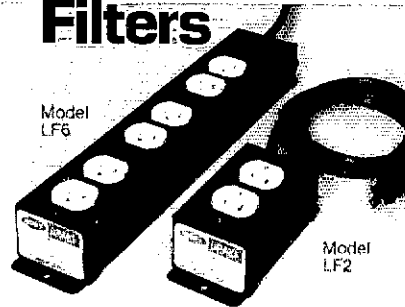


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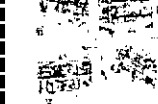
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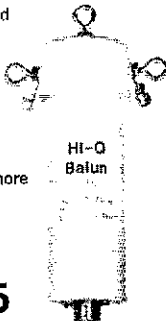
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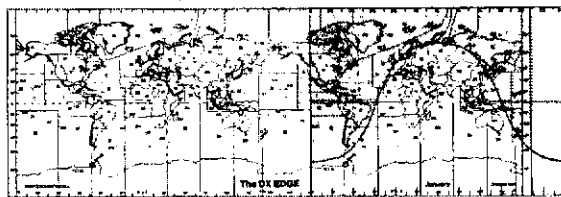
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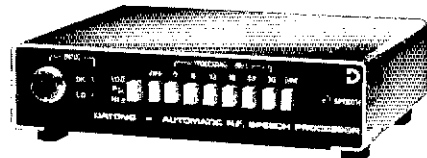
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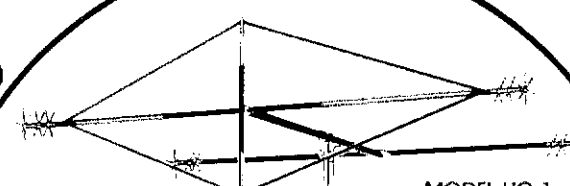


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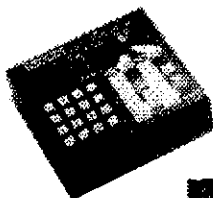
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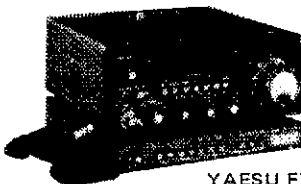
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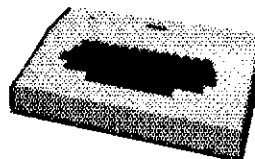
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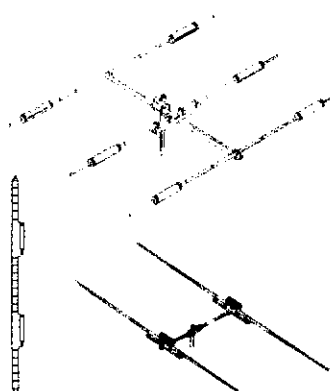
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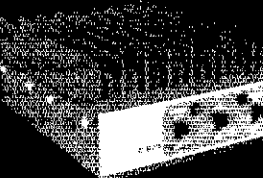
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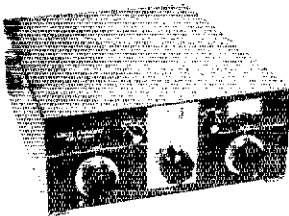
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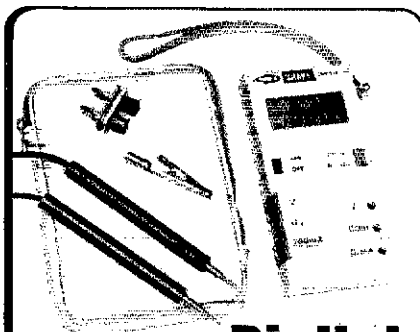
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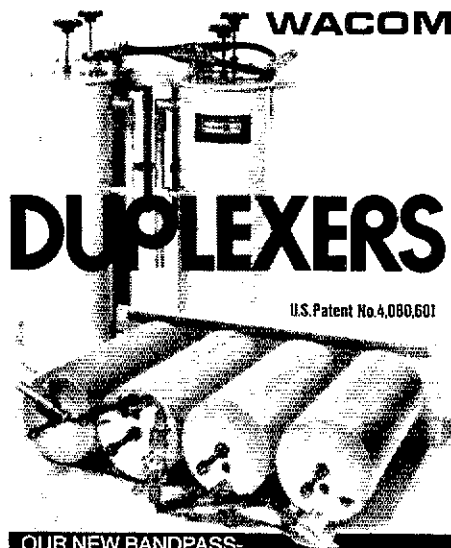
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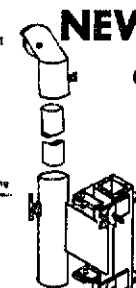
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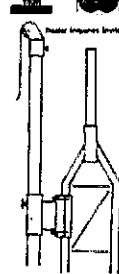
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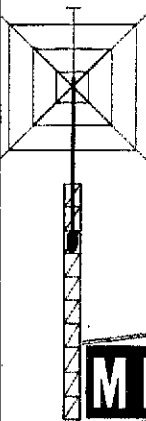
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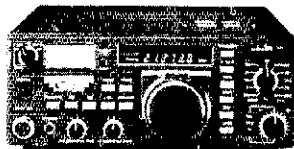
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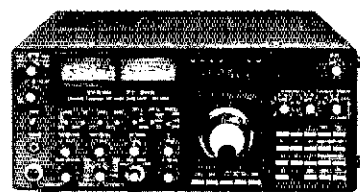


