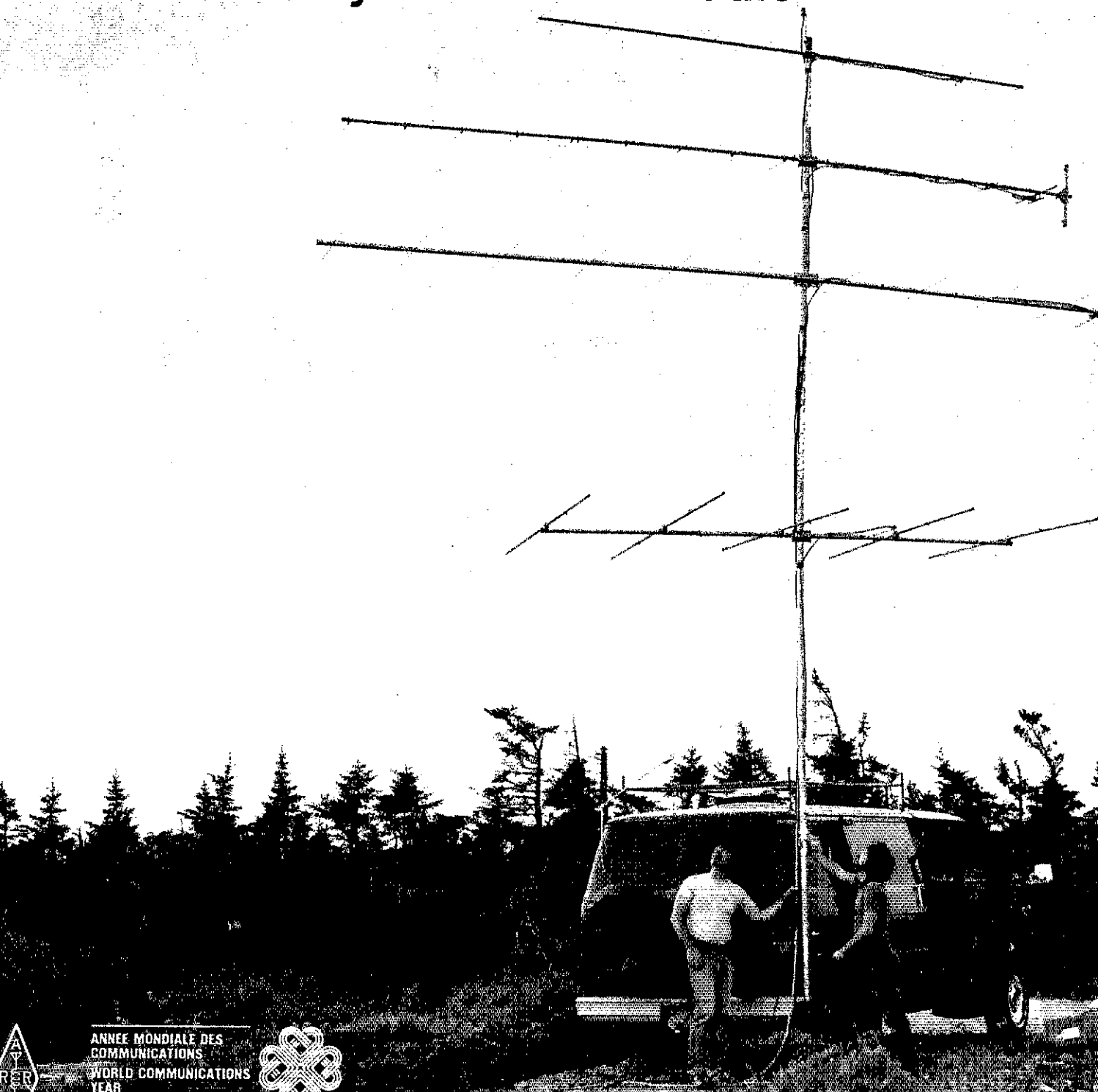
September 1983 $2.50

QST

devoted entirely to Amateur Radio



ANNEE MONDIALE DES COMMUNICATIONS
WORLD COMMUNICATIONS YEAR
AÑO MUNDIAL DE LAS COMUNICACIONES
1983

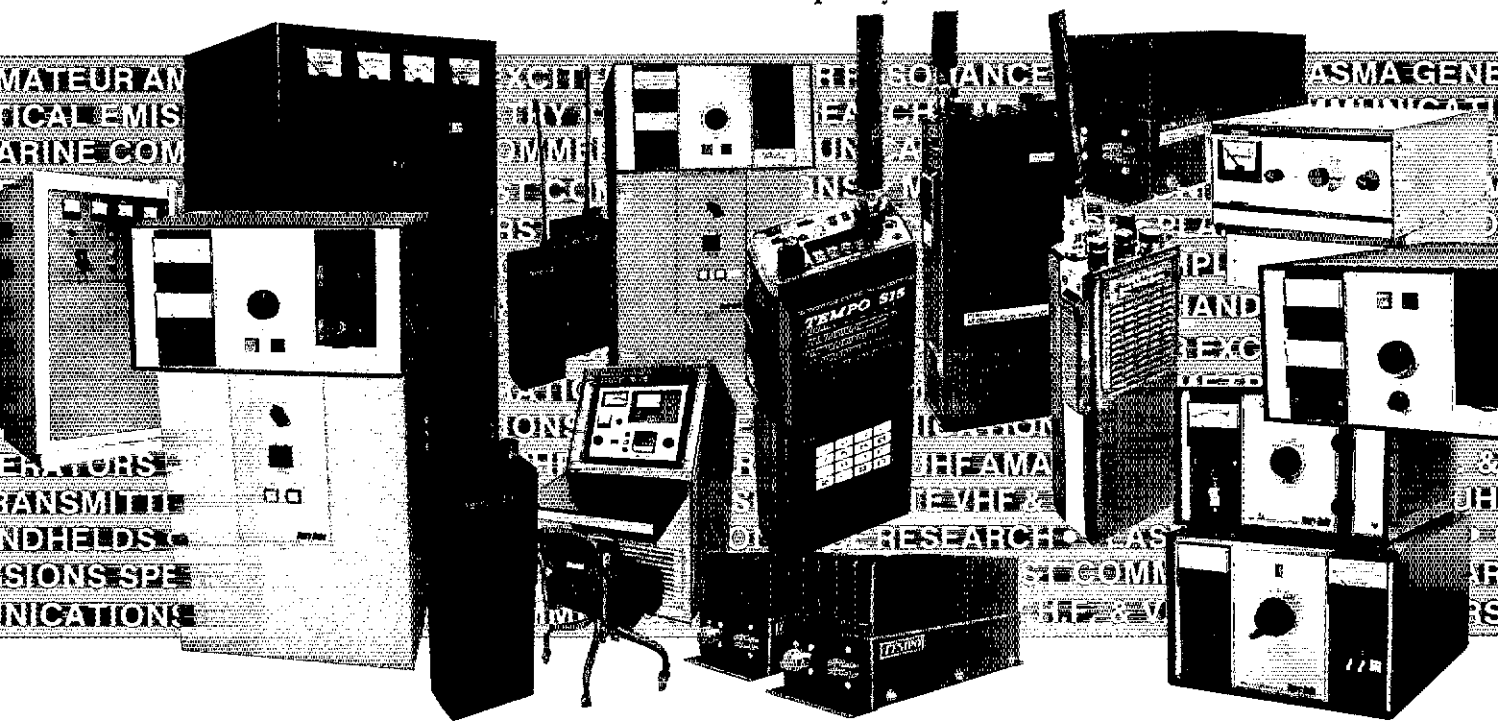
VHF QSO Party: 5-band fun

Page 92

Henry Radio has

RF POWER FOR SALE

No, we don't sell RF by the watt but we do offer a broad line of power RF devices for many different services... communications, HF-VHF-UHF (both vacuum tube and solid state), plasma generation for sputtering, etching, laser excitation, optical emissions spectrometry, cancer research, nuclear magnetic resonance, NMR imaging, meteor burst communications and many others. Frequencies from 1.5 to 500 MHz and power levels from 10 watts to 10,000 watts. Possibly no other single company offers such a wide range of standard and special RF power amplifiers
It all started many years ago with superb amateur linear amplifiers and today as always Henry amplifiers are famous throughout the Amateur world of HF, VHF and UHF communications.
Today the range of choice is truly "mind boggling".
Consider these examples:
Plasma excitation for sputtering or etching... frequencies at 13.56, 27.12 or 40.68. Powers from 500 watts to 10,000 watts.
Marine communications... 5,000 and 10,000 watts HF shore or shipboard CW, RTTY, SSB for 4, 6, 8, 12, 16, 22 MHz.
Commercial two-way FM... solid state to 130 watts, frequencies from 30 MHz to 500 MHz. Vacuum tubes to 500 watts.
Nuclear magnetic resonance pulse amplifiers... powers from 500 to 10,000 watts on the resonance frequency of choice.

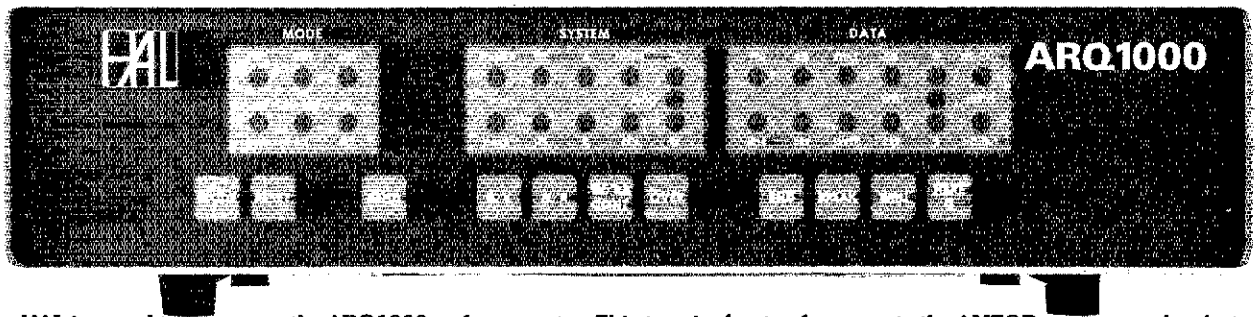


For more than half a century Henry Radio has provided the world's most diverse source of Amateur radio equipment. Now we offer the same expert personalized assistance for commercial, industrial, scientific, medical and research applications either communications or process engineering. Tell us how we can help you. Call or write Ted Henry, Ted Shannon or Mary Silva (Los Angeles office).

Henry Radio

2050 S. BUNDY DR., LOS ANGELES, CA 90025 (213) 820-1234 • 931 N. EUCLID, ANAHEIM, CA 92801 (714) 772-9200 • BUTLER, MO 64730 (816) 679-3127

AMTOR RTTY

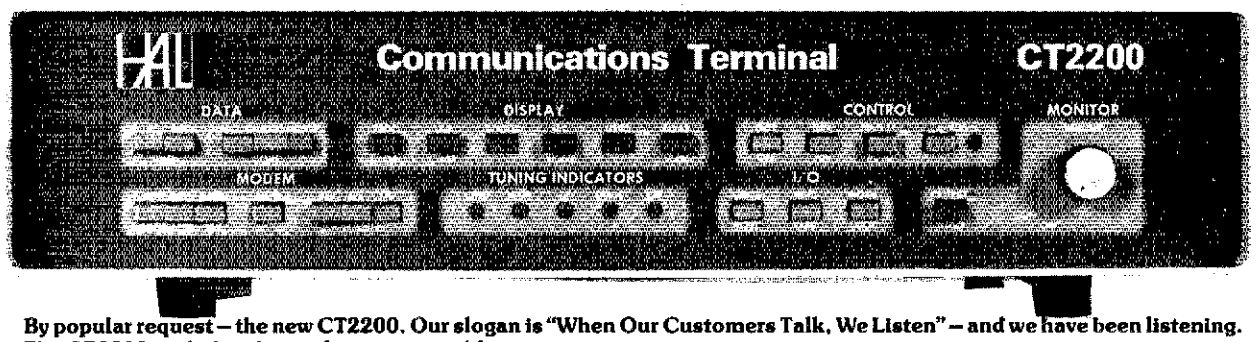


HAL is proud to announce the ARQ1000 code converter. This terminal not only supports the AMTOR amateur codes, but meets ALL of the commercial requirements of CCIR Recommendation 476-2. The ARQ1000 can be used with present and previous generation HAL RTTY products. In fact, any Baudot or ASCII full duplex terminal at data rates from 45 to 300 baud may be used with the ARQ1000. Some of the outstanding features of the ARQ1000 are:

- Send/receive error-free ARQ, FEC, and SEL-FEC modes
- Automatic listen mode for ARQ, FEC, and SEL-FEC
- Meets commercial requirements of CCIR 476-2
- By-pass mode for normal RTTY without changing cables
- Programmable ARQ access code, SEL-CAL code and WRU
- Programmable codes stored in non-volatile EEPROM
- Keyboard control of normal send/receive functions
- 30 Front panel indicators and 11 control switches
- Interfacing for loop, RS232, or TTL I/O
- "Handshaking" control for printer and keyboard or tape
- Self-contained with 120/240V, 50/60 Hz power supply
- Cabinet matches style and size of CT2200 and CT2100
- Table or rack mounting
- Built-in DM170 modem option available
- Encryption option available for commercial users
- 8½" × 17" × 10½"

The ARQ1000 is commercial-quality equipment that will give you the outstanding performance you expect from a HAL product. Write for full details and specifications of the ARQ1000.

BY POPULAR REQUEST

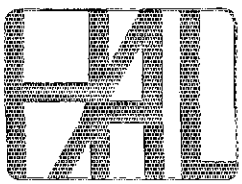


By popular request – the new CT2200. Our slogan is "When Our Customers Talk, We Listen" – and we have been listening. The CT2200 includes these often requested features:

- New AMTOR connections for use with ARQ1000
- Keyboard programming of all 8 "brag-tape" messages
- Programmable selective call code
- Expanded HERE IS storage for a total of 88 characters
- Non-volatile storage of HERE IS, "brag-tape," and SEL-CAL code
- 3⅝" × 17" × 10½"

All of the proven CT2100 features are retained. Some of these features are:
• Tuning scope outputs (a MUST for AMTOR) • Built-in demodulator for high tones, low tones, "103", or "202" modem tones • 36 or 72 character display lines • 2 pages of 72 character lines or 4 pages of 36 character lines • Split screen or full screen display • Baudot or ASCII. 45 to 1200 baud • Full or half duplex • Morse code send/receive at 5 to 99 wpm • Send/receive loop connection • Automatic transmit/receive control (KOS) • Audio, RS232C, or Loop I/O • On-screen tuning and status indicators • Clearly labeled front panel switches, not obscure keyboard key combinations • Separate convenient lap-size keyboard • Internal 120/240, 50/60 Hz power supply • Attractive shielded metal cabinet

In addition, an update kit is available so that all CT2100 owners can update their CT2100's to include CT2200 features. The kit even includes a new CT2200 front panel! Rather than making a proven product obsolete, HAL put even more behind the buttons. Pick up a CT2200 at your favorite HAL dealer and join the RTTY fun. Write for our full RTTY catalog.



HAL COMMUNICATIONS CORP.
Box 365
Urbana, IL 61801 (217) 367-7373

NEW!

ICOM IC-745

A New Transceiver Worth Celebrating!

9 HAM BANDS! **GENERAL COVERAGE RECEIVER!** **16 MEMORIES!** **SCANNING!** **PASSBAND TUNING!** **VARIABLE NB & AGC!**

What's the celebration about? The IC-745 . . . a new all ham band HF transceiver with SSB, AM, CW, RTTY and an FM option . . plus, a 100KHz — 30MHz general coverage receiver.

And . . . the IC-745 has a combination of features found on no other transceiver at such an incredibly low price.

Compare these exceptional features:

- 100KHz ~ 30mHz Receiver
- 16 Memories
- Full function Metering with a built in SWR Bridge
- IF Shift and Pass Band Tuning
- 10Hz / 100Hz / 1KHz Tuning Rates with 1MHz band steps
- Optional Internal AC Power Supply
- Adjustable Noise Blanker (width and level)
- Continuously Adjustable AGC with an OFF position
- Receiver Preamp
- 100% Transmit Duty Cycle

Other Standard Features:

- 100 Watt Output Transmitter with exceptionally low IMD
- VOX
- Speech Compressor
- Tunable Notch Filter
- RIT and XIT
- All Mode Squelch
- Scanning
- ICOM System Compatibility

Optional Accessories:

• IC-PS15	External Power Supply
• IC-PS740	Internal Power Supply for the ultimate in Portability
• IC-2KL	Linear Amplifier
• IC-SP3	External Speaker
• IC-MB12	Mobile Mounting Bracket
• IC-AT100	Antenna Tuner (100W)
• IC-AT500	Antenna Tuner (500W)
• IC-BC10	Memory Backup
• IC-EX241	Marker Module
• IC-EX242	FM Module
• IC-EX243	Electronic Keyer
• IC-FL52A	500Hz 455KHz CW Filter
• IC-FL45	500Hz 9MHz CW Filter
• IC-FL54	270Hz 9MHz CW Filter
• IC-FL53A	250Hz 455MHz CW Filter
• IC-FL44A	2.1KHz 455KHz SSB Filter
• IC-SM6	Desk Mic
• IC-HM12	Hand Mic

The IC-745 is the only transceiver today that has such features standard . . . the number of options and accessories available . . . and such a low price.

ICOM is *...Simply the Best* in quality built ham equipment today. See the IC-745 at your local authorized ICOM dealer or contact ICOM for more information.

ICOM

ICOM America, Inc., 2112-116th Ave NE, Bellevue, WA 98004 **(206)454-8155** / 3331 Towerwood Drive, Suite 307, Dallas, TX 75234 **(214)620-278**

September 1983 *Volume LXVII Number 9*

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OUR COVER

It's Saturday, June 11, and the WA2VUN/1 VHF QSO Party operation is underway atop Cadillac Mountain in Maine. The 3-person, 4-band effort netted a respectable score, some decent DX — and an unforgettable weekend! To see how you did, see page 92.

CONTENTS

DEPARTMENTS

Subscription rate: $25 per year postpaid in the U.S. and Possessions, $30 in Canada, and $33 elsewhere. All payments must be in U.S. funds. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U.S. and for an equivalent amount in U.S. funds. Individuals may apply for membership at the rates shown. Licensed Amateur Radio operators under 18 or over 65 — $20 U.S., $25 Canada, $28 elsewhere, plus proof of age. Membership and *QST* cannot be separated. Fifty per cent of dues is allocated to *QST*, the balance for membership. Single copies $2.50.

Second-class postage paid at Hartford, CT and at additional mailing offices. Postmaster: Form 3579 requested.

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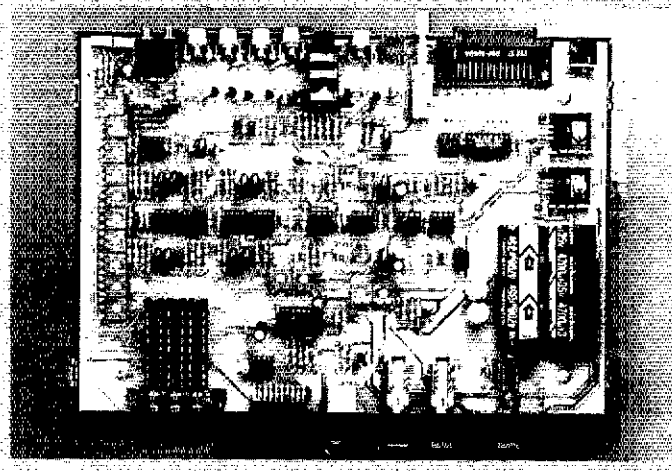
CHAMPAGNE RTTY/CW on a Beer Budget



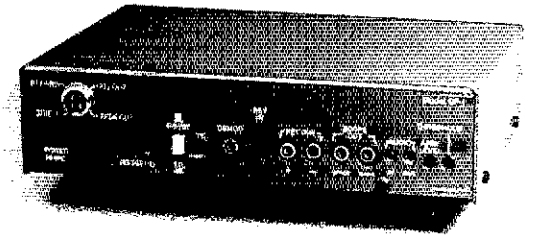
CP-1 Computer Patch™ Interface

The AEA Model CP-1 Computer Patch™ interface will let you discover the fastest growing segment of Amateur Radio: computerized RTTY and CW operation.

When used with the appropriate software package (see your dealer), the CP-1 will patch most of the popular personal computers to your transceiver for a complete full-feature RTTY/CW station. No computer programming skills are necessary. The CP-1 was designed with the RTTY neophyte in mind, but its sophisticated circuitry and features will appeal to the most experienced RTTY operator.

The CP-1 offers variable shift capability in addition to fixed 170 Hz dual channel filtering. Auto threshold plus pre and post limiter filters allow for good copy under fading and weak signal conditions.

Transmitter AFSK tones are generated by a clean, stable function generator. Plus (+) and minus (-) output jacks are also provided for CW keying of your transmitter. An optional low cost RS-232 port is also available. The CP-1 is powered with 16 VAC which is supplied by a 117 VAC wall adaptor included with the CP-1.



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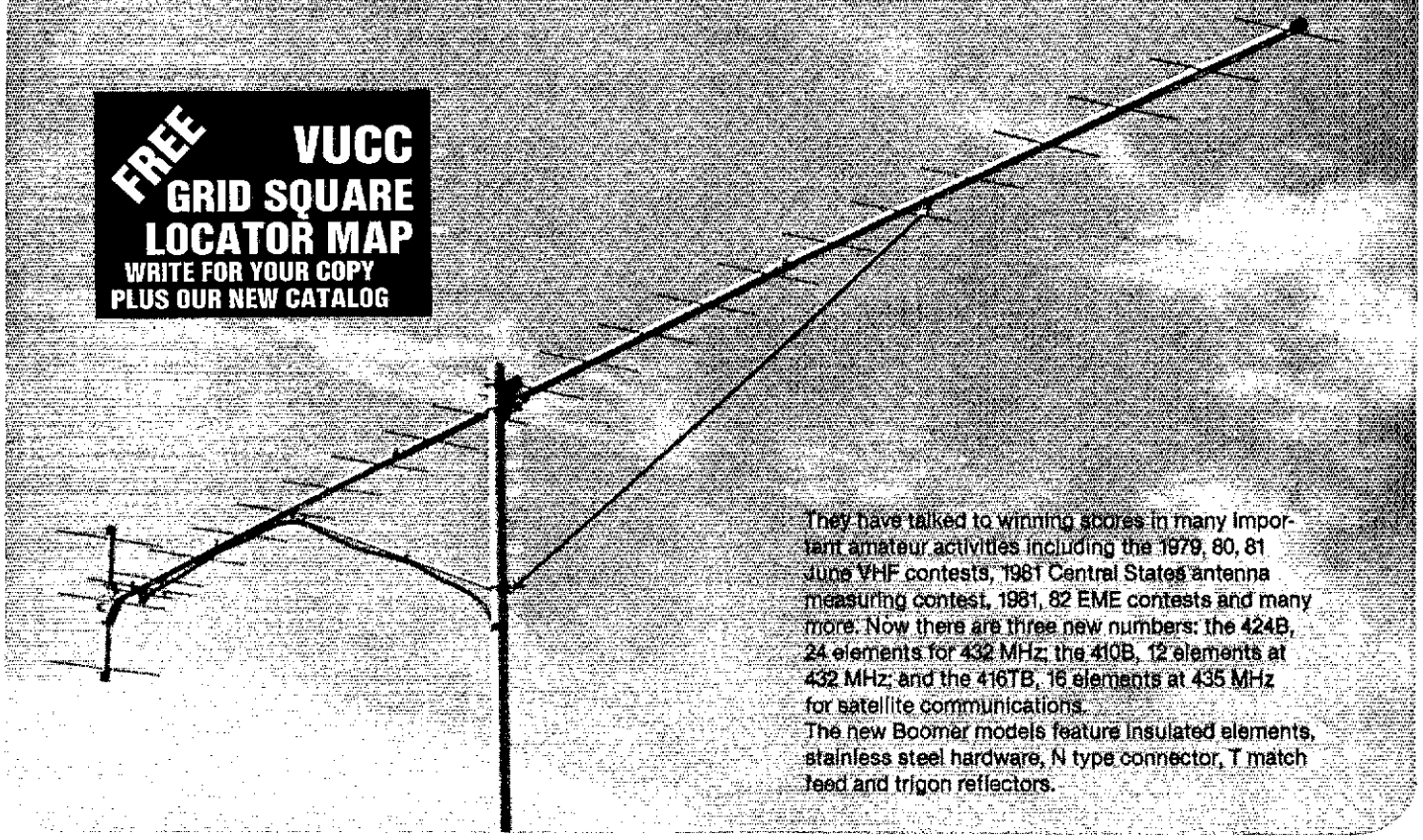
Brings you the Breakthrough!

Our numbers talk

424B

FREE VUCC GRID SQUARE LOCATOR MAP
WRITE FOR YOUR COPY PLUS OUR NEW CATALOG



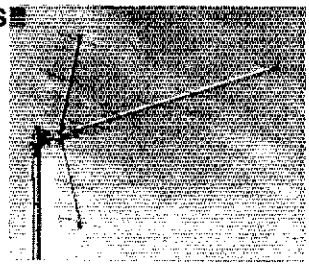
They have talked to winning scores in many important amateur activities including the 1979, 80, 81 June VHF contests, 1981 Central States antenna measuring contest, 1981, 82 EME contests and many more. Now there are three new numbers: the 424B, 24 elements for 432 MHz; the 410B, 12 elements at 432 MHz; and the 416TB, 16 elements at 435 MHz for satellite communications.
The new Boomer models feature insulated elements, stainless steel hardware, N type connector, T match feed and trigon reflectors.

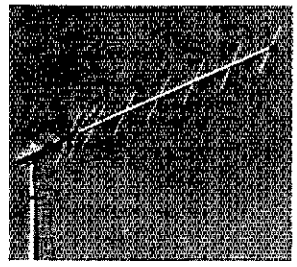
SPECIFICATIONS AND FEATURES

424B:
424-435 MHz, 7.6λ, gain *maximized, F/B ratio *excellent, beamwidth 19°, length 17.42 ft. 5.2 m.

410B:
424-435 MHz, 2.2λ, gain *maximized, F/B ratio *excellent, beamwidth 33°, length 6 ft. 1.83 m.

416TB:
428-438 MHz, Circular Polarization 2.2λ gain *maximized, F/B *excellent, beamwidth 34°, length 6.7 ft. 2.03 m.





MORE BOOMER NUMBERS

32-19	144-146 MHz	19 elements
214B	144-146 MHz	14 elements
214FB	145.5-148 MHz	14 elements
228FB	145.5-148 MHz	28 elements
220B	220-223 MHz	22 elements
617-6B	50-51 MHz	6 elements

Our list of model numbers also includes a full line of Boomer power dividers and stacking kits. See your dealer for all of the numbers, then talk to your friends throughout the world with Boomer antennas.

A LEADER FOR OVER 30 YEARS

cushcraft
CORPORATION

THE ANTENNA COMPANY
48 Perimeter Road, P.O. Box 4680
Manchester, NH 03108 USA

TELEX: 953050
CUSHSIG

*Gain and F/B ratio cannot be published in QST. They are included in Cushcraft specification sheets and other publications.

TR-9130

All mode (FM/SSB/CW) 25 watts, plus...!!!

The TR-9130 is a powerful, yet compact, 25 watt FM/USB/LSB/CW transceiver. Available with a 16-key autopatch UP/DOWN microphone (MC-46), or a basic UP/DOWN microphone.

TR-9130 FEATURES:

- 25 Watts RF output on all modes, (FM/SSB/CW).
- FM/USB/LSB/CW all mode. Selectable tuning steps of 100-Hz, 1-kHz, 5-kHz, 10-kHz.
- Six memories. On FM, memories 1-5 for simplex or ±600 kHz offset, using OFFSET switch, Memory 6 for non-standard offset. All six memories may be simplex, any mode.
- Memory scan.
- Internal battery memory back-up, using 9 V Ni-Cd battery, (not KENWOOD supplied). Memories are retained approx. 24 hours, adequate for the typical move from base to mobile. External back-up terminal on the rear.
- Automatic band scan.
- Dual digital VFO's.
- Transmit frequency tuning for OSCAR operations.
- Squelch circuit for FM/SSB/CW.
- Repeater reverse switch.
- Tone switch.
- CW semi break-in; sidetone.
- Compact size and lightweight.
- Covers 143.9 to 148.9999 MHz.
- High performance noise blanker.
- HI/LOW power switch. 25 or 5 watts on FM or CW.
- RF gain control. • RIT circuit.

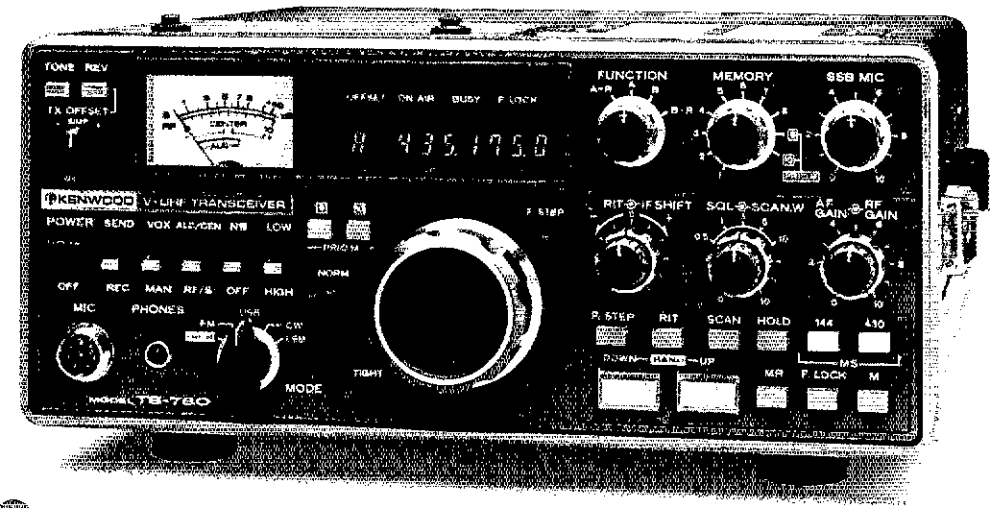
Optional accessories:

- KPS-7A AC power supply.
- PS-20 AC power supply (TR-9500 only).
- BO-9A system base with memory back-up supply.
- SP-120 external speaker.
- TK-1 AC adapter for memory back-up.

TR-9500

70 CM SSB/CW/FM transceiver

- Covers 430-440 MHz, in steps of 100-Hz, 1-kHz, 5-kHz, 25-kHz or 1-MHz.
- CW-FM HI=10 W, Low=1 W. SSB 10 W.
- Automatic band/memory scan. Search of selected 10-kHz segments on SSB/CW.
- 6 memory channels.



TS-780

All mode "Dual-Bander"...2-m & 70-cm all mode, dual digital VFO's, 10 memories, scan, IF shift...

TS-780 FEATURES:

- USB, LSB, CW, FM all mode, covering the 2-m band (144.000-148.000 MHz) and the middle 70-cm band (430.000-440.000 MHz). UP/DOWN band switch.
- Dual digital VFO's with normal/tight drag switch. VFO steps in 20-Hz, 200-Hz, 5-kHz, or 12.5-kHz, plus "FM CH" channelized tuning. Split (cross) frequency operation possible. F. LOCK switch provided.
- 10 memories include band and frequency data, backed up by internal batteries (not supplied). Battery life exceeds one year. Memories 9 and 10 for priority instant recall.
- Band scan, with selectable 0.5, 1, 3, 5, and 10-MHz scan bandwidth.
- Memory scan selectable for all memories, or 2-m or 70-cm only.
- IF shift circuit rejects adjacent interference.
- High sensitivity and wide dynamic range.
- 7-digit fluorescent tube digital display.
- 10 watt RF output.
- 2-m ±600-kHz TX offset switch with reverse switch.
- Tone switch for optional TU-4C programmable two-frequency CTCSS encoder unit.
- VOX and semi break-in CW built-in.
- FM center-tune meter.
- Noise blanker for SSB, CW.

TS-780 accessories:

- **TU-4C** programmable two-frequency CTCSS encoder.
- **MC-42S** 500 Ω UP/DOWN hand microphone.
- **MC-48** 16-button Autopatch UP/DOWN microphone.
- **MC-60A** deluxe desk top microphone.
- **MC-80** desk top UP/DOWN microphone.
- **TK-1** AC adaptor for memory back-up.

Subject to FCC approval

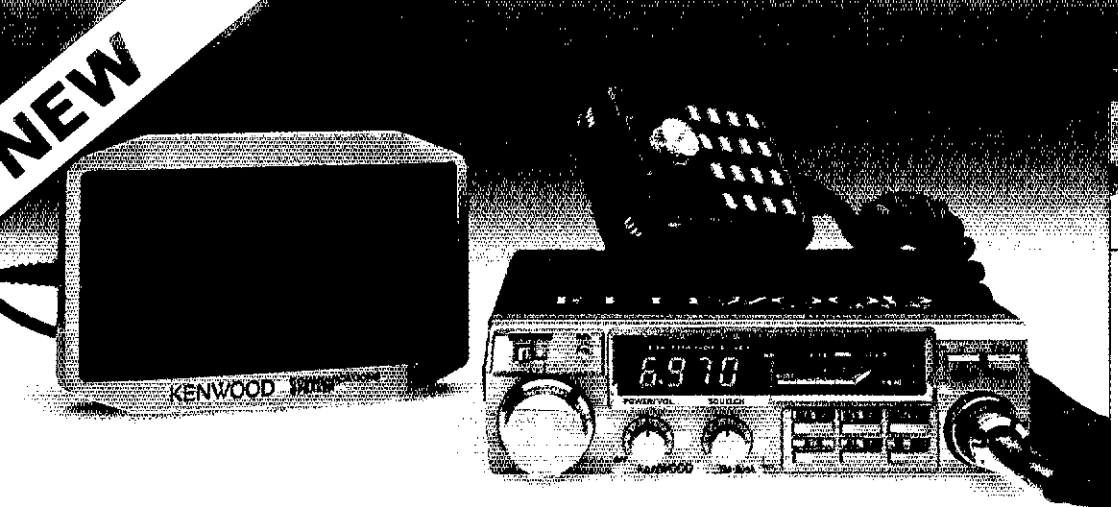
KENWOOD

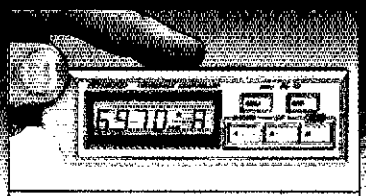
TRIO-KENWOOD COMMUNICATIONS

1111 West Walnut, Compton, California 90220

NEW

NEW





Optional FC-10 frequency controller
May be easily connected to the TM-201A or TM-401A. Convenient control keys for frequency UP/DOWN, MHz shift, VFO A/B, and MR (memory recall or change memory channel). A green, easy-to-read, back-lighted LCD display indicates transmit/receive frequencies, memory channel number, ALERT, and SCAN (with blinking MHz decimal). Size: 4.4 (112)W x 1.4 (35)H x 0.9 (22)D, inch(mm). Weight: 3.5 oz. (100 g).

TM-201A/TM-401A

Ultra-compact and lightweight, priority, memory and band scan, 25 watts/TM-201A & 12 watts/TM-401A.

The KENWOOD TM-201A 2- meter and TM-401A 70-cm FM mobile transceivers are the smallest and lightest units available, allowing maximum flexibility in automotive installation.

TM-201A/TM-401A FEATURES:

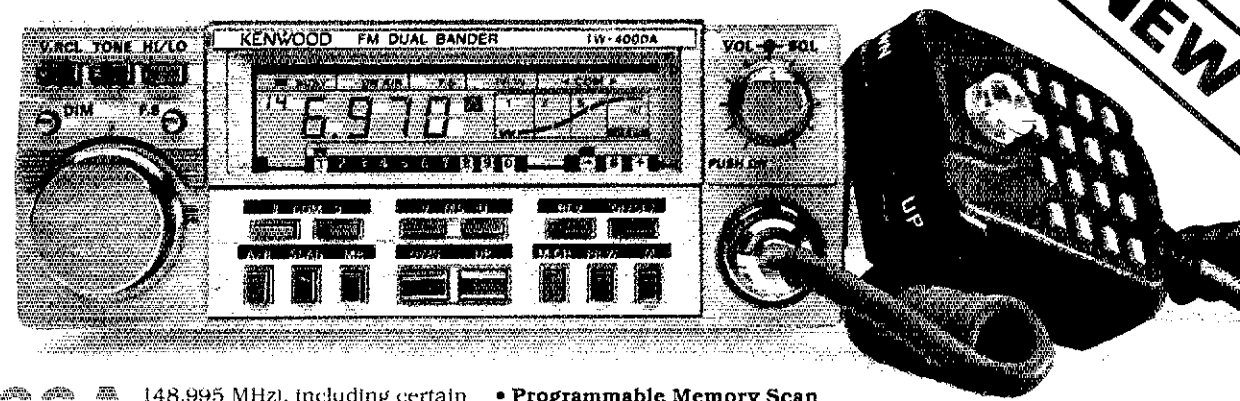
- **Ultra compact and lightweight**
  Measures 5.6 (141)W x 1.6 (39.5)H x 7.2 (183)D, inch(mm), weighs 2.8 lbs., (1.25 kg.).
- **25-watt output, with HI/LO power switch**
  Produces a powerful 25 watts RF output from a surprisingly compact design (TM-201A).
- **Dual digital VFO's built-in**
- **5 memories plus "COM" channel, with lithium battery back-up (est. 5 yr. life)**
- **Memory scan/programmable band scan**
- **Priority alert scan**
- **Highly visible yellow LED frequency display**
- **High performance receive/transmit**
  GaAs FET RF amplifier for high sensitivity with wide dynamic range. Transmit modulation characteristics selected for best sound and minimum distortion.
- **External high quality speaker supplied** (No internal speaker)
- **16-key autopatch UP/DOWN microphone**
- **Repeater offset switch (±600-kHz/TM-201A; ±5 MHz/TM-401A; and simplex) and reverse switch**
- **Audible "BEEPER" confirms operation**
- **Easy-to-install mobile mount**

TM-201A/TM-401A accessories:

- **TU-3** programmable two-frequency CTCSS encoder
- **KPS-7A** fixed station power supply

TM-401A subject to FCC approval

NEW



TW-4000A

FM "Dual-Bander"... 2-m & 70-cm in single compact package, LCD, 25 W, optional voice synthesizer.

KENWOOD's TW-4000A FM "Dual-Bander" provides new versatility in VHF and UHF operations, uniquely combining 2-m and 70-cm FM functions in a single compact package.

TW-4000A FEATURES:

- **2-m and 70-cm FM in a Compact Package**
  Covers the 2-m band (142.000-148.995 MHz), including certain MARS and CAP frequencies, plus the 70-cm FM band (440.000-449.995 MHz), all in a single compact package. Only 6-3/8 (161)W x 2-3/8 (60)H x 8-9/16 (217)D inches (mm), and 4.4 lbs. (2.0 kg.).
- **Large, Easy-to-Read LCD Display**
- **25 Watts RF Power on 2-m/70-cm.**
- **Opt. "Voice Synthesizer Unit"**
  Installs inside the TW-4000A. Voice announces frequency, band, VFO A or B, repeater offset, and memory channel number.
- **Front Panel Illumination**
- **10 Memories with Offset Recall and Lithium Battery Backup**
- **Programmable Memory Scan**
- **Band Scan in Selected 1-MHz Segments**
- **Priority Watch Function**
- **Common Channel Scan**
- **Dual Digital VFO's**
- **16-Key Autopatch UP/DOWN Microphone**
- **Repeater Reverse Switch**
- **High Performance Receiver/Transmitter**
  GaAs FET RF amplifiers on both 2-m and 70-cm, high performance MCF's in the 1st IF section, provide high receive sensitivity and excellent dynamic range. The high reliability RF power modules assure clean and dependable transmissions on either band.
- **Rugged Die-cast Chassis**
- **"BEEPER" sounds through speaker.**
- **Easy-to-Install mobile mount**

TW-4000A accessories:

- **VS-1** voice synthesizer
- **TU-4C** programmable two-frequency CTCSS encoder
- **KPS-7A** fixed station power supply
- **SP-40** compact mobile speaker
- **SP-50** high quality mobile speaker
- **MA-4000** dual-band mobile antenna with duplexor

KENWOOD

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

Directors

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55 Havenbrook Blvd., Willowdale, ON M2J 1A7
(416-494-8721)

Vice Director: Harry MacLean, VE3GRO,
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THE AMERICAN
RADIO RELAY
LEAGUE, INC.

"It Seems to Us..."

Amateur Radio's Newest Frontier

All summer, the excitement has been building: We're going to have a ham in space! When Astronaut Owen Garriott, W5LFL, rides into orbit on the Space Shuttle's STS-9 mission (now scheduled for October 28), he will have on board a 2-meter hand-held transceiver and an antenna that has been especially designed to fit into one of the Shuttle's windows. During off-duty hours, when it won't disturb other Shuttle activities, Owen has NASA's permission to operate. He will be trying to contact as many of us earthbound amateurs as possible during the few hours thus available. If you use the information in July and August *QST*, and the updates appearing this month and next, your chances of working him will be as good as anyone's!

The "ham in space" concept took more than 11 years to come to fruition. When Dr. Garriott was chosen as a member of the crew for Skylab II, NASA gave serious consideration to an AMSAT proposal, made with ARRL backing, that he bring a rig aloft for the two-month mission. March 1972 *QST* reported that the proposal was turned down "with reluctance." The STS-9 proposal, made jointly by AMSAT and ARRL, met a happier fate because of support for the idea that built up within the NASA organization. The first ham in space should not be the last; Astronaut Tony England, WØORE, is scheduled for a subsequent Shuttle ride, and there's no telling how many other members of the astronaut corps may be bitten by the bug!