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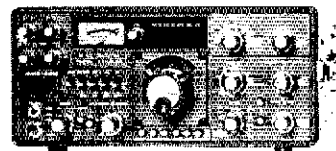
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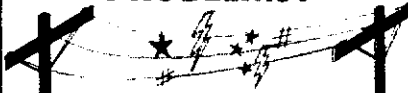
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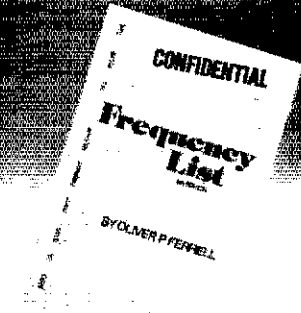
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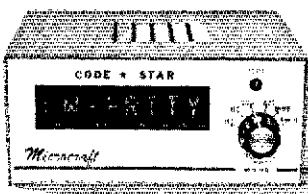
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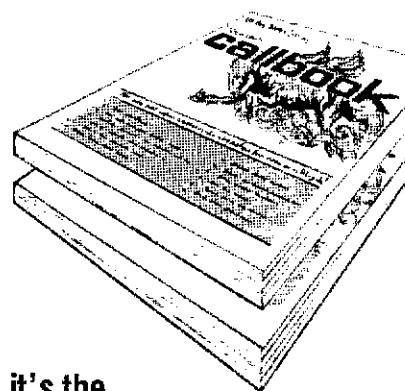
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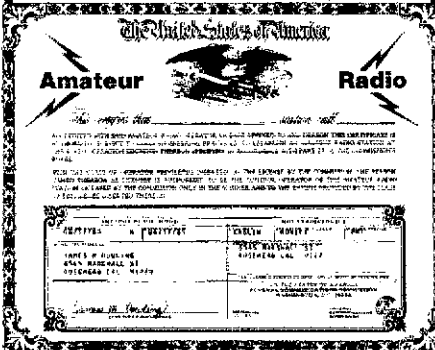
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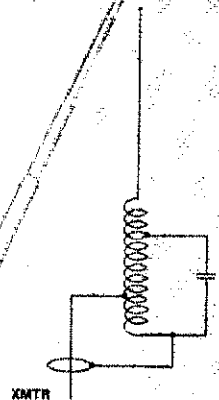
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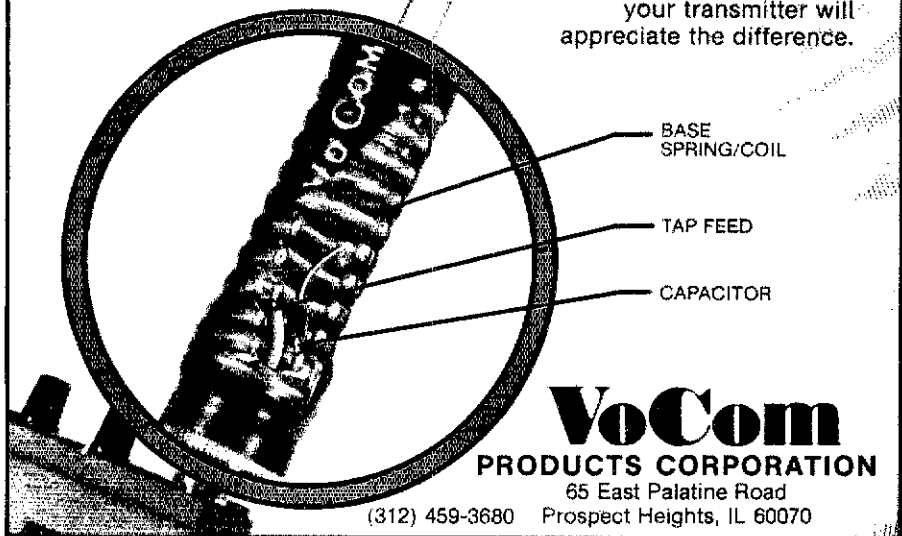
At right is the circuit that does it. The coil that doubles as a base spring is tap fed, and a matched capacitor completes the resonant circuit.

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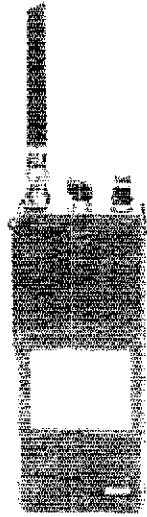
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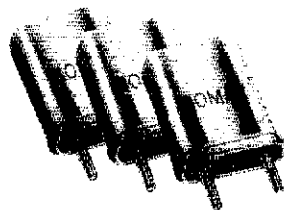
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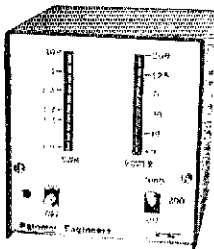