While hundreds of people have worked to make this operation possible, as discussed on page 51 of this issue, none has been more diligent or has shown greater vision than Roy Neal, K6DUE. Roy has covered the space program for NBC practically since its inception and with this background was able to see, perhaps more clearly than anyone, how the idea of private citizens communicating directly with an astronaut would excite the imagination of the general public. Last November, even before the joint AMSAT/ARRL proposal had been submitted formally to NASA, Roy submitted a proposal of his own to the League: an offer to produce a video tape keyed to Owen Garriott's mission and tying together the concepts of Amateur Radio, space communication and computer technology. The League's Executive Committee embraced Roy's proposal enthusiastically, since it appeared to be an ideal way to bring Amateur Radio to the attention of the public, and particularly of young people, in a positive and progressive light.

Planning for the video tape, entitled "Amateur Radio's Newest Frontier," progressed through the spring and was given an added boost with NASA's approval of the W5LFL operation on April 13. Just nine days later, the ARRL Foundation provided vital assistance in the form of a $5000 grant toward the estimated $30,000 in production expenses.

Actual shooting took place the week of July 18, on location at the Kennedy Space Center, Johnson Space Center, Marshall Space Flight Center, Goddard Space Flight Center and ARRL Headquarters. Roy himself served as Executive Producer as well as correspondent/narrator; Bill Pasternak, WA6ITF, was Field Producer and Technical Supervisor. Camera and audio work was done by local crews, including George Barker, WB8PBC; Bob Brandon; S. Larry D'Anna, WA3KOK; Gary Eldridge, KC8UD; Gary Hendrickson, W3DTN; Steve Mendelsohn, WA2DHF; Bill Robison, and Justine Schmidt. Tape shot by the NASA astronauts of STS-6 and STS-7 also was used. Producer was Alan Kaul, W6RCL, who also helped Roy write the script; Frosty Oden, N6ENV, was Editor, using the facilities of CBS Television City in Hollywood.

While many of the participants in the project were volunteers, they are all professionals in the field — as the results dramatically attest. What has emerged from their efforts is an 18-minute presentation in which Owen Garriott himself plays the key role. We see him describe how he first became a ham as a youngster in Enid, Oklahoma; we hear him say how important that early involvement in Amateur Radio was to his subsequent career. We listen to a "trial run" conducted to give Owen an idea of what 2 meters is going to sound like after his first CQ! NASA and Amateur Radio couldn't ask for a better spokesman than Owen Garriott; on camera, he displays a relaxed competence which is among the best of all American traits.

For ham audiences, Owen taped an additional six-minute segment describing in more detail the equipment he will use in flight, and how he intends to operate. The primary audience, however, is hams-to-be, particularly young people. Two video tape formats are available: 3/4-inch U-matic, mainly for use by television broadcasting stations and cable outlets, and 1/2-inch VHS for showing to groups. The time to use the program is *now!* If you can put a tape to good use before or during the STS-9 mission, contact ARRL Headquarters for the loan of a copy *today!* We have 150 copies of the U-matic version, and 200 copies of the VHS; if we run out, we'll make more!

Most opportunities for bringing Amateur Radio into public view occur in connection with some unpredictable event involving human suffering: fires, floods, tornadoes, hurricanes, ship sinkings, and the like. With this one, not only has advance planning been possible, but the positive aspects are not overshadowed by tragedy. Let's make the most of it! — *David Sumner, K1ZZ*

League Lines...

RFI Assistance List being revised. The ARRL RFI Task Group has neared completion of updating its list of electronic home-entertainment equipment, computer, electronic devices and appliance manufacturers who volunteer help in resolving RFI problems. Harold R. Richman, W4CIZ, reports that early amateur and industry responses to the Task Group's efforts are very encouraging. The new, expanded list will appear in QST.

Robert S. Foosaner, an attorney and career FCC employee, has been named new Chief of the Private Radio Bureau. James McKinney, who had served as PRB Chief since July 1982, has been appointed Chief of the Mass Media Bureau.

Attention artists: A design contest for a patch and logo for the Special Service Club Program is now underway. Submit original designs to Hq. before January 15, 1984. Designs will be anonymously presented to the Membership Affairs Committee and the ARRL Board of Directors for a final decision. The winner will receive prizes and photo coverage in QST. This contest is for ARRL members only. Contest details will appear in October Club Corner, or write to the Club and Training Department for more information (please include s.a.s.e.).

Starting with this issue (page 75), each month QST will publish a mini directory of items of particular interest and when they most recently appeared in QST. See "Mini Directory" in the Table of Contents.

The Space Shuttle STS-9 mission, on which Astronaut Dr. Owen Garriott, W5LFL, is to use Amateur Radio, has been postponed to October 28. The nine-day mission has not otherwise been changed.

Repeater Directory production is again in full swing. Send Hq. info about your repeater(s) for the new edition. Form CD-240 (available from Hq. for an s.a.s.e.) is a good way of giving us details, but anything else will do as long as it gets here by November 1.

Should the ARRL sponsor life, disability, in-hospital, major medical or other types of insurance plans? Let us know. If you did not respond to the questionnaire that appeared in last month's QST, please take a few moments now to fill out and return the questionnaire on page 24 of this issue.

The Club and Training Department is looking for an Assistant Training Manager. Solid technical writing ability is required to assist in writing the Advanced Class License Manual, in revising Instructor Guides, in contributing to department periodicals, and in helping develop training materials for instructor certification. An Advanced or Extra Class license is essential. Send resume and writing sample to Jonathan Towle, WB1DNL, at Hq.

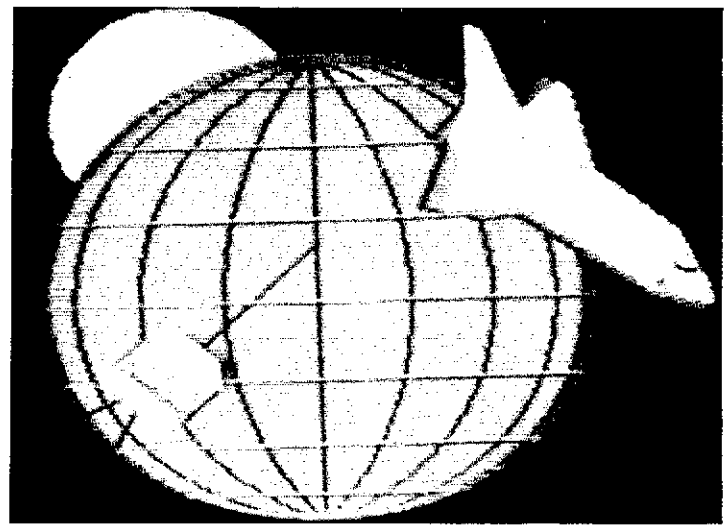
Roy Neal, K6DUE, and crew have completed work on ARRL's new videotape, "Amateur Radio's Newest Frontier." The League has U-matic 3/4" cassettes available for professional TV use, and also VHS copies for clubs to use in presenting Amateur Radio to non-ham groups. This tape about Amateur Radio and STS-9/Owen Garriott must be re-edited after the flight, so we want as much mileage as we can get. If you can arrange a showing, contact the ARRL Public Information Office today. We'll send you a copy.

STS-9/Amateur Radio will go to high school, thanks to Bob Heil, K9EID, and the gang in the Marissa (IL) ARC. Bob has arranged to show our new tape to the school followed by an attempt to work the Shuttle from school. Can you do the same thing at your local school?

The Commission is seeking comments on regulation of rf lighting devices such as energy-efficient light bulbs (General Docket 83-806). It particularly is looking for "comments from other parties, especially those associated with licensed radio communications services that may be affected by emissions from rf lighting devices." Specifically, the FCC is seeking supporting data, e.g., mathematical analysis, empirical results, and modeling, to substantiate any claims of interference. Comments are due by October 14; reply comments are due December 2.

Graphics on RTTY

Sending schematics over the air may not be as difficult as you think. Read about a computer-graphics technique that may be your opportunity to help advance the state of the art!



By Ted Thompson,* VE3FTT

This is an account of how Bob Howard, VE3GQW, and I combined Amateur Radio with the latest computer-graphics technology. We conducted picture-transmission experiments on hf using a coding method that has not been used previously on Amateur Radio. Techniques have existed for years to send pictures from one Amateur Radio station to another. Amateurs have used, and at times have been the first to use, such methods as uhf fast-scan television, vhf and hf slow-scan television, and facsimile, and have even sent greeting cards using asterisks or other characters.

A Better Way

Bob and I have been active in Amateur Radio and computering for several years. We had come to the point of wanting to combine the two hobbies and try experimenting beyond normal RTTY communications. There is a definite limit to the quality of graphic information that can be sent using RTTY characters (notwithstanding the fine pictures that appear every so often on the air). While trying to describe a circuit diagram on ssb one evening, we realized that there must be a better way. *That* was a real exercise in frustration!

We searched the available literature to see what methods had been used to send highly detailed pictures, such as circuit drawings, on hf. The distance between our locations restricted operations, for practical purposes, to 80 and 40 meters with the attendant bandwidth and mode restrictions. If we had been closer, we could have tried 220-MHz packet radio and used a higher transmission data rate, but we felt that whatever we finally decided on should be applicable to all the hf bands for the widest possible use.

Our literature search revealed only two methods in common use; slow-scan television and facsimile. Either of these would have meant the purchase of equipment for each end. In addition, neither method was directly related to our interests in computer graphics.

The search moved into the computer graphics field, and we were quickly overwhelmed with reports of methods for storing detailed picture data in computer memory. We soon found that several methods had been developed for transmitting pictures over coaxial cables, telephone lines and even broadcast television signals. This seemed more like it! There was no reference to any use on hf; in fact, several reports implied that the slow data rates we are required to use would be impractical. We were not aware of any data available about the error rates that could be expected on hf RTTY. This was important because we had decided to try to make use of some modern computer-communication method for sending graphic data.

Which Method?

Of the systems we researched at the time,[1] three stood out as possible methods to meet our requirements: Prestel, Antiope and Telidon. These three methods differ in the picture-storage space required, the amount of data to be sent to define a picture, the method of drawing the picture and most important, the picture quality. We had the opportunity to see a Telidon demonstration. This technique provided higher quality and greater versatility than the others, so we decided to look into it further.

At this point we had a fairly good idea of just what we wanted to do on the air: Select one of the available standards and try sending picture data, find out if error rates are low enough for useful work and see if sophisticated error-correcting techniques would help. There was one remaining problem, however. In Canada, as in most other countries, the rules specify that all Amateur Radio communications must be in "plain language." Unfortunately none of the techniques under consideration are "plain language," so we realized there would be difficulties, whichever one we chose. In Canada, the Department of Communications (DOC) controls Amateur Radio. Coincidentally, another branch of this Department had developed the Telidon picture-transmission techniques. It was this fact that finally led to our selection of Telidon as the experimental technique.

The DOC allows the use of Baudot or ASCII for amateur RTTY, but Telidon falls into a gray area. It is an internationally recognized extension of the ASCII character set but can hardly be called "plain language." Bob and I applied for special permission to use Telidon codes on the air. After further discussion with the Department, we were given permission, subject to several restrictions and the requirement for a full report to the Department on the results of our tests.

What is NAPLPS?

A few months later the choice would have been easier: Telidon is now recognized by the Canadian Standards Association —

*61 Sample Rd., Ottawa, ON K1V 9T9

[1]Notes appear on page 14.

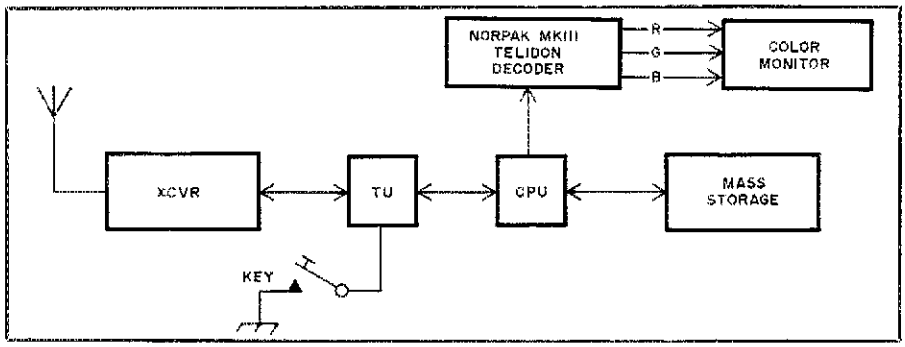


Fig. 1 — Block diagram of the station set up used for the Telidon tests.

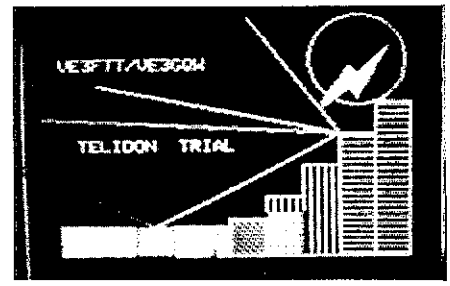


Fig. 2 — Photograph of one trial picture, as received by VE3FTT. The picture was received error free.

Fig. 3 — An error-free picture received during the Telidon testing.

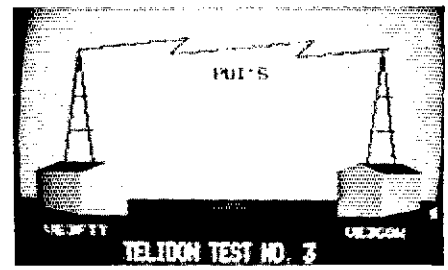


Fig. 4 — An error-free Telidon picture, illustrating the picture detail possible with this system.

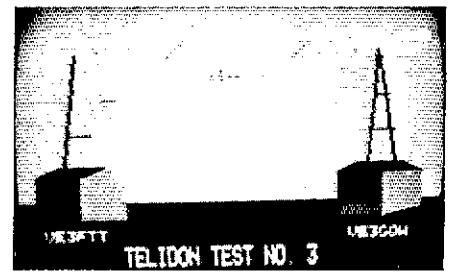


Fig. 5 — A test picture received with errors. Compare this with Fig. 4.

CSA(T500), the American National Standards Institute — ANSI(X3L2), and the American Telephone & Telegraph Co. — AT&T(PLP). This graphics-transmission technique has become known as the North American Presentation Level Protocol Syntax (or NAPLPS) and is being supported by such industry giants as AT&T, DEC and Intel.[2,3]

NAPLPS is a method of using an international standard code set (the International Organization for Standardization — ISO 2022) to encode text and pictures using a scheme that is independent of the particular terminal equipment used. Amateurs are already familiar with the idea of terminal independence in that the text code (ASCII) has been used for years on all sorts of terminals and hard-copy devices. The same idea is now extended to sending graphics data.

Pictures are defined under NAPLPS as points, lines, arcs, rectangles and polygons in a manner that does not depend on such terminal characteristics as resolution or color capabilities. The picture is produced by the receive terminal based on the drawing commands received.

This standard has found support from several major hardware manufacturers and could become as important to communications, and in particular computer communications, as ASCII is today. Full details of the standard can be found in a series of articles starting in the Feb. 1983 issue of *BYTE* magazine.[4]

Technical Details

Equipment

The equipment configuration at each station is shown in Fig. 1. Each station used a transmitter capable of producing 130 to 200 W on RTTY and a receiver with a homemade RTTY demodulator or terminal unit (TU). VE3FTT used a demodulator based on the Exar 2211 chip using Exar application notes for the design.[5,6,7] VE3GQW used a DT-600 demodulator described in the Feb. 1976 issue of *Ham Radio*.[8] Both units were optimized for the somewhat unusual baud rates used in the tests.

Each station had a computer connected to the transceiver for picture file generation and storage. One computer was a Heath H89, and the other was an S-100-based machine. Each computer was also connected to a Norpak Mark III Telidon decoder unit. This unit drove a modified color television used as an RGB (red, green, blue) type monitor.

RTTY Standards

All RTTY operation used standards that have developed on the amateur bands. We used 170-Hz shift with the mark frequency high. Data rates of 45, 75, 110 and 150 bauds were tried.

Propagation

A restriction forced on us by our station locations was the limitation to 80-meter operation. The path length was about 150 miles, but 40-meter QRM was always so high that 80 meters was the only band usable most of the time.[9] We operated in typical autumn/early winter conditions with low atmospheric-noise levels but fairly heavy band usage in early evening. There was generally strong fading with the signals going from S9+ down to noise level within seconds. Such fades would last for several seconds and do a lot of damage to a transmitted data stream.

We found very good cooperation from other operators. Only once did we fall prey to malicious interference in several evenings of operation. All coordinating communications were carried out in ASCII at the baud rate in use at the time. The Telidon files were each identified as such before transmission. This was a DOC requirement because the files were not "plain language."

What We Sent

Figs. 2 through 5 are examples of the pictures we used in our experiments. All the photographs are as drawn by the Norpak decoder on a modified Heath GR-169 14-inch color television using received data. All are error-free except Fig. 5, which is included to illustrate the effect of errors on a display file. Table 1 is a listing of the data file that will produce the display in Fig. 4. The underlined characters represent the corresponding control characters, used to switch the decoder from text to graphics mode and back. The rest of the characters are as sent, and appear as "non-plain language" when received by a normal ASCII terminal.

The time required to transmit a Telidon file will vary depending on the actual picture being transmitted. A more detailed picture requires an increased number of characters. The data for Fig. 4 will take 68.5 seconds to be transmitted at 45 bauds, and 28 seconds at 110 bauds.

Error-Rate Results

The one word that might best describe the results of our tests is "surprising." The experience we had with RTTY seemed to

Table 1
Sample Telidon Data File

```
N=M=@<P3@@@Xv<h3@GFZxz<`3@nB@[V<X7@nB@CFxhHGE@GWz<`7Aj@@XPxp^wZ<@5@H
nxhHwZ@Px<X3P~B@[V<`5@P~@xhHGDA<@7YRP@Pxxp^xhHwZ<X5x`h@HnGOj<@*Ab@Bk
F)FO@+YJNAI@)FO@+Ae[@H`+B`g@@x+YMk@H`+ZPA@@x<x/ZlI@@¦xxL<h7ZkF@@gxxg
$HB@<x=acQTELIDON TEST NO. 3N=aC$@TcQVE3FTTN$P¦sQVE3GQWN=J+BkF@xg)vv)
HQ@)vv)@pl]$Jg\QPDI'SN=H
```

indicate much higher error rates than we found. It may be that there are a lot of poor typists out there but we think rather that it is a matter of controlled conditions producing better results. There is not a lot of ASCII operation on the air at the lower baud rates that we were using, except for ARRL bulletins. Error counts on the bulletins seem to indicate the same order of magnitude as our 110-baud error rates.

Before we started we were not encouraged by those who are using Telidon every day. A normal Telidon decoder runs at 1200 bauds, so our low baud rates were deemed unworkably slow. However, that point of view is influenced by Telidon design objectives. Our application does not require the speed (although it would be nice) but rather the flexibility and image quality available.

We conducted extensive tests using Telidon files at 45, 75 and 110 bauds by saving each received file and doing automated and manual error counts. As I mentioned earlier, fading tends to introduce an extended burst of errors and missed characters. The calculated error rates include all these burst errors as well as single-character errors. Counting a burst as a single error gives an order of magnitude improvement in error rates, but that is a biased figure.

There is another effect that can introduce error bursts at the receiver. We found that it is possible for a terminal to lose synchronism with the data stream if the wrong sort of noise pulse comes along at just the right time. RTTY is an asynchronous communications method, requiring start bits and stop bits. In a continuous data stream a noise pulse can cover up a start bit, delaying the start of a character. The data stream would then be out of sync for a random period. We found that it sometimes took up to 30 character times at 45 bauds for the system to become synchronized again. This loss of sync did not happen very often so it has been left out of the error rate calculations but it will be considered further.

Table 2 shows the details of the error rates that we obtained over the entire test period. Remember that these error-rate numbers are statistical. There were evenings during which good conditions resulted in only two character errors in over 2400 characters received (at all baud rates). The tabulated error rates combine the good days with the not-so-good ones to give the averages shown.

Table 2
Error Rate Results

Baud Rate	*Errors/ Chars. Sent*	*Error Rate*
45	72/4890	1.5%
75	57/2103	3.1%
110	81/1815	5.1%

These statistical numbers are fine but what do errors do to the pictures? Fig. 5 is a photograph of a reproduced display file with typical error effects. This picture requires 308 characters to define, and there were 10 errors for an error rate of 3.2%. As can be seen, the errors show up not as noise spots (snow) in the picture but rather as obvious errors of omission or positioning of the picture details. This shows two things: first, that single errors can cause large picture faults and second, that even this high error rate can produce quality pictures.

Comments

There are several comments that can be made about our test results:

1) Error rates decrease with decreasing transmission speed as would be expected, but never approached rates that are normally encountered in telephone-line data communications (typically 1 error in 10,000 characters at 300 bauds).

2) Propagation conditions were average to good for normal amateur RTTY communications.

3) We could always produce an error-free file by using the results of three separate transmissions of a picture file to build one perfect copy. This is not a "high tech" way to do things but was good enough for our purposes.

4) Transmitting a full character time of constant mark every 25 characters or so helped reduce the length of out-of-sync bursts. The spacing required between mark characters depends on path conditions, with frequent static bursts requiring more frequent characters.

5) The original idea was to use this technique to transmit schematic diagrams but the error rates are somewhat high for that type of picture. There is, however, no problem in using NAPLPS coding for general-purpose graphic communications on hf RTTY such as QSL cards, pictures or cartoons. The use of more sophisticated error detection and correction schemes (such as longitudinal parity, over say 25 characters, and packet techniques) could improve the error rate so the transmission of schematic diagrams would be feasible.

As a result of our successful tests, we have forwarded a recommendation to the Department of Communications that NAPLPS be allowed as an Amateur Radio RTTY code set. Because it is a North American standard it seems logical that the FCC might also allow NAPLPS on the air.

There is still a lot of experimental work to be done on the technique, such as error-correcting schemes, packet-radio trials, tests on other bands and over longer paths, tests through amateur satellite links, and tests at higher baud rates. Work on any of these areas depends on being permitted to use the NAPLPS on the air.

Equipment Availability

During our tests we used Telidon decoders supplied by Norpak Ltd.[10] These decoders are available ready to use or as a board-level product that requires power supply and cabinet ($499 U.S. funds). A more advanced Mark IV unit is also available; details can be obtained from Norpak. Others sell decoders either as a board, a black box or a complete color monitor. For example, a decoder board is available for use with Apple® computers. Companies such as Electrohome, GTE and AT&T are selling or developing NAPLPS equipment. Development work is proceeding in Japan as well. In the very near future chip-level integration should bring the price of NAPLPS decoders below $200, and access to this new communications technique will be readily available to anyone who is interested.

Conclusion

In trying to find out if a picture can be described in a thousand words, we finally found ourselves using a communications

technqiue that is new to Amateur Radio. After some experimentation we concluded that the transmission of pictorial information using the NAPLPS/Telidon coding method is suitable for the type of work amateurs are interested in and that further work will refine the technique to be an even more useful one. Here is an exciting new field to test the traditional ingenuity of Amateur Radio operators.

We would like to thank Norpak Ltd. for the use of the Telidon decoders and the Canadian Department of Communications for the ready approval we received when we first requested permission to use Telidon codes on the hf bands.

Ted Thompson has been a radio amateur for over 19 years, and he currently holds a Canadian Advanced Amateur Certificate (VE3FTT). He also held the call G4JCV during a year spent in England.

A professional engineer, Ted works on air-traffic-control radar and display equipment for the Canadian Department of Transport. He holds a BAS degree in electrical engineering from the University of Waterloo and an MS in aviation electronic systems from the Cranfield Institute of Technology, Bedford, England. He has been working with computers and computer graphics for 12 years.

Notes

[1]IEEE Transactions on Consumer Electronics, Vol. CE25, No. 3, July 1979, a special issue on Teletex and Videotex systems.
[2]Videotex Standards, *Computer Data*, Nov. 1982, pp. 50-54.
[3]Telidon — Videotex Presentation Level Protocol, *CRC Technical Note No. 709-E*, Department of Communications, Canada, Feb. 1982.
[4]NAPLPS: A New Standard for Text and Graphics, *BYTE*, Feb. 1983, pp. 203-255.
[5]Product Review, *Computerworld*, Dec. 13, 1982, pp. 12-14.
[6]Stable FSK Modems Featuring the XR-2207, XR-2206 and XR-2211, Application note AN-01, Exar Integrated Systems, Inc., Sunnyvale, California.
[7]"Active Filter Design with IC Op-Amps," Application note AN-03, Exar Integrated Systems, Inc., Sunnyvale, CA.
[8]"The DT-600 Terminal Unit," *Ham Radio*, Feb. 1976, pp. 8-15.
[9]km = miles × 1.6; mm = in. × 25.4
[10]Norpak Ltd., Pakenham, Ontario

New Books

HEARST BUSINESS COMMUNICATIONS IC MASTER

IC Master, Vols. 1 and 2, *edited by Dave Howell. Published by Hearst Business Communications, Inc./UTP Division, Garden City, NY. Hard-bound, 8 × 11 inches, 3677 pages, $95.*

☐ In the early days of radio, amateur gear was not nearly as complex as it is today. The typical amateur normally constructed equipment with hollow-state devices (vacuum tubes), resistors, condensers (capacitors) and a coil or two.

These simple rigs were replaced by compact, solid-state transceivers, and servicing units constructed on printed-circuit boards became commonplace. Integrated circuits have replaced much of the circuitry found in the gear of the '60s and '70s. With these ICs, the equipment became more compact and complex, to the point where the number of servicing do-it-yourselfers has dwindled to almost nil.

Why doesn't the ham down the street service his own equipment anymore? Surely, the compact layout of the circuitry is playing a role in this, but most likely it is the *lack of information* on individual IC packages that is causing the bulk of the problem.

Just what is the LJ-8764583 chip, how does it function and who makes it? With the *IC Master*, you need never ask these questions again. The *Master* is a compilation of data from over 150 IC, single-board-computer, microprocessor-development-system and PROM-programmer manufacturers, designed to provide quick, detailed information on over 55,000 commonly used ICs.

Data is compiled several ways: by application category, type, specific function, part number and manufacturer. In addition, devices are listed numerically by part number, alphabetically by application, and pin-for-pin as equivalents.

For those who like finding sources of generic ICs, the *Master* lists the generic number (555, for instance), the various manufacturers who make the chip, and the specific manufacturer's part number. Did you realize that the 555 is available from nine different sources and that 19 different part-number designators identify a 555 timer?

With such detailed information, it should be obvious that the *IC Master* is not a minor publication; in fact, the 3585-page guide is supplied in two hard-bound volumes. Hundreds of manufacturers' data sheets, applications notes and directories are included.

While not *all* ICs are contained in the *IC Master*, most of the commonly used chips are documented sufficiently. During the review period, only one of the components I needed information on was nowhere to be found. That is a very good track record, especially in the fast-paced electronics field.

Volume 1

This text consists of 14 divisions, including a master selection guide, a part-number index and a part-number guide. These indexes are organized for quick location of any IC contained in this reference manual.

A guide to manufacturer logos is a welcome section in the manual. With over 150 different logos listed, the user should have no trouble locating any manufacturer.

An extensive application-note directory follows the logo section of the *IC Master*. This section lists various available applications notes from many manufacturers, and is invaluable for anyone who is interested in using ICs for a specific application.

A military-parts directory includes a master selection guide for components used in military/aerospace electronics. This section also includes a military-to-commercial cross-reference.

Digital devices are referenced next, along with microprocessors, μP-development systems, μP boards and support boards. For the computer-oriented do-it-yourselfer, these sections prove important.

Abbreviations frequently used in IC work are listed, along with an alternate-source directory. If a component is unavailable from the local TI distributor, for instance, this section will direct the user to another manufacturer, *including* that manufacturer's exact component designation for that particular device.

Volume 1 closes with a manufacturers-and-distributors directory, to help the user locate both a manufacturer's main office address and local distribution offices.

Volume 2

This book begins with a section on interface devices, including an index of digital-to-analog and analog-to-digital converters. It also contains manufacturers' application notes for some of the more advanced devices.

Linear devices are covered in Chapter 11. As in other chapters, this section is complete — a generous helping of manufacturers' application notes are supplied.

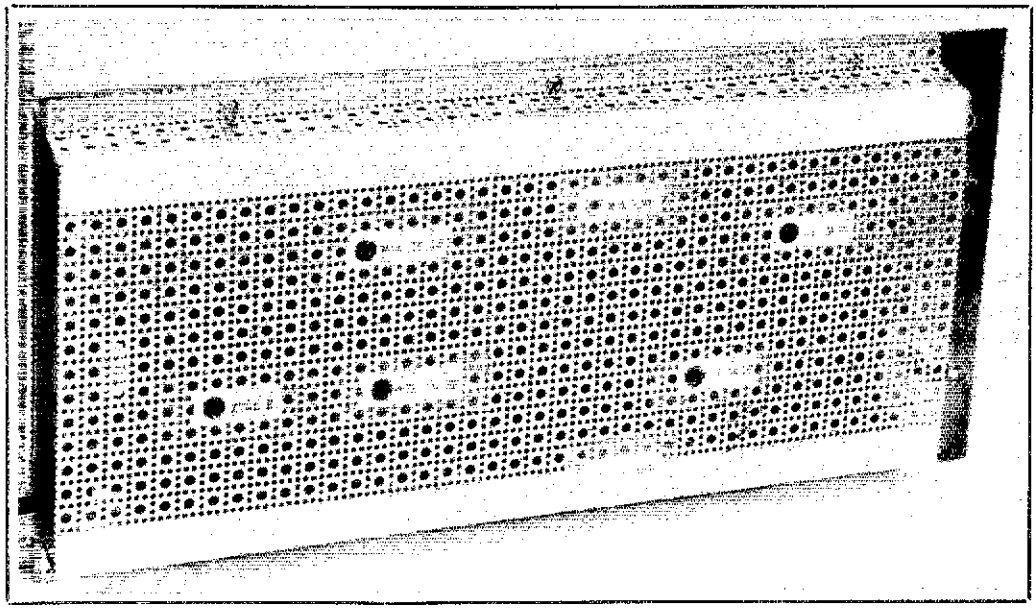
Chapter 12 is devoted to memory devices. This section contains listings and notes from several manufacturers, and is the most complete I've ever seen.

Chapter 13 contains a chart of PROM programmers from several manufacturers. Specifications and safety features are addressed, and the user is directed to the appropriate page in the chapter for more detailed information.

What manual would be complete without a chapter on special devices? Chapter 14 lists companies that supply custom digital, linear and combined digital/linear circuits. Twenty different manufacturers have supplied detailed information for the compilation of this section.

I recommended the *IC Master* for the serious "homebrewer" or the professional engineer. This reference is *not* for everyone, although 99% of hams would at one time or another find information in the books useful. — *Michael B. Kaczynski, W1OD*

Build a Satellite Transceiver Adapter



Do you need six hands to run the equipment in your satellite station? W6IOJ may have the cure for you!

By John Reed,* W6IOJ

Making AMSAT-OSCAR 8 or RS satellite contacts is similar to DXing on the hf bands — communications between stations are on or about the same frequency, and exchanges are generally limited to signal reports and station information (equipment, location, etc.).[1] Limited satellite access time and variable propagation conditions during a satellite pass encourage a similar short-QSO format. The ability to operate in the transceive mode during satellite operation would improve operating efficiency and enjoyment.

This article describes an adapter that makes use of an existing communications receiver and a variable-frequency 2-meter transmitter to provide transceive operation on OSCAR 8 Mode A or the Soviet RS satellites. The design has excellent dynamic range performance, and a converter can be added for OSCAR 8 Mode J operation.

[1]At presstime, OSCAR 8 is not operational, although it may again become active (at unpredictable times) when it is in periods of greater exposure to sunlight.

*770 La Buena Tierra, Santa Barbara, CA 93111

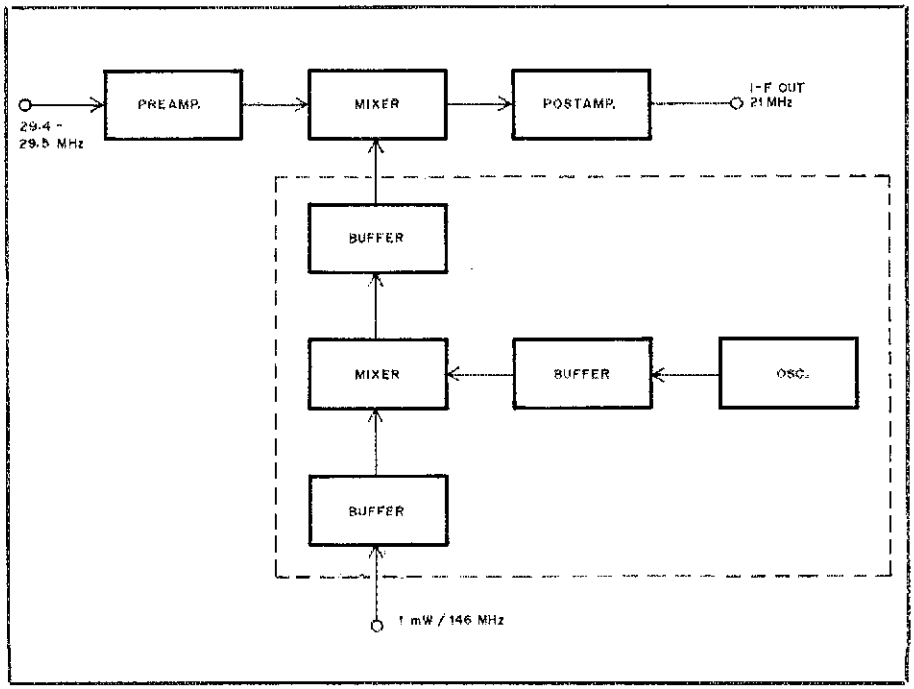


Fig. 1 — Block diagram of the Satellite Transceiver Adapter.

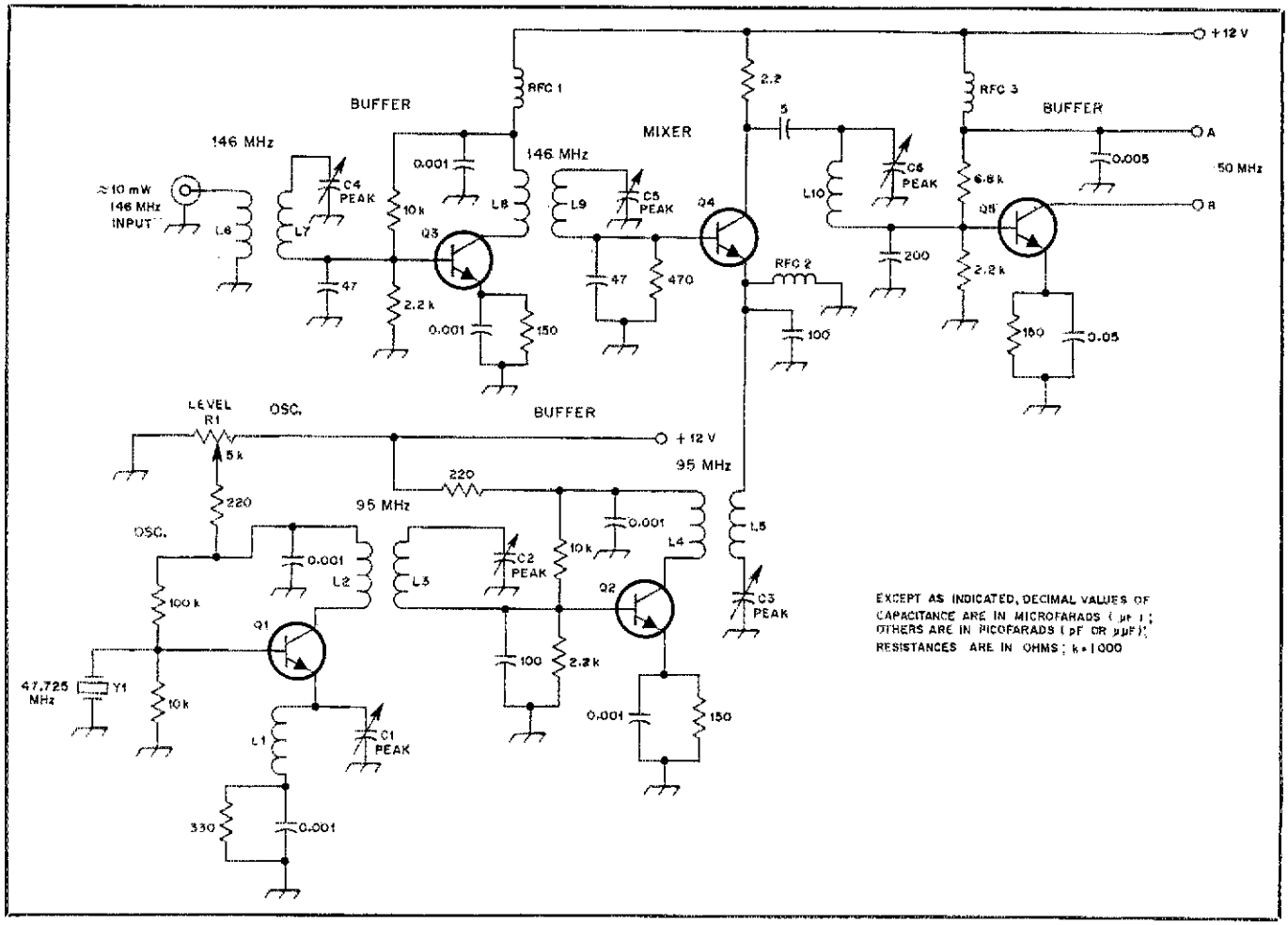


Fig. 2 — Schematic diagram of the LO portion of the adapter. Fixed-value capacitors are disc ceramic, unless otherwise noted. Polarized capacitors are electrolytic. Fixed-value resistors are 1/4- or 1/2-W carbon types, unless indicated otherwise. All inductors are air-core units wound with no. 22 bare solid wire, 3/8-inch diameter by 3/4-inch length, unless specified otherwise. Numbers in parentheses are Radio Shack catalog numbers.

C1-C6, incl. — 5-60 pF trimmer capacitor (272-1340).
L1 — 14 turns.
L2, L4 — 6 turns.
L3 — 2 turn link of no. 22 stranded hookup wire over L2.
L5 — 2 turn link of no. 22 stranded hookup wire over L4.
L6, L8 — 7 turns.
L7 — 2 turn link of no. 22 stranded hookup wire over L6.
L9 — 3 turn link of no. 22 stranded hookup wire over L8.
L10 — 9 turns.
Q1-Q5, incl. — 2N2222A npn silicon general-purpose transistor (276-2009).
Y1 — 47.725-MHz crystal (International Crystal type 031081).

Many of the parts are available from Radio Shack; all are available from mail-order houses.

Concept

The block diagram of the transceiver adapter is shown in Fig. 1. One milliwatt of 2-meter drive is required from the transmitter; this signal is mixed with a crystal-controlled first LO to produce a second LO signal tuning the range of 50.4 to 50.55 MHz. A second mixer combines the 50-MHz LO and the 29-MHz satellite signals to produce an i-f at 21 MHz. An alternate choice for the i-f would be 28 MHz; tests show performance to be equal to the 21-MHz version, except that the rf signals are isolated from the i-f by only 60 dB, introducing the possibility of interference from strong 28-MHz signals.

The advantage of this system is that one knob controls both the transmit and receive frequency. Coarse tuning is provided by the transmitter dial, and the receiver dial is adjusted to account for Doppler shift (an RIT-type function.)

Circuit Description

Local Oscillator

The LO schematic diagram is shown in Fig. 2. The crystal oscillator operates as a doubler, with the emitter circuit tuned to the *third* harmonic of the *marked* crystal frequency. A buffer stage (Q2) cleans up the oscillator signal and provides isolation. Drive from the 146-MHz transmitter is processed through a buffer stage (Q3) and injected into the base of bipolar mixer Q4. Output from this first mixer is lightly coupled to the next stage. LO output is approximately 20 mW, more than enough to drive the following passive mixer. The output level from the LO is adjustable using R1.

Signal Mixer

In this circuit application, the proximity of the i-f to the signal frequency requires the use of a doubly balanced mixer (DBM). A DBM provides superior port-to-port isolation and can be built with inexpensive components. The diode-ring DBM shown in Fig. 3 provides aproximately 40 dB of port-to-port isolation using ordinary, unmatched diodes. To ensure proper operation of the DBM, 4-dB pads are used at the rf and LO ports to provide a constant-impedance load.

Pre- and Postamplifiers

The preamplifier-stage schematic diagram is shown in Fig. 4A. Maximum

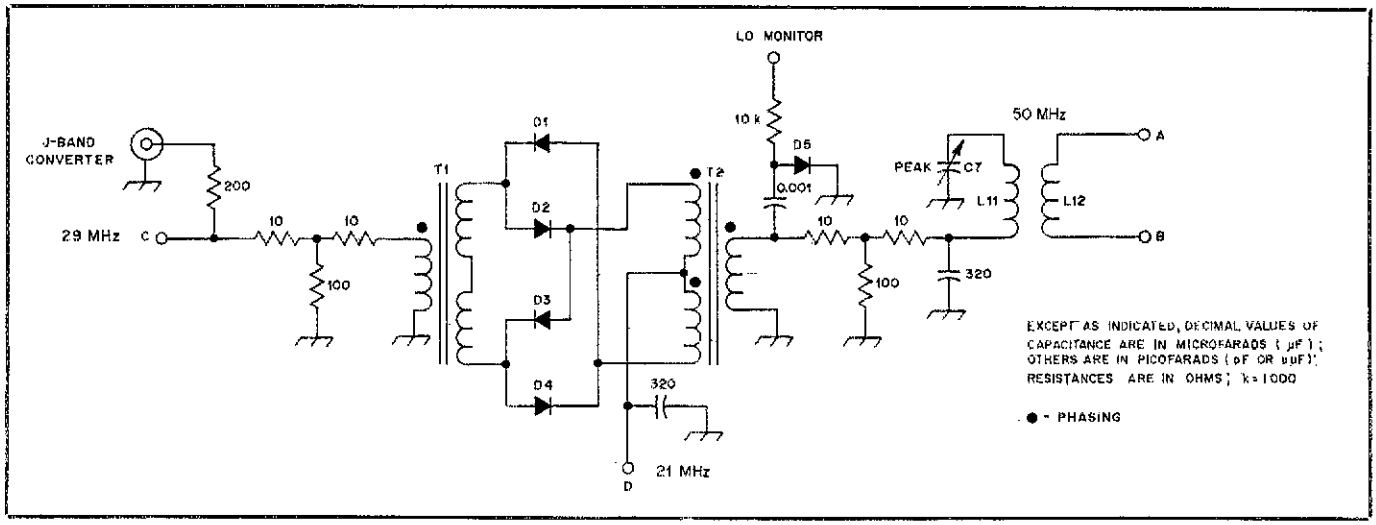


Fig. 3 — Schematic diagram of the DBM portion of the adapter. Fixed-value capacitors are disc ceramic. Fixed-value resistors are 1/4- or 1/2-W carbon types. Numbers in parentheses are Radio Shack catalog numbers.