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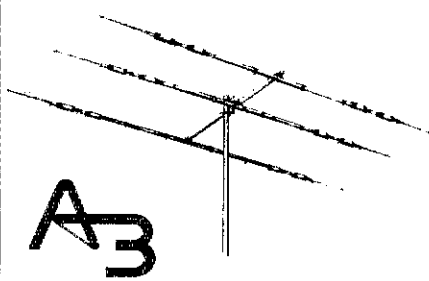
Index of Advertisers

AEA: Advanced Electronic Application: 146
ARRL National Convention: 136
AR Technical Products: 154
Advanced Receiver Research: 148, 161
Alpha Delta Communications: 147
Amateur Electronic Supply: 95, 100, 133, 144
Amateur Radio Supply of Nashville: A.R.S.O.N.: 96
Amateur Wholesale Electronics: 119, 146
American Radio Relay League: 116, 152, 164
Amidon Associates: 95
AMP-LETTER Co., The: 162
Amp Supply Co.: 144
Antenna Book, The: 146
Antenna Company of America: 152
Appliance & Equipment Co. Inc.: 103
Associated Radio: 151
Autek Research: 168
Autocode: 152
Barker & Williamson: 142
Barry Electronics: 131
Bauman Sales: 140
Bencher: 103
Ben Franklin Electronics: 138
Butternut Electronics: 128
CComm: 90, 91, 165
Caddell Coil Corp.: 162
Certified Communications: 138
Colorado Silver Co.: 161
Command Productions: 162
Comm Center, The: 103
Communications Center: 101, 150
Communications Specialists: 109
Crown MicroProducts: 130
Cubex Co. 148
Curtis Electro Devices: 150
Cushcraft: 5, 99, 161
Cygnus-Quasar Books: 149
DGM Electronics: 138
DX Print: 160
Daytapro Electronics: 165
Dentron Radio: 111
DigiMax Instruments Corp.: 117
Drake Co., R.L.: 126, 127, 140, 152, 158
EGE, Inc.: 140
ETCO Electronics: 144
Electronic Equipment Bank: 148
Encomm, Inc.: 4, 124
Forman, Mike: 138
Fox-Tango Corp.: 100
GLB Electronics: 160
Gilfer: 161
G.I.S.M.O.: 164
Gotham Antennas: 134
HAL Communications: 1
Ham Key Co.: 147
Hamlen, Harry A. K2QFL: 152
Ham Radio Center: 97, 149
Ham Radio Outlet: 86, 87
Ham Shack, The: 134
Harrison Radio Division of B/S Electronics, Inc.: 145
Harvey Sound, Inc.: 120
Heath Co.: 121
Henry Radio Stores: Cover 11
Herrman, Ted AE8G: 144
ICOM America, Inc.: 2, 105 thru 108
IIX Equipment, Ltd.: 158
Info-Tech: 155
Insert Products: 162

International Crystal Mfg. Co.: 138
JSR Engineering: 159
Jacksonville Hamfest Association: 144
Janel Laboratories: 150
Johnston, Bill, Computerized Great Circle Maps: 139
Jun's Electronics: 142
KDK Distributing Co. Inc.: 110
KLM: 118
Kalglo Electronics: 160
Kantronics: 98, 132, 143
Kengore Corp.: 152
LaCue Communications & Electronics: 156
Larsen Electronics: 122
LaRue Electronics: 132, 156
M/A-Com Video Satellites, Inc: 141
MFJ Enterprises: 135, 137, 139, 141
M&M Electronics: 120
Macrotronics: 94
Madison Electronics: 136, 164
Maggiore Electronic Lab: 128
Memphis Amateur Electronics: 139
Miami Radio Center Corp.: 159
Microcraft: 138, 162
Microlog: 129
Mid Com Electronics: 158
Mil Industries: 137
Mini-Products: 154
Mirage Communications Equipment, Inc.: 157
Missouri Radio Center: 160
Mosley Electronics, Inc.: 156
Murch Electronics: 157
N & G Distributors: 125
N.P.S. Inc.: 138
National Tower Co.: 142
Nema Electronics: 159
Nuts & Volts Magazine: 156
Nye Co., William: 95
P.C. Electronics: 165
Palomar Engineers: 96, 166
Payne Radio: 88
Personal Eyes: 141
RCA Service Co.: 153
RF Power Components: 156
Radio Amateur Callbook: 162
Radiokit: 143
Radiomasters: 92
Radios Unlimited: 161
Radio Warehouse: 154
Radio World: 156, 160
Robot Research: 89
Rockwell International/Collins Telecommunications: 123
Rolin Distributors: 165
Ross Distributing Co.: 154
San Antonio Travel: 163
Sartori Associates: 154
Sherwood Engineering: 158, 161
Skylane Products: 162
Space Electronics: 140
Spectronics, Inc.: 155
Superior Microwave Products, Inc. (SMP): 157
TET Antenna Systems: 92
Telrex Labs: 102
Ten-Tec: 93
Texas Towers: 104, 167
TOWTEC CORP.: 137
Trio-Kenwood Communications: 6, 7, Cover IV
Tristao Tower Co.: 148
Tufts Electronics: 139
UPI Communications Systems, Inc.: 151
Universal Radio: 159
Van Gorden Engineering: 153
Vanguard Labs: 141
Van Valzah Co., H.C.: 150
VoCom Products Corp.: 163
W9INN "Folded Unirold" Antenna: 157
Wacom Products: 158
Western Electronics: 140
Wheeler Applied Research Lab: 164
Wrightapes: 164
Xantek, Inc.: 153
Yaesu Electronics Corp.: 112 thru 115, 125, Cover III
Zephyr Services: 134