C7 — 5-60 pF trimmer capacitor (272-1340).
D1-D4, incl. — 5082-2835 silicon barrier diodes (276-1124).
L11 — 9 turns of no. 22 solid bare wire wound on a 3/8-inch-diameter, 3/4-inch-long form.
L12 — 3 turns of no. 22 stranded hookup wire wound over L11
T1, T2 — 8 turns of no. 26 enameled wire trifilar wound on an FT37-43 toroidal core.

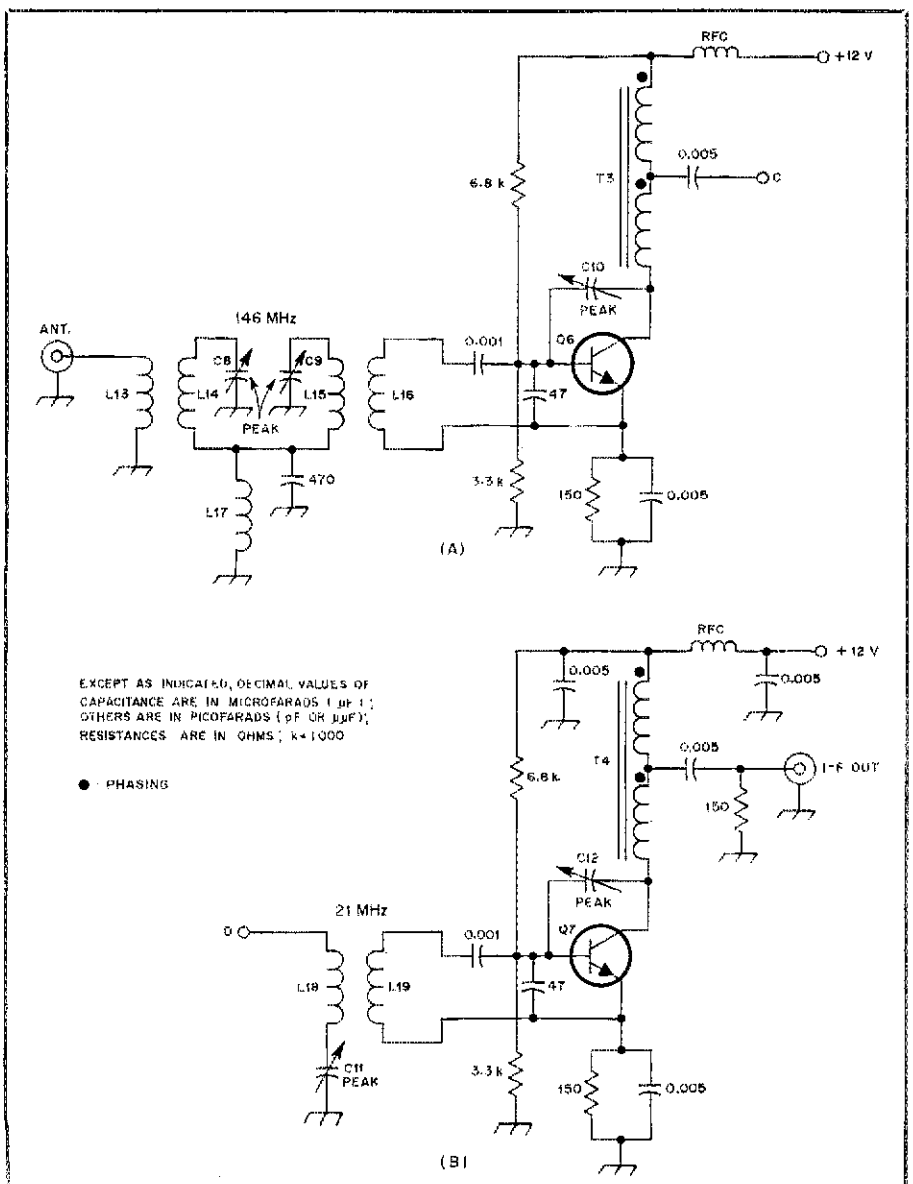


Fig. 4 — Schematic diagram of the (A) preamplifier and (B) postamplifier stages of the adapter. Fixed-value capacitors are disc ceramic. Fixed-value resistors are 1/4- or 1/2-W carbon types. Numbers in parentheses are Radio Shack catalog numbers.

C8-C12, incl. — 5-60 pF trimmer capacitors (272-1340).
L13, L16 — 2-turn links of no. 22 stranded hookup wire wound over L14 and L15, respectively.
L14, L15, — 25 turns of no. 22 enameled wire, 3/8-inch diameter by 3/4 inch long.
Q6 — MRF-901 npn silicon vhf amplifier transistor (276-2044).
Q7 — 2N2222A npn silicon general-purpose transistor (276-2009).
RFC3, RFC4 — 30 turns of no. 30 wire close wound on a high-value 1/2-W resistor.
T3, T4 — 10 turns of no. 26 enameled wire bifilar wound on an FT37-43 toroidal core.

gain is aproximately 20 dB, and the noise figure should be less than 2 dB. If large signals are present at the preamp input, gain can be reduced by decreasing the value of C10.

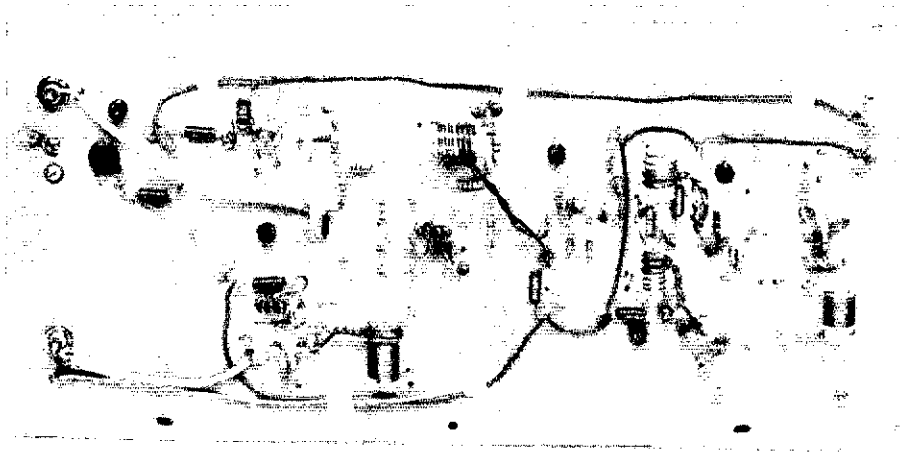
Post-mixer amplification is provided by a single bipolar stage using a 2N2222A in a circuit similar to that of the preamplifier (Fig. 4B). The gain of this stage is variable from 3 to 17 dB.

Construction

The transceiver adapter is built on a 5-1/2 × 12-in. single-sided pc board.[2] Components mount on both sides of the board using push-in terminals. Each ter-

[2]mm = in. × 25.4.

(A)



(B)

Fig. 5 — Top (A) and bottom (B) views of the transceiver adapter, illustrating construction techniques.

minal is isolated from the ground-plane foil by removing 1/8 inch of copper from around the terminal with a drill bit. It is *very* important to observe good vhf construction practices while assembling the unit — keep lead lengths as short as possible, especially between stages. Layout details can be seen in Fig. 5. Two shields are used on the top and bottom of the pc board; they are made from aluminum cane stock. This light, perforated material is easy to bend and drill.

Table 1

Adapter Performance Summary

Circuit	*Gain*	*Maximum Output*
Input	0 dB	0.1 mW
Preamp	20 dB	10 mW
Pad	– 4 dB	4 mW
DBM	– 6 dB	1 mW
Postamp	17 dB	50 mW
Total gain	27 dB	

Alignment

The initial alignment and trouble-shooting work does not require the shields to be in place; the unit is very stable. Alignment is straightforward. A dc voltmeter, attached to the LO MONITOR test point and set to the 1-V range, is used to measure LO output. First, peak the crystal-oscillator trimmer capacitors for maximum output. Next, peak the remaining stages with 1 mW of 2-m drive applied. The oscillator drive control, R1, should be adjusted so that the dc meter reads 0.7 V when all stages are peaked. Tuning the preamp and post-amplifier stages requires a signal source. Either a signal generator or dip meter coupled to the antenna circuit will work. Peak each tuned circuit for maximum output at the i-f port.

A performance summary for the transceiver adapter is given in Table 1. The unit has performed well at W6IOJ and continues to add enjoyment to my satellite operation. The ease of construction, alignment and operation should encourage the newcomer to try (single-handed) satellite operation. QST

Next Month in QST

There's some fine reading ahead for those of us into contesting and/or computers. In the October issue you'll be able to see how you (and your competition) did in the International DX Contest. And you laid-back types can prepare for the next one with an article describing a BASIC program that generates contest QSOs as well as random code (for practice, not contesting!).

Elsewhere in the issue you'll find out how to join the fun on 10 MHz in an article surveying several simple but effective antenna designs. Another article shows how to build an Amateur Radio modem. What's an Amateur Radio modem? Quite simply, it's the interface between a computer and a transceiver.

All this, and a great deal more, in October *QST*.

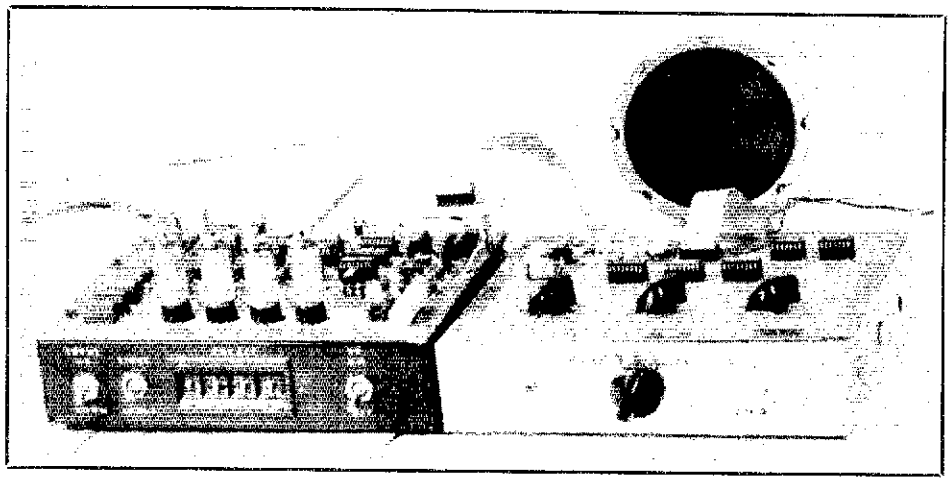
Strays

WORKING CMOS KEYBOARD MEMORY UNIT SOUGHT

☐ There have been many inquiries to the ARRL Technical Information Service about the interfacing of "An Inexpensive Morse Keyboard" (Jan. 1978 *QST*) and "Memory for the K2BLA CMOS Keyboard" (Dec. 1980 *QST*). Problems with the design have so far proved the two units incompatible. If anyone has a working memory unit for the CMOS keyboard, please contact Bob Schetgen, KU7G, Technical Information Service, ARRL, 225 Main St., Newington, CT 06111.

Amateurs at the Collins Radio Company in Cedar Rapids, Iowa, are celebrating the company's 50th anniversary by operating special event station AD0C through the end of the year. Among those manning AD0C, which will be operating before and after work hours and on weekends, are station committee members (l-r) W0NGL, WA9YZN and K0DAS. See July *QST* Special Events for operating frequencies.

The "Beeper": An Audible Frequency Readout for the Blind Amateur



A BCD-output frequency counter, a decoder and an oscillator produce a tone to tell you when your transceiver is tuned to a predetermined frequency.

By Philip S. Rand,* W1DBM

When a blind ham wishes to tune a transceiver to a given frequency, he or she must rely on the 100-kHz crystal calibrator that is usually built into the rig. He will turn the tuning dial fully counterclockwise to the low-frequency end of the band. Next, he switches on the 100-kHz calibrator and, turning the dial clockwise, counts the 100-kHz beat notes until coming to the marker nearest the desired frequency. Finally, he counts dial revolutions, having previously found the number of revolutions per 100 kHz, and from that, the number of kHz per revolution (16 kHz per revolution on my Yaesu FT-101ZD).

By this method anyone can find, for example, 3716 kHz quickly and accurately by counting two beat notes plus one dial revolution, turning the dial in a clockwise direction. Some transceivers have frequency markers every 25 kHz, and also tune almost 50 kHz out of the band at each end. With such a rig a blind ham must count 10 beat notes to reach 3700 kHz.

Suppose he wants to tune into a net on 3923 kHz. He must count 18 beat notes and continue tuning clockwise about 1-1/2 dial revolutions. He tries to locate the net by tuning around and listening for a familiar voice.

Some blind hams use an external 1-MHz crystal marker generator for finding band edges accurately. This is followed by several ICs to divide the frequency down to 100, 50, 25 or 10 kHz, as selected by a switch. Others use specially made crystals to serve as markers for their favorite frequencies.

A Better Way

Having designed a visual frequency display previously,[1] I decided to convert this unit to an audible frequency display that could be used by visually handicapped amateurs. This device allows a ham with impaired vision to tune his transceiver quickly and accurately to any frequency in any amateur band without counting beat notes or dial revolutions. The lead photo shows my "Beeper" along with the frequency counter described in note 1.

Theory of Operation

Basically, the unit consists of 5 sections, as shown in Fig. 1. These are:

1) The up/down presettable BCD-output counter.

2) A decoder to change the BCD data into decimal form.

3) A set of three program switches for setting the desired frequency.

4) Two NOR gates and one NAND gate to provide the logic that determines when you have tuned to the programmed frequency.

5) A one-shot multivibrator that triggers an audio-frequency oscillator driving a miniature loud-speaker.

The Up/Down Counter

The up/down, presettable counter is almost identical to my previous design ex-

*P.O. Box 8, Haverhill, NH 03765

[1]Notes appear on page 24.

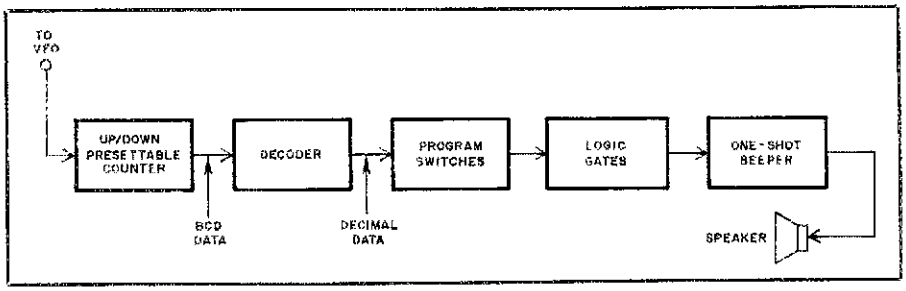


Fig. 1 — A block diagram of the audible frequency readout unit.

cept that to allow for a faster tuning rate, one divide-by-10 IC has been eliminated in the clock and a preset up/down counter has been eliminated from the counting chain. I can now turn the dial at a rate of 50 kHz per second instead of only 5 kHz per second.

As explained in note 1, an up/down presettable counter is necessary so the unit can be used with almost any transceiver regardless of VFO frequency or i-f. The only connection to the transceiver is a piece

of miniature coaxial cable to the VFO. A complete schematic diagram of the counter and readout is given in Fig. 2.

The Decoder

The decoder consists of three 7442s that decode the BCD data for the three least-significant figures of the frequency. For example, a frequency of 14,303 kHz would be decoded as 303. You know that you are tuned to 14 MHz because of the position of the band switch on the rig. The counter does not read hundreds of hertz because it would slow down the tuning rate and really is not necessary. Most nets and round tables operate plus or minus a few kilohertz as band conditions and QRM dictate.

Each 7442 has four BCD inputs and 10 decimal outputs. All outputs are high except the decoded one, which is low. A high is represented by +3.5 V or higher on the output pin of the IC, while a low is usually +0.3 V or less.

Program Switches

The three frequency-programming switches are one-pole, 10-position, non-shorting rotary switches. The output pins of each IC are connected to the 0 through 9 positions on a switch. Fig. 3 shows a means by which shorting-type switches can be used for the programming switches. The 0 through 9 positions of each switch are marked on the top panel with no. 2-56 machine screws so the blind ham can tell the position of the switch by feeling with his or her finger (Fig. 4). The left-most switch programs the 100s of kHz, the middle switch programs the 10s of kHz while

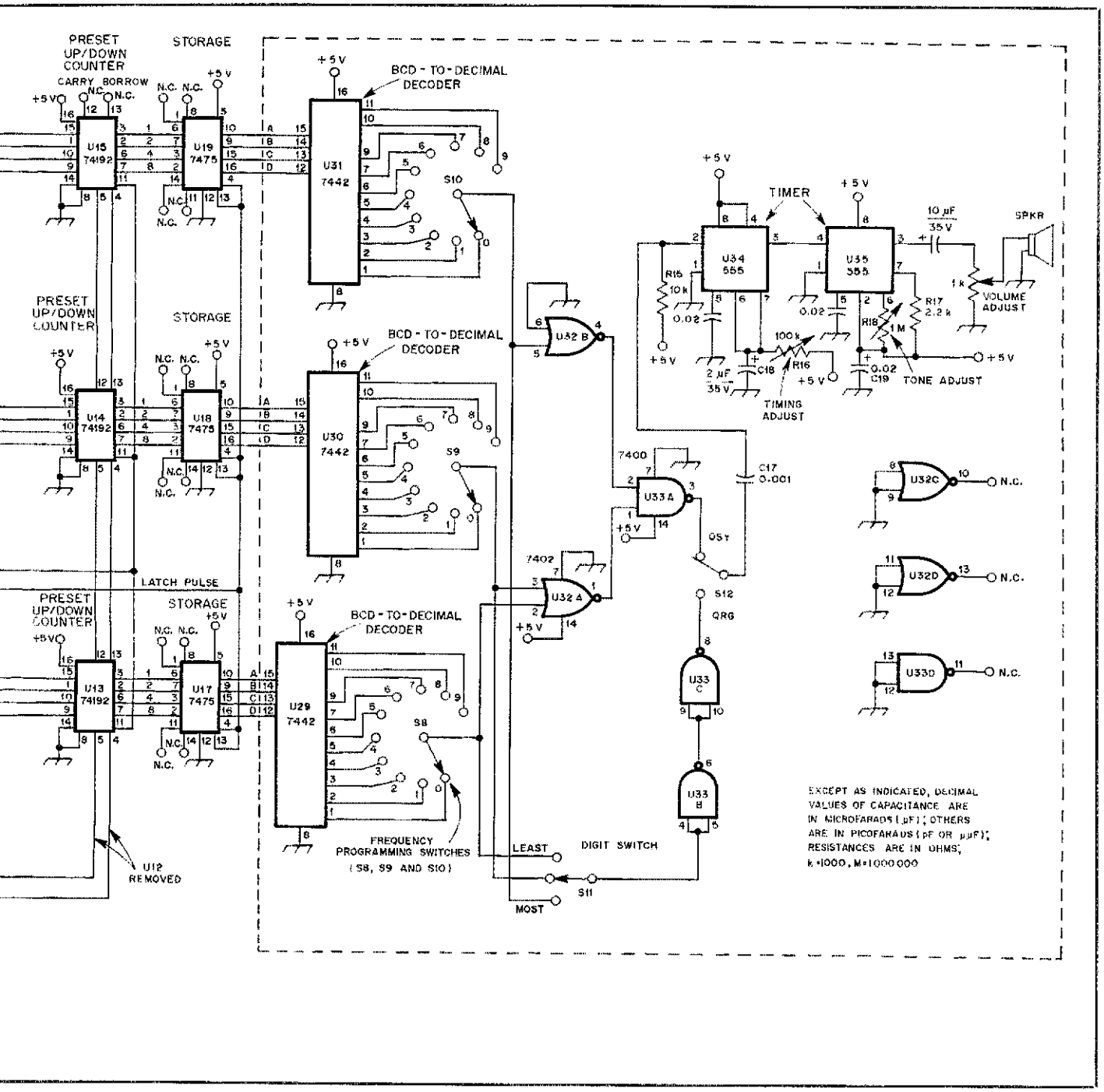


Fig. 2 — Complete schematic diagram of the frequency counter and audible frequency readout.

S2-S4 — Thumb-wheel switches, 0 to 9 BCD output.
S8-S10 — Single-pole, 10-position, non-shorting, rotary-type switches.
S11 — Single-pole, three-position rotary-type switch.
S12 — Spdt toggle switch.

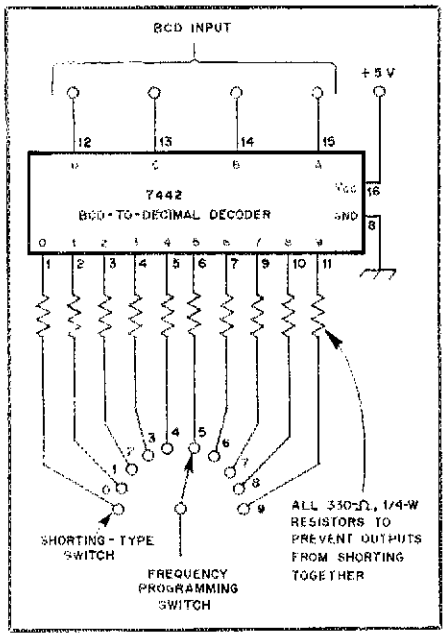


Fig. 3 — A method of using shorting-type rotary switches for the frequency-programming switches.

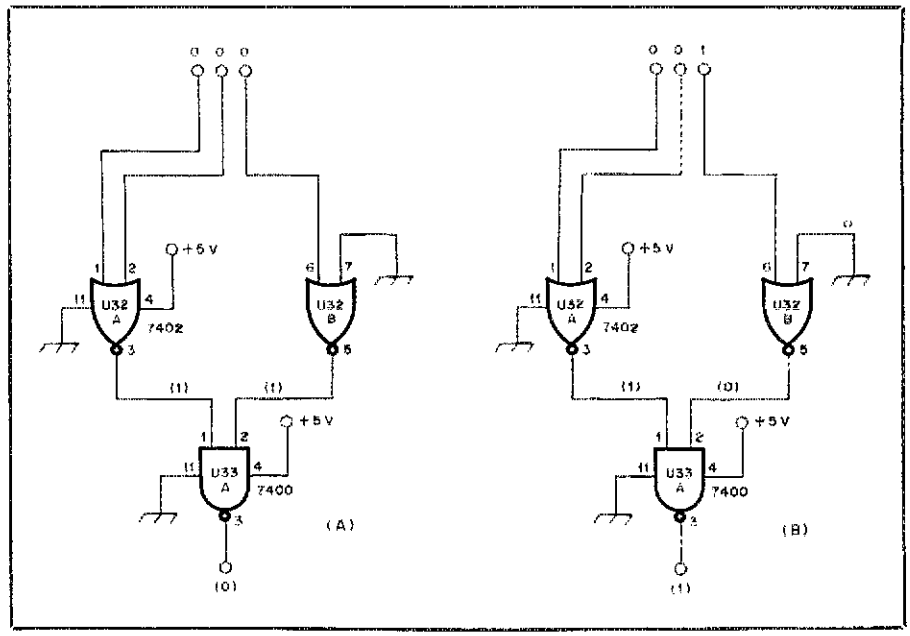


Fig. 5 — A three-input OR gate can be wired from two NOR gates and a NAND gate. The output from this gate when the transceiver is tuned to the programmed frequency is shown at A; B shows the output when the tuning is off by 9 kHz or less.

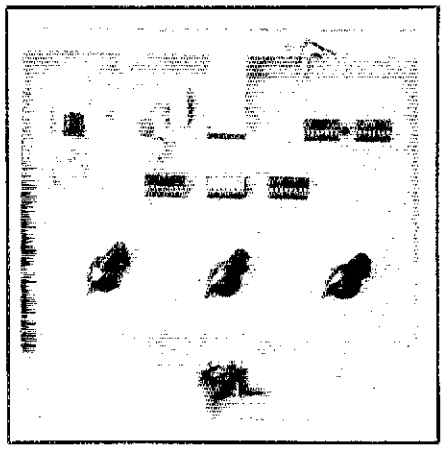


Fig. 4 — Photograph of the top panel of the decoder and beeper chassis. The three frequency-programming switches, with no. 2-56 machine-screw position markers, can be seen. No etched-circuit pattern is given because the wiring is simple, and experienced builders should be able to lay out a board if they desire to use one.

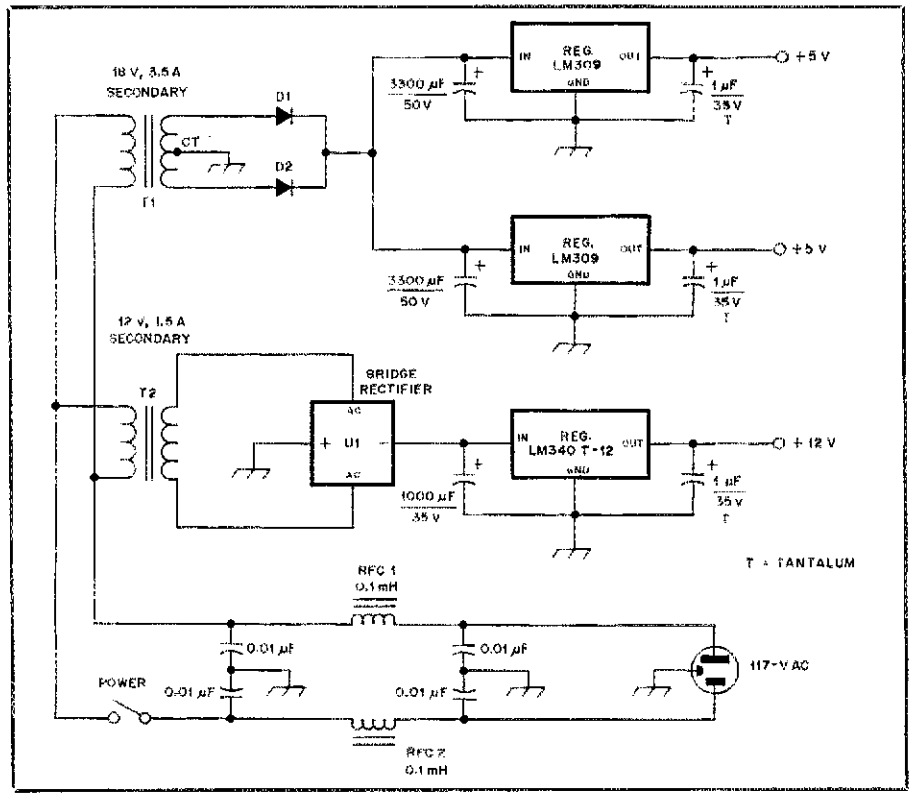


Fig. 6 — A schematic diagram of a power supply suitable for use with the complete audible frequency readout unit.

the right-most switch programs the units digit. The programmed output is taken from the movable contact on each switch and fed to the three gates.

Logic Gates

A circuit is needed that will give a low output only when three lows are fed into it. This requires a three-input OR gate. Any output containing a high will be ignored by the decoder. The OR gate is easily wired as shown in Fig. 5. A NOR gate output will be high only when both inputs are low. If one or both inputs are high, the output is low. I have wired a three-input OR gate by using two 2-input NOR gates with one input tied to ground and then combining their outputs with a NAND gate. A NAND gate only

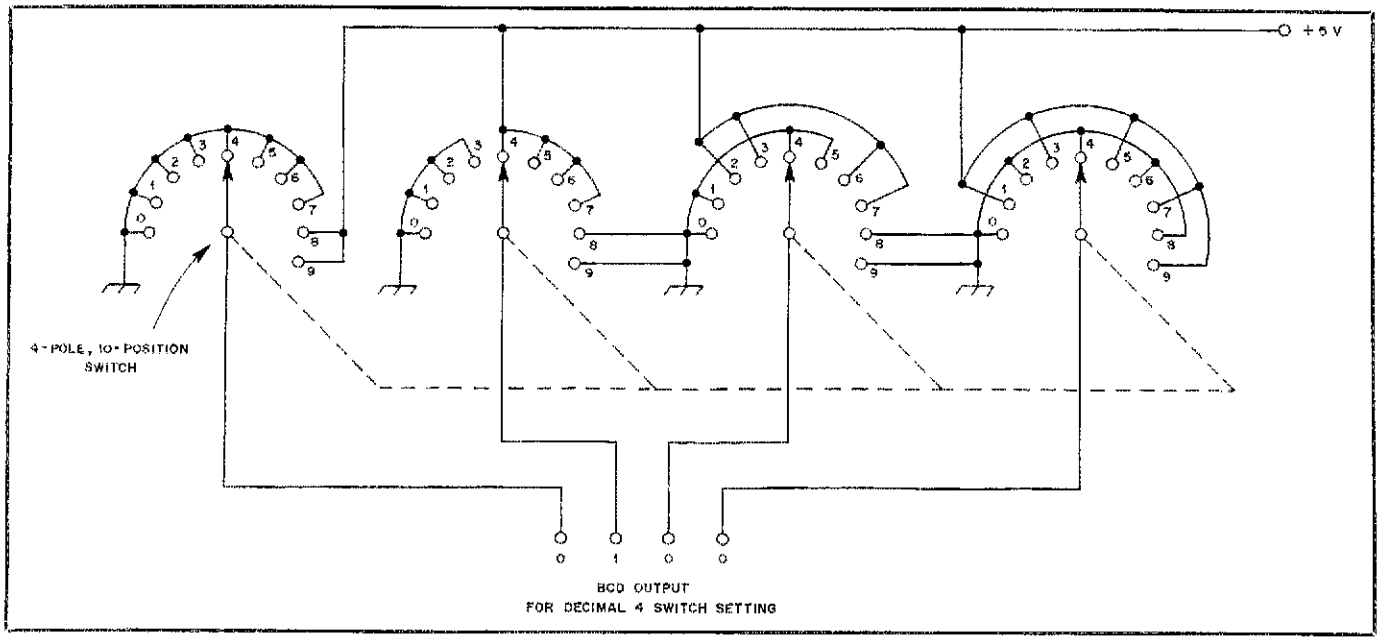


Fig. 7 — A method of wiring a four-pole, 10-position rotary switch to provide a BCD output is shown.

produces a low output when both inputs are high. Referring to Fig. 5A, note that when you have tuned to the programmed frequency, three lows are present at the input to the NOR gates, producing two highs at the input of the NAND gate and forcing its output low. Fig. 5B illustrates the situation when you have correctly tuned to the left and middle digits of your programmed frequency but are still as much as 9 kHz away from the exact frequency.

The Beeper

We need a low output from the NAND gate to trigger the 555 one-shot multivibrator shown in Fig. 2. Since the output from the NAND gate is high up to the moment that you tune to the exact programmed frequency, and then falls to 0, C17 and R15 are used to differentiate this wave form to produce the necessary pulse for the one-shot. The output of the one-shot is timed by R16 and C18 for about 1/10 of a second and is fed to the control pin of the second 555, an audio-frequency oscillator that generates a tone in a miniature loud speaker. The tone of the beep is controlled by the values of R17, R18 and C19. R15 ensures that the voltage on pin 2 of the one-shot is always high except during the short interval of the trigger pulse. The trigger pulse always must be shorter than the one-shot output pulse.

Construction

You have several choices in building this audible frequency readout. If you own a rig with a digital frequency display you may omit the counter portion and build only the decoder and beeper sections. In this case you must tap into the BCD lines with a 14-wire cable. This may be difficult because of the compactness of modern solid-state transceivers and the fact that some use single-chip counters with no BCD output available. Generally, it is much easier to connect a short length of miniature coaxial cable to the VFO output and use an external counter.

If your rig does not have a built-in frequency counter, then you will need to build or acquire a suitable counter. If you elect to build the counter from scratch, the entire unit will fit on one 7- × 9-inch circuit board.[2] All the switches go on the front panel.

A power supply can be included in the cabinet. See Fig. 6 for the circuit diagram of a suitable supply. The power-supply requirements are reduced by not using the visual readout. A brute-force line filter is included to help prevent RFI problems.

If you already built the counter described in note 1, you may do as I did, and build just the decoder/beeper on a circuit board to be mounted on a separate 7- × 9- × 2-inch chassis. The Beeper is connected to the counter by means of a flat 16-wire cable with 16-pin DIP plugs on each end (a standard Radio Shack item). The new circuit board and switches could also be mounted directly over the counter. If you are using a circuit board from Circuit Board Specialists[3], be sure to put jumpers from input to output across the spaces for the two divide-by-10 ICs that are not used. The BCD outputs are available at the input pins of the old 7448 sockets.

Thumb-wheel Switches

Since we are using only three digits in the audible readout, three thumb-wheel switches are needed for presetting the up/down counters instead of the four used in the original counter. If you cannot locate 0-to-9, BCD-output, thumb-wheel switches, you can make substitute switches from 4-pole, 10-position rotary switches by connecting them as shown in Fig. 7.

Calibration

Calibration of the up/down presettable counter is necessary because the unit is designed to work with any rig that you may have, with or without a frequency display. When shifting from band to band, from upper to lower sideband or to cw, an additional adjustment of the thumb-wheel switches will be necessary.

To calibrate, simply tune to a known frequency containing three 0s (such as 7000 kHz) using the 100-kHz crystal marker. Now set the program switches fully counterclockwise to 000, place the QSY/QRG switch in the QRG position and set the three-position "digit" switch to the right, the least significant digit. Next, rotate the right-hand thumb-wheel switch until you hear a beep. Now set the digit switch to the middle position and rotate the middle thumb-wheel switch until you hear another beep. Finally, with the digit switch in the most significant position, fully counterclockwise, rotate the left thumb-wheel switch for a third beep. The counter is now calibrated for that particular band and mode of operation.

Next it is necessary to check for up/down counting. To do this, set the program switches to read 100 and then tune the rig to the next 100-kHz marker, turning the dial clockwise. If the unit beeps as you reach zero-beat, it means you are counting in the right direction. *If not, you must* change the up/down switch and repeat the calibration. Rigs such as the Heathkit

HW-101, Yaesu FT-101 and others using the same conversion logic require the switch to be in the count-down position. This need only be checked once for your rig.

Using the "Beeper" to QSY

To tune rapidly from one part of a band to a net frequency, simply program the desired frequency with the three switches, set the QSY switch and crank the dial one way or the other until you hear a beep. If you were tuning fast you probably overshot the mark, so tune slowly in the other direction a few kilohertz until you hear another beep. You are now on frequency, plus or minus 1 kHz if you calibrated the up/down counter for the band and mode of operation in your particular transceiver.

QRG? What Is My Frequency?

To read the frequency you are tuned to, it is necessary to question each digit, one at a time. This is not as hard as it sounds because you usually know about where you are tuned: You may only have to question the least significant digit. For example, set the QSY/QRG switch to QRG, set the digit switch to the right (the least significant digit) and rotate the right-hand program switch until you hear a beep. Let's assume you are working in the General class portion of the 20-meter phone band and you think your frequency is somewhere between 14,300 and 14,310 kHz. You determine by feeling the screw heads with your finger that the switch is in the 3 position. It's a pretty good bet that you are on 14,303 kHz. It could not be 14,403 or 14,203 but perhaps it is 14,313. To be sure, set the digit switch to the middle position and rotate the middle program switch for a beep. Your finger tells you that the second digit is in fact a 0. If you want, you can also confirm that the left-hand digit is a 3. Of course the 14 MHz is determined by the band switch on the rig.

Conclusions

I gave some thought to using a voice synthesizer to produce an audible frequency readout, but this seemed to be a needless complication. Most operators would not want to move a few kilohertz, wait for a voice announcement of the frequency and tune a few more kilohertz, repeating this procedure until finally reaching the desired frequency. The circuit required for a voice synthesizer would be more complicated, and construction of the unit would be more difficult. The device just described is simple to build and easy to use. It enables a ham with impaired vision to tune to any desired frequency quickly and accurately.

Notes

[1]Rand, "A Versatile Digital Frequency Display," *QST*, Nov. 1977, page 21.
[2]mm = in. × 25.4
[3]Circuit boards and complete parts kits for the original frequency counter and the audible frequency readout are available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002.

Strays

TEACHING THROUGH AMATEUR RADIO

☐ Have you ever participated in a historical event, or met a famous person? Why not tune to 21.395 MHz between 1200 and 2100 UTC Monday through Friday, and share that experience with members of the NYC Junior High School No. 22 ARC? See the difference you can make in a youngster's education. — *Joseph J. Fairclough, WB2JKJ, New York, New York*

Wayland "Soupy" Groves, W5NW (left), of Odessa, Texas, was honored recently with a party put on by the members of the West Texas ARC in recognition of his 60 years of membership in the ARRL, 35 of which were spent on the Board of Directors. Helping Soupy celebrate were club President K5IID (center) and ARRL West Gulf Division Director W5EDZ. *(photo by Rainey)*

MOVING, CHANGING CALL?

☐ When you change your address or call sign, be sure to notify the Circulation Department at ARRL Hq. Enclose a recent address label from a *QST* wrapper if at all possible. Address your letter to Circulation Department, ARRL, 225 Main St., Newington, CT 06111. Please allow six weeks for the change to take effect. Once we have the information, we'll make sure your records are kept up-to-date so you'll be sure to receive *QST* without interruption. If you're writing to Hq. about something else, please use a separate piece of paper for each request.

IHN HAS NEW MANAGER

☐ Cal Burt, KAØDFN, is the new manager of the International Handicappers' Net, succeeding Ray Meyers, W6MLZ, sponsor of the IHN for the past 25 years. KAØDFN, a retired Air Force colonel, was recently appointed to the President's Committee for the Employment of the Handicapped. Membership in the IHN costs but a letter stating your call sign and the nature of your handicap, and a business-size s.a.s.e. to hold your certificate. For more information, write to Cal Burt, KAØDFN, P.O. Box 59, Oregon, MO 64473.

INTERESTED IN LEAGUE-SPONSORED INSURANCE?

☐ The Membership Affairs Committee is studying the feasibility of offering League members additional insurance programs beyond the present ARRL Ham Radio Equipment and Club Liability programs. Participation in the plans would be voluntary. Please take a few moments to complete the following questionnaire and send it to the Membership Services Department, ARRL, 225 Main St., Newington, CT 06111. Make a photocopy if you'd like, or simply answer the questions on a separate piece of paper. Thanks.

I would be interested in the following types of voluntary insurance plans, should the ARRL offer them:

	I am interested	I am not interested
1) Life Insurance	☐	☐
2) In-Hospital Insurance (to pay a fixed amount each day during hospitalization)	☐	☐
3) High-Limit Accident Insurance (to pay specified amounts for specific levels of injury due to accident)	☐	☐
4) Disability Income Protection	☐	☐
5) Excess Major Medical (to pay medical charges above a deductible of $15,000 to $25,000)	☐	☐
6) Major Medical (to pay medical expenses above a deductible of $500 to $1000 but with a maximum benefit of $20,000)	☐	☐

I do not believe the ARRL should sponsor insurance programs that have no direct relation to Amateur Radio. ☐

Please note: An expression of interest in no way binds you to a particular course of action. This survey is designed only to gauge membership interest in these insurance programs.

A Top-Fed Vertical Antenna for 1.8 MHz — Plus 3

Mathematical analysis unlocks the secret behind this unusual antenna system.

By Carl Eichenauer,* W2QIP

Does your antenna act strangely at times? Does it resonate where it is not supposed to? Well, mine does. To understand why, I developed a BASIC computer program to "crunch" through various mathematical calculations. The program is listed in the Appendix. My "strange" installation consists of 80- and 40-meter inverted-Vs, fed from a single coaxial cable and mounted on a common support.

There is nothing unusual about this system; the approach is described in *The ARRL Antenna Book*.[1] The antenna shown in Fig. 1 provides satisfactory performance on 80, 40 and 15 meters. It also provides — strange as it may seem — effective radiation on 160 meters! No traps, switches or antenna matching networks are required to accomplish 4-band operation.

A certain amount of skepticism is in order at this point — in fact, I could not have been more surprised. After trying to tune the antenna on 160 m with the aid of a Transmatch, I eventually found that the system had a SWR of 1.2:1 on 1805 kHz with *no matching network* at all!

The following description and analysis of my antenna system should present ideas useful to other antenna builders. Those familiar with BASIC programming may eliminate many hours of number crunching on a calculator by using a program similar to mine.