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| HDX48 | 48 ft | 10 sq ft | 303 | BXB7 | 349 | 26 | 375 |
| HDX56 | 56 ft | 10 sq ft | 385 | BXB8 | 419 | 30 | 449 |
| HDX40 | 40 ft | 18 sq ft | 281 | BXB7 | 313 | 26 | 339 |
| HDX48 | 48 ft | 18 sq ft | 363 | BXB8 | 399 | 30 | 429 |

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| HFGV | 80-10 mtr. Vertical | \$119 |
| TBR 160HD | 160-mtr. Coil Kit | \$ 49 |
| RM KIT | Roof Mount w/Stub Tuned Radials | \$ 39 |
| STR KIT | Stub Tuned Radial Kit | \$ 20 |

CUSHCRAFT

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|----------|--|-------|
| A3 | 3-El. Triband Beam | \$179 |
| A4 | 4-El. Triband Beam | \$229 |
| A743 | 40 mtr. Add-on Kit for A3 Antenna | \$ 69 |
| A744 | 40 mtr. Add-on Kit for A4 Antenna | \$ 69 |
| R3 | New Motor Tuned 20/15/10 mtr. Vertical | \$229 |
| AV5 | 80-10 mtr. Trap Vertical | \$ 95 |
| 20-3CD | 3-El. 20 mtr. Beam | \$179 |
| 20-4CD | 4-El. 20 mtr. Beam | \$239 |
| 15-3CD | 3-El. 15 mtr. Beam | \$ 99 |
| 15-4CD | 4-El. 15 mtr. Beam | \$109 |
| 10-3CD | 3-El. 10 mtr. Beam | \$ 76 |
| 10-4CD | 4-El. 10 mtr. Beam | \$ 89 |
| A50-5 | 5-El. 5 mtr. Beam | \$ 65 |
| 424B | 24-El. 432 MHz "Boomer" | \$ 63 |
| 214B | 14-El. 2 mtr. "Boomer" | \$ 69 |
| 214FB | 14-El. 2 mtr. FM "Boomer" | \$ 69 |
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| 2208 | 17-El. 220 MHz "Boomer" | \$ 75 |
| ARX2B | 2 mtr. "Ringo Ranger II" | \$ 36 |
| ARX450B | 450 Mhz "Ringo Ranger II" | \$ 38 |
| A147-20T | 2 mtr. Vert. & Horiz. 10-El. Beam | \$ 63 |
| A144-10T | 10-El. 2 mtr. Satellite Antenna | \$ 45 |
| A144-20T | 20-El. 2 mtr. Satellite Antenna | \$ 89 |
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| TH3MK3S | 3-El. Triband Beam | \$199 |
| TH3JRS | 3-El. Triband Beam | \$159 |
| TH2MK3S | 2-El. Triband Beam | \$139 |
| HY-QUAD | 2-El. Triband Quad | \$249 |
| 402BA5 | 2-El. 40 mtr. Beam | \$189 |
| 205BA5 | 5-El. 20 mtr. "Long John" | \$289 |
| 155BA5 | 5-El. 15 mtr. "Long John" | \$169 |
| 105BA5 | 5-El. 10 mtr. "Long John" | \$119 |
| 204BA5 | 4-El. 20 mtr. Beam | \$219 |
| 203BA5 | 3-El. 20 mtr. Beam | \$119 |
| 153BA5 | 3-El. 15 mtr. Beam | \$ 72 |
| 103BA5 | 3-El. 10 mtr. Beam | \$ 59 |
| D81015AS | 3-El. 10/15 mtr. Beam | \$159 |
| 64BS | 4-El. 6 mtr. Beam | \$ 49 |
| 66BS | 6-El. 6 mtr. "Long John" | \$ 99 |
| 18HTS | 80-10 mtr. Hy-Tower Vertical | \$329 |
| 18AVT/WBS | 80-10 mtr. Trap Vertical | \$ 89 |
| 214 | 14-El. 2 mtr. Beam | \$ 33 |
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| 5BDQ | 80-10 mtr. Trap Dipole | \$ 89 |
| BN86 | 80-10 mtr. KW Balun | \$ 15 |

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| TA-33 | 3-El. Triband Beam | \$199 |
| TA-33 Jr. | 3-El. Triband Beam | \$149 |
| TA-36 | 6-El. Triband Beam | \$309 |
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| 1/2" Copper H.L. Conn (UHF or N - Male or Female) | \$22.00 |
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| HDX40 | 40 ft. Free Standing (rated 18 sq. ft.) | \$259 |
| HDX48 | 48 ft. Free Standing (rated 10 sq. ft.) | \$289 |
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| 14 Ga. Stranded Copper (140 ft. Coil) | \$ 14.00 |
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Does Your Shiny New Rig Really Have: "STATE-OF-THE-ART" SELECTIVITY

**EXCITING
NEW RADIO
ACCESSORIES**



Add an Autek.
QF-1A Active Filter

For SSB & CW
PATENT PENDING

Only \$73 ppd. U.S.A.