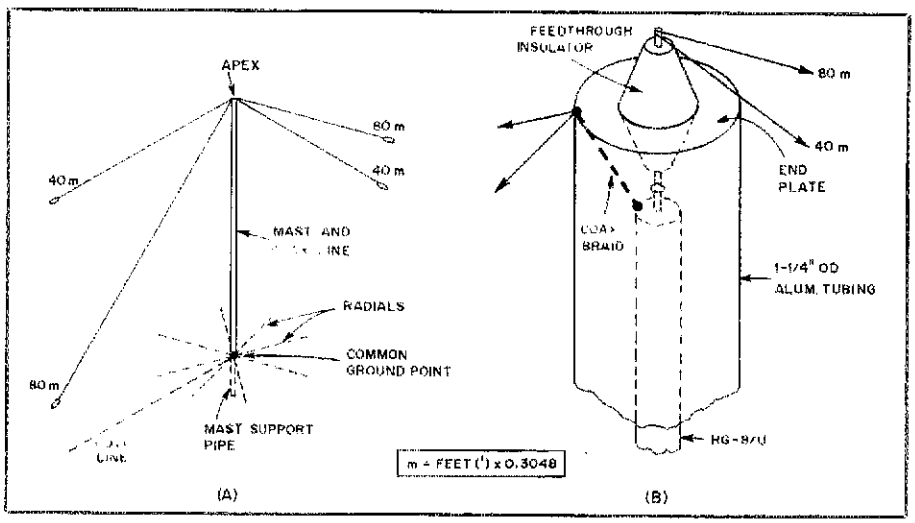


Fig. 1 — Physical details of the antenna system used by W2QIP. A shows the element and radial layout and B details the feed system.

Physical Details of System

A 34-foot wooden mast with a 12-foot aluminum-pole extension provides a center support for both antennas.[2] The 80- and 40-meter inverted-Vs are positioned roughly at right angles to each other. The lower ends are connected to convenient supports (such as trees, house corners or lamp posts) and the height above ground ranges from 6 to 20 feet. RG-8/U coaxial cable runs up the mast and through the center of the aluminum extension pole. A small aluminum plate covers the top end of the aluminum pole and a ceramic feedthrough insulator passes through the plate. The four antenna wires, in addition to an insulated guy wire, support the top of the antenna. The wooden mast is also guyed.

From the feed point, the coaxial line runs down the mast to ground level and then continues underground (at a depth of several inches) to the house, through the basement, and eventually reaches the operating position. Total line length is approximately 100 feet. The outer braid connects to the mast support at the point where the coaxial line goes underground. Bottom support for the mast consists of a 1-1/2 inch steel pipe driven into the earth to a depth of 10 feet. A set of eight wire radials ranging from 20 to 40 feet in length are buried to a depth of an inch or so and are connected to the coaxial-cable braid where it goes underground. This ground network turns out to be an important part of the 160-meter radiation system.

System Modeling

In an attempt to understand the mysterious antenna resonance at 160 meters, I investigated several analytic techniques. The technique that gave the closest agreement with measurements is based on principles set forth in Jordan's

[1]Notes appear on page 27.

*205 Lathrop Rd., Syracuse, NY 13219

book.[3] He points out that while lumped-constant circuit elements can be used to model an antenna system over a narrow band of frequencies, transmission-line simulation of the antenna elements is a more accurate approach when analyzing an antenna over a broad frequency range.

The following 10 steps and the BASIC program outline the analysis of my antenna system. Each step is based either on transmission-line or radiation-resistance formulas. In each case, the formulas are functions of frequency.

The six conductors represented in Fig. 2 consist of two 80-meter dipole halves, two 40-meter dipole halves, and the center conductor and braid of the coaxial feed line. For the purpose of mathematical modeling, we will first assume that the six antenna conductors are suspended in free space.

1) Fig. 2A shows the two 80-meter antenna elements. Each wire can be analyzed as a sloping transmission line in which one conductor is a combination of the earth and antenna radial system. Inspection of the actual antenna shows that the input end of the line (I) is 46 feet high, the output end (K) is 6 feet high and the output load impedance is infinite. This information along with wire diameter and frequency-of-operation data is placed into an appropriate formula and the reactance looking into each half of the antenna (X8) is calculated. Next, the same data is used in a different formula to calculate the radiation resistance looking into the two elements acting as a dipole. One-half of this value is assigned to each element (R8). The key electrical properties of these two "radiating transmission lines" are now defined.

2) The same procedure used in step 1 is used to calculate R6 and X6.

3) Next, the 40- and 80-meter elements are connected together and their total reactance is calculated. This value (X9) is simple — the parallel value of X6 and X8 (Fig. 2C).

4) Fig. 2D represents the analysis of the coaxial line. Since the bottom end is connected to ground, only the 46-foot section shown is relevant to the model. Furthermore, since the line is open-circuited at the top end (for the moment), nothing but a source of voltage appears at the upper end (assuming, of course, that the signal generator is turned on and that it can operate into an infinite-impedance load).

5) As an alternative equivalent, the transmission line can be represented by a solid conductor whose diameter is equal to the O.D. of the transmission-line outer braid (Fig. 2E). The voltage from the transmitter is represented simply by a two-terminal sine-wave generator with one terminal connected to the vertical conductor and one terminal open circuited (for the moment).

6) Next, the two sets of conductors from step 2C are "connected" to the vertical conductor top. From the reactance of this combination, X9, the equivalent electrical length (in degrees) of the elements can be determined for any given frequency. The vertical conductor electrical length (in degrees) is calculated from the physical length. These two sections form a top-loaded vertical antenna. By "lifting" the bottom connection off ground, the base radiation resistance of the top-loaded vertical can be determined (Fig. 2F).

7) An unfortunate fact of nature must be accounted for — no ground system is perfect. Therefore, a resistor (RG, the ground loss) is inserted in series with the radiation resistance of the vertical, as

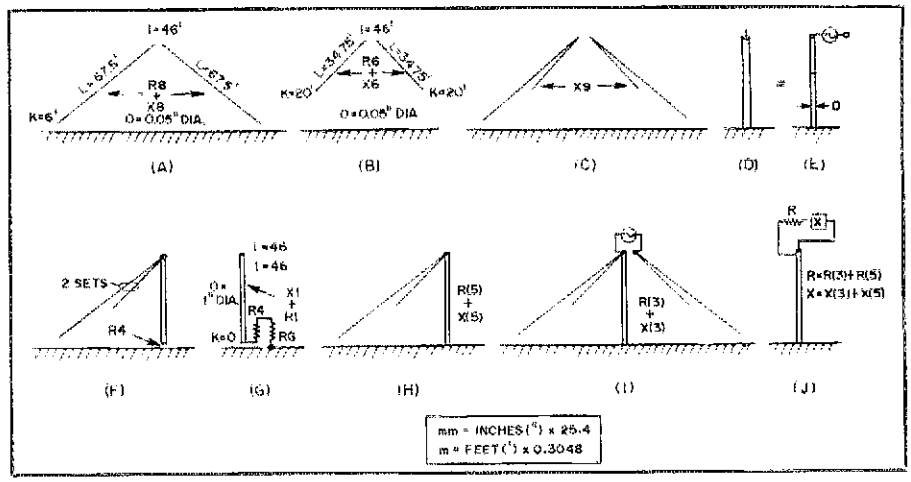


Fig. 2 — Step-by-step development for the mathematical model of the antenna. See text for details.

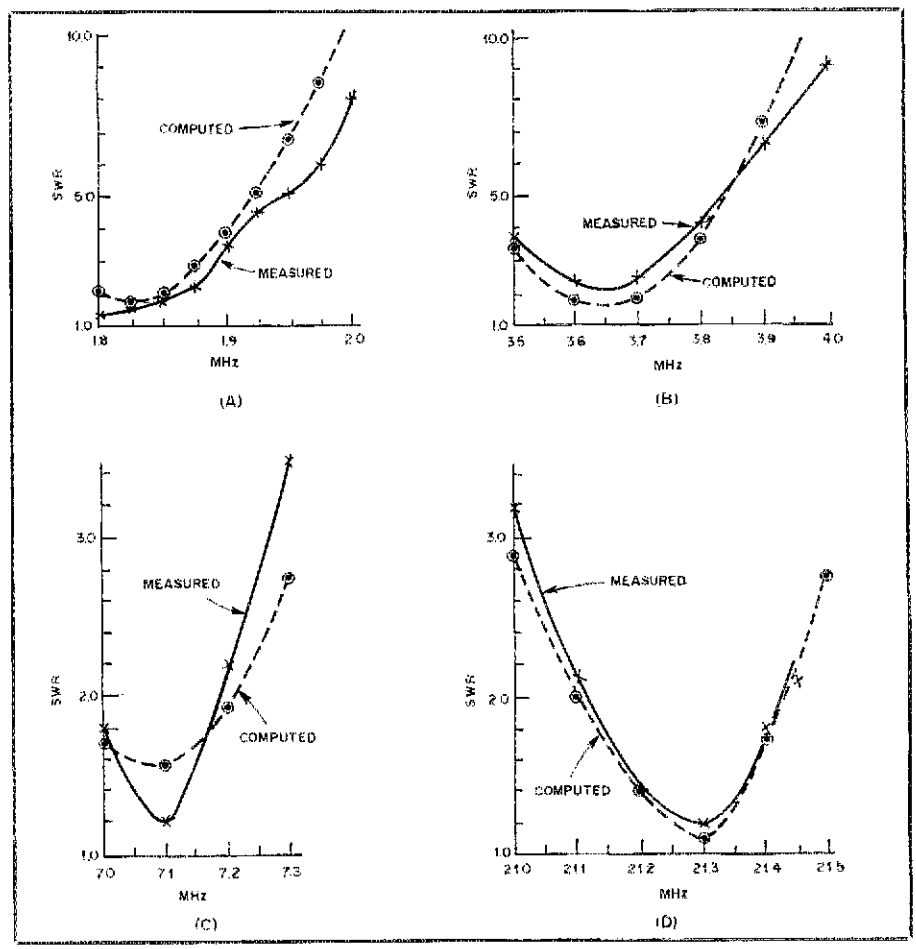


Fig. 3 — Measured and calculated SWR curves for the antenna on (A) 160 meters, (B) 80 meters, (C) 40 meters and (D) 15 meters.

shown in Fig. 2G. Consider the 46-foot vertical section as another transmission line in which the input end is at 46 feet above ground and the output end is terminated in a resistor of value R1 + RG. This information, along with the vertical-section outside diameter and operating frequency is used to determine the values of X1 and R1, the reactive and resistive components of the vertical transmission line.

8) In Fig. 2H one set of sloping elements is reattached. Now, the series equivalent value for the whole system is calculated.

9) In Fig. 2I one terminal of a sine-wave generator is attached to the vertical element and the set of wires and the other set of sloping wires is connected to the other terminal of the generator. This allows the equivalent series reactance and resistance for the complete set of wires to be calculated.

10) Fig. 2J displays the equivalent result of the modeling. The resistances and reactances of steps 8 and 9 are added together to give the effective input impedance for the complete antenna system. Since this representation is broadband in nature, the system SWR can be checked at any frequency by "sweeping" the signal source!

Calculated vs. Measured Results

An SWR meter at the transmitter end of the transmission line was used for SWR measurements in all cases except one; because SWR values from below the 160-meter band were desired, a home-made RX bridge was employed.

Fig. 3 shows the measured and calculated SWR curves. Resonance occurs near the bottom edge of the 160-meter band. Fortunately, virtually all of my operation on 160 is cw. For operation higher in the band, the computer program showed that lowering the height of the apex by a foot or two should provide satisfactory performance.

Note that the calculated SWR is consistently higher than the measured values. This characteristic can be modified by selection of the value of ground resistance used in the calculations. In the case shown, a value of 5 ohms has been arbitrarily selected. If a lower value is used, the lowest calculated SWR coincides almost exactly with the lowest measured value, but the off-resonance SWR rises at a more rapid rate than the measured values. This simply points out the fact that the model is representative, but not exact. In defense of the model, it should be pointed out that SWR measurements are seldom exact either!

The SWR curves for the other bands present few surprises. Over the years, similarly installed dipoles and inverted Vs have produced essentially the same response characteristics.

Conclusions

If you wonder whether this antenna really works, I must confess that it has not been responsible for a 160-meter DXCC award. However, in a recent ARRL 160-meter contest it was used with a QRP rig running three watts input. Over a three-hour period 50 stations in 22 states were worked. If nothing else, this should prove that the system does radiate on 1.8 MHz!

Appendix

The BASIC program listed below was developed on a Timex/Sinclair 1000® computer with 16K of RAM. [The program will run on the 2K T/S 1000 if the REM statements are removed from the program. — Ed.] The program follows the analysis algorithm presented in the text. Readers familiar with BASIC programming should have no trouble in adapting the program to any BASIC-equipped machine.

Notes

[1]G. Hall, Ed., *The ARRL Antenna Book*, 14th ed. (Newington: ARRL, 1982), chapter 8.

[2]m = ft × 0.3048; mm = in. × 25.4.

[3]Jordan, *Electromagnetic Waves and Radiating Systems* (Englewood Cliffs, NJ: Prentice-Hall, 1950), chapter 13.

```
*LIST

10 REM FILE NAME IS ANTENNAZ
20 FOR F=1.8 TO 2.0 STEP .025
30 LET P=3.1415927
40 DIMR(10)
50 DIMX(10)
60 REM 80 M.SLOPER REL.TO GND.
70 LET L=27.5
80 LET Q=.05
90 LET T=46
100 LET K=5
110 LET D=(I+K)/2
120 LET R4=0
130 LET X4=-1E6
140 GOSUB 400
150 LET X8=X5
160 LET R8=.01215*(ABS(1-COS(ATN(B)))*180/P)↑2
170 REM 40 M.SLOPER REL.TO GND.
180 LET L=24.75
190 LET Q=.05
200 LET I=46
210 LET K=20
220 LET D=(I+K)/2
230 LET R4=0
240 LET X4=-1E6
250 GOSUB 400
260 LET X6=X5
270 LET R6=.01215*(ABS(1-COS(ATN(B)))*180/P)↑2
280 REM VERTICAL REL.TO GND.
290 LET L=46
300 LET Q=1
310 LET I=46
320 LET K=0
330 LET D=(I+K)/2
340 LET X4=0
350 LET R4=0
360 GOSUB 400
370 LET R1=R5
380 LET X1=X5
390 GOTO 550
400 REM Z SUBROUTINE
410 LET B=TAN(2*P*L*F/984)
420 IF X4=0 GOTO 450
430 LET Z0=60*LOG(48*D/Q)
440 GOTO 510
450 LET Z0=60*(LOG(24*L/Q)-1)
460 LET X9=X8*X6/(X8+X6)
470 LET B1=ATN(Z0/ABS(X9/2))
480 LET B2=ATN(B)
490 LET R4=.01215*(ABS(COS(B1)-COS(B1+B2))*180/P)↑2
500 LET R4=R4+5
510 LET R3=R4/Z0
520 LET X3=X4/Z0
530 GOSUB 900
540 RETURN
550 REM PAR.R1 AND X1 VALUES
560 LET R=(R1↑2+X1↑2)/R1
570 LET X=(R1↑2+X1↑2)/X1
580 REM PAR.EQUIV.OF 80 SLOPER
590 LET R(6)=(R8↑2+X8↑2)/R8
600 LET X(6)=(R8↑2+X8↑2)/X8
610 REM PAR.EQUIV.OF 40 SLOPER
620 LET R(1)=(R6↑2+X6↑2)/R6
630 LET X(1)=(R6↑2+X6↑2)/X6
640 REM PAR.EQUIV.OF 80&40 SLOPERS
650 LET R(2)=R(6)*R(1)/(R(6)+R(1))
660 LET X(2)=X(6)*X(1)/(X(6)+X(1))
670 REM SER.EQUIV.OF 80&40 SLOPERS
680 LET R(3)=X(2)/(X(2)/R(2)+R(2)/X(2))
690 LET X(3)=R(2)/(X(2)/R(2)+R(2)/X(2))
700 REM PAR.EQUIV.OF80&40 SLOPERS+VERT.
710 LET R(4)=R(2)*R/(R(2)+R)
720 LET X(4)=X(2)*X/(X(2)+X)
730 REM SER.EQUIV.OF 80&40 SLOPERS+VERT.
740 LET R(5)=X(4)/(R(4)/X(4)+X(4)/R(4))
750 LET X(5)=R(4)/(R(4)/X(4)+X(4)/R(4))
760 REM SER.VALUES FOR ANTENNA
770 LET R1=R(5)+R(3)
780 LET X1=X(5)+X(3)
790 REM REFLECTION COEF.
800 LET V1=SQR((R1-50)↑2+X1↑2)
810 LET V2=SQR((R1+50)↑2+X1↑2)
820 LET V=V1/V2
830 REM  VSWR
840 LET V=(1+V)/(1-V)
850 PRINT"F=";F;" X=";X1
860 PRINT"R=";R1;" VSWR=";V
870 PRINT
880 NEXT F
890 STOP
900 REM LINE R AND X SUBROUTINE
910 LET C=(1-X3*B)↑2+(R3*B)↑2
920 LET R=R3*(1+B↑2)/C
930 LET X=(X3*(1-B↑2)+B*(1-R3↑2-X3↑2))/C
940 LET R5=R*Z0
950 LET X5=X*Z0
960 RETURN
970 END
```

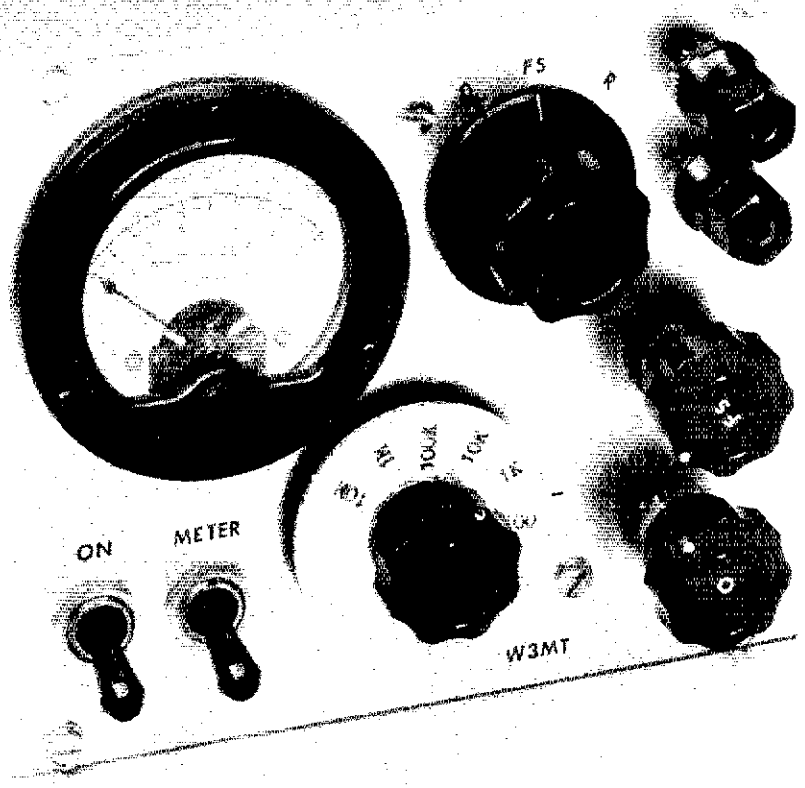
```
*RUN

F= 1.8 X=-36.79183
R= 77.75574 VSWR= 2.060922

F= 1.825 X=-8.213758
R= 86.00515 VSWR= 1.743639

F= 1.85 X= 21.77462
R= 95.5599 VSWR= 2.046966

F= 1.875 X= 54.04112
R= 106.7074 VSWR= 2.791916

F= 1.9 X= 88.23508
R= 119.8171 VSWR= 3.855286

F= 1.925 X= 125.0536
R= 135.3697 VSWR= 5.124723

F= 1.95 X= 164.747
R= 153.9985 VSWR= 6.782116

F= 1.975 X= 207.8211
R= 176.5483 VSWR= 8.590436

F= 2 X= 254.7821
R= 204.1618 VSWR= 10.5928
```

```
ready
*20 FOR F=3.5 TO 4.0 STEP .1
*RUN

F= 3.5 X=-73.5251
R= 66.48304 VSWR= 2.415184

F= 3.6 X=-14.44687
R= 74.61266 VSWR= 1.751711

F= 3.7 X= 36.76289
R= 77.6977 VSWR= 1.837677

F= 3.8 X= 91.90717
R= 76.59321 VSWR= 3.66362

F= 3.9 X= 144.457
R= 77.41974 VSWR= 7.099825

F= 4 X= 210.934
R= 80.79132 VSWR= 13.17514
```

```
ready
*20 FOR F=7.0 TO 7.3 STEP .1
*RUN

F= 7 X=-26.09847
R= 75.65659 VSWR= 1.722581

F= 7.1 X= 4.48773
R= 73.68868 VSWR= 1.582331

F= 7.2 X= 31.80422
R= 73.99452 VSWR= 1.905327

F= 7.3 X= 60.01251
R= 76.04982 VSWR= 2.263779
```

```
ready
*20 FOR F=21 TO 21.5 STEP .1
*RUN

F= 21 X=-50.96339
R= 48.20148 VSWR= 2.854866

F= 21.1 X=-34.9547
R= 49.29955 VSWR= 1.994922

F= 21.2 X=-17.06762
R= 49.21908 VSWR= 1.408788

F= 21.3 X= 2.17015
R= 45.08509 VSWR= 1.119742

F= 21.4 X= 24.11263
R= 40.9635 VSWR= 1.75343

F= 21.5 X= 45.62159
R= 39.40734 VSWR= 2.250102
```

A Linear, Self-Calibrating Ohmmeter



Do you want an accurate, easy-to-use ohmmeter, but can't afford a digital unit? Try your hand at putting together this easy-to-build project, and you'll have one.

By Frank Noble,* W3MT

A conventional ohmmeter has a nonlinear scale. At high resistance values the meter is hard to read because the scale graduations are so close together. It may be difficult to interpolate between the calibration points at the low-resistance end of the scale. The meter accuracy is degraded as the battery approaches the end of its life. While most of these disadvantages can be overcome by providing additional ranges, the construction of a meter scale remains a major problem if you want to build your own ohmmeter. Finally, most multimeters pass a relatively large current through the device under test, and this may be sufficient to destroy some components.

The nonlinear scale of the conventional ohmmeter causes larger reading errors with increasing resistance. For best accuracy the instrument should be calibrated against standards in the range of the unknown each time it is used. This article describes a linear-scale meter, self-calibrating against internal standards, which dissipates very little power in the unknown resistor. It has six decade ranges from 100 ohms to 10 megohms, full scale, so that any resistance in the range 10 ohms to 10 megohms will yield a meter deflection of at least 10% of the scale. Neben presented a similar meter, but the circuit described here includes several design improvements.[1]

The Scheme

An understanding of the system requires a quick review of op-amp theory. In Fig. 1, the amplifier is assumed to have infinite gain, infinite input impedance, zero output impedance and exact phase inversion. Because the gain is infinite and the output voltage is finite, the voltage at the amplifier input is zero. Hence the current in R_A is just

$$I = E_i/R_A \qquad \text{(Eq. 1)}$$

None of this current can enter the amplifier because any current flowing through an infinite impedance will produce infinite voltage, saturating the amplifier. The only recourse is for the same current to flow in R_B, forced there by E_o.

$$I = E_o/R_B \qquad \text{(Eq. 2)}$$

Setting Eq. 1 and 2 equal, we have the usual

*10004 Belhaven Rd., Bethesda, MD 20817

[1]Notes appear on page 30.

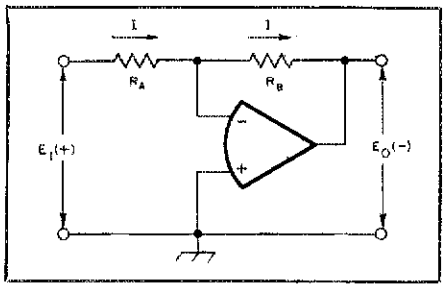


Fig. 1 — Diagram of a simple inverting amplifier. The theory of operation is explained in the text.

formula for the gain of an inverting op amp.

$$G = E_o/E_i = R_B/R_A \qquad \text{(Eq. 3)}$$

Design Considerations

To minimize the power dissipation in the unknown resistor, E_o must be as small as possible, but still drive the meter to full scale. Although almost any meter movement could be arranged to read low voltages, a sensitive meter is indicated because it must be protected from transients that can occur when you switch ranges, disconnect the unknown, or turn the meter on with no unknown connected. Diodes are not suitable elements for this protection because they will degrade the scale linearity. A large R-C time constant is used instead. (Fig. 2). While this does not eliminate the meter overload, it does slow the deflection rate so the meter will not be damaged mechanically. The internal resistance of my 100-μA meter is 1800 ohms, as compared to 50 ohms for a typical 1-mA meter. The larger meter resistance makes it possible to slow the meter movement with a much smaller capacitor for C6.

Optimum sensitivity combined with long time constant is achieved by coupling the capacitor/meter combination to the amplifier through a resistance equal to the meter resistance, in this case 1800 ohms. The meter now reads 360 mV full scale. This is the maximum on-scale voltage that can appear across an unknown resistor; a maximum power dissipation of about 1.3 mW will occur in a 100-ohm resistor. The maximum voltage that can be applied to the meter is 4.5 volts, producing less than 12-mW dissipation in the meter winding. This will not burn it out, even over long periods. In addition to these precautions, a switch is provided to shunt the meter whenever transients are expected. A small resistor limits the capacitor discharge current, protecting the capacitor and switch.

The 360-mV maximum output is large compared to the expected offset drift, and small enough to expect good amplifier linearity and low current consumption. Fig. 2 shows that a dual op amp is used, the first section being a voltage follower and the second section an inverting amplifier as shown in Fig. 1. The voltage follower supplies sizable currents to R_A from an output impedance of much less than an ohm, providing good voltage and gain regulation against range changes. Since the input impedance of this amplifier is virtually infinite, it can be supplied by a high-impedance source requiring little battery current. The net result is that E_i to the in-

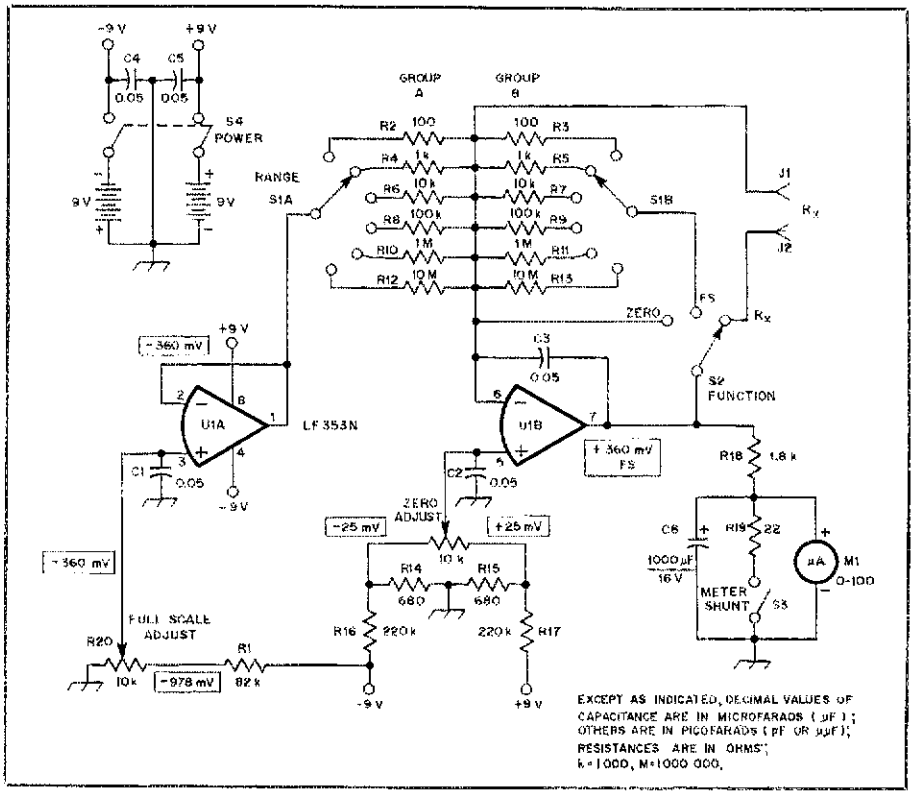


Fig. 2 — Schematic diagram of the Linear, Self-Calibrating Ohmmeter. Fixed-value resistors are 1/2 W composition. R2-R13, inclusive, are 5% tolerance or better. Capacitors are disc ceramic unless otherwise specified.

J1, J2 — Binding posts.
S1 — 2 pole 6 position nonshorting rotary.
S2 — 1 pole 3 position nonshorting rotary.
S3 — Spst toggle.
S4 — Dpst toggle.
U1 — Dual JFET op amp, LF353N (Radio Shack part no. 276-1715).

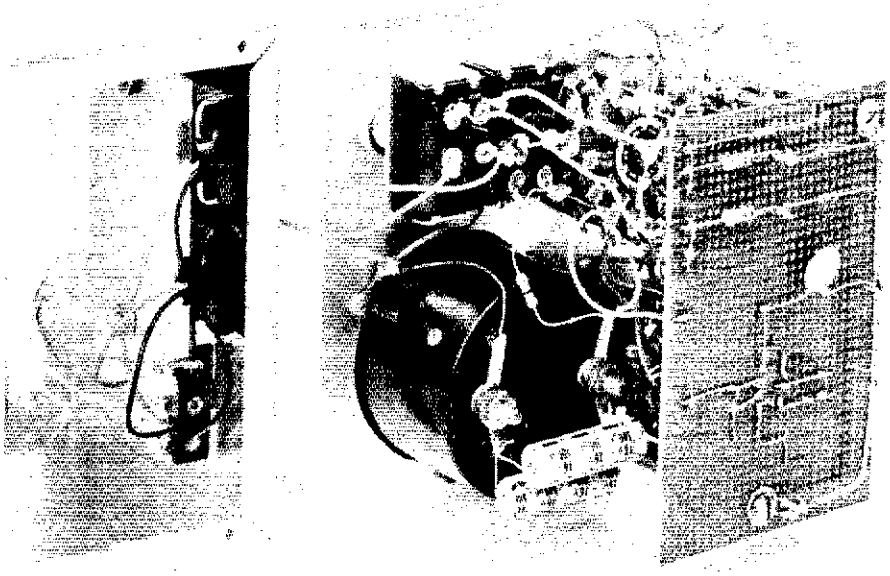


Fig. 3 — Construction details of the ohmmeter. A piece of perf board and point-to-point wiring is used for those components not connected directly to panel-mounted parts. Note that C6, wired directly across the meter terminals, consists of two 500-μF capacitors in parallel.

verting amplifier does not change materially with range switching, and the control is always linear.

The question of gain (R_B/R_A) now arises. Suppose we choose a gain of 1/10. This would require the follower to operate at 3.6 volts in and out, which would certainly reduce drift problems. But the maximum R_A value for a 10-megohm range would be 100 megohms, which is not commonly available and not likely to be stable in the presence of moisture and dirt. Suppose we consider a gain of 10. Then the follower would operate at 36 mV in and out, which is too small in relation to offset drift. So the vicinity of unity gain is indicated. The availability of inexpensive pairs of 5% resistors from Radio Shack influenced my final choice.

From Eq. 3 we see that E_o will be 0 V when $R_B = 0$, and $E_o = E_{in}$ when $R_B = R_A$. The ohmmeter in this article is constructed so the meter reads zero with R_B shorted, and full scale when $R_B = R_A$. An unknown with a resistance of R_B or less can be read on a linear scale with this meter.

Construction

I built my unit in an aluminum box measuring 5 × 6 × 4 inches (HWD).[2] The meter and all controls are mounted on the front panel for convenience when using the ohmmeter. The 9-V transistor-radio batteries are mounted on the side of the box by means of an aluminum strip. The op-amp IC and associated components are mounted on a piece of perf board, and the circuit is wired using point-to-point techniques. There is nothing critical about the circuit layout or the lead lengths. Fig. 3 shows the construction details.

Operation

The range switch, S1, is turned to the position that will put R_X on scale. The function switch, S2, is rotated to zero, and the ZERO control, R21, is adjusted to set the meter needle at zero. The function switch is then turned to the full scale position and the meter is deflected to full scale by adjusting the FS control, R20. Finally, the function switch is set to R_X, and the meter reads the unknown resistance directly.

In practice, the zero and full-scale positions do not vary more than a few percent with range changes. For routine work it is necessary to make these settings only occasionally. But for greatest accuracy, both settings should be adjusted immediately before the measurement is made.

Accuracy

Correct readings depend on the accuracy of the resistors in Group B and on the meter quality. Resistors with 1% tolerance may be justified if the meter is an excellent one. Close-tolerance resistors in Group A would also be a convenience because the full-scale deflection would not vary with range. However, precision resistors are expensive and not readily available.[3] In the rare event that extreme accuracy is required, a standard resistor may be connected to the R_X terminals and the meter set to full scale with R20. Now when the unknown is connected to the R_X terminals, the readings will be as accurate as the meter permits.

Notes

[1] H. Neben, "An Ohmmeter With a Linear Scale," *QST*, Nov. 1982, pp. 38-39.

[2] mm = in. × 25.4.

[3] [Editor's Note: 1/2-W, 1% metal-film resistors (10 Ω to 1 MΩ) are available from Mouser Electronics, 11433 Woodside Ave., Santee, CA 92071. The price is 13¢ each in single lots, with a $20 minimum order.]

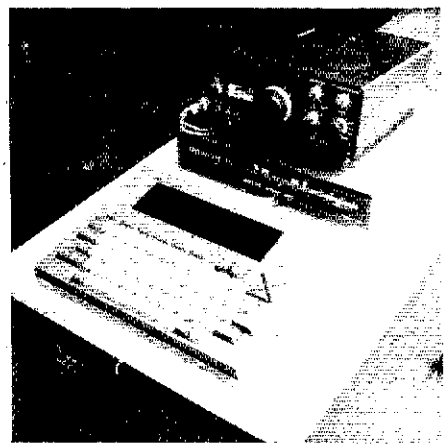
Strays

SPANNING THE WORLD WITH MICRO AMTOR

☐ Pounding a key or talking into a mike may well be the traditional notions of Amateur Radio, but more and more amateurs have taken to Baudot radio teletype (RTTY). Still others have turned to AMTOR (*AM*ateur *T*eletype *O*ver *R*adio), an error-detecting system that produces a spectacular improvement in accuracy over ordinary RTTY.

This system is specified in ITU (CCIR) Recommendation 476, and it is widely used by maritime stations. Credit for the development of the amateur version must be given to Peter Martinez, G3PLX, who produced a workable microprocessor program and the AMT-1, which houses the μP unit and the terminal (see June 1981 *QST*, page 25).

The final "micro" touch at 9M2CR (see photo) was achieved by using an NEC PC-8201 personal computer as a keyboard and display. Powered by four penlight batteries, it can house up to 64K of RAM and run BASIC. The standard RS-232-C port can be set with the required parameters for the AMT-1 by keying in a code, which stays in the memory even after shutoff. There are also ports for a printer, a cassette-recorder, a CRT and disk drives. And all in a 10 × 12 × 2-inch package. With the tiny TS-120V putting out 10-W maximum, the system spans the world. It's micro magic! — *Colin Richards, 9M2CR, Negri Sembilan, Malaysia*



AMTOR has found its way to Malaysia, where Colin Richards, 9M2CR, gets big results using little power with this station.

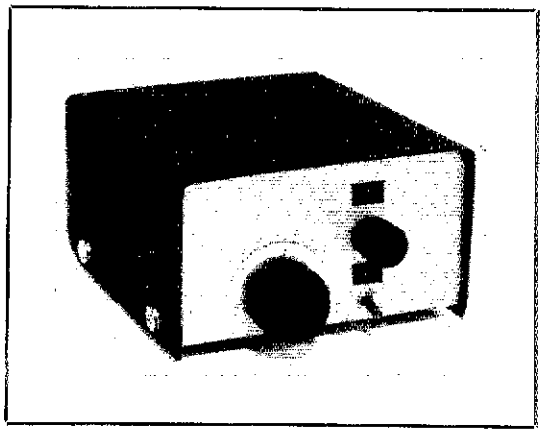
SATELLITE LINKS REPEATERS

☐ In what may be the first operation of its kind, Amateur Radio repeaters on the East and West Coasts were linked by satellite. On May 21, 1983, amateurs at the RCA Astro-Electronics Space Center at Hightstown, New Jersey, used an RCA Satcom satellite to establish a transcontinental link between their club's 450-MHz repeater, WB2JQR/R, and a 2-meter repeater, WA6OBT, in Thousand Oaks, California. During the seven-hour operation in commemoration of the 25th anniversary of the Space Center, several hundred contacts were made between hams in New Jersey and California, with more than 150 QSOs being logged by WB2JQR/R. — *Irv Seideman, KB2LG, RCA Astro-Electronics ARC, Princeton, New Jersey*

I would like to get in touch with...

☐ anyone who has the engineering drawings and installation plans for a Tristao HZ-354 tower. Marty Waite, WA6JDU, 11408 Buell St., Sante Fe Springs, CA 90670.

A Traveler's Receiver for 20 Meters



Simple, small and sensitive — three noteworthy features of this portable receiver design.

By Doug Blakeslee,* N1RM

Whether visiting the next state or halfway around the world, most hams wonder what band conditions sound like from a different location. My business provides travel to several rare spots on the globe, and so I decided to build a portable ham-band receiver to listen in from "the other side." The "Progressive Communications Receiver" circuit by Hayward and Lawson had the basic features I desired, but as in any design a series of compromises had to be made.[1]

Design Tradeoffs

For simplicity, I chose a single-band, battery powered design. Twenty meters was selected because it is the best all-around DX band. The antenna would be a quarter wavelength of hook-up wire, so the design required a "hot" front-end. Strong-signal performance was not a consideration — there would be few (strong) local signals where I travel.

A direct-conversion design was chosen as a tradeoff of size for performance. A block diagram of the receiver is shown in Fig. 1. The modules are the Hayward-Lawson designs. The VFO is modified to cover 13.9 to 14.5 MHz and a 20-meter preamplifier is added to increase the system gain. These circuit changes are shown in Fig. 2. A 6-pole ssb-bandwidth audio filter is also included; it provides adequate selectivity for casual listening on phone and cw. A pair of lightweight headphones designed for use with personal tape players are a delight to use because of their small size and their clean, sharp response.

Construction

I built the receiver using ready-made pc boards, except for the 20-meter preamplifier board, which I made.[2] Everything "played" well the first time. For those who build their own equipment, the VFO capacitor and associated dial are always difficult to locate. My junk box yielded a capacitor with a built-in reduction drive (of unknown origin) that is physically large. A dial pointer was fashioned by soldering a stiff wire to the outer brass shaft of the capacitor. Not very elegant, but inexpensive! A planar drive with a standard capacitor would work as well.

Packaging the receiver was a difficult

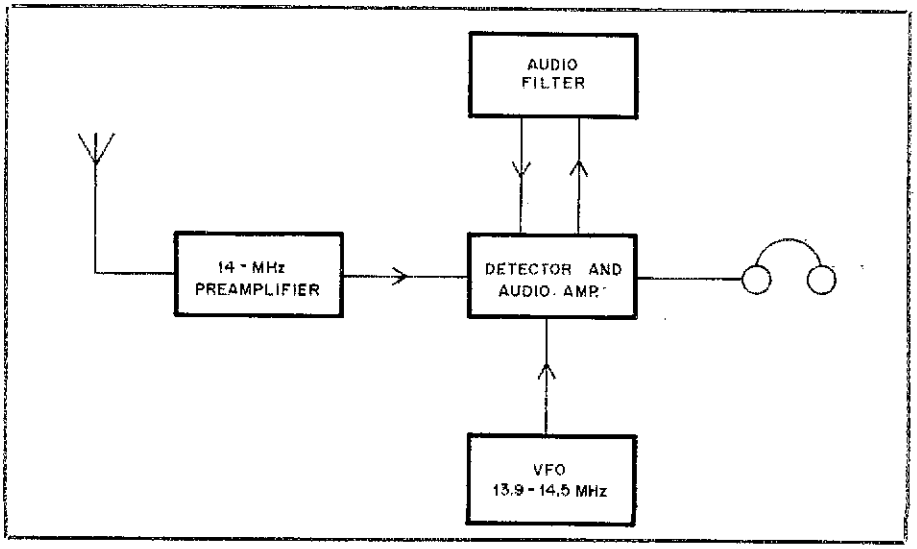


Fig. 1 — Block diagram of the portable receiver.

[1]Notes appear on page 32.

*4 Maple La., Brookfield, CT 06804

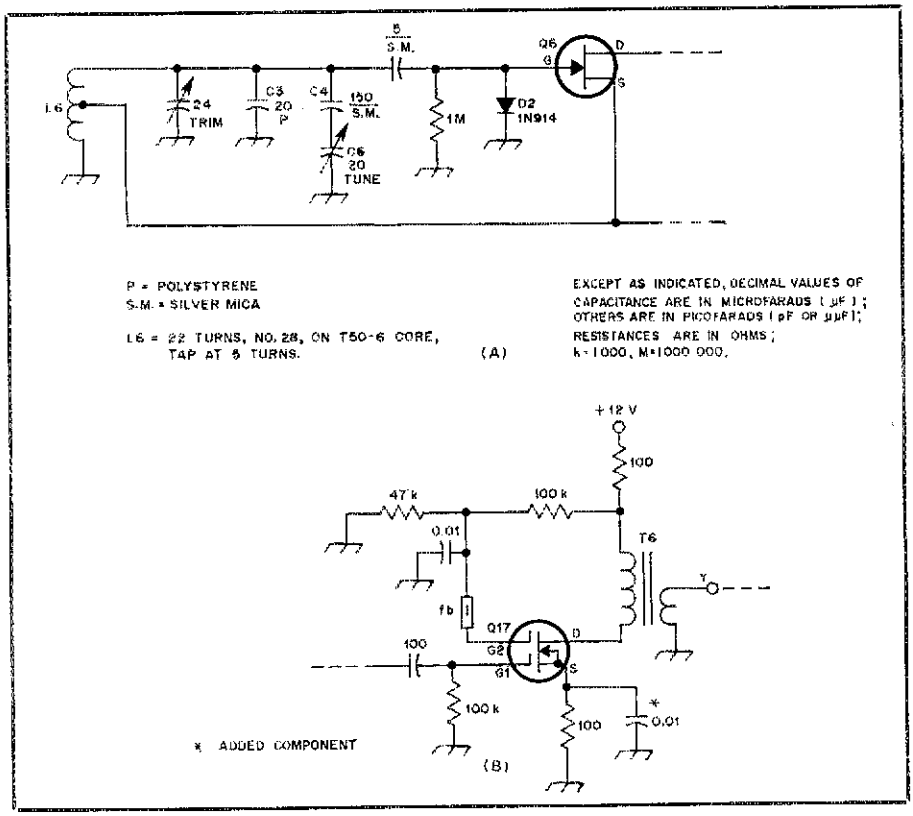


Fig. 2 — Component value and circuit changes to the VFO and rf amplifier sections of the Hayward-Lawson receiver are shown here. Component designations are those of the original circuits.

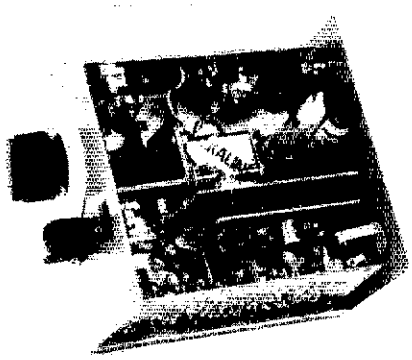


Fig. 3 — Internal view of the portable receiver.

problem. The receiver size had to be small. It had to appear simple — not similar to an aircraft control panel! The appearance had to be innocuous, as it would have to pass through Customs in a number of countries. So, the package ended up with a tuning knob, volume control and an on-off switch on the front panel. A miniature phone jack provides for antenna connection; it looks less conspicuous than a coaxial connector.

To make the smallest package, the circuit boards are mounted vertically, as shown in Fig. 3. I was concerned about coupling from the VFO into the preamplifier. So the VFO and preamplifier are placed on opposite sides of the chassis. The audio-filter board is used as a shield. Investigation with an hf oscilloscope indicated that there are no unwanted coupling problems. A Radio Shack 5-1/4 × 3 × 5-7/8 inch (270-253) cabinet houses the receiver;[3] a Bud Minibox would have been a better choice, because the front and back panels of the Radio Shack cabinet are unsupported and, thus, tend to be bent as my suitcase endures international travel.

Results

The receiver was finished only two days before I was to leave on a trip to Asia. Casual listening with an outside antenna proved that it was indeed "hot." Using a 1/4-wave end-fed antenna stretched across the floor, a good deal of DX was audible. I tried assorted shake and bounce tests, fearing that one bad solder joint would render the unit inoperative 9000 miles away from my soldering iron. These fears were also groundless — the unit worked perfectly for the entire trip. Many stations from around the world were heard. BY1PK was one of the loudest signals on the band — while I was listening from Singapore, of course! If only they were as loud in the northeastern U.S.!

Notes

[1]Hayward and Lawson, "A Progressive Communications Receiver," *QST*, Nov. 1981.
[2]Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002.
[3]mm = in. × 25.4.

Strays

STRAY HINTS

☐ "Strays" are those interesting fillers used when space allows in *QST*. Think you have an item with Stray potential? Here are some hints to help your submission become one. (1) Be sure the information will be of interest to most readers of *QST*. (2) Submit your material before deadline — the 8th of the second month preceding desired publication (i.e. arrive at Hq. before September 8 for November *QST*). (3) Any photographs you send should be good-quality, black-and-white glossy prints. Color prints, slides and instant photos do not usually reproduce well.

Items submitted are normally acknowledged, but that doesn't necessarily mean that your Stray will be appearing in *QST*. We receive far more material than we can find room for. If you want your material returned, please include a statement to that effect and an s.a.s.e.

Follow the above hints and maybe your Stray will find a home in *QST*. — *Andrew Tripp, KA1JGG*

Last May, members of the Albuquerque (New Mexico) Amateur Radio Caravan Club set up a station at the 34th International Science and Engineering Fair in Albuquerque, where they passed messages through the National Traffic System for students participating in the fair. Among those manning the station were (l-r) KA5KYR, N5CFO, KC5QF and WB8VCE.

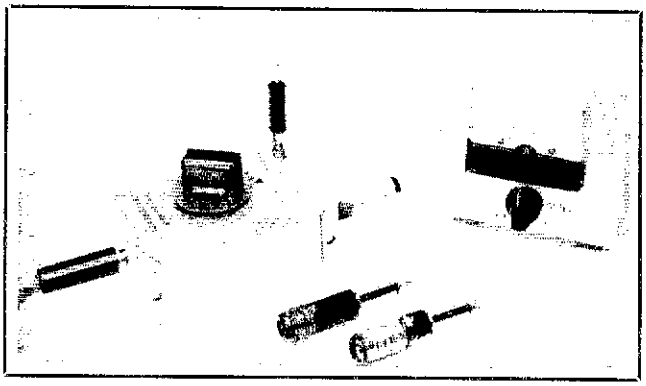
RCA ARC ADDRESS UPDATE

☐ Many amateurs who sent for the certificate and QSL card issued to commemorate the East Coast to West Coast linkage of 2-meter and 450-MHz repeaters by means of the RCA Satcom Communications Satellite on May 21, 1983 have had their requests returned undeliverable. This is because the *Callbook* address for the RCA Astro-Electronics ARC is outdated, and the post office does not forward the mail. The club's correct address is P.O. 800, Princeton, NJ 08540. Certificates and QSL cards are being sent to all stations having a QSO entered in the club's log. — *Irv Seideman, KB2LG, RCA Astro-Electronics ARC*

The Ever-Useful Wavemeter

BEGINNER'S BENCH

No amateur workshop is complete without a wavemeter. Learning a few useful tricks with these simple instruments can save time during construction-project exercises and antenna experiments.



By Doug DeMaw,* W1FB/8

You say that building homemade gear is beyond you because you lack suitable test equipment? If this has been your reason for not becoming involved in this satisfying and enjoyable side of Amateur Radio, then follow this *QST* series. Last month's Beginner's Bench column marked the start of a series on homebuilt test apparatus for the ham workshop. We have a number of simple, interesting test-equipment projects planned for the *QST* issues to come.

The wavemeter has been a basic Amateur Radio tool since the start of our communications pastime. In fact, it was perhaps the *primary* unit for frequency measurement during the early years of this hobby. Although digital frequency meters are accurate and reliable, we need not use them for coarse frequency checks. A home-constructed wavemeter will suffice for numerous routine measurements, and the cost for our own instrument will be a fraction of that for a commercial frequency counter. Furthermore, our wavemeter can be used as a relative field-strength meter or an "rf sniffer" for detecting rf-energy leaks. Still another advantage of the wavemeter is its passive nature — meaning that it requires no dc power supply to operate the circuit. This provides us with an instrument that can be carried afield for all manner of uses, without dependency on a power source.

This month, we shall learn some uses for wavemeters, how to apply them and how to build an inexpensive unit that covers the range from 1.5 to 38 MHz. An uncomplicated construction technique is described to make duplication a simple matter for even the least-experienced builder.

*ARRL Contributing Editor, Box 250, Luther, MI 49656

What Is a Wavemeter?

A wavemeter is a tuned circuit with components of capacitance and inductance (a coil and a tuning capacitor). The tuned circuit must be capable of tuning the frequency range of interest. For example, if we want to check the relative field strength of our 80-meter antenna when adjustments are being made, our wavemeter must tune from 3.5 to at least 3.8 MHz. A short antenna is connected to the instrument so it can pick up enough radiated energy to provide a field-strength indication.

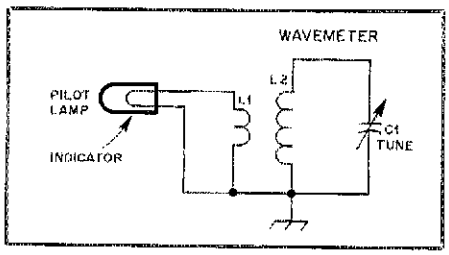


Fig. 1 — Circuit illustration of an early-day absorption wavemeter that used a lamp or neon bulb as a visual indicator.

But, we need something in addition to the basic tuned circuit. It is essential that we employ some form of visual indication to show us that we have the instrument tuned to the desired frequency. In the early days of radio, the indicator was often a small incandescent lamp or neon bulb that was coupled to the tuned circuit. If sufficient rf energy could be sampled, the lamp would glow when the wavemeter was tuned to the frequency of the energy source. Fig. 1 shows a circuit of this type. Greater sensitivity is possible by using the modern technique of rectifying the sampled energy, thereby converting it to dc. The dc is routed through a sensitive meter, and the response of the tuned circuit is indicated by an upward deflection of the needle in the meter. A circuit of this kind is depicted in Fig. 2. Considerable sensitivity is possible when a *microammeter* is used for the indicator.

Most wavemeters have a calibrated dial face that indicates the approximate frequency to which the L-C circuit is tuned. This permits us to take a direct analog reading from the dial when the peak response is obtained. Alternatively, a numbered dial can be used. If this is done, we can compile a list of frequencies versus

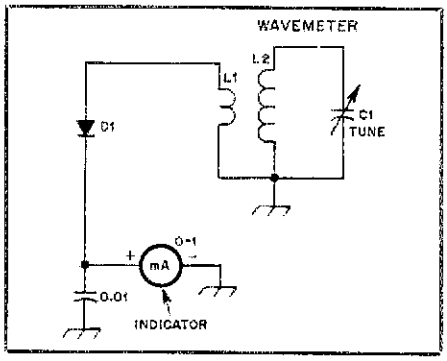


Fig. 2 — Simplified circuit of a modern wavemeter. A link is used to couple to the detector diode, thereby minimizing loading of the tuned circuit, L2/C1.

the dial numbers (a calibration chart) to permit us to be aware of the frequency to which the instrument is tuned.

A wavemeter can be used for field-strength observations when we experiment with antennas. Generally, a short whip antenna is plugged into the wavemeter to increase the pickup ability. Rf energy that reaches the sampling antenna (whip) is carried to the tuned circuit in the instrument, detected and displayed visually on the dc meter. For many years, this was the only indicator used by some amateurs for adjusting antenna matching sections, Transmatches and pruning the coils for resonance in mobile antennas; rf-power meters and SWR indicators were not common items in those days. A field-strength meter is useful for determining the approximate radiation pattern of an antenna — still another application we can take advantage of.

Some Other Uses for Wavemeters

Let's suppose we were working on a homemade transmitter and wanted to observe the operating frequency of one of the stages in the circuit. We may wonder if the tuned circuit of that stage is on the desired frequency, or if it is tuned to a harmonic of the desired frequency. We simply place our wavemeter probe (plug-in coil) in proximity to the questionable tuned circuit and adjust it for a peak reading. If all is well, our wavemeter will show the correct frequency. If not, our response will occur at some other frequency — indicating a problem with the coil or capacitor value in the transmitter.

Another trick we can play with our wavemeter is to observe the progress we are making in extracting the last acceptable vestiges of power from a particular tuned circuit in our transmitter. We can place the wavemeter probe near the output tuned circuit of the stage in question, then tune or adjust the circuit values for maximum wavemeter indication. *Caution: Do not poke the wavemeter near any circuit that contains high operating voltages:* This could result in personal injury. There should be no need for concern, however, when working with transistorized circuits.

A wavemeter is useful in getting a general idea of the harmonic energy contained in the output of a transmitter or excitation stage. Tune the wavemeter to the second and third harmonics of the operating frequency. If a significant amount of harmonic current is present, the wavemeter will yield a pretty good indication. Compare the amount of meter deflection with that obtained at the fundamental frequency. This will provide a comparative analysis of the problem. Take corrective steps to reduce the harmonic levels, then recheck the circuit with your wavemeter until the harmonics do not deflect the indicating meter or just barely show up on the instrument.

Transmitter and receiver stages that are unstable can be detected quickly with a sensitive wavemeter. This calls for a spectrum search with our meter — tuning from medium frequencies through the upper end of the high-frequency region. If a wavemeter response is noted on some frequency that is unrelated to the operating frequency, chances are that we will know the self-oscillation frequency. Of course, such unwanted oscillations may be occurring in the vhf region or in the standard a-m broadcast band, or lower. Our wavemeter would have to cover all of those frequencies to make the search complete. Some hams build two or more wavemeters — one for low frequency, one for high frequency and perhaps another for the vhf range. It depends primarily on how complete you want your test-equipment capability to be.

VHF Wavemeters

The plug-in coil concept can be applied at vhf and uhf, just as it is for dip meters. But, most commercial vhf or uhf wavemeters are constructed in a more rugged manner. Tunable resonant cavities or strip-line resonators are the usual choice. The sampling point can be effected by means of link or probe coupling to the cavity, and output to a rectifier can be by the same means. A circuit example of a strip-line resonator for wavemeter use is given in Fig. 3. The tuned circuit, L3 and C1, are selected for the vhf range of interest.

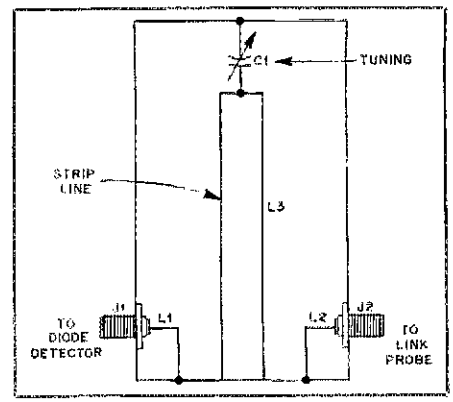


Fig. 3 — Hybrid diagram of a vhf or uhf style of wavemeter. A strip-line tuned circuit is indicated. L3 and the inner surface of the box form a transmission-line section.

For example, we might use a 25-pF variable at C1 to work with a strip line (L3) that is, say, 15 inches (381 mm) long. This should give us coverage from roughly 100 to 160 MHz. L1 and L2 are adjusted in size and proximity to L3 in accordance with the degree of coupling we desire. Too much coupling will lower the tuned-circuit Q. Too little coupling will cause the tuned circuit to present an insertion loss. The tuned circuit is contained in a metal box made from copper, aluminum or silver-plated brass. The impedance of the strip line and box, considering them as a section of transmission line, can be on the order of 75 ohms. J1 is connected to a diode detector and indicating meter, similar to that shown in Fig. 2. J2 is mated with a suitable length (short) of 50-ohm coaxial cable that has a one-turn small loop at the far end. The loop is used to probe the circuit of interest. A short whip antenna can be attached at J2 for field-strength use when adjusting antennas.

Table 1 provides a digest of the many uses to which we may put a homemade wavemeter. Certainly there are additional applications that did not come to mind as this article is being written. Perhaps you will think of them in the course of your circuit testing.

Table 1

Wavemeter Applications

Transmitter Testing

1) Tuning indicator for maximizing stage output.
2) Testing for fundamental output or unwanted harmonic output of a transmitter stage.
3) Finding the frequency of a transmitter stage.
4) Detecting an unwanted self-oscillation and determining its frequency.
5) Comparing the relative level of harmonics against that of the desired transmitter frequency.
6) Determining whether an oscillator is functioning.
7) Comparing the relative output power of transmitter stages to ensure that each low-level stage is providing gain.

Receiver Testing

1) Establishing that oscillator circuits are operating.
2) Investigating stages for self-oscillations.
3) Coarse frequency measurements of oscillators.

Rf Sniffing

1) Checking for ground loops (rf) on pc boards and chassis.
2) Sampling cabinet openings for rf leaks (meters, louvers, etc.).
3) Checking for rf leakage on line cords, microphone cables and control lines.

Antennas

1) Making relative field-strength measurements.
2) Adjusting antennas for maximum gain.
3) Observing approximate radiation patterns.

A Practical Wavemeter

Let's dispense with the whys and wherefores of wavemeters and consider constructing one of these instruments. I'm sure each of us enjoys short-term, simple projects that can be built during an evening. This instrument fits that description. The design and assembly of this wavemeter took six hours. It may require more or less time to complete the task, depending on the variety of hand tools you have in your shop and how much skill you may possess in assembling circuits. At any rate, you should be able to complete your work in a weekend.

The wavemeter is built in two pieces. It

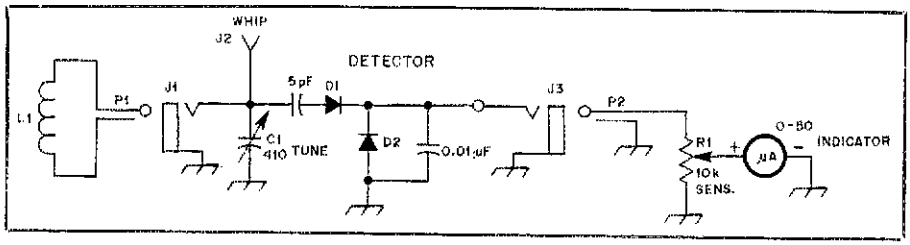


Fig. 4 — Schematic diagram of the wavemeter described in the construction section of this article. D1 and D2 are small-signal diodes. See text for a discussion of the components in this circuit. R1 is a linear-taper composition control.

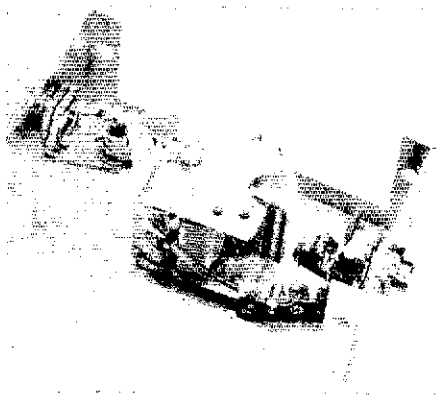


Fig. 6 — Interior view of the wavemeter tuning head. Large-diameter bus wire is used to join C1 to J1. This will help to reduce unwanted stray inductance.

Table 2

Wavemeter Calibration

Coil Dial-Skirt Numbers Versus Frequency (MHz)

Coil	0	1	2	3	4	5	6	7	8	9	10
A	38.0	27.0	22.0	18.0	16.0	14.5	13.5	12.5	11.75	11.0	10.5
B	12.0	8.9	7.0	5.9	5.25	4.7	4.4	4.0	3.8	3.6	3.4
C	5.4	4.0	3.2	2.8	2.4	2.2	1.92	1.79	1.67	1.57	1.5

Coil information: Coil A contains 7 turns no. 20 enam. wire (0.7 µH) space wound to fill 0.5-inch length. Coil B has 30 turns no. 22 enam. wire (6 µH) close wound. Coil C contains 65 turns no. 28 enam. wire (27.5 µH) close wound. Note: Set C1 at minimum mesh with the tuning dial at 0.

could be assembled as a one-piece unit, but that would make it unwieldy for use with compact circuits. The two-piece format makes the unit more convenient to use, especially when it is necessary to probe into tight places during a test. The tuning head is built around a 4 × 2 × 1-1/2 inch (in. × 25.4 = mm) Minibox. A homemade enclosure can be fashioned from pieces of pc board if that is your pleasure. A piece of aluminum sheet (3-1/2 × 3-3/4 inches) is bent to provide a sloping panel. This serves as the base for the microampere meter (2-1/4 × 2-3/4 inches) and the sensitivity control. A fancier indicator unit would result if we were to use a sloping-panel meter case, but the cost would be greater.

Fig. 4 shows the circuit of the wavemeter. Only three plug-in coils are required for coverage from 1.5 to 38 MHz. P1 is the base of the plug-in coil, and J1 is the jack into which it is inserted. C1 is a single-section broadcast-radio tuning capacitor.[1] It has a capacitance range of 15 to 410 pF, as measured in the ARRL lab. A 365-pF variable capacitor can be used, but this will result in a sacrifice of the tuning capability at the low end of each plug-in coil range.

Light coupling from the high end of the tuned circuit to the rectifier is ensured by our use of a 5-pF capacitor. This permits ample rf energy to reach the rectifier without lowering the Q of the tuned circuit by loading it with the low impedance presented by D1 and D2. Too low a loaded Q would cause broad tuning and reduced sensitivity.

[1]Notes appear on page 36.

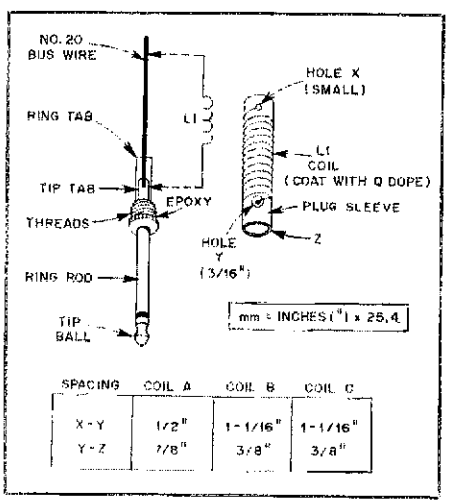


Fig. 5 — Assembly and modification details of the PL-55 style of phone plug used for plug-in coils A, B and C. Do not exert undue pressure on the plug insulating sleeve when drilling holes X and Y, lest the plastic cracks. Drill a no. 60 pilot hole at each point before applying a larger drill bit. See text for additional data.

A voltage doubler is used for the rectifier. This results in somewhat greater meter deflection than would be realized with a single diode in a half-wave rectifier. Germanium diodes, such as the 1N34A type, are recommended for best sensitivity at low signal levels. I used silicon small-signal diodes (1N914) with good results.

P2 plugs into J3, thereby connecting our meter and sensitivity control to the tuning head. J2 is a pin jack that accepts a short whip antenna (18 inches for my unit) made from brass brazing rod. The lower end of the rod is soldered into a pin plug. A small loop is formed at the top of the whip to prevent eye damage through accidental contact with it.

Construction

In an effort to provide a small plug-in coil of good mechanical strength, I decided to try a PL-55 type of phone jack. This seemed like an inexpensive solution to an otherwise perplexing problem. The notion was a good one, for the coils are easy to wind on the insulating sleeve of the jacks, and the resultant unloaded Q is acceptable. The Qs for coils A, B and C are 130, 120 and 90, respectively.

Fig. 5 shows the details for preparing the plug-in coils. First, remove the sleeve from the plug and note where the solder tab for the ring connection is. Place a mark on the ring rod so that it's aligned with the center of the ring tab. Next, screw on the insulating sleeve until the threads are snug. Now, make a mark on the sleeve so that it is lined up with the mark on the ring rod of the plug. This will indicate the line along which you will drill hole "Y." The line can be extended up the sleeve to show where hole "X" must be drilled.

Use a 3/16-inch drill bit when making hole "Y." This will allow sufficient access for soldering the lower coil lead to the ring tab. A length of no. 20 bus wire is soldered to the tip tab and extended through the upper opening in the insulating sleeve of the phone plug. The upper coil lead will be soldered to this wire, flush with the top of the sleeve. Poke the solder joint into the sleeve slightly so that it is not exposed. An interior view of the tuning head is shown in Fig. 6.

Coil A has the ring tab at its full length. The tab is snipped off (see chart in Fig. 5) adjacent to hole "Y" for coils B and C. This prevents the ring tab from protruding into the coil and degrading the Q. A drop of epoxy cement can be placed on the plug threads just before you screw the sleeve into place for the last time. The coil is wound after the sleeve is in place. Start with the

lower end, and solder it to the ring tab. A coating or two of coil cement or Q Dope can be applied to the completed coil windings to protect them and to hold the turns in place. Shrink tubing might offer an even better solution to this problem. I did not try it.

Calibration

If the coil dimensions in this article are followed closely, and if the variable capacitor specified for C1 is used (or one of the same capacitance range), a 0-10 dial face will yield the calibration specified in Table 2. If you depart from the circuit and component values suggested here, calibration can be effected by using a dip meter to plot the megahertz points on your tuning dial. The dipper signal can be checked for accuracy by listening to it with a calibrated general-coverage receiver.

The readout resolution can be made better if a smaller amount of capacitance is used at C1 — such as 100-pF variable capacitor. If this is done, it will be necessary to wind more coils in order to cover the desired tuning range. My intention was to keep this circuit as simple and inexpensive as possible, hence only three coils.[2]

Summary Comments

Care needs to be exercised when sampling rf near a high-power part of a circuit. Too much rf energy will destroy the detector diodes. Fortunately, diodes are inexpensive and easy to replace, so there's no need to be deeply concerned about this potential problem. When in doubt, start your tests with the wavemeter a considerable distance from the circuit being tested. Move it close enough to get a full-scale meter reading with the sensitivity control set for maximum meter response. That procedure will ensure you of safety to the diodes.

If you constructed last month's project, and will build this one, you'll find yourself well down the road toward having some useful gadgets in your workshop for designing, building and testing homemade amateur equipment. Perhaps now is the time to get involved!

A parting comment: Almost any microammeter will serve in this project. Many of the surplus edgewise fm tuning meters can be used. See note 1 for a supplier of low-cost meters of that variety.

Notes

[1]400-pF variable capacitors and low-cost fm tuning meters are available from Surplus Electronics Corp., 7294 N.W. 54th St., Miami, FL 33166, tel. 305-887-8228. Catalog available.

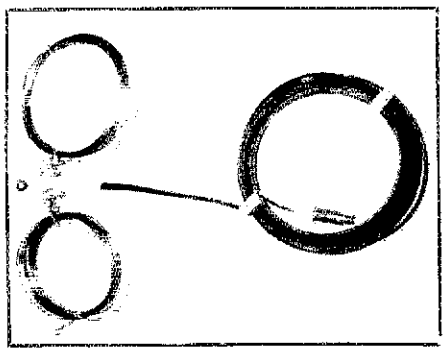
[2]A kit of parts for this project is available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002.

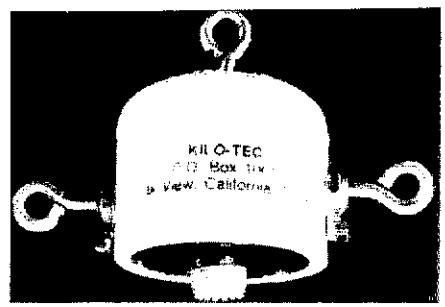
New Products

KILO-TEC ANTENNA AND DIPOLE CENTER CONNECTOR

☐ The KT5B is a multiband antenna designed for use on the 1.8-30 MHz Amateur Radio bands. It uses no loading coils or traps and the manufacturer claims it will handle 2 kW PEP. Price: $59.95.

The DP-1 antenna center connector is supplied with an SO-239 fitting and can be used with dipoles, quads or V antennas where a weather-resistant coaxial connection is needed. The manufacturer rates the unit at a full 2 kW and states it features a Mil-type potting material to prevent rf flashover. Price: $8.95. For further information on these products, contact Kilo-Tec, P.O. Box 1001, Oak View, CA 93022 or call 805-646-9645. — *Paul K. Pagel, N1FB*





DX PREDICTOR

☐ A *QST* article describing MINIMUF, an hf propagation prediction program, raised considerable interest within the amateur community.[1] A program currently being marketed by Flynn's Business Services, P.O. Box 903, Mountain View, CA 94043, embodies not only the NOSC (Naval Ocean Systems Center) MINIMUF program but also algorithms that predict fot (frequency of optimum transmission) and luf (lowest usable frequency). This package relies upon NOSC algorithms and has a user-friendly input routine and a graphic display. The program was written to provide amateurs with a ready-to-go program that can be of use as an operating and, possibly, an educational tool.

The DX Predictor is priced at $40 and includes a 5¼-inch diskette (or tape) and documentation. It is available for the Apple II® (48K), Commodore PET® and Commodore VIC 20® (16K RAM card required) personal computers. The program is also compatible with the Apple IIe.® — *Paul K. Pagel, N1FB*

[1]Rose, R., "MINIMUF: A Simplified MUF-Prediction Program for Microcomputers," *QST*, December 1982, p. 36.

ICM CRYSTAL CATALOG

☐ A new, 32-page crossover list and custom-crystal catalog is available from International Crystal Mfg. Co., Inc. The crossover list provides the user with the ICM crystal catalog number, referenced to the manufacturer's equipment number for the most popular types of commercial two-way equipment. The custom crystal list features charts that establish the ICM catalog number and available holder dimensions for their crystals.

If you're a builder or you like to modify commercial equipment, you'll probably find the catalog to be a valuable addition to your stash of reference material. To obtain your free copy, write to International Crystal Mfg. Co., Inc., Dept. A, P.O. Box 26330, Oklahoma City, OK 73126. — *Paul K. Pagel, N1FB*

Hints and Kinks

Conducted By Larry D. Wolfgang,* WA3VIL

CONVERTING A HUSTLER MOBILE ANTENNA FOR 30-METER OPERATION

☐ A Hustler RM-40 resonator can be trimmed easily for operation on the 30-meter band by removing a few turns from the coil. There are two versions of the 40-meter resonators made by Hustler. One has a coil diameter of about 1 inch, and the other has a diameter of about 1-1/2 inches.[1]

I moved the smaller coil higher in frequency by removing turns from each end, leaving 55 turns in the middle of the form. With the larger coil, I had to leave 30 turns on the form. These numbers were the end result of my experimentation. I would suggest that you leave a few more turns on the coil at first. Check the resonant frequency of your system, and remove turns gradually until the antenna resonates at 10.125 MHz with the adjustable whip extended half its length.

My SWR measurements with both coils were less than 1.4 at resonance. On-the-air results have been good. — *Bob Douglas, W5GEL, Corpus Christi, Texas*

A TRIPLE-MODE POWER SUPPLY

☐ A low-voltage utility power supply can serve triple duty if a double-pole, triple-throw switch is included in the circuit, as shown in Fig. 1. You may choose to build a separate supply or add a switch to one you already have. This supply provides a switch-selectable output: either as a full-wave center-tapped circuit, a bridge-rectifier circuit or as a full-wave voltage-doubler circuit.

When the mode switch, S1, is in the 1/2 position, D1 and D3 are effectively out of the circuit. The center tap of the transformer is connected to ground, and the supply is in a conventional full-wave, center-tapped configuration. The loaded output voltage is nominally about half the total secondary rms voltage. To configure the supply as a full-wave bridge circuit, move the switch to the 1 position. The ground connection is transferred to the junction of D1 and D3, and the loaded output voltage is approximately equal to the transformer rms voltage. With S1 in the 2 position, D1 and D2 form a full-wave voltage-doubler circuit. D3 and D4 are reverse biased in series across the output and have no effect on circuit operation. Nominal loaded output voltage is twice the rms voltage of the transformer.

The voltage and current ratings for the components in your supply must be chosen for the worst case of the three modes. Diode and filter-capacitor voltage ratings are determined by the voltage-doubling mode. The diodes must have a PIV rating of at least 2.83 × V_{rms} plus some safety factor. A rating of about 4 × V_{rms} would be about right for most applications. C1 and C2 each have a maximum voltage of 1.41 × V_{rms} applied to them, so they should be rated at about 2 × V_{rms}. Power ratings for the equalizer/bleeder resistors, R1 and R2, are also determined in the doubling mode. This rating can be found by

$$P = \frac{E_o^2}{R} \qquad \text{(Eq. 1)}$$

where

P = the minimum power rating for the bleeder resistors

E_o = the nominal loaded output voltage of the supply in the voltage-doubling mode

R = the total resistance of the bleeder resistors, R1 + R2

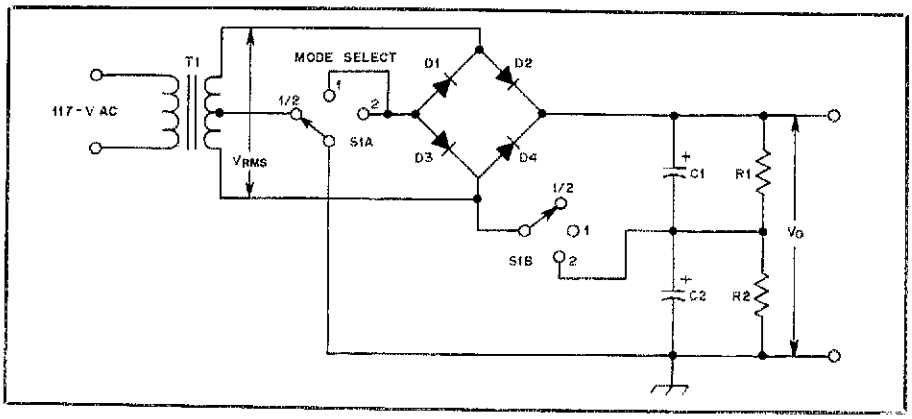


Fig. 1 — Schematic diagram of a triple-mode power supply. Component values and ratings are discussed in the text.

The filter capacitance and the diode current ratings are determined by the maximum current to be taken from the supply in the full-wave, center-tapped configuration.

This design offers a degree of flexibility for an unregulated power supply, and it can also provide increased operating efficiency with a supply that uses an adjustable three-terminal regulator. You can select the appropriate mode to reduce the voltage drop in the regulator for different output voltages. This will permit the regulator to handle more current at low voltages, while remaining within power dissipation limits. — *R. B. Gibson, KE5E, Los Alamos, New Mexico*

BEWARE THE GROUND CONNECTION!

☐ Many mobile-radio manufacturers recommend that you make all power connections as close to the battery as possible. This will reduce noise pickup and other problems, but it is imperative that *both* the positive and negative leads be fused.

Most cars are wired so that a short, heavy negative battery lead goes directly to the engine block, on or near the starter motor. Another smaller-diameter lead completes the circuit to the car chassis, which is used as the power return (or negative) connection for the car accessories. Since the starter motor is the biggest current hog (taking several hundred amperes while cranking the engine), it is essential that the voltage drop on the cables to the battery be minimal.

On my car, the bolt attaching the negative lead to the engine block loosened. One morning when I tried to start the car, it cranked slowly and erratically. I traced the problem to the loose bolt. I tightened it, and the car started right up. But when I turned on my Clegg FM-76 220-MHz mobile rig, it did not seem to work right. The output power was down, there was ignition noise on the receiver and the squelch did not operate properly.

Mike Santana, WB6TEB, helped me troubleshoot the radio. We found four burned-out ground traces on the printed-circuit board, with charred debris around them. Amazingly, bridging these spots with short pieces of wire was all that was needed to restore the radio to full performance. But what had caused this near-total disaster?

After some thought, I realized that the radio was grounded through the chassis and my antenna; this had provided the ground return path for the starter motor when the bolt loosened. The power cord for my rig had a fuse only in the positive lead, even though the manufacturer recommended connecting both leads to the battery. With a fuse in both leads, if this problem ever recurs, the starter-motor current will blow the negative-lead fuse before any damage can be done to my radio.

Fortunately, some of the more recent radios being produced have fuses in both leads. A single fuse would be safe if you connect the negative lead to the car chassis, but if you want to minimize noise pickup by going directly to the battery, make sure you have fuses in both leads! [The fuses should also be as close to the battery as possible. — Ed.] — *Merv MacMedan, N6NO, Arcadia, California* (adapted from an article of the same title in *W6VIO CALLING*, Dec. 1982, the Jet Propulsion Laboratory ARC newsletter)

COAXIAL CABLES FOR MINIATURE PROJECTS

☐ In the construction of small projects it is often desirable to use miniature coaxial cables. The most popular type is RG-174/U. The major drawback to this cable is that the insulation is made of polyethylene. This material will melt with the heat of soldering the cable, making it difficult to work with. One good thing about it is the price, about 15 or 20 cents per foot in small quantities.

[1]mm = in. × 25.4

*Assistant Technical Editor

I find it far better to use Teflon-insulated cable for these projects. This type of cable is expensive, costing as much as a dollar or two per foot, but it is much easier to work with. It is no problem to do a nice looking job of wiring a project with this cable. The price is acceptable when you realize that only a foot or two will be needed for most projects. RG-178/BU is one type of Teflon cable.[1] It features silver-coated copper braid and a stranded center conductor.

Try this method for making a neat wiring job on your project: Cut all the way around the outer insulation with a sharp knife. Start about 1/2 inch from the end and be careful not to nick the braid. Tin the exposed braid. When this is done properly, the braid weave should be visible. If you apply too much solder, heat it again and flip the excess off. Be careful if you do this, and wear safety glasses so you don't flip hot solder in your eyes. Now use a sharp knife to score the braid all the way around about 1/4 inch from the end. Bend the braid back and forth at the score mark with your fingers until the piece breaks off. Trim a piece of the Teflon insulation away from the center conductor using your knife. Be careful not to nick the wire. You may need a short length of wire to connect the outer braid to your circuit. Wrap a few turns of bare hook-up wire around the braid and solder it. Fig. 2 illustrates this technique. — *Robert Shriner, WA0UZO, Pueblo, Colorado*

Fig. 2 — You can make a neat connection to the shield braid on a piece of Teflon-dielectric miniature coaxial cable by wrapping a few turns of wire around the braid and soldering it.

A FLEXIBLE MOBILE-ANTENNA MOUNT

☐ I have found an easy way to build a completely flexible and inexpensive mount for my 1/4-λ 2-meter antenna. Overhead obstructions, such as garage doors and low tree branches, no longer damage my antenna.

To build this mount, you will need to cut two 1-1/2 × 2-3/4 inch pieces of galvanized sheet metal. These must be bent into a right-angle bracket, one side being 1-1/4 inches long and the other 1-1/2 inches. Drill a 5/8-inch hole in the 1-1/2 inch side of one bracket to accommodate an SO-239 connector. Cut a small piece of sidewall from a discarded non-steel-belted tire. The piece of tire should be 1-1/2 × 3-1/4 inches. Fig. 3 gives the assembly details. You will have to drill the required bolt holes in the brackets and tire sidewall. I drilled matching holes in the lower bracket and my car roof for mounting the antenna. You may want to find an alternate means of attaching the bracket to your car.

My antenna consists of a 17-inch-long piece of 1/16-inch brass brazing rod. I soldered this into the SO-239 connector on my antenna mount, and attached a short piece of braided wire between the two brackets to ensure a good ground connection. A little extra length is needed for flexibility. Finally, I placed an SWR meter in the antenna feed line and trimmed the antenna to resonance. — *P. K. Hurlbut, N5DHN, Midland, Texas*

[1]RG-178/BU Teflon cable is available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002.

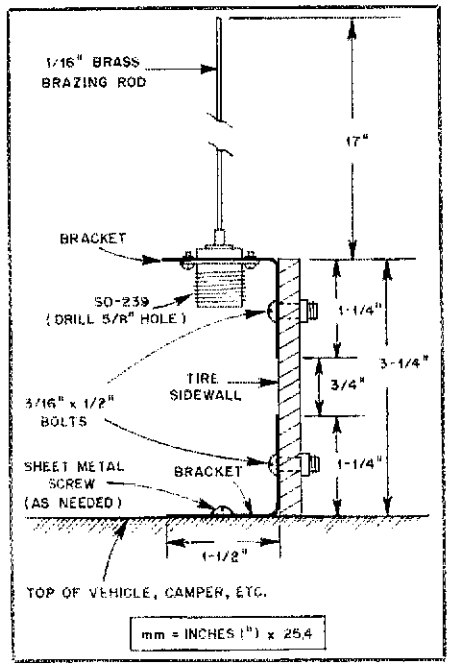


Fig. 3 — Construction details of a flexible mount built by N5DHN for his 2-meter mobile antenna.

REPEATER INPUT FREQUENCIES WITH THE AZDEN PCS-300

☐ Owners of an AZDEN PCS-300 2-meter hand-held transceiver can listen to the input or output frequency of a repeater at the touch of a few keys. First, lock the keyboard while receiving on the repeater output frequency. Now, press any number key in the top row, and simultaneously press the corresponding key (in the same column) in the bottom row. You are now receiving on the repeater input frequency. Releasing either key puts the receiver back on the repeater output frequency. — *Dick Shongut, W2QFR, New Rochelle, New York*

OLD TIMER'S NOTEBOOK

Making Inductance Clips

☐ It is hard to do a neat job of making small clips to go on tubing, etc., with a pair of pliers. This kink may help.

A strip of phosphor bronze or other suitable material of the proper width is bent in the middle to form the two sides of the clip. A nail or rod of approximately the same diameter as the tubing on which the clip is to work is then inserted between the blades at the point where the bends should occur. The assembly is then put in a vise between two small blocks of very hard wood (Fig. 4), the nail carefully set at right angles to the length of the material, and the vise screwed home. Fast and neat — and the two halves come opposite each other! The outer lips are then bent back slightly with pliers. A small bolt may be put through the clip about mid-way along the length if necessary. — *K. B. Warner, W1EH (reprinted from* Hints and Kinks for the Radio Amateur, *2nd ed. [Newington: ARRL, 1937], p. 6)*

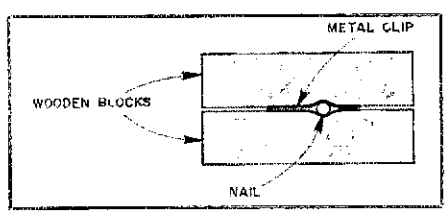


Fig. 4 — Spring clips for transmitting inductances can be formed readily with the help of a pair of wood blocks and a vise.

Tapping Transmitter Coils

☐ A satisfactory method of making taps on heavy wire coils is shown in Fig. 5. A short piece of bare wire, bent as shown, is soldered directly to the turn to be tapped. In soldering, both the coil wire and the tap should be tinned separately and then sweated together without additional solder. This method helps prevent shorting the adjacent turns.

The insulated "clip," also shown in Fig. 5, consists of a jaw taken from a miniature knife switch, the handle being the top of an old binding post. A machine screw of suitable length is first run firmly into the binding-post top, then the head of the screw is clipped off and the assembly fastened to the switch jaw with a small nut. The connecting wire is fastened between the jaw and handle. The resultant clip is positive, easy to handle, has plenty of contact surface and is neat in appearance. *(reprinted from* Hints and Kinks for the Radio Amateur, *2nd ed. [Newington: ARRL, 1937], pp. 6-7)*

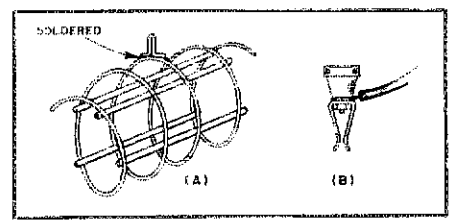


Fig. 5 — Details of a method of tapping a coil are shown at A. A suitable clip for attaching to this tap is shown at B.