115 VAC supply built-in. Filter by-passed when off.

SUPER-RANGE Auxiliary Notch rejects 80 to 11,000 Hz! Covers signals other notches can't touch.

Four main filter modes for any QRM situation.

Continuously variable main selectivity (to an incredible 20 Hz!)

Continuously variable main frequency. (250 to 2500 Hz, all modes.)

AUTEK pioneered the ACTIVE AUDIO FILTER way back in 1972. Today, we're still maintaining that engineering leadership. Our QF-1A evolved from suggestions from thousands of owners, and years of dedication to making the "ultimate" filter. No gimmicks — just something that really "works" like the ad says. You're in for a treat!

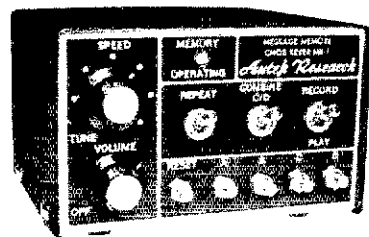
Autek filters gained their reputation by using a costly INFINITELY VARIABLE design. Yet, mass production (we sell only ONE MODEL — the best) makes it a tremendous bargain. You're not limited by a few fixed positions. You vary selectivity 100:1, and vary frequency over the entire usable audio range. PEAK CW (or voice) with an incredible 20 HZ

BANDWIDTH, but also variable all the way to "flat." Imagine what the NARROWEST CW FILTER MADE will do to QRM! Reject whistles with the most flexible NOTCH you've heard. Wide or narrow. Depth to 70 dB. LOWPASS helps you cope with SSB hiss and splatter. Skirts exceed 80 dB. Most above features were in the popular QF.1 (See excellent review in March, 1977 QST.) The new "A" model is more selective, adds a HIGHPASS mode for SSB, and a great AUXILIARY NOTCH (35 to 60 dB) to give TWO NOTCHES, NOTCH/PEAK, NOTCH/LOWPASS, or NOTCH/HIGHPASS! If this doesn't convince you, please ASK ON THE AIR. Owners are our best salesmen!

Due to cost and panel-space limitations, even the latest rigs only include a fraction of the QF-1A features. We recommend you buy the best rig you can afford, spend \$3,000 or more, then add a QF-1A and listen to the improvement! WORKS WITH Yaesu, Kenwood, Drake, Swan, Atlas, Tempo, Collins, Heath, S/1, etc., ANY RIG!

Hooks up in minutes. Plug into your rig's phone jack, or attach to speaker wires. Plug speaker or phones into QF-1A rear-panel jack. That's it! Filter supplies 1 watt to fill a room. No batteries reqd. (+12 VDC hookup possible.) 6 1/2 x 5 x 2 1/2". Handsome light/dark grey styling. Get yours today.!

CMOS PROGRAMMABLE KEYSER MAKES CW FUN!



Calls CQ while you relax.
Also remembers name, QTH, contest exchanges.
Record anything you want in seconds!

Model MK-1 \$104.50 ppd. U.S.A.

Our classic MK-1 should make you wonder why anyone would buy an ordinary keyer, when memory costs so little! Records 4 messages. Just select "record," tap the A, B, C, or D message, and start sending at any speed! Record over old messages as easily. Playback by tapping the same button. Each message holds about 25 characters (letters, numbers). Total 100 characters. Handy repeat switch repeats message forever until reset. Very useful for CQ's. YOU SIT BACK AND WAIT FOR A CALL! Another switch combines two messages for 50

characters "Memory-saver" feature standard.

This "state-of-the-art" keyer pleases beginners and CW "pros" alike. DOT AND DASH MEMORIES. TRIGGERED CLOCK. IAMBIC. SELF COMPLETING. JAM PROOF. 5 to 50+ WPM. LATEST CMOS FOR LOW CURRENT. Built-in monitor, speaker. Widely adjustable tone, volume. Perfect weighting at all times. No fiddling with an adjustment that varies with speed. NEW: DUAL TRANSMITTER OUTPUTS key ANY modern (post

1963) ham rig directly without a battery or relay, including difficult-to-key solid-state rigs. 115VAC supply built in, or connect 9-14 VDC to rear panel. Use with ANY paddle. 6x3 1/2 x 5". Burned-in and tested. Sockets for IC's. Full instructions.

NOW AVAILABLE. 4096 BIT MEMORY EXPANDER (ME-1) allows 16 messages, 400 chars. & "combine" for longer messages. Plugs into memory socket of ANY MK-1 ever made. Installs in 10 to 30 mins. Full instructions. Buy your MK-1 now and easily add memory later if you wish!

FLASH! An MK-1 breaks its old world CW record! A single operator worked well over 4000 DX QSO's in 48 hours. And heard the weak ones through a QF-1. Second-place wasn't even close. Get the choice of champions — AUTEK!