Coil-Tapping Aid

☐ Finding the correct point for the tap on a small air-wound coil can be greatly simplified by using a paper clip that has been equipped with a flexible wire lead. The smaller paper clips can be easily slipped over turns that usually cannot be gotten at with regular commercial clips. — *John J. Schultz, W2EEY (reprinted from* Hints and Kinks for the Radio Amateur, *5th ed. [Newington: ARRL, 1954], p. 8)*

Tapping Miniature Coils

☐ It is always difficult to make a movable tap arrangement for small coils, where the turns are so close together that almost any of the usual clip arrangements merely short out several adjacent turns.

This problem can be solved easily by using a shortened bobby pin. Cut off all but the last "wiggle," clean the enamel off, and solder a flexible lead to the top. This gadget makes a swell movable tap that will fit between the turns of any of the small coils, and will make a good contact without shorting turns. — *Don Geary, VE3BTS (reprinted from* Hints and Kinks for the Radio Amateur, *4th ed. [Newington: ARRL, 1949], p. 7)*

Product Review

Conducted By Paul K. Pagel,* N1FB

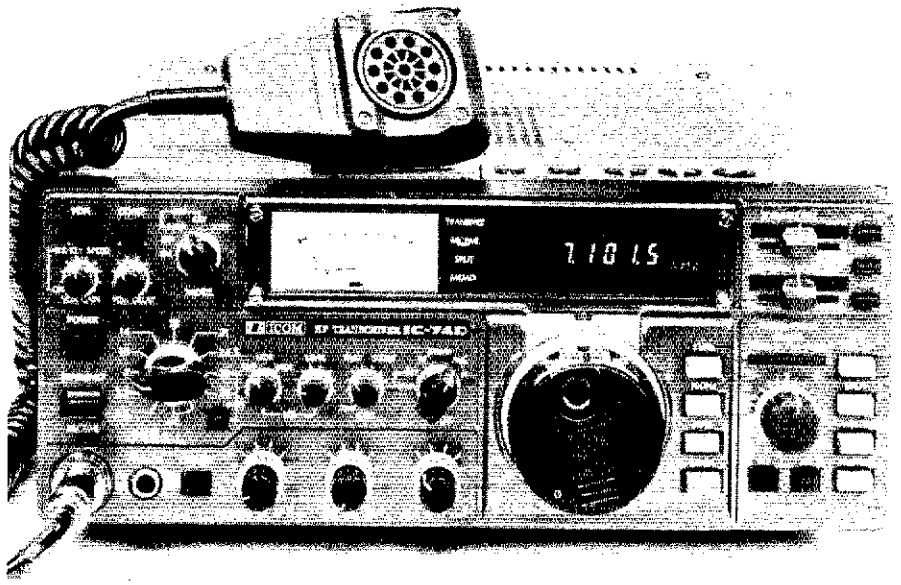
Icom IC-740 HF Transceiver

Amateur Radio equipment has changed drastically in the past decade! Back in 1973, equipment designers were toiling over how to improve such things as oscillator stability and image rejection. Also, their efforts included trying to produce high-performance, low-cost transceivers for the limited-size amateur market. In the late '70s, this market mushroomed, largely because of the influx of disheartened CB operators. This increase in market size allowed manufacturers to develop quality equipment for sale at a reasonable price. Also, during this period, the state of the art in communications electronics equipment improved significantly, but there were still deficiencies, specifically in receiver performance.

In much of the Amateur Radio literature there was talk of improving receiver dynamic range.[1] The ability of a receiver to tolerate large signal levels is important to the consumer. Manufacturers responded to this market demand and, by 1980, were producing equipment with excellent dynamic-range figures.

The challenge of the '80s will be to produce a fully synthesized hf transceiver that is low in cost and has a low-noise frequency synthesizer. Much of today's amateur equipment uses digital frequency synthesis; the advent of LSI synthesizer and microcontroller (dedicated computer) ICs greatly simplifies circuit designs. But the new problems associated with synthesizer circuitry are by no means simple.[2] Digital frequency synthesizers inherently generate noise that is superimposed on the output signal; this noise can mask weak signals present in a receiver passband or cause QRM to nearby stations while transmitting.

The IC-740 features most of the "bells and whistles" found on competitive products, small size and all-band coverage. The most important feature, in my opinion, is the high-performance, low-noise receiver section.



ICOM IC-740 HF Transceiver, Serial No. 01721

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
Frequency coverage: 1.8-2.0, 3.5-4.0, 7-7.3, 10.0-10.5, 14.0-14.35, 18.0-18.5 (receive only), 21.0-21.45, 24.5-25.0 (receive only), 28.0-29.7 MHz.	As specified.
Modes of operation: Ssb, cw, RTTY and fm (with an optional fm unit installed).	As specified; the fm unit was not supplied with the review unit.
Readout: 6-digit, 100-Hz resolution.	1/2-in. high, 6-digit fluorescent-blue display.
kHz/turn of knob: Not specified.	100/10/1.
Frequency resolution: 100 Hz.	As specified.
Backlash: Not specified.	Nil.
RIT range: Not specified.	±800 Hz.
S-meter sensitivity: Not specified.	W/o preamp (band, μV) — 80 m, 9.6; 40 m, 15; 20 m, 16; 15 m, 13.5; 10 m, 11.
Transmitter rf power input: 200 W cw; 200-W PEP, ssb; adjustable.	Greater than 100-W output, except on 160 m (90 W), 80 m (95 W) and 40 m (95 W).
Harmonic suppression: Better than 50 dB.	−57 dB (see photo).
Third-order IMD: Not specified.	−30 dB (see photo).
Spurious suppression: Better than 50 dB.	−63 dB (see photo).
Receiver sensitivity: Less than 0.15 μV for 10 dB S + N/N with preamp on; 0.3 μV for 10 dB S + N/N with preamp off.	Receiver dynamics measured with optional FL-45 500-Hz cw filter:

	Preamp Off	*Preamp On*
Noise floor (MDS) dBm:	−133	−141
Blocking DR (dB):	130	125
Two-tone, 3rd-order IMD DR, worst case (dB):	95	94
Third-order intercept:	+9.5	−0.5

Color: Black and gray.
Size (HWD): 4.2 × 11.7 × 14. in. (107 × 297 × 356 mm).
Weight: 17.6 lb (8 kg).

Basic Features

Receiver

Frequency coverage of the transceiver includes all the amateur bands (WARC bands, too!) from 1.8 through 30 MHz. Passband tuning (PBT) and i-f shift (IF) functions are adjusted by front-panel controls, although they are not available independently. The agc decay time is set by a potentiometer rather than a switch; this should satisfy those who are not happy with a "two-speed" control. Two noise-blanker switches control the blanking level and the pulse width — narrow for ignition-type noise and wide for "woodpecker-type" QRM. Other unique receiver functions include an rf notch filter, an audio squelch control that works in all modes, an audio tone control and a switchable 10-dB gain broadband preamplifier. The remaining controls and jacks are listed in Table 1.

Transmitter

Emission type is selected by the MODE switch, which can select between NORmal or REVerse sideband (lsb on 1.8 through 10 MHz, usb on 14 through 28 MHz), cw, fm (with the optional fm unit installed) or RTTY. True fsk is used during RTTY operation; the user must supply a pair of "dry contacts" to key the radio. On ssb, an rf-type speech compressor circuit can be activated by the COMP button. A new feature cropping up these days is an rf-power control that works in all modes; the '740 includes this

[1] W. Hayward, "More Thoughts on Receiver Performance Specification," Technical Correspondence, *QST*, Nov. 1979, p. 48, and Burwasser, "Reducing Intermodulation Distortion in High-Frequency Receivers," *Ham Radio*, March 1977.

[2] A. Helfrick, "The Universal Synthesizer," *QST*, Sept. 1981.

*Assistant Technical Editor

Table 1

Additional Front- and Rear-Panel Controls and Connections

Front Panel	*Rear Panel*
METER switch	Accessory socket (Molex)
VOX switch	Power socket (Molex)
VOX DELAY control	Antenna connector (PL-259)
VOX GAIN/KEYER speed control	Memory backup terminal
POWER switch	T-R control jack
T-R switch (MOX)	External alc jack
+0.5-MHz switch (for 10-meter operation)	Transverter jack (T-R)
AF GAIN control	Receiver input jack
RF GAIN control	Receiver output jack
MIC GAIN control	RTTY keying jack
PHONES jack (1/4-inch phone)	Key jack (1/4-inch phone)
MIC jack (multi-pin)	External speaker jack (1/8-inch phone)
Incremental tuning control	
RIT and XIT switches	

Jacks are phono types unless otherwise specified.

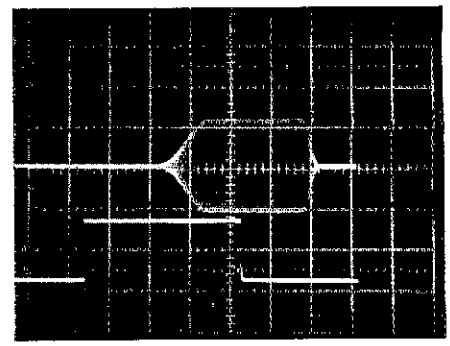


Fig. 3 — Cw keying waveform of the IC-740. Upper trace is the actual key closure; lower trace is the rf envelope. Each horizontal division is 5 ms. This keyed wave has a rapid fall time, which *may* cause key clicks.

feature. Another front-panel control sets the speed of a built-in electronic keyer (which is an option).

Several other functions are controlled by knobs mounted flush with the top of the cabinet. These include a MONITOR switch, which lets the user hear the transmitted signal; a MARKER switch and calibration control for an optional crystal calibrator; a FREQUENCY SET control that allows minor adjustment of the dial calibration; and the ANTI-VOX potentiometer.

Frequency Control

In keeping with the ICOM tradition, this transceiver incorporates a chopper-type optical counter dial and three speed-selector push buttons to select an operating frequency. Each pulse from the counter dial will step the frequency synthesizer 10 Hz, 100 Hz or 1 kHz, depending on the selected speed. An additional button provides a lock fuction that electronically turns off the counter dial. Two "VFOs" are built into the transceiver; they may be used independently or combined for split-frequency operation. A one-frequency memory is available.

Circuit Highlights

To describe the entire transceiver circuitry is beyond the scope of this column. Rather, I will highlight specific design areas that influence the overall performance.

The receiver front-end design is typical of today's high-performance equipment — band-pass filters followed by a doubly balanced diode-ring mixer. A switchable 10-dB-gain MOSFET preamplifier improves the receiver noise figure (sensitivity) on the higher hf bands. Note in the specification table that the receiver input intercept (P_i) drops 10 dB when the preamp is switched in; this means the ability to tolerate large input signals has decreased. This switchable preamp feature allows the user to choose between best sensitivity and best strong-signal performance — a choice not found in equipment that uses a simple attenuator.

A dual-conversion system allows the user to select several i-f filters. In the standard model, a 2.3-kHz crystal filter is used at the first i-f (9 MHz) and a ceramic 3-kHz filter is used at the second i-f (455 kHz). Several optional filters are available that increase the ssb-filter shape factor (by changing the second i-f filter to a crystal type) and narrow the cw bandwidth (by replacing the first i-f cw filter with a narrower bandwidth crystal type unit).

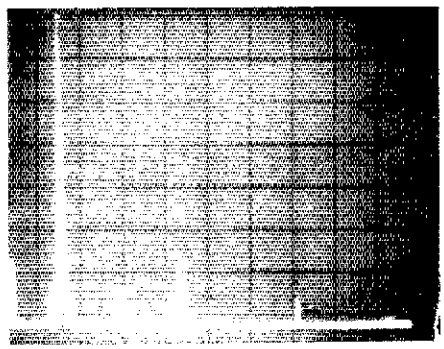


Fig. 1 — Spectral display of the IC-740. This is the worst-case condition, operating with 105-W output on 14 MHz. Each vertical division is 10 dB, and each horizontal division is 10 MHz. The IC-740 complies with current FCC specifications for spectral purity.

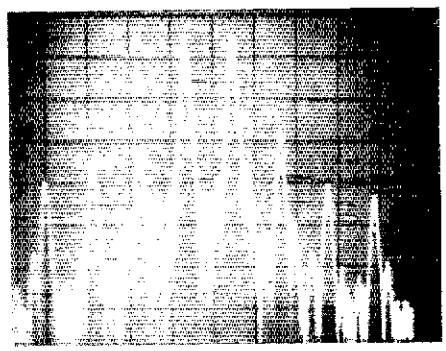


Fig. 2 — Spectral display of the IC-740 output during two-tone IMD test. Third-order products are 30 dB below PEP, and fifth-order products are 40 dB down. Vertical divisions are each 10 dB, and horizontal divisions are each 1 kHz. The transceiver was operated at the rated input power on the 14-MHz band.

Probably the most significant portion of the transceiver design is the frequency synthesizer. In this unit there are two PLL systems: one is used to generate the HFO injection signals, and the other generates the VFO signals.

Checkout and On-the-Air Performance

When the '740 arrived at Hq., I was anxious to see how it performed in the lab (other transceivers with frequency synthesizers have been reviewed and many have a poor synthesizer design, which results in a noisy receiver). To my delight, the receiver performance is impressive; in fact, the dynamic range figures shown in the specification table are better than those of some analog VFO transceivers. Receiver mixing and synthesizer products are nonevident. Of course, the supreme test for any piece of equipment is an on-the-air evaluation.

The first performance test came during the ARRL November SS cw contest. As always, signals were loud. No evidence of blocking or overload was noted. I noticed several signals with noise modulation on their carriers. These stations were probably using synthesized equipment; I'm sure the IC-740 was not at fault.

Although the "electronic" performance of the radio is impressive, the human engineering leaves much to be desired. The front-panel knobs are small; my large fingers found them hard to manipulate. Many of the functions are mounted using concentric control knobs; this makes the situation more difficult. The cw filter is available only when passband tuning is engaged; this requires the operator to press two buttons to change one function, and since there are no indicator lights, it is sometimes hard to discern why the cw filter is not working.

The cw waveform photograph looks great, but the sidetone is so mushy sounding that dots and dashes run together at speeds above 50 wpm. Most of the time I used my keyer sidetone for monitoring. Also the S-meter sensitivity is quite high.

Overall Thoughts

ICOM has done a superb job with the '740. Their experience in designing synthesized equipment has paid off; I have seen very few amateur products that are comparable. Don't let the small size of the unit fool you; it packs a lot of electronics in a small space. In fact, an optional *built-in* ac-operated power supply is available. Those potential buyers with large hands should play with the radio before purchasing one. Price classes: IC-740, $1099; FL-44 2.3-kHz second i-f ssb filter, $159; FL-45 500-Hz cw filter, $59.50; PS15 external power supply, $149; PS-740 internal power supply, $160. For more information on the IC-740 HF Transceiver, contact ICOM America, Inc., 2112 116th Ave. N.E., Bellevue, WA 98004 — *Gerry Hull, AK4L*

Yaesu FT-730R 440-MHz FM Transceiver

Manufacturer's Claimed Specifications	*Measured in ARRL Lab*
Frequency coverage: 440-449.975 MHz.	440-449.975 MHz.
Synthesizer steps: 25 and 100 kHz.	25 and 100 kHz.
Power output: 10 W.	15 W.
Mode of operation: F3 (fm).	Fm.
Spurious emissions: −60 dB or better.	Better than −64 dB.
Antenna connector: Type N.	Type N.
Receiver type: Double-conversion superheterodyne.	
First i-f: 46.255 MHz.	
Second i-f: 455 kHz.	
Sensitivity: 0.25 μV for 12-dB SINAD.	0.2 μV for 20-dB quieting.
Squelch sensitivity: 1 μV for 30 dB S/N.	0.56 μV for 30-dB quieting; 0.085 μV minimum, 0.34 μV maximum.
Selectivity: ±7.5 kHz (−6 dB), ±15 kHz (−60 dB).	
Audio output: 1 W into 8 ohms.	2 W @ 10% THD.
Audio output impedance: 8 ohms.	
Power requirements: 13.8-V dc (negative ground).	
Current consumption: 3 A on transmit (10-W rf output); 0.3 A on receive.	3.6 A (15-W output). 265 mA (squelched).
Case size (HWD): 2 × 5.9 × 7.1 in.†	2 × 5.9 × 7.1 in.
Weight: 3 lb 5 oz.	

†mm = in. × 25.4; kg = lb × 0.454

YAESU FT-730R 440-MHz FM TRANSCEIVER

☐ Fm transceivers for the vhf and uhf amateur bands are becoming more compact and versatile with advances in the state of the technical art. Rigs not much larger than you would expect for hand-held use are available for mobile (and fixed-station) operation, providing power outputs in the 10- to 15-W class. And they are packed with features that will amaze you if you haven't kept up with what has become available recently. The FT-730R is one such rig.

At first glance, the '730 may look like just another fm transceiver. The case is finished in a dark gray, almost black enamel. The rig sports a 1.4-in. edgewise D'Arsonval type of S meter that doubles as a relative-power-output meter.[1] In operation, the meter scale, with its red and black markings, is illuminated from behind. To the left of the meter is the digital frequency readout. This is a liquid-crystal type of display, with five 1/4-in. numerals displaying frequency to the nearest 100 Hz. This is a newly developed readout device with wide-angle viewing, and is also illuminated from behind. When power is removed, the black numerals disappear, leaving the frosty-gray area clear. Between the readout and the S meter are two LEDs, one above the other. The upper red LED indicates ON AIR, and the lower green LED indicates BUSY when the squelch has been opened.

[1]mm = in. × 25.4

The usual ± transmit frequency offset switch is located at the upper left of the front panel. Directly below are concentric VOLume and SQUELch controls. To the right, below the frequency readout, is a large knob, obviously for frequency tuning. A multiposition MEMORY switch indicates some type of memory capability. The seven-pin microphone connector may seem a bit strange if you consider the need for only audio, PTT and common lines. There are also eight push buttons with various labels on the front panel, a clue that there are additional features. A 3-inch built-in speaker is located at the bottom of the enclosure, with a miniature phone jack on the rear panel for an external speaker.

Operating Features

But behind the neatly arranged front panel are all kinds of features that are not immediately apparent at first glance. The '730R is microprocessor controlled. In part, that's why the manufacturer can pack so many features into such a small space. The rig has 10 memories and two VFOs for frequency selection. A small lithium battery provides power to hold all 12 frequencies in memory when the rig is turned off or disconnected from the 13.8-V supply. (Life expectancy of the battery is five years or more.)

The frequency displayed on the indicator is that of actual operation, except that the first two digits (44) are omitted. In other words, add 440 MHz to the readout indication to get the actual operating frequency. A three-position rotary switch labeled RPT controls the transmitting-frequency offset. With simplex operation (center position of the switch), the readout remains unchanged when going from receive to transmit. At the right and left positions of the switch, the transmitter offset is plus and minus 5 MHz, respectively. The readout changes to indicate the transmitting frequency during offset transmissions. Provisions are also made for split-frequency operation, by receiving on a memory channel and transmitting on a VFO frequency (while following the instruction you set up with the offset switch). In this way, an almost unlimited number of frequency combinations may be used in split operation.

The '730R has a "goof-proof" feature, too. If by chance you have selected a frequency and an offset combination that would place your transmitted signal *outside* the 440- to 449.975-MHz frequency range, depressing the PTT switch on the microphone does nothing except display an E on the readout. Meanwhile, the transceiver remains in the receive mode.

Frequency Selection

With 10 memories and two VFOs, you might think that selecting desired frequencies would be a confusing or perhaps cumbersome process. Not so! In manual VFO operation, the appropriate VFO (A or B) is selected with a push switch. When pushed once, this switch locks itself in the IN position for one VFO. When pushed again, the switch unlocks and returns to the OUT position for the other VFO. It's as simple as that. Meanwhile, the frequency that was last selected on the unused VFO is held in memory, and is available instantly, merely by returning to that VFO.

VFO tuning is done with the main tuning knob. This is not a continuously variable control, but has closely spaced detents — 50 per knob revolution, to be exact. There is no

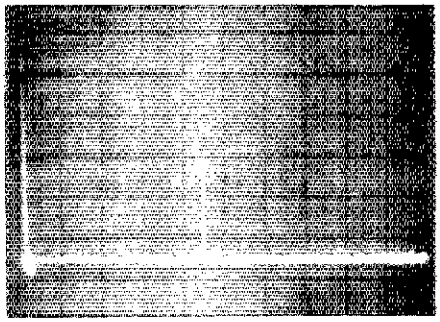


Fig. 4 — Spectral display of the Yaesu FT-730R. Vertical divisions are each 10 dB; horizontal divisions are each 100 MHz. Output power is approximately 15 W at a frequency of 448.775 MHz. The fundamental has been reduced in amplitude approximately 40 dB by means of notch cavities; this prevents analyzer overload.

mechanical stop on this control; it may be turned indefinitely in either direction. Switching to the next detent position changes the frequency by one step. The frequency steps are selectable at the front panel with a STEP push switch, either 25-kHz or 100-kHz increments. This switch is a momentary type, not a locking switch. For rapid frequency changes from one end of the band to the other, the 100-kHz steps are useful. Then, pushing the STEP switch toggles operation to provide 25-kHz steps for "fine tuning." The instrument continues to step in 25-kHz increments until the STEP switch is again depressed, when it returns to 100. The direction of frequency tuning is conventional — clockwise rotation of the knob to select higher frequencies, and counterclockwise for lower frequencies. There are no provisions to tune to frequencies that are not multiples of 25 kHz.

The 10 memories are selected with a rotary switch. Any VFO frequency may be stored in memory, merely by pushing a switch labeled M. (The previous content of that memory is lost when a frequency is stored.) Recalling a frequency from memory requires only pushing a "memory recall" switch and selecting the appropriate memory with the rotary selector switch. The transmitting-frequency offset functions are the same with memory frequencies as with VFO operation. This allows you to set up the memories on the output frequencies of repeaters in your area, and transmit in normal offset operation to hit the repeater input frequencies. With this feature, the operator who spends most of his time on only a few repeaters will have little use for the VFOs except for storing frequencies in memory. But, of course, two VFOs are nice to have.

Earlier, I mentioned a seven-pin microphone connector. Those extra pins provide for frequency-scanning operation, controlled from the microphone. Two switches, labeled UP and DWN, control this feature. During VFO operation, a momentary push of either switch shifts the frequency up or down by one frequency step. Operation is exactly the same as moving the main tuning knob by one detent position. But if either switch is held down for approximately one second, the entire frequency range of the rig is scanned automatically, either in 25- or 100-kHz steps, as controlled by the STEP switch.

A three-position slide switch on the rear panel permits you to select momentary interruption of the scanning on either a busy channel or else a clear channel, or to scan continuously without interruption. Let's say you set the '730R up to scan in 25-kHz increments for a busy channel. Scanning will start from the VFO frequency that is displayed when you initiate scanning, and proceed in the frequency direction according to which control switch you pushed. The scanning will continue until a frequency is tuned where a signal of sufficient strength to open the receiver squelch is found. Scanning will pause automatically for approximately five seconds, and then resume.

During that five-second period, you can halt the scanning operation by depressing the UP or the DWN switch or the microphone PTT switch. Now you are ready to transmit on that frequency (or an offset from that frequency) immediately, if you so desire. This is a handy feature if you are looking for signals on the band. Scanning of the entire 10-MHz range without momentary halts requires about 40 seconds. If no signals are found, the scanning progresses from the bottom of the frequency range to the top, and returns to the bottom of the range without delay to continue upward again (or vice versa, if you are scanning downward in frequency).

But that's not all the scanning you can do. If you wish, you can scan only the frequencies retained in the 10 memories. All the features mentioned above, except frequency steps, are available in memory scanning, too. This is superb if you want to search only your favorite repeater frequencies for activity.

VFO A or B, or readiness for memory scanning, is selected from the front panel. Actual scanning is controlled from the microphone only; there is no provision to initiate or terminate scanning from the front panel.

The '730R has yet another useful feature called priority channel operation. Using a VFO and a memory, this feature lets you listen on a frequency you select with the VFO, but provides automatic checking of the memory frequency for activity every five seconds. If the memory frequency is busy (or clear, as selected by the three-position slide switch), the scanner will halt on the memory channel. Otherwise, it will return immediately to the VFO frequency, and hardly a word of what is being said will be missed.

The FT-730R comes with yet other features. One is a tone-burst generator. When activated with a two position rear-panel slide switch (ON and OFF), an 1800-Hz tone having a duration of approximately 0.5 second is keyed each time the PTT switch is activated. For longer bursts, a front-panel CALL switch provides for manual control of the burst duration.

An optional feature contained in the review unit is a tone-squelch decoder. Many repeaters operate with such decoders on their input frequencies, perhaps more commonly known as PL® operation. A front-panel push switch on the '730R activates this feature to prevent unwanted signals from breaking the receiver squelch. An encoder in the equipment provides the subaudible tone at all times during transmission.

As shown in the title photo, a mounting stand for using the '730R at a base station is available. An accessory FP-80 ac-operated power supply is also offered. For mobile operation, a universal bracket is supplied for under-dash mounting. The transceiver may be removed from the bracket merely by unsnapping a locking bar and sliding the rig forward. Mobile installation requires a vehicle with a negative ground. Power connection is made through a keyed, two-pin plug, supplied with leads for interconnection to the power source.

The FT-730R is manufactured by Yaesu Electronics Corp., P.O. Box 49, Paramount, CA 90723, tel. 213-633-4007. The price class is $399. Various versions of the FT-730 are manufactured for use in countries other than the U.S. and Canada. These models offer various features, such as a frequency coverage that is 10 MHz lower and a different tone call frequency. — *Jerry Hall, K1TD*

FOX-TANGO 2.1-kHz KENWOOD TS-830S TRANSCEIVER FILTER MODIFICATION

☐ For the past two years, I have used a TS-830S transceiver at my home station. The variable bandwidth tuning (VBT) and IF SHIFT controls are extremely valuable for the elimination of adjacent-channel interference. On cw, these controls eliminate just about any QRM encountered.

On ssb, however, the stock Kenwood filters didn't perform as well as I expected. In fact, while operating on a crowded band, I noticed many instances in which using the VBT and IF SHIFT controls together wouldn't put a dent in the QRM! Since most of my operating time is spent on cw, this problem didn't disturb me too much. When a serious operation in November Sweepstakes was undertaken, however, the shortcoming of the standard filters became apparent.

A few weeks after the contest, I noticed a Fox-Tango advertisement in *QST*. A single Fox-Tango 1.8-kHz filter worked very well in my TS-520S several years ago, so the twin 2.1-kHz filter TS-830 modification was extremely appealing to me.

The filter modification comes with several photocopied pages of instructions to assist in the installation of the filters. The documentation is rather extensive; in fact, *too* much information is supplied. A prospective modifier *may* become discouraged after reading the complete package. The modification is relatively simple to perform, so don't feel intimidated by the pages of paperwork!

Modification installation is fairly straightforward, but care should be used during the operation. Screws that hold the i-f board in place must be removed and the board tilted 90° to allow unsoldering and removal of the stock filters. Exercise care during this operation, as the circuit board traces in this area are narrow and close together. The filters supplied for this modification are *not* direct plug-in replacements for the stock filters, so it is necessary to mount them elsewhere in the transceiver.

Instructions suggest mounting the new filters on top of the existing cw filter (if installed) with double-sided tape. Suitable tape is supplied with the kit. This approach didn't appeal to me, so I placed them on a piece of perforated board. This board is mounted on the chassis, just to the left of the power transformer.

Connections between the filter terminals and the i-f board were made with RG-174/U coaxial cable (supplied). The supplied cable length is sufficient for filter installation atop the cw filters, per instructions, but more was required for my installation.

Filter installation took approximately four hours. Much of this time was spent fabricating the filter mounting board and realigning the i-f after installation. Realignment is not required, but highly recommended. If an rf signal generator is available, follow the i-f alignment

Table 2

Receiver Performance

Specification	*Before*	*After*
MDS		
80 Meters	−129 dBm	−133 dBm
20 Meters	−130 dBm	−133.5 dBm
IMD D.R.		
80 Meters (low)	85 dB	88 dB
80 Meters (high)	78 dB	81 dB
20 Meters (low)	83 dB	88.5 dB
20 Meters (high)	77 dB	81 dB
Third-Order Intercept		
80 Meters (low)	− 1.5 dBm	− 1 dBm
80 Meters (high)	−12 dBm	−11.5 dBm
20 Meters (low)	− 5.5 dBm	− 1 dBm
20 Meters (high)	−14.5 dBm	−12 dBm

procedure in the TS-830 *service* manual. If either is not available, the procedure in the user's manual will suffice.

Overall, I'm pleased with the performance of the "new" '830. The band-pass response curves of a stock TS-830, one with a new 2.1 kHz *first* i-f filter (standard second i-f filter) and one with *both* new 2.1-kHz filters, are shown in Fig. 5. Measured −60 dB bandwidth of the unmodified '830 was 3.4 kHz. After modification, the measured bandwidth at −60 dB is 2.7 kHz — a 700-Hz improvement.

Receiver performance characteristics (before and after) are shown in Table 2. An approximate 3-dB improvement in two-tone dynamic range and third-order intercept is noted. This, in addition to the narrowed bandwidth, made the necessary work worthwhile.

The FTK-830 modification is available from Fox-Tango Corporation, Box 15944T, West Palm Beach, FL 33406. Price Class: $150. — *Michael B. Kaczynski, W1OD*

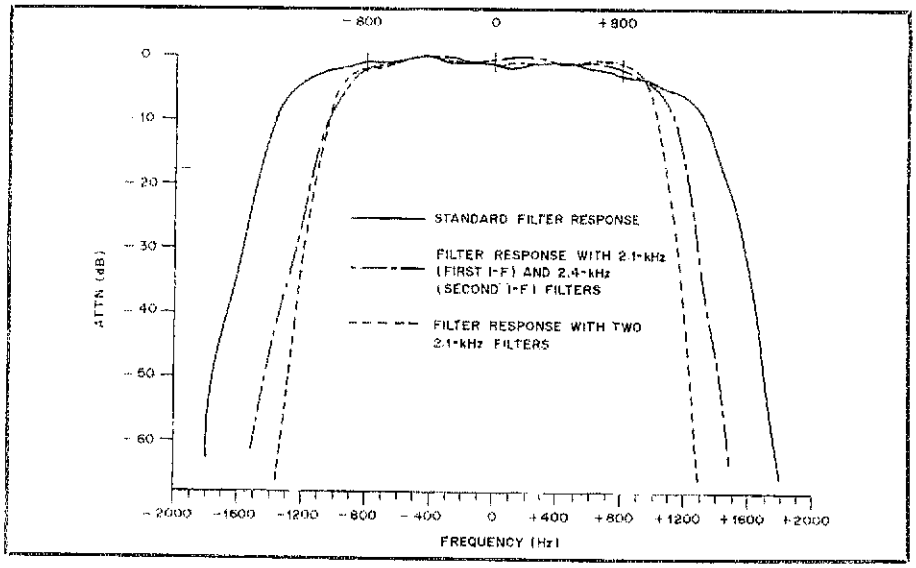


Fig. 5 — Filter response curves for the TS-830S with and without the Fox-Tango filters.

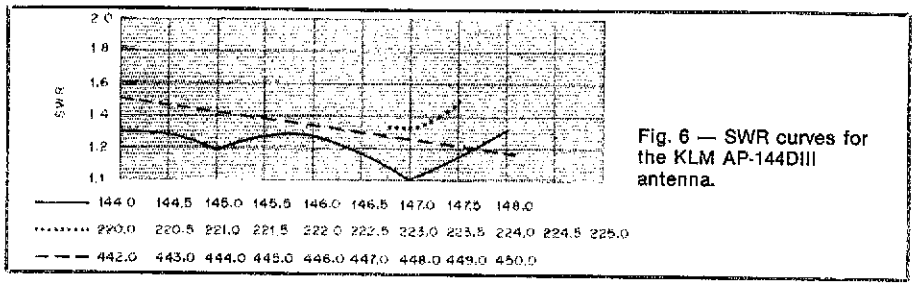


Fig. 6 — SWR curves for the KLM AP-144DIII antenna.

KLM AP-144DIII BASE STATION VHF ANTENNA

☐ Some hams may think that once they have seen a few base-station antennas for 2 meters, all such antennas are basically similar. The KLM AP-144DIII is different.

This antenna is a collinear, double 5/8-wavelength vertical for the 2-meter band that also incorporates a discone antenna for 70-cm (440-450 MHz) operation. The feed point is weatherproof, being housed within a machined aluminum hub. A sealed static-charge arrestor is fitted to the feed point. KLM claims the arrestor will offer some degree of protection to the transceiver in the event of static buildup.

All the parts and the machining of the KLM AP-144DIII are of a high standard, and everything fit together beautifully during construction. The clearly written instructions include excellent exploded drawings of the antenna, especially of the feed-point housing. Several reducing adapters are provided for the feed point to accommodate different sizes of coaxial cable. Coaxial cable ranging in size from RG-58/U to slightly larger than RG-8/U can be used. I am feeding the review model with RG-8/U. Two small tubes of silicone sealant are provided in the kit, along with specific details for weatherproofing the antenna. I used only half of one tube to seal the antenna; this leaves plenty of sealant for other uses around the shack. In all, complete assembly of the antenna took about one hour, with an overnight wait for the sealant to set.

At my QTH, the antenna is mounted atop the tower at a height of 75 feet. The antenna performs better than another commercially manufactured collinear that it replaced. For purposes of comparison, I used a distant (95 mi) 2-meter repeater in northwestern Massachusetts. Before I installed the new antenna, my signals into that repeater were marginal, and the repeater output would scarcely open the squelch of my transceiver. The first QSO with the new antenna netted me a signal report of almost full quieting; I now could copy the repeater S 3 to S 4. Overall, the improvement was immediate and gratifying. SWR checked across the 2-meter fm band is shown in Fig. 6. Worst case, it is less than 1.5:1. SWR on 440-450 MHz slopes from 1.5:1 to near unity. Signal reports on 440-450 MHz were excellent through the local repeater, as well. Although the antenna instructions provide for some adjustment of antenna length for minimizing SWR, none was necessary.

The SWR chart for typical operation, supplied by KLM, suggests that the AP-144DIII can be used on the 220-MHz fm band with a reasonable SWR, although KLM makes no claims to that effect. I decided to try operation on 220 MHz, and I'm pleased to report that this antenna appears to operate on that band with an SWR of approximately 1.5:1. The frequencies used were three standard 220-MHz repeater pairs and 223.50-MHz simplex. The entire 220-MHz fm band was not checked, inasmuch as the rig I used is a crystal-controlled unit. This three-band capability should definitely interest many active vhf ops.

The KLM AP-144DIII appears to be a well-engineered antenna. Materials and finish are first-rate; performance has been excellent on 144, 220 and 440-450 MHz. It certainly is nice to put up a two-band vhf vertical antenna and find you've got operation on an extra band (220 MHz) along for the ride! The AP-144DIII is imported by KLM Electronics, P.O. Box 816, Morgan Hill, CA 95037. Price class: $112. The same antenna, less the uhf discone, is available in the $99 price class as the AP-144DII. — *Sandy Gerli, AC1Y*

WEST JERSEY COMMUNICATIONS PRODUCTS 80-METER "BN CAGE" ANTENNA

☐ Many amateurs would like to find an antenna that provides coverage of the entire 80-meter band with an SWR of 1.5:1 or less. Solid-state rigs reduce power output if the SWR is much higher than this. Of course, you can use a Transmatch to present the required low SWR to your rig, but that seems to be an unnecessary set of controls to manipulate. The advantage of a "no tune" rig is, after all, being able to tune from one end of the band to the other without adjusting any controls.

The cage antenna has been around since the early days of radio, and was discussed in *QST* articles in recent times.[4,5] The idea behind the cage antenna is really quite simple. As the length-to-diameter ratio of an antenna element decreases, the resonant length for a given frequency will decrease. The antenna bandwidth will also increase. This principle is more evident in higher-frequency designs, where aluminum tubing is often used for the radiating elements. It is impractical, however, to use large-enough diameter tubing on 160, 80 or 40 meters. One

[4]A. Harbach, "Broad-Band 80-Meter Antenna," *QST*, Dec. 1980, p. 36.
[5]J. Hall, "The Search for a Simple, Broadband 80-Meter Dipole," *QST*, April 1983, p. 22.

method of producing an antenna element of large effective diameter is to space a number of wires around the perimeter of a cylinder. At the ends of the cylinder, or cage, the wires can be brought to a point in a conical taper, and joined.

There are a number of parameters that will affect the feed-point impedance and bandwidth of the cage. The size and number of wires, the diameter of the cage and the length of the taper are all important. WJCP has experimented with all of these parameters, and appears to have balanced them in a workable design.

The 80-meter antenna kit comes in a box 10-1/2 inches on a side and weighing about 18 pounds.* It includes everything you will need to put the antenna together, except some basic tools. In the box you will find eight molded-plastic spreaders, a spool of no. 14 enameled wire (approximately 800 feet) and 100 feet of coaxial cable with a PL-259 on one end and pigtails ready to connect to the antenna on the other. You will also find 50 feet of 1/8-inch Nylon rope, center and end insulators, and all required hardware. Even a small piece of emery cloth for removing the enamel insulation from the ends of the antenna wire and a small packet of Noalox® compound for use with the aluminum cable connectors are included. The coaxial cable is about the size of RG-59/U, but is sold by Channel Master and is specified to have a characteristic impedance of 67.2 ohms.

The instructions that come with this antenna are detailed and seem to cover all aspects of construction. The manufacturer recommends that you read them through at least once before beginning work. I certainly agree that this is a good idea. It is much easier to understand each step when you are aware of what will have to be done next.

One person could build the antenna, but a helper sure is nice, at least for measuring and cutting the wires. Mike Kaczynski, W1OD, assisted me with most of the construction. At one point you are directed to secure a collet 11 inches from the end of each wire. This is to prevent the last spacer from sliding on the wire when the conical taper is formed at the end. The instructions suggest that you use a crimp tool or ordinary gas (slip-joint) pliers to crimp the collet in place. (These collets look like crimp-on wire connectors.) We found it impossible to dent the ones supplied, even with a large pair of pliers. Ultimately, we had to resort to using a hammer and a piece of scrap iron to crimp the collets in place.

I found the insulation coating on the wire to be quite heavy, and I needed about three times as much emery cloth as had been supplied to complete the job of stripping the wire ends. A pocket knife could be used to scrape the enamel off, but the danger with this procedure is that you may nick the wire, causing it to break after the antenna is up.

As the four ends of the cage sections are completed, you are instructed to twist the six wires together, apply a *thin* coating of Noalox and tighten an aluminum cable clamp over them. The manufacturer suggests that you may want to solder the wires together first. I would say this is a required step if you want the electrical connection to be maintained. The amount of Noalox supplied really is insufficient to cover the wires. A few years ago, I purchased a container of this compound at an electrical supply store. It is inexpensive, and I apply a liberal coat to all exposed connections. The investment for a container of Noalox would be worthwhile for most hams involved in antenna work. Total assembly time for the cage was about three hours.

*mm = in. × 25.4; m = ft × 0.3048; kg = lb × 0.454.

Deployment and Performance

The first real snag in the operation came when Mike and I went to move the entire assembly into position to put it in the air. The antenna weighs only about 15 pounds, but to hold the entire length off the ground by pulling on the ends, 100 pounds or more force is needed! If any part of the antenna is allowed to touch the ground while you are moving it, the spreaders will roll, twisting the cage wires together. Believe me, it is very difficult to get all of the twists out once this happens! A third person to hold the center insulator would be a great help for moving the antenna.

Initially, one end of the dipole was attached to a 40-foot tower atop the ARRL Headquarters building and the other end sloped down to a tree. The feed line was brought in to Hq. club station W1INF, and the SWR curve was plotted. A Bird Model 43 wattmeter was used to make these measurements. We found it necessary to prop the center insulator with a wooden pole to hold it about 10 feet above the corner of the building. This resulted in the SWR curve shown in Fig. 7. The curve compares favorably with the manufacturer's claim of an SWR of 1.5:1 or less over the entire band.

The amount of sideways pull exerted on a tower with the antenna in this configuration is quite large. Any additional tug on the antenna, or a slight breeze, would cause the tower to sway noticeably. We did not leave the cage up this way for very long! If you want to support the antenna from your tower, I would recommend that you hang the center insulator from an arm off the tower.

After carefully coiling the antenna wires to prevent kinks or tangles, I took it home for further evaluation. My yard has two tall maple trees in the center. There is no way to support an antenna above those trees, so I decided to use a branch of one of them as a center support. About half of one side of the dipole goes through the top branches of this tree, about 30 feet off the ground. One end is tied off to the peak of my house roof and the other is supported by another maple tree. One problem that developed is a tendency for the wires to twist once the cage is in the air. This may be a result of having "rolled" the antenna earlier when we tried to move it. Even though this arrangement would have to be considered less than ideal, a check of the SWR curve revealed it to still be less than 2:1 over the entire 80-meter band. Not bad!

The real question about any new antenna is, "How does it perform compared to the old antenna?" In many cases, such a comparison is difficult because the old antenna is taken down to make room for the new one. My comparison antenna was a 135-foot inverted L fed through a Transmatch. I did not have to take this antenna down, and was able to switch between the two conveniently. The inverted L is mostly horizontal, also goes through part of a maple tree, and is about the same height as the cage dipole. This should permit a reasonable comparison to be made. Received signals are two to three "S" units stronger on the cage antenna. Transmitted signal reports indicate the same results. For a while, I had a hard time convincing some of my friends on the Eastern Pennsylvania Emergency Phone and Traffic Net that I had not moved back to PA! The cage antenna made a definite improvement in my 80-meter antenna system.

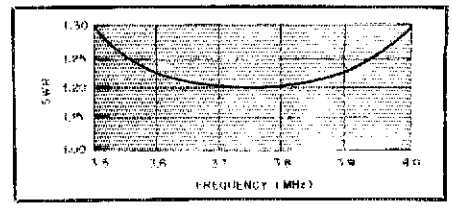


Fig. 7 — SWR curve for the 80-meter "BN Cage" antenna.