ORDER BLANK (Or Use Separate Sheet of Paper)

Please Rush QF-1A Filter at \$73.00
ppd. via MK-1 Keyer at \$104.50
Speedy UPS. ME-1 Expander for MK-1 at \$35 [factory installed]
 ME-1 Owner installed at \$25 [save \$10]

Add 5% tax in Fla. Add \$3 each to Canada, Hawaii and Alaska. \$3 for UPS air. Add \$18 each elsewhere [shipped air].

Enclosed is \$ _____
VISA or MC# _____ Exp. date _____

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

Send to Autek Research, Box 302, Dept. E., ODESSA FL 33556

PRICING: Autek is an innovator, so we're heavily copied. Yet, the "copies" cost you much more. We also give you a free AC supply and pay US shipping. How do we do it? Volume. And because WE SELL ONLY FACTORY DIRECT. No 25% to 50% middlemen markups.

DELIVERY: For 9 years we've shipped over 95% of orders from stock. Some companies have regular long delays. Not us. Order with confidence.

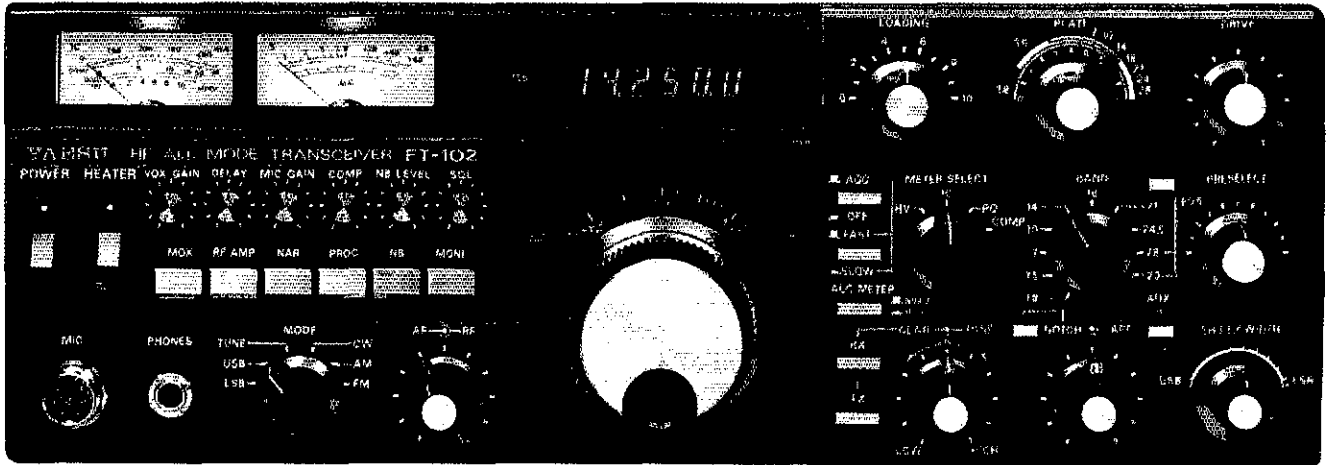
REPUTATION: Don't take our word. Ask on the air for a personal recommendation.

DIRECT MAIL: Your order or request for information will be processed just as fast and with fewer chances for error if you write. PLEASE ORDER BY MAIL. We're best set up for mail. However, if you need to call, our number is (813) 920-4349.

Autek Research

Box 302
Dept. E.
ODESSA, FL
33556

New Yaesu FT-102 Series Transceiver of Champions!



The long-awaited new generation of Yaesu HF technology has arrived! New research in improved receiver filtering and spectral purity is brought to bear in the competition-bred FT-102, the HF transceiver designed for active Amateurs on today's intensely active bands!

Unique Cascaded Filter System

The FT-102 utilizes an advanced 8.2 MHz and 455 kHz IF system, capable of accepting as many as three filters in cascade. Optional filters of 2.9 kHz, 1.8 kHz, 600 Hz, and 300 Hz may be combined with the two stock 2.9 kHz filters for operating flexibility you've never seen in an HF transceiver before now!

All New Receiver Front End

Utilizing husky junction field-effect transistors in a 24 volt, high-current design, the FT-102 front end features a low-distortion RF preamplifier that may be bypassed via a front panel switch when not needed.

IF Notch and Audio Peak Filter

A highly effective 455 kHz IF Notch Filter provides superb rejection of heterodynes, carriers, and other annoying interference appearing within the IF passband. On CW, the Audio Peak Filter may be switched in during extremely tight pile-up conditions for post-detection signal enhancement.

Variable IF Bandwidth with IF Shift

The FT-102's double conversion receiver features Yaesu's time-proven Variable Bandwidth System, which utilizes the cascaded IF filters to provide intermediate bandwidths such as 2.1 kHz, 1.5 kHz, or 800 Hz simply by twisting a dial. The Variable Bandwidth System is used in conjunction with the IF Shift control, which allows the operator to center the IF passband frequency response without varying the incoming signal pitch.

Wide/Narrow Filter Selection

Depending on the exact combination of optional filters you choose, a variety of wide/narrow operating modes may be selected. For example, you may set up 2.9 kHz in SSB/WIDE, 1.8 kHz in SSB/NARROW, then select 1.8 kHz for CW/WIDE, and 600 Hz or 300 Hz for CW/NARROW. Or use the Variable Bandwidth to set your SSB bandwidth, and use 600 Hz for CW/WIDE and 300 Hz for CW/NARROW! No other manufacturer gives you so much flexibility in selecting filter responses!