One ordeal I was not able to put this antenna through during the review period was the test of a typical New England ice storm. Several Headquarters staffers have virtually guaranteed me that this antenna will come down in such a storm. Their feeling is that the weight of the ice build-up on the cage wires will break either the support rope or the wires themselves. My own feeling is that ice is not going to build up on the wires. The insulating coat is quite smooth, and any water or ice just seems to fall off. One snowstorm did stick to the coaxial cables, the inverted L wire and even to my Cushcraft R3 vertical. The snow built up to about two inches in diameter. The cage wires remained clear, however. This seems to support my feeling, but I'll have to wait for a real ice storm to know for sure.

Specifications

A few things about the antenna specifications are worth mentioning. Our measured SWR curve does not go as low at the center of the band as the manufacturer suggests it should. After some thought, I realized that the 67.2-Ω coaxial-cable impedance would provide some mismatch to the Bird wattmeter and transmitter, which are designed to operate into a 50-Ω resistive load. Under these conditions, the feed line will act like an impedance transformer, and the impedance seen by the transmitter and wattmeter will depend on line length and the degree of mismatch at both ends. The measured SWR will not necessarily be the actual SWR caused by a mismatch at the antenna. Of course, there are many other factors that will influence the SWR measurement, but I found these few thoughts shed some light on one aspect of the problem.

The 80-meter cage antenna has a wind-loading surface area of about 2.5 ft^2. In an 80-mph wind, this would produce about 60 pounds of force on the antenna. Add this to the 100 pounds or so of force needed just to hold the antenna up without unreasonable sag, and you will realize that a couple of very sturdy end supports are required. This should reinforce what I said earlier about not using your tower as an end support.

The manufacturer claims the coaxial cable supplied with the antenna will handle 1000 W, but I did not test this capability because I do not have an amplifier. A few calculations indicate that this should be reasonable power for a cable this size to handle.

Besides the 80-meter antenna, WJCP also has cage antennas for 160 and 40 meters. If you like to operate at both ends of these bands and want an antenna that will cover the entire band with a low SWR, then I recommend the "BN Cage" antennas. They are available from West Jersey Communications Products, 932 Oakland Ave., Burlington, NJ 08016. Price class: 160-meter cage, $180; 80-meter cage, $100; 40/15-meter cage, $80. — *Larry Wolfgang, WA3VIL*

Technical Correspondence

Conducted By
Dennis J. Lusis,* W1LJ

THE QUAD-J-COLLINEAR ANTENNA

☐ This new antenna is essentially a four-element, wide-spaced, collinear broad-side array. However, it has been reduced to the minimum possible overall size without diminishing its performance. The Quad-J-Collinear antenna is a highly efficient, bi-directional array that produces a moderate 6-dB gain over a 1/2-λ dipole. If it's installed so the lower element is at least 1/2 λ above ground, this array will provide low-angle, elliptically polarized radiation useful for DXing. The elliptical-polarization feature provides a desirable polarization-diversity effect, which overcomes signal fading caused by constant variations in ionospheric refraction.

Fig. 1 illustrates the basic principle of operation, and may also be used as a design guide. Fig. 2 provides the dimensions for a 10-m antenna. The array is constructed from copper wire for light weight and low wind resistance. It may be suspended by nylon ropes from existing towers, masts or even trees — provided that sufficient separation between supports exists.

This is a fairly broadband type of array and provided the dimensional proportions are maintained, it will work effectively over a large frequency range. Overall bandwidth is primarily governed by the "J" type phasing stubs and the method employed in transmission-line matching.

Feed methods are left to your particular station requirements. However, it should be known that the feed point has a high impedance (>1 kΩ), and is balanced. Because of these characteristics, either tuned feeders or a 1/4-λ matching section with a balun (Fig. 2) may be used. The length of coaxial cable from the balun to the transceiver is non critical in this application. — *Richard Schellenbach, W1JF, Reading, Massachusetts*

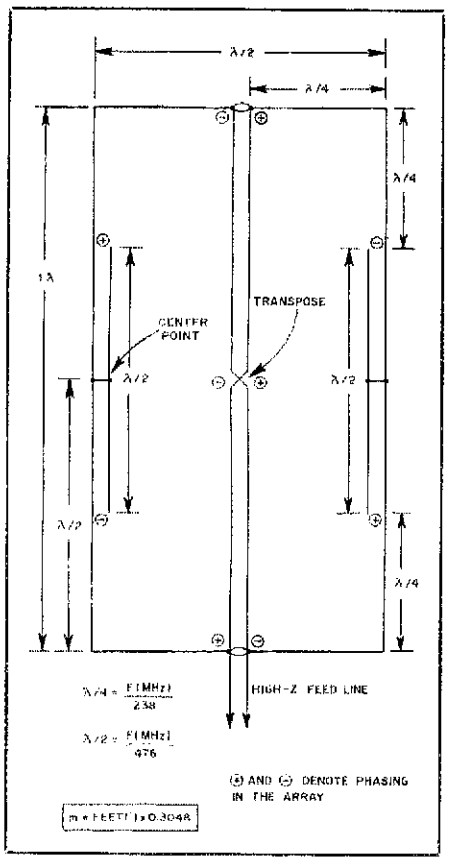


Fig. 1 — Drawing of the Quad-J-Collinear antenna, showing principal phase and element-length relationships.

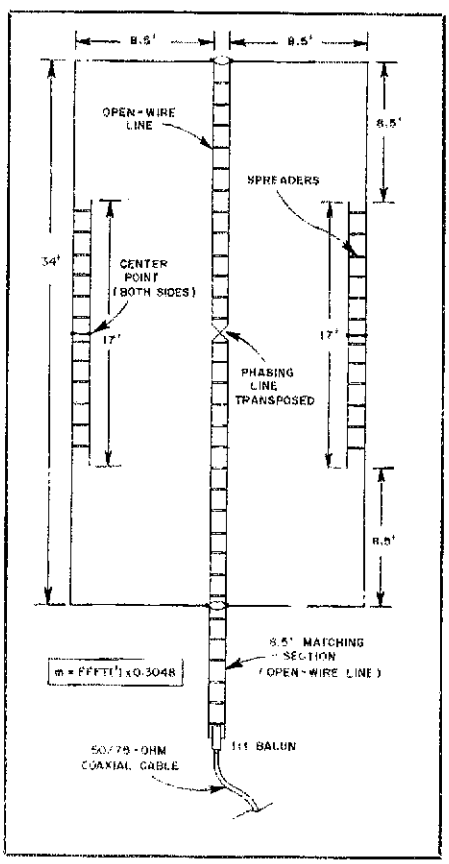


Fig. 2 — Dimensional drawing of a Quad-J-Collinear antenna for the 10-m band. Resonance is set for 28.0 MHz.

IMPROVEMENTS FOR THE AA6PZ POWER CHARGER

☐ The AA6PZ Power Charger (Dec. 1982 *QST*, p. 17) has proven most useful in maintaining my HT battery in both mobile and home operation. Zander's article is informative as well as descriptive, and the charger fills the need to quick-charge a battery safely. I have a few comments that will correct a minor circuit error, and help the builder ensure that his battery is charged to maximum capacity.

Correspondence received with the power-charger pc board indicates that the emitter of Q4 is connected to the wrong side of the ammeter jumper. A voltage drop in the meter could turn on Q4 and limit the current to a lower-than-normal value. Cut the pc trace and reconnect the emitter of Q4 to the correct side of the jumper.

The text implies that R5 should be left out for a 700-mA charge-current limit; however, any variation because of the tolerance of R1 and other resistors will affect the current limit value markedly. In my charger, R1 was actually 1.1 Ω and the limit was only about 250 mA! A value of 1 kΩ for R5 was required (as indicated by Eq. 1) to bring the limit to 700 mA.

Calibration of the output voltage is extremely critical, and most inexpensive VOMs are definitely not accurate enough to do the job. Furthermore, typical milliammeters have a relatively high series resistance and will affect the charge current when removed from the circuit. Here's why: To charge the battery to 100% of capacity, the individual cell voltage must reach a minimum of 1.42 V at a charge rate of 0.1C, or 11.36 V for an 8-cell battery without an internal diode.[1] A set point of 11.20 V, or 1.40 V per cell (as suggested), will result in only 15-37% of full charge. I experienced an apparent loss of battery capacity, which was actually due to insufficient charge current at 11.20 V. Similarly, voltmeter errors as little as 0.16 V or milliammeter-induced voltage drops of the same amount will result in failure to charge the battery properly.

The charge rate must taper to the normal charge rate of 0.05C to 0.1C at 1.42 to 1.44 V per cell, or 22.5 to 45 mA for a 450-mAh battery.[2] This charge rate may be left on indefinitely. A charge rate of 0.02C is a trickle charge, and it is used only to maintain a battery which previously has been fully charged. The power charger should not taper below 0.05C, or the battery will never reach 100% of capacity; 0.1C is a better minimum value.[3]

You may wish to calibrate the charger with a digital voltmeter as follows:

1) Using the slow-rate "wall charger," give your battery a 16-hour charge.

2) Connect the battery to the power charger for at least one-half hour. Monitor the current with a meter having a resistance of less than 0.2 Ω. You may use a current-sampling resistor of 0.1 Ω in series with the charger, and measure the voltage drop across it with a *good* DVM. For example, a reading of 0.0045 V indicates a charging current of 45 mA. (This measurement is usually beyond the means of anything but laboratory-grade instruments.)

3) If a laboratory-grade DVM is not available,

*Assistant Technical Editor

[1] *Nickel-Cadmium Application Engineering Handbook*, 2nd ed., General Electric Co. (Battery Business Dept., Box 861, Gainesville, FL 32602), pp. 4-22, 4-33.

[2] *Ibid.*, p. 4-11.

[3] *Ibid.*, p. 4-12.

connect the charger directly to the battery, without any series resistor or ammeter, using the leads intended to be permanent. Measure the battery voltage with a DVM or laboratory-grade analog meter.[4] Adjust R2 for a battery voltage of 1.42-1.44 V per cell, adding 0.7 V if your battery pack has an internal diode. Adjust R3 so that the yellow LED barely glows, then readjust R2 (because of interaction). Alternatively, measure the voltage across R1 and adjust R2 and R3 to give a reading corresponding to 0.05C-0.1C. V = R1 × 0.1C, so for a 450-mAh, 8-cell battery, V = 1.0 × 0.045 A = 0.045 V.

As a final thought, I strongly suggest the use of a multifingered or other effective heat sink and thermally conductive grease together on Q1. Without them, excessive temperatures and thermal cycling will eventually damage the transistor, possibly damaging your battery from overcharge. — *Sam Bases, K2IUV, Yonkers, New York*

HYSTERESIS LOSS AND METAL DETERIORATION

☐ With reference to the article "A Homemade High-Power Tuning Capacitor" (June 1983 *QST*), I suggest that brass washers be used for this application. From my experience with high-frequency rf circuits, I have found that hysteresis loss will eventually cause steel washers to disintegrate where high currents are present. — *Bill Barnard, Jr., WB6ACV, Flintridge, California*

MORE ON REFLECTED POWER

☐ Since Walter Maxwell, W2DU, was gracious in suggesting that my own article be consulted,[5,6] I thought it propitious to add a few comments. Maxwell's most recent effort quite correctly states the reflected-power case.[7] My own article also attempted, in a heuristic fashion, to describe the mechanism of reflection. I took into account matters seemingly most contradictory to experience: That power is actually reflected and should not be confused with standing waves; and that power "flowing" backward doesn't necessarily cause the source to suffer for it. I'm sure that more than one amateur has suggested the possibility that reflected power must somehow dissipate in the output tank circuit. The corollary, that "real" power is not reflected, as suggested by some authors, must therefore come as a relief to those who don't understand the mechanics involved.

The practical result is that an understanding of this subject has little to do with the everyday operation of most stations. We have all been warned to avoid high SWR. If you operate a modern solid-state, broad-band rig, protective feedback circuits simply reduce or eliminate the power output if feeding into a gross mismatch. Thus, new amateurs might conclude that operating into a high SWR limits the ability of the amplifier to transfer power to the load. Vacuum tube users are more likely to conclude that while it is entirely possible to transfer maximum (or nearly so) power, reflected power would cause all kinds of havoc to the final tubes and tank circuit. Of course, it's all nonsense (although some types of damage can result when the SWR is excessive), but most hams avoid trouble by resorting to a Transmatch circuit. Thus, as Maxwell long ago advised, SWR really doesn't mean all that much.

I think the most interesting of the arguments suggested by Maxwell is the analog to visible light reflected from a mirror. Those amateurs who have seen light both reflected from, and transmitted through, a half-silvered mirror must appreciate, *a priori*, that reflected power is real. You can do this with a flashlight as long as you are willing to accept that the essential difference is one of wavelength. — *Martin R. Kramer, K2KGF, Brooklyn, New York*

LESSONS LEARNED

☐ I recently had a potentially disastrous electrical fire in my car. Here's what happened: A short developed in the line carrying 12-V dc to the slide-in mount for my 2-meter rig. (Everything was burned so badly I couldn't pinpoint the exact cause.) Although the rig had an in-line fuse, the short was on the battery side of it. Consequently, the 12-V power line got so hot that the insulation started to burn and parts of the car were also ignited.

At 55 mi/h this was quite a thrill. I stopped the car and pulled (ripped was more like it!) the rig from the slide-in mount. That of course didn't help a bit. I ran back to the trunk, where the battery is located, grabbed a pair of diagonal cutters and cut the wire coming off the positive battery terminal. I then ran back to the front of the car and extinguished the fire by blowing and swatting it out.

All this was bad enough, but I was very lucky not to lose the whole car. I learned the following lessons:

1) It's a good idea to check your mobile installation periodically for possible loose connections and cut and chafed wires.

2) In addition to the fuse that protects your rig, make sure *every* wire you install is adequately fused *at the power source*. Alternatively, rely on the car fusing by making sure the wires you install going to the rig are at least the same or bigger gauge than the wires of the 12-V source you are tapping. (The typical 2-meter rig or car radio/stereo can trap you. The in-line fuse is normally installed close to the unit, with 4 or 5 feet of cord left for attachment.[8] Connecting that wire to a source like an ignition switch exposes you to exactly the situation I had!)

3) Carry a fire extinguisher.

All of this may seem like overkill, but, believe me, all you need is one fire at 55 mi/h to become a believer. An ounce of prevention... — *Hank Garretson, W6SX, Edwards, California*

KEEPING RF OUT

☐ You *can't* keep rf out of the shack! Even the amateur who uses coaxial cable to the antenna often weeps that the microphone burns his lip, the vfo chirps, the keyer or computer doesn't work, or that sparks can be drawn off of the equipment cabinets. The poor guy mutters that he's "gotta get a better ground" and tries to figure out the best way of running a wire to earth.

His real problem isn't ground, but that all the pieces of equipment (including the person holding the mike) are at *different* rf voltages. That potential difference causes feedback and sparks.

First, *all* equipment cabinets should be wired together with the shortest possible connections. The cabinets can be strung together in a line, with a good dc ground somewhere around the center. (This also is a good shock and fire preventative.) Sometimes the connections are made to an inch-wide copper strap running under the back lip of the operating desk.

If the desk isn't metal, the underside can be turned into a ground plane by gluing aluminum foil or tacking copper screen to it. If grounded to the equipment, this plane will help all equipment resting on it (including the amateur, through his arms) to stay at the same rf potential. This markedly reduces sparks, feedback, and weeping. — *David T. Geiser, WA2ANU, ARRL TA, New Hartford, New York*

[4]Mercuric-oxide "mercury" cells (used in photographic light meters) can be used as precision voltage-calibration standards. They are either 1.35 or 1.4 V, depending on type.

[5]"Feedback," *QST*, April 1983, p. 40.

[6]M. Kramer, "Reflected Waves and Mismatched Loads," *CQ*, June 1978.

[7]W. Maxwell, "The Reality of Reflected Power," Technical Correspondence, *QST*, Feb. 1983.

[8]mm = in. × 25.4; m = feet × 0.3048

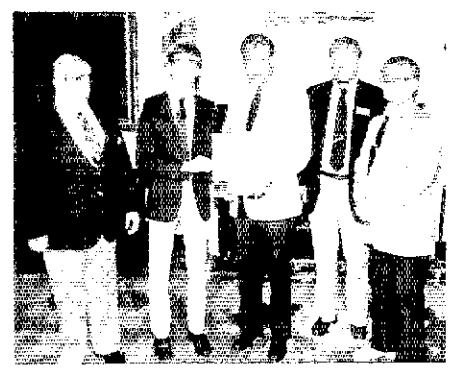
Feedback

☐ Please note: Pc boards and kits of parts for the ASCII/Baudot character generator in the July issue of *QST* ("A Serial ASCII/Baudot Character Generator You Can Build") are available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002.

☐ A number of readers have expressed dismay over Fig. 1 of "Wire Antennas for the Beginner," June 1983 *QST*, p. 34. Some type of stress relief should be used at either end of the antenna support cable to prevent damage to the vent pipe from tree movement. Thanks to the many who wrote us!

☐ In "An Introduction to AMTOR," July 1983 *QST*, there is an error in the bibliography. The reference to A. Daley should read: ....*IEEE Transactions on Vehicular Technology*, VT-26, No. 3...

Strays



In recognition of the 7600 radio amateurs in Maryland, Governor Harry Hughes proclaimed June 20-26 as Amateur Radio Week. Participating in the presentation are (l-r) AK3B, KK3C, Governor Hughes, WB3ELV and KB3OB.

Finding OSCAR 10

Using AMSAT-OSCAR 10 can be as simple as, "If you can hear it, you can work it." So, what's all the fuss about tracking?

By Steve Place,* WB1EYI

We're about to share the wisdom of the ages — the secret to using our OSCAR satellites! Sorry, no mysterious ministrations by satellite sorcerers over rotators and Yagis; no secret incantations passed on from wizened Brujo to eager apprentice. Simply stated, if OSCAR 10 is line-of-sight to your station, you can work it. How can you tell when the satellite is within your line-of-sight? You can hear it. Not so intimidating after all, is it?

Nonetheless, a lot of OSCAR 10 users take the time to predict access times and tracking angles. Though not absolutely necesary, these techniques can help you derive more enjoyment from your satellite time as you advance beyond the first few casual contacts.

OSCAR 10 Status Update

AMSAT-OSCAR 10's kick motor was fired initially at 2230 UTC Monday, July 11, 1983, roughly 26 days after launch. The intended 107-second burn actually lasted for 190 seconds, lifting perigee to 3958 km and the angle of inclination to 26.2 degrees. The final kick-motor firing was attempted at 0032 UTC Tuesday, July 26. Though the command was sent several times, and though telemetry indicated that the commands were received, there was no change in orbit. The motor did not fire.

The European Space Agency has announced that 53 seconds after OSCAR 10 separated from the launch vehicle on June 16, the Ariane third stage caught up with and bumped OSCAR 10 on the underside. AMSAT speculates that this collision damaged a portion of the onboard plumbing; when the valves were opened to mix the fuel and oxidant for the initial firing, a leak in the helium (used for pressurization) lines emptied the helium tank. Thus, the final firing was disabled for lack of the necessary helium pressure.

Though AMSAT-OSCAR 10's final orbit is not the one planned by AMSAT, it is nonetheless a useful one that should provide years of long-distance, long-duration communication. Insofar as tracking goes, the problem lies mainly with Phase III Trackers: Because the perigee will precess more rapidly than with an orbit at a higher inclination angle, the ground-track curves must be changed more frequently, probably every few weeks.

The Mode B transponder was scheduled to be turned on for general use for the first time on August 6. Monitor W1AW and AMSAT Nets for orbital data and transponder operating schedules.

To Track or Not to Track?

Once you're equipped for satellite operation, you'll quickly tire of hit-or-miss methods of tuning it in. When you're in the mood, OSCAR 10 may not be — that is, it may not be within line-of-sight. Satellite-tracker map devices and computer programs can help you *plan* your operating time. You will know exactly when a satellite will be within range of your shack — when you'll first be able to hear it, and consequently work through it — and exactly when you'll lose access. Taking this a step further, you can also predict when your buddy in Des Moines or Saskatoon — or even a 9Q5 in Kinshasa — will share line-of-sight time to the spacecraft. Then you can carry on to your hearts' content throughout the entire time that you *both* have access. How many other Amateur Radio "bands" can you think of that guarantee such reliable scheduling?

Most OSCAR aficionados have another very good reason for predicting orbit times and tracking. Like most hams, they want to get the greatest possible "mileage" for their dollars. Knowing that you need roughly 1000-W effective isotropic radiated power (eirp) from your 70-cm ground station to work through the Mode B transponder, what's the most cost-efficient way to achieve this level? (Don't be put off by the term eirp; it's not a sorcerer's incantation. Eirp is simply the output power of your transmitter final amplifier, multiplied by the numerical gain of any further amplifier stages, multiplied by the numerical gain of your antenna, divided by transmission-line losses. Numerical gain is not expressed in decibels; 3 dB is equivalent to a numerical gain of 2; 6 dB is equivalent to a numerical gain of 4; 10 dB is equivalent to a numerical gain of 10.) In designing your ground station, you have many choices.

The solution settled on by the majority of users is elegantly simple. The typical output of today's 70-cm (435-MHz) transmitters or transmitting converters is about 10 W. A typical off-the-shelf solid-state amplifier provides about 10 dB of gain, giving 100 W out when driven by 10 W. Average coax and connector line losses can be "guesstimated" at 3 dB, reducing the power level to this point by a factor of 2 to 50 W. Finally, the typical gain of antennas commonly used in OSCAR ground stations is 13 dB, raising the power level by a factor of 20 to about 1000-W eirp.

Not magic, just common sense. This is also the most straightforward, economical approach for the user who chooses not to build his or her own vhf/uhf amplifier. Alternatively, you could use a higher-power amplifier and lower-gain antenna as long as the eirp comes to roughly 1000 W.

Though we've digressed a little, your choice of ground station system will, to an extent, determine your need for tracking. A 13-dB gain antenna is very directional; you must point it in the direction of the other station to realize its full gain. In this case, the other station is OSCAR 10. Map plotters and computer programs not only help predict when you have access to a satellite, they also tell you where to point your antennas at any given time.

Take heart, though: AMSAT-OSCAR 10 is a very "forgiving" bird. For several hours near its apogee (farthest point from earth) OSCAR 10's *apparent* movement from our perspective on earth is slight. You won't have to chase the spacecraft furiously across the sky even with directional antennas. Minor adjustments every half hour or so will suffice.

Menu of Tracking Methods

Experienced OSCAR users take the time to predict when satellites will be within range. This helps them to squeeze every last minute out of a pass, to schedule their operating time in advance or to plan shared access times for "skeds." They track the

*Manager, Club and Training, ARRL

satellites because they typically use high-gain vhf antennas that are directional. Beginners, though, may just want a casual taste of OSCAR 10; you may want only to listen to the General Beacon at 145.810 MHz or to the activity in the passband (centered about 145.903 MHz) as a first step. Whatever your reasons for finding OSCAR 10, the following menu of progressively more precise alternatives will bring you on target quickly.

Easy-chair tracking. Following our basic premise, "If you can hear it, you can work it," is by far the simplest method. If you're ready for a little satellite action, listen for the General Beacon, plus or minus a few kilohertz. Assuming your receiver performs sufficiently well (as low a noise figure as possible — a 2-dB-nf or less preamplifier is often worth the minimal expense), if you don't pick up the signal at first, scan your 2-meter receive antenna around in azimuth (side-to-side). If you still can't hear it, the earth is probably between you and OSCAR 10 — the satellite is not within line-of-sight of your station. If you do hear the signal, peak it up by adjusting your antenna in both azimuth and elevation (up and down).

For a first contact, many hams dispense with rotators and use the "arm-strong" method — aiming the antenna manually. My friends and I have spent many hours working together on OSCAR 7 and OSCAR 8 passes: One would work the station while the other steered antennas that were mounted temporarily on a camera tripod in the front yard, raising eyebrows throughout the neighborhood! OSCAR 10, of course, simplifies the task enormously, as it apparently hangs motionless in the sky for hours at a time near apogee.

Apogee subsatellite point. A slightly more efficient method is to use the time of apogee, the latitude and longitude coordinates of the subsatellite point (the point on the surface of the earth directly under the satellite) and a little common sense. Though not every apogee will be in range of every North American station (higher latitudes are favored slightly over lower latitudes), a few hours before apogee is a good time to start listening. Given the coordinates of the subsatellite point (SSP), you'll know where to aim your antennas in azimuth just as you know where to aim your hf antennas to work a particular country.

Don't forget: You're steering a "Great Circle" course in aiming at the SSP — the direction of the shortest distance on the surface of a globe between your station and the SSP. When the signal appears, peak its strength by adjusting your antenna elevation. Apogee times and SSP latitudes and longitudes will be available from many sources, including W1AW bulletins, monthly orbit predictions (available from Hq. to ARRL members only for an s.a.s.e.) and even on the OSCAR 10 General Beacon!

Phase III Trackers. Thousands of hams have used ARRL's OSCARLOCATORs to plan their OSCAR work in years past. OSCARLOCATORs consist of a cardboard polar-projection map centered on the North Pole, a range circle that you center and fix on your QTH, and a large, transparent, rotatable ground track (satellite path) curve. By setting one end of the ground track to the longitude where the satellite crosses the equator (information published months in advance), an operator would know access and loss times and minute-to-minute antenna azimuth and elevation bearings to a surprising degree of accuracy. OSCARLOCATORs are simple devices with range circles that are fixed in size because all amateur satellites before OSCAR 10 have orbited at constant altitudes. Whenever the ground track falls within the range circle, you have access to the satellite.

AMSAT-OSCAR 10 is not, however, a constant-altitude, circular-orbiting spacecraft. In its high, elliptical orbit, OSCAR 10's altitude is changing constantly. Thus, the size of the range circle is not constant; it grows larger as the spacecraft travels away from earth, and grows smaller as the spacecraft travels toward earth. The higher OSCAR 10's altitude, the greater the communications range through it; obviously, the greater the communications range, the larger the range circle over your QTH at that time. Therefore, the tracking device for OSCAR 10 contains several concentric range circles that are color-coded, each one used during a specified portion of a given orbit.

Additionally, the ground track is not the smooth, gradual curve to which past OSCAR users have been accustomed. It more closely resembles an ocean wave seen from the side. Whereas the ground-track curves for earlier satellites were valid throughout a satellite's lifetime, the

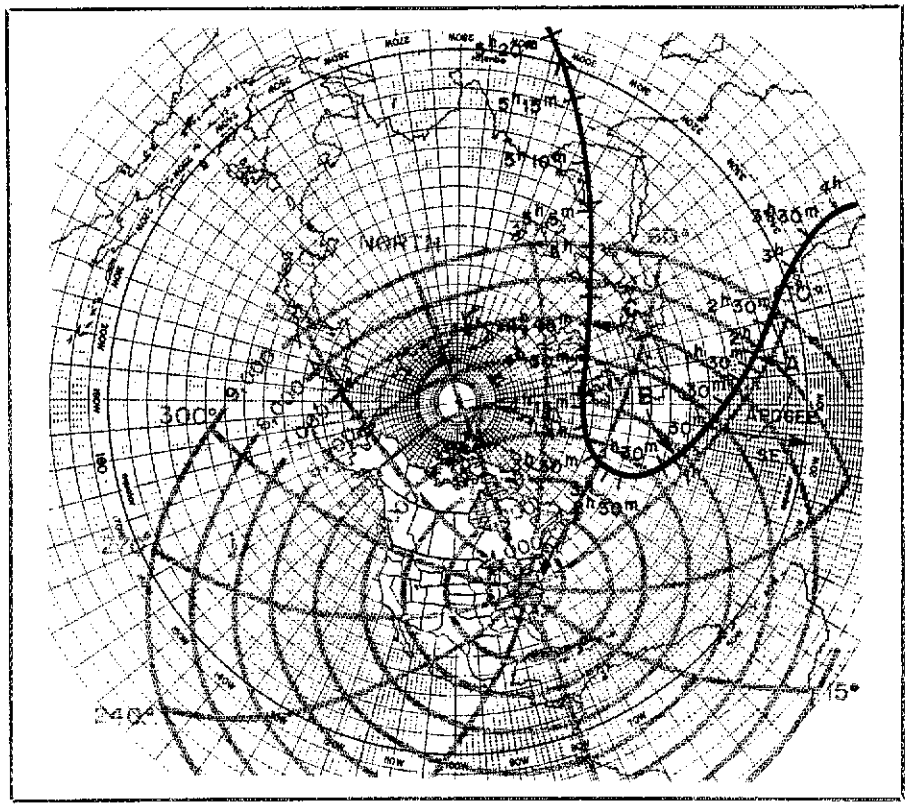


Fig. 1 — A typical Phase III Tracker with range and bearing curves centered on Washington, DC. The ground-track curve is derived for a satellite with a 35,800-km apogee, 1500-km perigee, 57-degree angle of inclination and an argument of perigee of 210 degrees — values that may differ significantly from those of OSCAR 10. The range circles are affixed over a particular QTH; the ground track is drawn on a transparent overlay that rotates about the North Pole.

Satellite Information Available from Three Sources

The status of AMSAT-OSCAR 10 changes from day to day. To determine the current status, monitor the daily W1AW bulletins (W1AW schedule in Aug. *QST*, page 83) and join the AMSAT Nets each week.

Wednesday Morning UTC (Tuesday evening local in the continental U.S. and Canada):

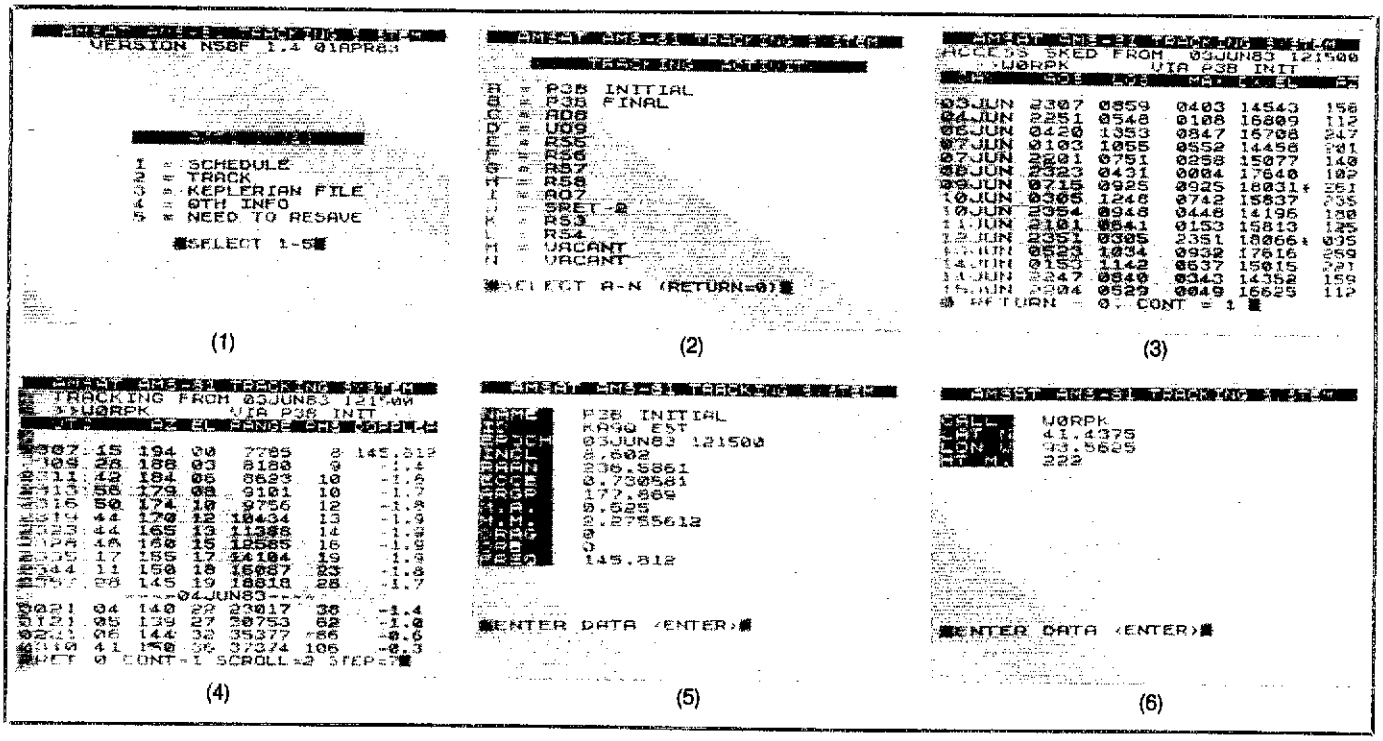
3850 kHz	0100 UTC	East Coast Net
3850 kHz	0200 UTC	Mid States Net
3850 kHz	0300 UTC	West Coast Net

Sunday Afternoon UTC:

21,280 kHz	1800 UTC	International Net
14,280 kHz	1900 UTC	International Net

AMSAT Net and Calling Frequency in the OSCAR-10 passband: 435.043 MHz up /145.960 MHz down (approx.)

AMSAT-OSCAR 10 operating information will also be carried on the H2 (ssb) and L2 (cw/RTTY) Special Service Channels.



(1) (2) (3)

(4) (5) (6)

Fig. 2 — AMSAT AMS-81 Tracking System screen displays (left to right):
(1) MAIN MENU — displayed after successful program load;
(2) SPACECRAFT — choose from among 14 possible satellites;
(3) Menu Selection 1: SCHEDULING — date and time a particular satellite will be within line-of-sight of your QTH (above your horizon); the time, terrestrial distance and azimuth of maximum communications range (or range and elevation for Phase II satellites);
(4) Menu Selection 2: TRACKING — time increments, antenna azimuth/elevation, slant range, orbit phase (0 to 255; 0 = perigee, 127 = apogee) and Doppler shift;
(5) Menu Selection 3: KEPLERIAN FILE — Keplerian elements used by AMSAT to define a particular orbit; numbers to be plugged in are available from many sources;
(6) Menu Selection 4: QTH — latitude, longitude and height (in meters) above sea level of your QTH.
For detailed explanations see the program documentation and the related article in *Orbit* #14.
(AMSAT/Ralph Wallio, WØRPK, photos)

OSCAR 10 ground track will gradually change. Given OSCAR 10's final orbit (inclination angle about 26.2°), the ground-track overlay curve will likely have to be replaced every three weeks or so to maintain tracking accuracy.

You'll find tracking OSCAR 10 with a Phase III Tracker is easy and accurate after a few minutes of practice. The Tracker is a good choice for OSCAR users who want orbital prediction and tracking data, but who do not have access to a microcomputer.

For a more detailed discussion of this method, and for instructions on making your own OSCAR-10 Tracker, see "AMSAT-OSCAR Phase III on the Horizon — Part 3" by Martin R. Davidoff, K2UBC, in May 1980 *QST*.

AMSAT Software Exchange. For those of you with microcomputers, AMSAT offers a variety of programs at *very* reasonable prices. From orbit predictions and azimuth/elevation antenna aiming data to computer-automated antenna aiming, AMSAT's software eliminates your tracking concerns altogether. Most of the common personal computers are supported; programs are available in hardcopy listings ($5), on standard cassette tape ($10) and on 5¼-in. diskette ($15) from AMSAT Software Exchange, Box 27, Washington, DC 20044. Send an s.a.s.e. for their catalog.

OSCAR-10 Mode B Band Plan

The band plan for the AMSAT-OSCAR 10 Mode B transponder appears in the 1983 *Radio Amateur's Handbook*, page 14-4, and in May 1983 *QST*, page 49. Those diagrams were presented using relative frequency offsets from an unspecified passband center frequency. Now that the satellite is in orbit, AMSAT has released the actual reference frequencies; you can locate any particular activity in the passband using the following:

70-Cm Uplink	*(Ground Station Transmit)*
435.100 MHz	Center of passband
435.043 MHz	AMSAT Net and Calling Frequency
2-Meter Downlink	*(Ground Station Receive)*
145.810 MHz	General Beacon
145.987 MHz	Engineering Beacon
145.903 MHz	Center of Passband
145.960 MHz	AMSAT Net and Calling Frequency
145.962 MHz	Approximate SSC H2 voice bulletin frequency
145.835 MHz	Approximate SSC L2 cw/RTTY bulletin frequency

Note: All of the above frequencies should be considered accurate to about ±3 kHz to allow for Doppler shift.

Of particular interest to those of you who do not yet own a personal computer is the AMSAT AMS-81 project. For the cost of a Timex Sinclair 1000 with 16K RAM (less than $90 — not sold by AMSAT) you can calculate and display on a television screen up-to-the-minute satellite schedule, tracking and range information (see Fig. 2). The program on cassette (also compatible with the soon-to-be-released Timex Sinclair 1500 computer) is available with documentation for $15 from AMSAT AMS-81 Tracking System, c/o Bob McCaffrey, KØCY, 3913 29th St., Des Moines, IA 50310. A program listing, with variables, is available for $5.

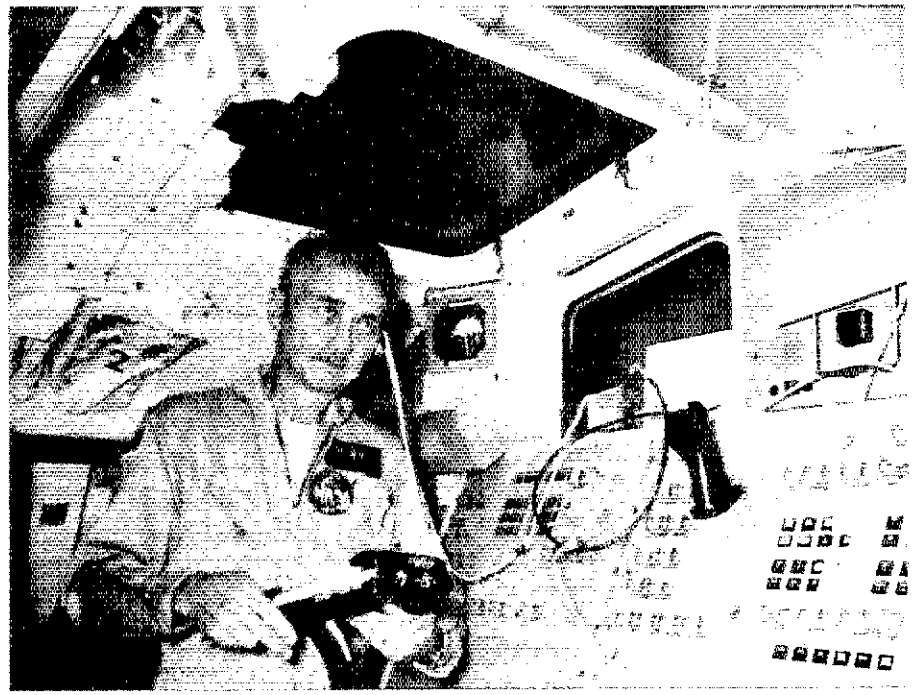
AMSAT's AMS-81 Project Group reports that work is also nearing completion on an AMS-81 add-on interface board (real-time clock, D/A and A/D converters, RS-232 and enclosure) that will enable you to use your TS-1000 computer to aim your OSCAR antennas automatically under computer control! Watch *Orbit* and *QST* for announcements of interface availability. This is one very intelligent way to put an inexpensive microcomputer to work in your shack.

What's the a-track-tion? Tune in to 145.810 MHz and find out for yourself. Your satellite tracking can be as simple or as sophisticated as you like. The end result, however, is to get you in contact with the thousands of other OSCAR 10 users worldwide. With the AMSAT-OSCAR 10 "band" open many hours each day, you'll wonder how you got along without our first Phase III satellite! QST

Owen Garriott: The Man Behind the Mission

By Roy Neal,* K6DUE

When the Space Shuttle Columbia *lifts off from Cape Canaveral, Florida, on October 28, Amateur Radio will be aboard looking to make its own mark on history. It is during that nine-day mission, designated STS-9, that NASA Astronaut Owen Garriott, W5LFL, will become the first radio amateur to operate from space. Using a specially designed 2-meter fm transceiver and antenna, Dr. Garriott will attempt, at certain times during the flight, to make two-way contacts with Amateur Radio operators worldwide (see accompanying sidebar). Recently, NBC Science Editor Roy Neal, K6DUE, had the chance to meet with Dr. Garriott and find out more about the man who will soon usher Amateur Radio into the world of manned space communications.*



Aboard the Space Shuttle Trainer at Johnson Space Center in Houston, Astronaut Owen Garriott, W5LFL, goes through a trial run with the specially designed equipment he will use when he becomes the first radio amateur to operate from an orbiting spacecraft. *(NASA photo)*

In Enid, Oklahoma, the main road is "Owen Garriott Street." Enid is as proud of its astronaut as he is of his home town. Garriott feels strongly that Enid gave him the training and inspiration to become what he is today — and Amateur Radio played a prominent role.

During the early '40s, when Owen was in junior high school, his father came home with the news that the Enid Amateur Radio Club was starting a code class. Father and son began taking lessons. A few months later, the club offered classes in the theory and practice of radio, and the Garriotts kept right on studying. They went to the FCC field office to take the test for an amateur license, and both passed. Owen Garriott, Sr., became W5KWQ; Owen K. Garriott got the call W5LFL.

The future astronaut's first station was a "homebrew" two-tube transmitter — a 6L6 feeding an 807. His antenna was a wire strung from a bedroom window to the garage, and 80-meter cw was his favorite hunting ground.

By the time Owen graduated from high school, his interest in radio had set him on course for college. He earned a BSEE degree from the University of Oklahoma (1953) and an MSEE degree (1957) and a PhD (1960) from Stanford, where he taught electronics, electromagnetic theory and ionospheric physics as an associate professor. Later, he was presented with an honorary doctorate from Phillips University in Enid. Owen has authored or coauthored more than 30 scientific papers and a book, most dealing with ionospheric physics. He remains a consulting professor at Stanford.

As an electronics officer in the U.S. Navy from 1953 to 1956, Owen saw duty at sea on several destroyers. Also, he has logged more than 4300 hours of flying time, including more than 2500 hours in jets.

In June 1965, NASA selected Owen as a scientist-astronaut. As scientist-pilot aboard Skylab 3, he was in orbit from July 28 to September 25, 1973, logging a total of 1427 hours and 9 minutes in space. Owen also spent more than 13 hours in three separate spacewalks outside the orbital workshop. He tried to get permission to carry Amateur Radio equipment on that flight, but NASA management turned down the request.