Variable Pulse Width Noise Blanker

Ignition noise, the "Woodpecker," and power line noise are modern-day enemies of effective Amateur operation. The FT-102 Noise Blanker offers improved blanking action on today's man-made noise sources (though no blanker can eliminate all forms of band noise) for more solid copy under adverse conditions.

Low Distortion Audio/IF Stage Design

Now that dynamic range, stability, and AGC problems have been largely eliminated thanks to improved technology, Yaesu's engineers have put particular attention on maximizing intelligence recovery in the receiver. While elementary filter cascading schemes often degrade performance, the FT-102's unique blend of crystal and ceramic IF filters plus audio tone control provides very low phase delay, reduced passband ripple, and hence increased recovery of information.

Heavy Duty Three-Tube Final Amplifier

The FT-102 final amplifier uses three 6146B tubes for more consistent power output and improved reliability. Using up to 10 dB of RF negative feedback, the FT-102 transmitter third-order distortion products are typically 40 dB down, giving you a studio quality output signal.

Dual Metering System

Adopted from the new FT-ONE transceiver, the Dual Metering System provides simultaneous display of ALC voltage on one meter along with metering of plate voltage, cathode current, relative power output, or clipping level on the other. This system greatly simplifies proper adjustment of the transmitter.

Microphone Amplifier Tone Control

Recognizing the differences in voice characteristics of Amateur operators, Yaesu's engineers have incorporated an ingenious microphone amplifier tone control circuit, which allows you to tailor the treble and bass response of the FT-102 transmitter for best fidelity on your speech pattern.

RF Speech Processor

The built-in RF Speech Processor uses true RF clipping, for improved talk power under difficult conditions. The clipping type speech processor provides cleaner, more effective "punch" for your signal than simpler circuits used in other transmitters.

VOX with Front Panel Controls

The FT-102 standard package includes VOX for hands-free operation. Both the VOX Gain and VOX Delay controls are located on the front panel, for maximum operator convenience.

IF Monitor Circuit

For easy adjustment of the RF Speech Processor or for recording both sides of a conversation, an IF monitor circuit is provided in the transmitter section. When the optional AM/FM unit is installed, the IF monitor may be used for proper setting of the FM deviation and AM mic gain.

WARC Bands Factory Installed

The FT-102 is factory equipped for operation on all present and proposed Amateur bands, so you won't have to worry about retrofitting capability on your transceiver. An extra AUX band position is available on the bandswitch for special applications.

Full Line Of Accessories

For maximum operating flexibility, see your Authorized Dealer for details of the complete line of FT-102 accessories. Coming soon are the FV-102DM Synthesized VFO, SP-102 Speaker/Audio Filter, a full line of optional filters and microphones, and the AM/FM Unit.

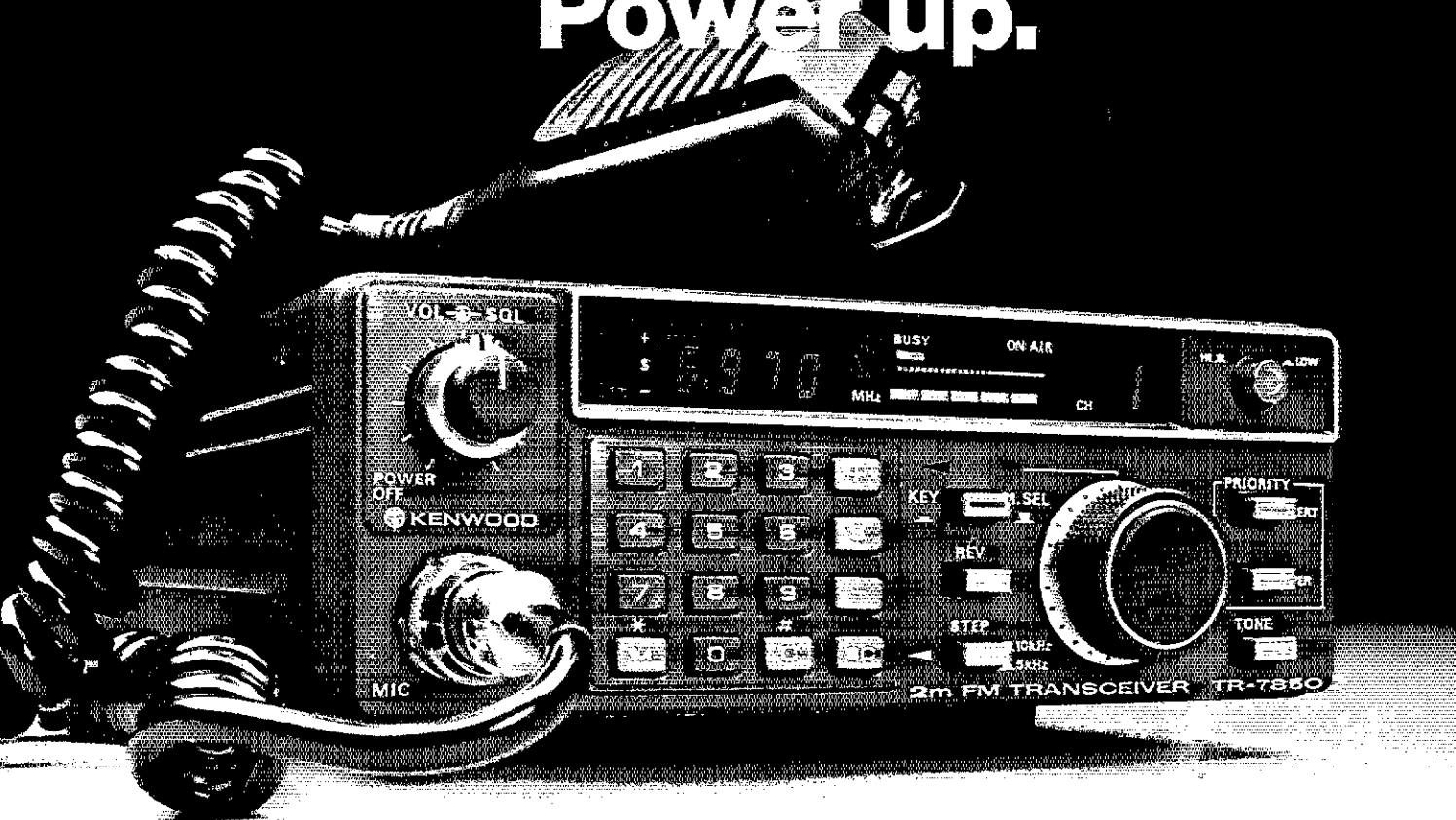
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YAESU
The radio.



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YAESU Eastern Service Ctr., 9812 Princeton-Glendale Rd., Cincinnati, OH 45246 • (513) 874-3100

Power up.



40 W, 15 memories/offset recall, scan, priority, DTMF touch-pad

TR-7850

Kenwood's remarkable TR-7850 2-meter FM mobile transceiver provides all the features you could desire, including a powerful 40 watts RF output. Frequency selection is easier than ever, and the rig incorporates new memory developments for repeater shift, priority, and scan, and includes a built-in autopatch touch-pad (DTMF) encoder. A 25-watt output version, the TR-7800, is also available.

TR-7850 FEATURES:

- **Powerful 40 watts power output**
Selectable high or low power operation. High 40-watt output provides reliable signal for wide area coverage.
- **15 multifunction memory channels, easily selectable with a rotary control**
M1-M13... memorize frequency and offset (± 600 kHz or simplex). M14... memorize transmit and receive frequencies independently for nonstandard offset.
M0... priority channel, with simplex, ± 600 kHz, or nonstandard offset operation.
- **Internal battery backup for all memories**
All memory channels (including transmit offset) are retained when four AA NiCd batteries (not Kenwood supplied) are installed in battery holder inside TR-7850. Batteries are automatically charged while transceiver is connected to 12-VDC source.
- **Extended frequency coverage**
143.900-148.995 MHz, in switchable 5-kHz or 10-kHz steps.

- **Priority alert**
M0 memory is priority channel. "Beep" alerts operator when signal appears on priority channel. Operation can be switched immediately to priority channel with the push of a switch.
- **Built-in autopatch touch-pad (DTMF) encoder**
Front-panel touch pad generates all 12 telephone-compatible dual tones in transmit mode, plus four additional DTMF signaling tones (with simultaneous push of REV switch).
- **Front-panel keyboard**
For frequency selection, transmit offset selection, memory programming, scan control, and selection of autopatch encoder tones.
- **Autoscan**
Entire band (5-kHz or 10-kHz steps) and memories. Automatically locks on busy channel; scan resumes automatically after several seconds, unless CLEAR or mic PTT button is pressed to cancel scan.
- **Up/down manual scan**
Entire band (5-kHz or 10-kHz steps) and memories, with UP/DOWN microphone (standard).

- **Repeater reverse switch**
Handy for checking signals on the input of a repeater or for determining if a repeater is "upside down."
- **Separate digital readouts**
To display frequency (both receive and transmit) and memory channel.
- **LED bar meter**
For monitoring received signal level and RF output.
- **LED indicators**
To show: +600 kHz, simplex, or -600 kHz transmitter offset; BUSY channel; ON AIR.
- **TONE switch**
To actuate subaudible tone module (not Kenwood-supplied).
- **Compact size**
Depth is reduced substantially.
- **Mobile mounting bracket**
With quick-release levers.

More information on the TR-7850 is available from all authorized dealers of Trio-Kenwood Communications
1111 West Walnut Street, Compton, California 90220.

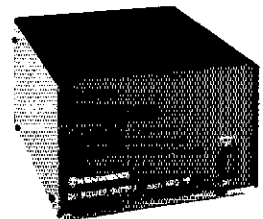
KENWOOD
...pacesetter in amateur radio

Matching accessory for fixed-station operation:

- KPS-12 fixed-station power supply for TR-7850

Other accessories not shown:

- KPS-7 fixed-station power supply for TR-7800
- SP-40 compact mobile speaker



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