Since then, Owen and fellow scientist-astronaut Robert Parker have been working as mission specialists, preparing for the Spacelab 1 flight aboard the Space Shuttle Orbiter *Columbia*. When NASA decided to allow him to operate 2-meter equipment on that flight, Owen says it was a dream coming true — the achievement of a project that had been on his mind since he first became an astronaut.

In his 53 years, Owen Garriott has received many honors, among them the Collier Trophy, the Goddard Memorial Trophy and the NASA Distinguished Service Medal — special honors awarded to a man who has pioneered the techniques of space. Now, he is about to pioneer Amateur Radio from the flight deck of a spaceship. And one of his proudest possessions is the ticket that reads "Owen Garriott, W5LFL." QST

"Ham in Space" Update

At periods of time during the nine-day flight of STS-9 (rescheduled for launch on October 28), radio amateurs will have a chance to make a two-way contact with Owen Garriott, W5LFL. During the *odd minutes* of this time period, Owen will scan the earth-to-space frequencies and log those call signs he identifies. During the *even minutes*, he will transmit on 145.550 MHz (the primary space-to-earth frequency, with backups available) and read back those call signs he has entered in his log. Remember to synchronize your station clock with WWV. See Amateur Satellite Program News, this issue, and July and August *QST* for more details.

*c/o NBC News, 3000 West Alameda Ave., Burbank, CA 91523

They Made First Space Operation Possible

A happy coincidence and three men in key spots have made Owen Garriott's upcoming historic shuttle operation a reality.

By Peter R. O'Dell,* KB1N

Hundreds of hams and nonhams in NASA, AMSAT and ARRL have worked for more than 10 years to bring about the first Amateur Radio operation from space, but three individuals (in addition to Astronaut Owen Garriott) have played critical roles. They are Major General James A. Abrahamson, NASA's Associate Administrator for Space Transportation Systems; Harry G. Craft, Jr., Mission Manager for Spacelab (the primary mission of STS-9); and Roy Neal, NBC Science Editor (better known to us as K6DUE).

Gen. Abrahamson, who is "on loan" to NASA from the Air Force, is the man who approved the concept of an Amateur Radio station aboard the Shuttle. A graduate of MIT, he holds a master's degree in aeronautical engineering as well as having trained as an astronaut with the Air Force Manned Orbiting Laboratory.

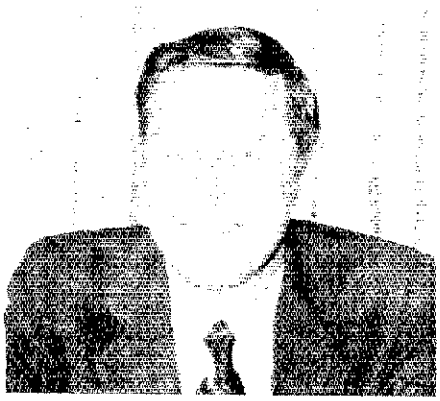
*ARRL Public Information Coordinator

Spacelab Mission Manager Craft is the man in charge of the STS-9 mission once it's in orbit. He is the person who has given Garriott permission to operate aboard STS-9. Craft is responsible for seeing to it that the objectives of the mission are met — sometimes it's hard for us hams to recall that the main purpose of the STS-9 mission is Spacelab, but Craft is the man who will keep the priorities straight. A native of Huntsville, Alabama, Craft holds a BS degree in electrical engineering from Auburn University and a master's degree in administrative science from the University of Alabama. He entered the Army in 1964 and served as a Signal Corps officer in Vietnam and at the Army Missile School, Redstone Arsenal in Huntsville. After leaving the Army, he returned to work at the Marshall Space Flight Center, specializing in scientific payloads and mission management.

During a commercial break on the *Today* show last spring, Roy Neal reminded Gen. Abrahamson of the often-talked-about plans for an Amateur Radio station on a Shuttle mission. That happy coincidence set the stage for one of Amateur Radio's finest hours. Neal is NBC's leading expert on aerospace coverage, and has been present at every one of America's major space flights. Born in Bryn Mawr, Pennsylvania, Roy graduated from the University of Pennsylvania, where he majored in journalism, English and drama. He began his ham radio career as W3GIB in Wayne, Pennsylvania, in 1934. After serving in Europe during WW II, Neal returned to the Philadelphia area, where W3GIB was among the early experimenters with triband antennas and 2-meter relay stations (now called repeaters). In 1952, NBC moved him to California, where he picked up the now-famous call K6DUE.

Hundreds of people are playing a major role in this operation. But all effort would be to naught if it were not for the cooperation of these three men.

Gen. James A. Abrahamson, NASA Shuttle Chief



STS-9 Mission Manager Harry G. Craft

NBC Science Editor Roy Neal, K6DUE

JOTA — Worldwide Scouting Through Amateur Radio

By Leo D. Kluger,* WB2TRN

The Jamboree-on-the-Air! What an event! The combination of Scouting, friendship and Amateur Radio. Rarely is the communications medium put to such good use as it will be on October 15-16, 1983.

This 26th Annual Jamboree is sponsored by the World Scout Bureau in Geneva, Switzerland. Scouts from the youngest Cubs to the oldest adult Scouters meet Amateur Radio firsthand. Anyone interested in Scouting and ham radio is invited to join the fun. If you've ever been a Scout, why not join in? If you've never been a Scout, it's not too late to experience the excitement and camaraderie.

HB9S, the World Scout Bureau Station, and K2BSA, the Boy Scouts of America National Hq. ARC Station (now in W5 land, after the BSA National Headquarters moved to Dallas), will be operating. The New Zealand Jamboree will be represented by ZL2APE, and many other local and national camp-out jamborees coinciding with JOTA will have operating amateur stations at their campsites.

The Scout Jamboree-on-the-Air (JOTA) is an annual activity that enables Scouts and other interested people all over the world to talk to each other via Amateur Radio. The emphasis of JOTA is not a brief five- or 10-minute exchange of RST reports and weather. Rather, it is the cultivation of friendship over the air, the exchange of thoughts, ideas and experiences.

Through JOTA, international friendships are made and old ones renewed, as the Scouting community (called Guides and Rovers in some countries) is made aware of the international range of the movement. JOTA is held for 48 hours every third weekend in October. Those who participate in this year's JOTA can receive a QSL-sized participation certificate or, for your Scout uniform (if you have one), a distinctive pocket insignia.[1]

Last year, the 25th JOTA was held on October 16-17, coinciding with the 75th anniversary of Scouting. Ninety-nine countries participated, from Sri Lanka (4S7) to the Jan Mayen Islands (JW).

George Endres, K2ZLU, assistant Scoutmaster of Troop 4 in Bloomfield, New Jersey, guided these young Scouts as they demonstrated the marvels of Amateur Radio to local Scouts during the "Jamboree-on-the-Air 1982" last October. *(photo courtesy K2ZLU)*

In the U.S., activity was widespread. As reported by Harry Harchar, W2GND, the national JOTA coordinator, more than 8000 participation certificates were distributed throughout the 50 states and to several overseas districts that serve the military services and the diplomatic corps.

The Canadian contingent was well represented, with at least 100 stations participating. VE7BAR was a real combination of Scouting and radio: a portable operation on top of Mount Seymour, 1600 meters above sea level! As advance promotion for JOTA, the special call sign VE6CSJ was used during the 15th World Scout Jamboree held in July 1983 in Calgary, Alberta.

Following each JOTA, the World Scout Bureau puts out a compendium of each participating country's activities. The 25th JOTA provided participants with many stories for future campfires. Among them were

- Aeronautical mobile JOTA by VK3PFH.
- In Bolivar, Argentina, Scouts braved a heavy wind storm and the loss of electricity to make a few but well-earned contacts.
- Cubical quads, specially built for the event by Scouts in Luxembourg, resulted in *big* signals — on the neighbors' television sets!

The first JOTA was held 25 years ago.

Jamboree-on-the-Air at a Glance

When
0001Z Oct. 15-2400Z Oct. 16, 1983

Where
CW — 3.590 7.030 14.070 21.140 28.190 MHz
Voice — 3.940 7.290 14.290 21.360 28.990 MHz
The usual Novice, RTTY and SSTV frequencies

Conceived by Les Mitchell, G3BHK, the event was sponsored by the International Scout Club of London. The first JOTA "information letter" explained some of its purposes: "Apart from individual participation, it is hoped that radio stations will be set up in group and district headquarters and on camp-sites with the cooperation of local Amateur Radio societies and clubs who are being asked to assist if at all possible. . . The event is being expressly organized to further the bonds of international friendship and brotherhood which unite the Scout movement."

From these beginnings have come wonderful results and tremendous participation. More than 400,000 individuals have participated in JOTA during this past quarter century.

Hidden transmitter ("fox") hunts are an extremely popular form of Scouting/Amateur Radio competition in Europe, particularly Scandinavia. The game combines orienteering skills (a true Scout tradition) with the technological expertise needed for optimal operation of a transceiver. The keen competition seen in Amateur Radio contesting in Europe is duplicated in these activities (see Aug. and Nov. 1976 *QST* for a detailed description of European fox hunting).

Another popular event is the Radio Hike. In this activity, one group of Scouts takes to the trail and radios back verbal descriptions of the traveled area to the base camp where, based on these reports, other Scouts map the area. Comparisons with a commercially prepared map give an extra degree of competition among different groups.

With all this exotic and exciting Radio Scout activity, it's unfortunate that we don't have more U.S. stations participating. So what's keeping you from joining in the fun? Call your local Scout District office and ask for information about a nearby troop. Contact the Scoutmaster and invite his troop over for an afternoon of international Scouting on the air!

[1]Certificates are available for an s.a.s.e. (20 cents postage for up to eight cards and 17 cents for each additional eight cards) to Boy Scouts of America, International Division/JOTA Cards, 1325 Walnut Hill La., Irving, TX 75062-1296. Reports and logs are not required, but photos, articles, announcements and narrative reports are solicited for a BSA report to the World Scout Bureau. Send to JOTA Coordinator W2GND, 216 Maxwell Ave., Hightstown, NJ 08520.

*Recruitment Program Manager, ARRL

Teaching Team Receives 1982 Instructor of the Year Award

W8EEY and WD5BOW, a proficient and dedicated husband-and-wife instructor team, have motivated their students uncommonly well.

By Steve Ewald,* WA4CMS

If it's true that some things in life are "more caught than taught," then I can say that, in my Novice class, I "caught" it. Oh, I got the information that I went in there to get, but I came away with more. I came away sold on Amateur Radio and on the people involved. I'm sold on Paul and Vera Woodland, too. They are the best. — Mike Smith, N5FIQ

I am now a General class licensee and can truthfully say that I give much of the credit to Mr. and Mrs. Woodland for their instruction and their encouragement along the way. — Jerry Neel, KA5OIC

Amateur Radio, as a product, looks exciting and full of wonder. But it takes the special talent and concern of instructors like Paul (W8EEY) and Vera (WD5BOW) Woodland to inspire and guide newcomers into Amateur Radio. This excellent husband-and-wife teaching team from Arlington, Texas, was chosen to receive the Herb S. Brier, W9AD, Instructor of the Year Award.

The Lake County (Indiana) Amateur Radio Club, in cooperation with the ARRL Hq. Training Branch, sponsored the fifth annual award that recognizes outstanding Amateur Radio license class instructors. The award is named in memory of Herb S. Brier, W9AD, longtime Novice editor for *CQ*. Brier dedicated his life to helping newcomers, writing articles and setting a fine example through his operating activities. In 1978, the Lake County Amateur Radio Club established the Instructor of the Year Award to honor instructors who have continued in the tradition of W9AD. An impartial panel of licensed amateurs awards this honor to the nominee who in their judgment best exemplifies excellence in volunteer instruction and the spirit of Amateur Radio.

The Arlington Radio Club is grateful to Paul and Vera Woodland for the superior job they have done with their training program. Last year, the club honored them for their leadership and support. Paul became a Silent Key in late December 1982, leaving Vera to continue the Novice classes. "With the great help of many club members, I hope to carry on Paul's work," Vera said.

*Training Assistant, ARRL

For Instructors Vera (WD5BOW) and Paul (W8EEY) Woodland, team teaching provided a winning combination for their students.

Herb S. Brier, W9AD, Award

1978 Sam May, AD7F
1979 Dr. Arthur Smith, N3DR
1980 Dan Hoover, W9VEY
1981 Eddie Miller, W5EXI
1982 Paul Woodland, W8EEY and Vera Woodland, WD5BOW

Paul, originally from Alma, Michigan, got his start as an Amateur Radio instructor 50 years ago when he taught his brother, W8KIQ. Vera, also from Michigan, has a professional teaching background. She was first licensed in 1977, and now holds an Advanced class license. Paul's and Vera's teaching experience, patience and love of Amateur Radio encouraged their students to stick with their newfound interest and join the Amateur Radio fraternity. Each class over the past several years has averaged 20 students, many of whom recommend that their friends join the next session.

The Woodlands stressed radio fundamentals, and found interesting and fun ways to teach the material. "Paul's 52 years of experience as a licensed ham gave him enough anecdotes and practical knowledge to keep everyone wanting to know more," said Tom Anderson, KA5OCO. Vera explained, "Since many people in our classes had no scientific background, we started at the very beginning. For example, when studying capacitors, we talked about how they were made and what they did. After several capacitors were shown to the class, Paul made one using aluminum foil and waxed paper. He charged it up, then discharged it with a bang!"

"They had constant enthusiasm for teaching," said Melody Ripley, KA5OOD. "My class was successful because the Woodlands taught at *our* level — not so hard to be discouraging, but difficult enough to be challenging." And extra code practice was always available. In the true "Elmer" tradition of Amateur Radio teaching, Paul and Vera helped their students become acquainted with all phases of the hobby, even after their licenses arrived. To help promote activity in the amateur community, Vera edits a newsletter for class members, helping new hams keep in touch with each other and the sponsoring club.

The first runner-up this year is George "Ed" King, K8OT, of Birch Run, Michigan. Ed has set an admirable example over the years for his classes sponsored by the Saginaw Valley ARC. The community holds a great appreciation for Ed's leadership in Amateur Radio, Red Cross and civic activities. K8OT has taught with gusto and enthusiasm, and many of his students have responded with new and upgraded licenses.

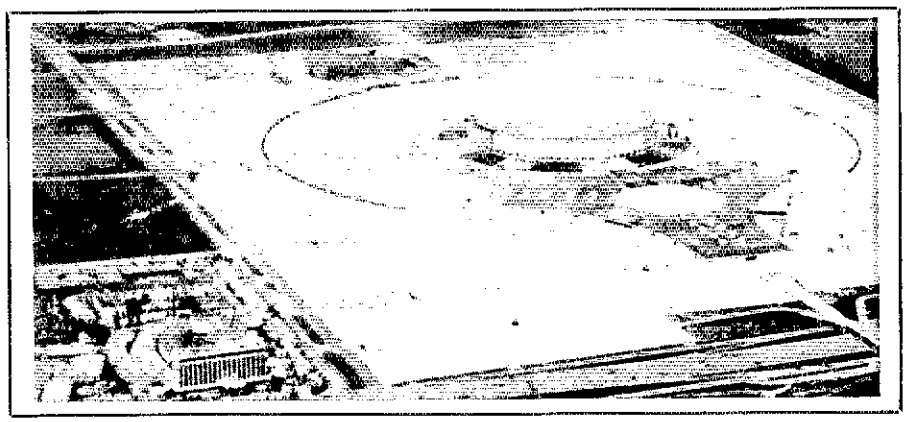
Second runner-up is W. L. "Bill" Baird, W5GXU, of Graham, Texas. Bill has been teaching the Lake Country ARC classes since 1976, with more than 150 new licensees to his credit. Bill encourages students to learn by doing, so construction projects highlight each course.

Honorable mentions go to Ed Holdsworth, N2EH; Peter Kemp, KA1KD; Doyle McGrew, KC5JS; Ronald Rose, KW7W; and Gordon West, WB6NOA. Congratulations to all these instructors who have inspired their students with splendid training programs.

Nominations are open for the 1983 Instructor of the Year Award. Help us salute outstanding Amateur Radio instructors by writing to ARRL Hq. with your nomination.

1983 ARRL National Convention, Houston, Texas

By R. Jan Carman,* K5MA



Focus of the 1983 National Convention is the Astro Village Hotel Complex (lower left), located next to the Astrodome (center) and Astroworld amusement park.

Dallas may be known for its oil barons and San Antonio for the Alamo, but for a weekend this fall Houston will become the Amateur Radio "capital" of the country, as radio amateurs from both sides of the Continental Divide gather for the 1983 ARRL National Convention. As with past ARRL National Conventions, Houston Com-Vention '83 promises to be bustling with Amateur Radio activity. So saddle up the horses, hitch up the wagons and start making plans now to join the fun.

The Convention will be held on October 7-9, 1983, in conjunction with Houston Com-Vention '83. Facilities will be provided by the Astro Village Hotel Complex, adjacent to Astroworld and the Houston Astrodome. Convenient to the Houston freeway system and shopping and entertainment facilities, the Astro Village three-hotel and convention complex provides an ideal setting for North America's premier Amateur Radio gathering.

Sponsored by Houston Ham Conventions, Inc., in cooperation with 19 Houston-area Amateur Radio clubs, the Convention will undoubtedly attract hams from all across North America. HHC is a management committee that has organized and operated the annual Houston Com-Vention since 1979. A non-profit Texas corporation, HHC is a volunteer professional management team composed of members from the local supporting radio clubs. The 1983 committee includes the following members: HHC President and General Chairman Tom Taormina, K5RC; HHC Vice President and Publicity/Publications Chairman Jan Carman, K5MA; HHC Secretary/Treasurer and Finance Chairman Mike Warner, K5JIN; Exhibitor Chairman Bob Burns, W5SJS; Registration Chairman Dennis Motschenbacher, KZ5M; Facilities Chairman Russ Seto, W5TMH; Activities Chairman Richard Shankle, N5KV; and Intra-Convention Activities Chairman George Walker, KQ5W. Many other local amateurs, working on committees reporting to HHC, are also responsible for the successful implementation of the convention.

Something for Everyone

The 1983 ARRL National Convention is packed with activities for everyone. Convention activities and features include 110 commercial exhibits; plenty of free parking convenient to all activities; tours of the Johnson Space Center; Astrodome and Astroworld (discount tickets available at the convention) within walking distance; nearby shopping and restaurants; covered flea market; first SMIRK International VHF Symposium and Tenth Anniversary SMIRK Convention; International QRP Forum sponsored by the Texas QRP Committee; operation of special-events station KM5J, arranged and operated by the Brazosport Amateur Radio Club; first International DX and Contest Symposium sponsored by the Texas DX Society; family activities; FCC exams; maritime mobile group meetings; county hunters activities; transmitter hunt; hospitality suites; huge equipment auction held by the Houston Amateur Radio Club; licensed YL activities arranged by the Gaylarks; Saturday night banquet; QCWA activities; Wouff Hong ceremony; convention and club prizes and "Amateur Radio in Space," the events of space shuttle mission STS-9, including, if the schedule permits, a recording of the first Amateur Radio space-to-ground QSO.

Featured seminar topics and guest speakers in the Saturday and Sunday sessions include Emergency Communication Response Teams, by WD5AAH; Amateur RTTY and the Red Cross, by AK5N; ARES, by K5BY; West Gulf Division ARES meeting, by W5GPO, N5FN, and WA5RVT; erection of the KPRC-TV (Channel 2) 1500-ft tower, by W5ANQ; computers in Amateur Radio, by WØXI; OSCAR, by K4TWJ; Slow-Scan TV, by K4TWJ; holographic video, by K4TWJ; RFI-TVI Cures, by W6BIP; vhf Super Repeater System, by K9EID; electronics in medicine, by N4BOS; rf Interception, by W5PXH; RTTY-HAL Communications; amplifier design, by ETO Electronics; Collapse of the Senior Road 2000-ft Radio Tower, by N5WW; ARRL forum, 3:30 P.M. Saturday; and NTS central staff meeting, by K5RG.

In addition, the program is highlighted this year by three special-interest seminars organized by leading groups in the following subject areas:

First SMIRK International VHF Symposium and the 10th Anniversary SMIRK Convention. This will be the inaugural gathering of its size on an international scale. Six Meter International Radio Klub (SMIRK) members in Texas have arranged an outstanding list of speakers covering major areas in the vhf/uhf spectrum. Featured speakers and topics include Dr. Rick Dorch HC1MD/HC5 — Ecuadorian VHF Activity and Galapagos Islands DXpedition; Jim Treybig, W6JKV — DXpeditions I Have Known; Joe Burke, WA8OGS — Building VHF/UHF Antennas; Marshall Williams, K5MB — Matching VHF/UHF Antennas; Ed Tilton, W1HDQ — Keeping up with the Sun — HF/UHF Propagation, Parts 1 and 2; Bob Heil, K9EID — VHF/UHF Remote-Base Techniques; Jim Stitt, WA8ONQ — Building VHF/UHF Amplifiers; Al Ward, WB5LUA — EME techniques; VHF/UHF Editors Forum — Bill Tynan, W3XO, Kazu Ogasawara, JA1RJU, and others; Graham Baker, VK8GB — 6- and 2-Meter Propagation Down Under; Al Fromm, AL7C — Aurora Propagation; Jim Stitt, WA8ONQ — VHF/UHF Contesting; and SMIRK VHF/UHF breakfast awards on Sunday, with guest speaker Harry Wilson, EI2W, and hosted by SMIRK President Tex Kennedy, N5TX, SMIRK Vice President Roy Albright, N5RA, SMIRK Secretary and Treasurer Ray Clark, K5ZMS, and the SMIRK Board of Directors.

*Publicity Chairman, HHC, P.O. Box 79252, Houston, TX 77279

QRP Forum. The Texas QRP Committee has organized the QRP forum, which represents the first time that a major QRP program will be featured at an ARRL National Convention. Featured speakers include Wes Hayward, W7ZOI well-known receiver authority and coauthor with Doug DeMaw, W1FB, of *Solid State Design for the Radio Amateur;* Adrian Weiss, WØRSP, QRP editor of *CQ*; the Rev. George Dobbs, G3RJV, secretary of F-QRP Club; and George Burt, GM3OXX, avid QRP designer and "homebrew" enthusiast.

In addition to the QRP forum on Saturday, a QRP hospitality suite will be open Friday evening beginning at 5 P.M. The suite will be open to all interested amateurs, and will feature most of the participants in the forum, industry officials, convention organizers and other guests.

A dinner for QRP enthusiasts is planned for 8:30 P.M. Friday, at Angelo's Fisherman's Wharf Restaurant, 10200 S. Main St., in the vicinity of the convention hotel complex. There will be a cash bar prior to dinner. Dinner is $15 per person at the door, and QRPers will have their choice of a seafood platter or a steak with vegetables, salad, rolls and iced tea; gratuity included. Organizers have promised no lengthy speeches! Although advance registrations for dinner are not required, those planning to attend should notify Leo Delaney, KC5EV, by Labor Day, at P.O. Box 383, Spring, TX 77373, or call 713-880-2340. Dinner tickets will be sold at the door.

First International DX and Contest Symposium. Sponsored by the Texas DX Society, this event will be featured on Friday and Saturday. The Saturday discussions are designed to openly present issues of vital interest to the DX and contest fraternity, such as QRO_o (excessive power), list operation and contest ethics. Invited panelists attending will include N6AA, K4BAI, W9RE, KV4FZ, W6AM, W5IO, KH6BZF, N4IN, KØTO, G3FXB, N4MM, W1YL, K4FW, W6OAT, W4KFC and K1ZZ. Other symposium topics and speakers include Heard Island DXpedition, K8CW; Spratly Island DXpedition, K1MM; African DXpedition, Lloyd and Iris Colvin, W6KG-W6QL; Amateur Radio in China, W6AM; Super Stations.

The Texas DX Society continues its convention traditions with the world-famous TDXS hospitality suite, a weekend-long event; the TDXS Friday night Texas Bar-B-Q; and a code-recognition contest. Times and places for these events will be posted at the convention, listed in the program book and made available at the TDXS hospitality suite.

Wait! There's More

The convention banquet and cocktail hour will be held Saturday evening at the convention center. Banquet activities include cocktail hour, dinner, ARRL President's message and guest speaker Ron Stone, dean of Houston television broadcasters. The banquet is $22 per person, and reservations must be made with advance registration.

FCC examinations for Amateur Radio licenses will be held Saturday at the Holiday Inn Astro Village, between 8 A.M. and 3 P.M. Seating is limited and on a first-come, first-served basis.

The 14.313 Net Group, consisting of the Maritime Mobile Net, Intercontinental Net, Coast Guard Net, Pacific Net and Seafarers Net will meet for an organized breakfast on Saturday, October 8, at the Holiday Inn Astro Village, beginning at 8 A.M. Tickets will be available at the door. The group will also have a hospitality suite available Friday and Saturday evenings at the Holiday Inn. For more information contact W5YLP.

An auction of operating equipment will be held Friday night at the convention complex by the Houston Amateur Radio Club. This is the ARRL National Convention version of HARC's very successful Friday night selling spree. This event usually packs the room, so plan to be there early. The auction gets underway at 7:15 P.M., immediately following the opening ceremonies at 7 P.M.

The JSC Amateur Radio Club has arranged a special tour of the Johnson Space Center for Com-Vention '83 attendees. At 9 A.M. Sunday morning, buses leave the convention hotel for a most unforgettable five-hour guided tour of JSC, including the Space Museum, exhibits, and a tour of the simulators and shuttle Mission Control. In Mission Control, an astronaut will meet with you for an interesting view of the space program and a question-and-answer session. The tour will return to the hotel at 2 P.M. Special arrangements have been made with the hotel to allow late checkout. A must for the entire family, the cost is $8 per person for the bus and tourguide. Advance registration is required.

The Lake Houston Repeater Association will host the flea market, this year bigger and better than ever. Spaces will be available under cover, including one table and chair. In addition, roped-off parking spaces will be available for "tailgating." Hours are Saturday from 7 A.M. to 5 P.M., and Sunday, from 7 A.M. to 3 P.M. There is a $14 charge for each undercover space, or $8 for each uncovered parking space. Undercover space includes one table and chair. Charges cover both days. First-come, first-served both days.

The Brazos Valley Amateur Radio Club will conduct an exciting transmitter hunt on Sunday morning. Details and rules will appear in the convention program book. Major points are: Frequency is 146.52 MHz; each team must furnish its own equipment, transportation and maps; winner judged on elapsed time and total mileage; judges' decisions are final.

For those driving to Houston who require directions and parking information, a talk-in station has been established at the Convention. Set up and manned by the Houston Echo Society, talk-in station frequencies are 69/09, 146.52 and 222.66/224.26 MHz.

Hospitality suites will be open at various times during the weekend, including Friday and Saturday evenings. Suite room numbers and operating hours will be posted in the hotel lobby and in the registration area.

Houston-area Amateur Radio clubs and organizations participating in Houston Com-Vention '83 are Alvin Community College ARC; Brazosport ARC; Brazos Valley ARC; Cypress Repeater Club; Exxon ARS, Buffalo Chapter; Gaylarks; Houston ARC; Houston Echo Society; Houston Shot Chapter, 10-10 International Net, Inc.; Houston Telephone Pioneers ARC; Intermedics ARC; JSC ARC; KATY ARC; Lake Houston Repeater Association; Matagorda County ARC; Pasadena Radio Relay League; Texas DX Society; Tidelands ARS; and University of Houston ARC. Also recognized for their contributions to Com-Vention '83 are regional and international organizations Texas QRP Committee, FOC, QCWA and SMIRK.

Convention registration can be accomplished in two ways: advance registration by mail, and registration at the door. We encourage you to take advantage of advance registration by mail; it's less expensive and you receive at the Convention a commemorative coffee cup free of charge. Advance registration forms may be requested by writing to Houston Com-Vention '83, P.O. Box 79252, Houston, TX 77279. Advance registration is $6, and applications will be accepted through September 27, 1983. Advance-registration packages must be picked up at the registration booth.

The Convention is being held at the Astro Village Hotel complex. The headquarters hotel is the Astro Village Hotel, with the other on-site facilities being the Astro Village Lodge and the Holiday Inn Astro Village. Room rates at the Astro Village Hotel are single, $50; double, $60; triple and quad, $62.

These are special convention rates. *Com-Vention '83* or the *ARRL National Convention* must be mentioned when making reservations to ensure the special rate. Reservations must be made on or before September 27, 1983, and may be made by mail; a hotel reservation form is enclosed with the advance registration form. You can also make hotel reservations by calling these toll-free numbers: 1-800-231-2360 (from locations outside Texas) and 1-800-392-4398 (from locations within Texas).

Free parking space is available in the hotel complex, and unlimited free parking is available in the Astrodome parking lot immediately across the street from the hotels.

See you there!

New Novice Test Procedures

FCC Issues Report and Order on PR Docket 82-727

- Tests to be graded in the field
- Question pool overhauled and made public
- Delays in test processing reduced
- Possible new restrictions for examiners

By Curt Hoisopple,* K9CH and Jonathan Towle,** WB1DNL

New procedures for giving Novice class Amateur Radio examinations were adopted by the FCC on June 29, 1983. Requests for Novice written examinations under the present system will be honored by the FCC's Licensing Division at Gettysburg, Pennsylvania, until August 30, 1983. Effective August 31, examiners for the Novice class license must follow the new procedures. Here's a report on how this action will affect Novice applicants and examiners.

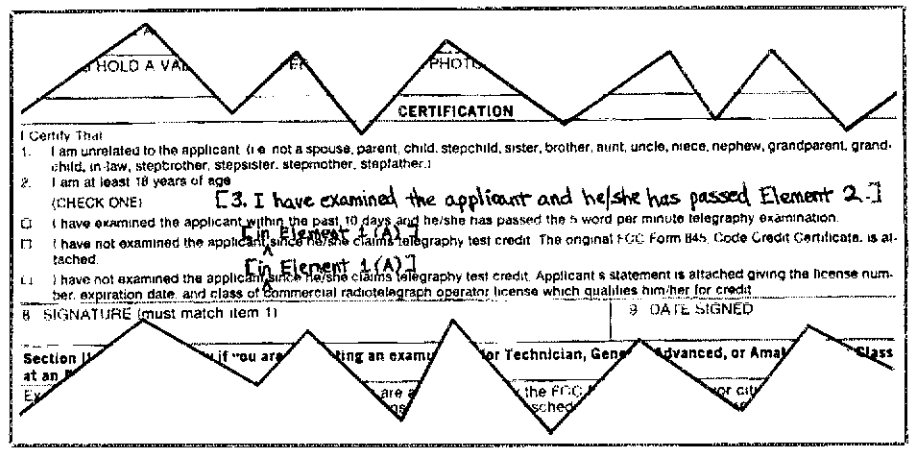


Fig. 1 — In the Certification section on the back of the current FCC Form 610, the instructor *must write in* three additions. They are shown in brackets.

What's changed?

Under the old program, an applicant for a Novice class license was required to pass a code test administered by a volunteer Novice examiner. The examiner then sent the applicant's completed FCC Form 610 to Gettysburg and requested a Novice written test. After that exam was mailed out, administered and returned to Gettysburg, the applicant had to wait several weeks before learning the results. This was a tedious process for the applicant and examiner, and it caused substantial paperwork for the FCC Licensing Division staff.

Under the new program, the tests will no longer be issued one at a time by request to Gettysburg. All of the questions for the Novice examination have been released by the FCC to the public through PR Bulletin 1035-A, which is available free of charge from any FCC Field Office. The questions are also reproduced at the end of this article.

Why publish the question pool?

A person taking the Novice test must answer 20 questions about Amateur Radio rules, theory and practice. These are drawn from a pool of 200 questions. The questions were written as a combined effort by many licensed radio amateurs, and were then edited by the FCC. All the questions are based on the FCC Element 2 Novice study guide. Having the chance to see the entire question pool *word for word* gives the applicant a clear idea of what knowledge the FCC considers necessary to qualify for a Novice class Amateur Radio license. Seeing the questions in advance also removes the problem of "test shock," which sometimes has kept otherwise-qualified persons from passing.

Publishing the question pool certainly doesn't "give away the test." The Federal Aviation Administration (FAA) has used this procedure for testing pilots, and has had excellent results. A 200-item pool of questions is sufficiently large; *memorization is no shortcut.* To quote the Commission: *"It is not likely that anyone will memorize such a formidable array of questions. However, if that feat is attempted and mastered, we do not foresee that it would compromise the examination. We are convinced that, especially at the Novice operator level, in the memorization process a sufficient competency in radio theory and amateur rules would unavoidably and automatically occur."* Public disclosure of the questions also is a form of test-item quality control. The FCC has solicited input from the radio amateur community to ensure that the best questions are being used.

You may submit new test questions at any time. Write to any FCC Field Office for *PR Bulletin 1035, April 1983,* which describes how test questions may be submitted for consideration.

How is the test to be given?

The code test will be administered as before; the new changes affect only the written portion of the test. The question pool has been subdivided by the FCC into 20 blocks of 10 questions each. An applicant must answer one question, selected by the examiner, from each of the 20 blocks. Fifteen or more correct answers are needed to pass the test.

Upon passing both the code and written tests administered by the Novice examiner, the applicant fills out an FCC Form 610. Then, the examiner completes the Certification section on the back, indicating that both the code and written elements were passed. Until the Form 610 is revised, the examiner *must write in* three additions to

*ARRL Volunteer Examiner Program Manager
**ARRL Training Program Manager

the Certification section: the sentence "*3. I have examined the applicant and he/she has passed Element 2" and the words "in Element 1(A)"* in two places (see Fig. 1).

The completed application is sent to the FCC in Gettysburg. Since the FCC Licensing staff will not need to handle test papers or grade tests, the process of issuing a license should proceed much more quickly.

What happened to the multiple-choice answers?

The FCC has issued only the questions in PR Bulletin 1035-A, including this note of explanation: "The examiners may use their discretion as to the form of the examination. It may be a single-answer test, a multiple choice or essay type." This opens several possibilities for the examiner. The test may be conducted entirely on an oral "interview" basis, with the examiner asking the questions and the applicant responding. Alternatively, the test may be conducted in written form with fill-in-the-blank or short essay questions.

Novice examiners are also free to construct true/false and multiple-choice versions of the test in the field. This approach may be preferred by some people, particularly for large test sessions. For those of you who find the new Novice examination process a bit confusing, the ARRL will be issuing a *multiple choice* version of the question pool along with complete instructions to examiners and applicants. The League's version of the FCC Novice exam is available from ARRL Headquarters; ask for the "ARRL Novice Test." Again, there is no charge for the test, but an s.a.s.e. is welcome.

Who may give the Novice test?

Commission Rule §97.28(b)(2) lists the qualifications for persons who administer a Novice class test. *Each Novice examiner must*

1) hold a current General, Advanced or Extra Class operator license issued by the Commission;

2) be at least 18 years of age;

3) not be related to the applicant;

4) not be in an employer-employee or employee-employee relationship with the applicant; and

5) not own a significant interest in or be an employee of any company or other entity engaged in the manufacture or distribution of equipment used in connection with Amateur Radio transmissions, or in the preparation or distribution of any publication used in preparing for obtaining amateur station operator licenses.

We should note here that parts (4) and (5) of this rule have raised some controversy because of the potential for very broad interpretation. ARRL has petitioned for reconsideration of the "employee-employee relationship" ban as overly restrictive and unnecessary.

Introducing the Question Pool

All 200 questions as issued by the FCC are provided here. We have added page references with each question to assist you in studying for the test. A booklet incorporating all of these changes will be included with the ARRL Novice study guide *Tune in the World with Ham Radio*, and subsequent editions of that book will include the new material.

A note about the question numbering system: Each question is based on the FCC Syllabus (see the Novice chapter of the ARRL *License Manual*, the new *Tune in the World* materials and the ARRL's *FCC Rule Book*). Each topic on the syllabus is numbered uniquely. For example, the first question is numbered 2A-1.1. The "2" stands for "Element 2 (Novice)" the "A" is for the subelement on "Rules and Regulations;" the first "1" indicates the topic "Define: amateur radio service"; and the second "1" is for that particular question.

The FCC has given the Amateur Radio Service an opportunity to remove needless delays to the Novice class licensing process. In their discussion of this proceeding, the Commissioners wrote: "...we affirm our belief in the fundamental integrity of amateur licensees. They are, as a group, dedicated to the ideals, principles and goals of amateur radio."

This is our opportunity — as licensed amateurs — to smooth the path for would-be Novice radio amateurs. If you wish to become a registered instructor, or if you have any questions about the new Novice examination program, write to the ARRL, 225 Main St., Newington, CT 06111.

QUESTIONS FOR THE ELEMENT 2 AMATEUR RADIO OPERATOR LICENSE EXAMINATION

Note: In subelement 2A, references in brackets refer to Part 97 of the FCC Rules and Regulations, available in the ARRL's *License Manual* and *FCC Rule Book*. Page numbers alone refer to *Tune in the World with Ham Radio*. Other sources cited are *The Radio Amateur's Handbook* (HBK), the *ARRL Antenna Book* (ANT) and *Radio Frequency Interference* (RFI), all published by ARRL.

SUBELEMENT 2A — Rules and Regulations (7 questions)

One (1) question must be from the following:

2A-1.1 What is the *Amateur Radio Service*? [97.3(a)]
2A-2.1 Who is an *amateur radio operator*? [97.3(c)]
2A-3.1 What is an *amateur radio station*? [97.3(e)]
2A-4.1 What is *amateur radiocommunications*? [97.3(b)]
2A-5.1 What is that portion of an amateur radio license that conveys operator privileges called? [97.3(d)]
2A-6.1 What authority is derived from an amateur radio station license? [97.3(d)]
2A-7.1 What is a *control operator*? [97.3(o)]
2A-7.2 What is the term used in Part 97 of the FCC Rules to define the amateur radio operator designated by the licensee of an amateur radio station to also be responsible for the emissions from that station? [97.3(o)]
2A-8.1 What is *third-party traffic*? [97.3(v)]
2A-8.2 Who is a *third-party* in amateur radio communications? [97.3(v)]

One (1) question must be from the following:

2A-9.1 What are the Novice class operator transmitting frequency privileges in the 80 meter band? [97.7(c)]
2A-9.2 What are the Novice class operator transmitting frequency privileges in the 40 meter band? [97.7(c)]
2A-9.3 What are the Novice class operator transmitting frequency privileges in the 15 meter band? [97.7(c)]
2A-9.4 What are the Novice class operator transmitting frequency privileges in the 10 meter band? [97.7(c)]
2A-9.5 What, if any, transmitting frequency privileges are authorized to the Novice class operator beside those in the 80, 40, 15 and 10 meter bands? [97.7(c)]
2A-9.6 In what frequency bands is a Novice class operator authorized to be the control operator of an amateur radio station? [97.7(c)]
2A-9.7 What does the term *frequency band* mean? [97.7(c)]
2A-9.8 What does the term *frequency privilege* mean? [97.7(c)]
2A-9.9 In what frequency band is the Novice class operator transmitting frequency privileges 3700-3750 kHz? [97.7(c)]
2A-9.10 In what frequency band is the Novice class operator transmitting frequency privileges 7100-7150 kHz? [97.7(c)]

One (1) question must be from the following:

2A-10.1 What is the only emission authorized for use by Novice class operators? [97.7(e)]
2A-10.2 What does the term *A1 emission* mean? [97.7(e)]
2A-10.3 What is the symbol for a transmission of telegraphy by on-off keying? [97.7(e)]
2A-10.4 What does the term *CW* mean? (97.7(e)]
2A-10.5 What, if any, emission privileges are authorized to the Novice class beside A1? [97.7(e)]
2A-10.6 What is the only telegraphy code a Novice class operator may use? [97.7(e)]
2A-10.7 Which, if any, telegraphy codes may a Novice class operator use beside the international Morse code? [97.7(e)]
2A-10.8 What does the term *emission* mean? [97.7(e)]
2A-10.9 What is the term for a transmission from a radio station, as used in the FCC Rules? [97.7(e)]
2A-10.10 What does the term *emission privileges* mean? [97.7(e)]

One (1) question must be from the following:

2A-11.1 Under what circumstances, if any, may the control operator cause unidentified radiocommunications or signals to be transmitted from an amateur radio station? [97.123]
2A-11.2 What is the meaning of the term *unidentified radiocommunications or signals*? [97.123]
2A-11.3 What is the term for transmissions from an amateur radio station without the required station identification? [97.123]
2A-12.1 Under what circumstances, if any, may the control operator of an amateur radio station willfully or maliciously interfere

with or cause interference to a radiocommunication or signal? [97.125]

2A-12.2 What is the meaning of the term *maliciously interfere*? [97.125]

2A-12.3 What is the term for transmissions from an amateur radio station which are intended by the control operator to disrupt other communications in progress? [97.125]

2A-13.1 Under what circumstances, if any, may the control operator cause *false or deceptive signals* or communications to be transmitted? [97.125]

2A-13.2 What is the term for a transmission from an amateur radio station of the word *MAYDAY* when no actual emergency has occurred? [97.121]

2A-14.1 Under what circumstances, if any, may an amateur radio station be used to transmit messages for hire? [97.112(a)]

2A-14.2 Under what circumstances, if any, may the control operator be paid to transmit messages from an amateur radio station? [97.112(a)]

One (1) question must be from the following:

2A-15.1 What is one of the five principles which express the fundamental purpose for which the Rules for the Amateur Radio Service are designed? [97.1(a)]

2A-20.1 Call signs of amateur radio stations licensed to Novice class operators are from which call sign group?

2A-20.2 What is the format of a group D call sign? [113]

2A-20.3 What are the call sign prefixes for amateur radio stations licensed by the FCC? [112-113]

2A-20.4 In what call sign district will your amateur radio call sign be assigned? [113]

2A-21.1 With which amateur radio stations may an FCC-licensed amateur radio station communicate? [97.89(a)(1)]

2A-21.2 With which non-amateur radio stations may an FCC-licensed amateur radio station communicate? [97.89(a)(1)]

2A-21.3 Under what circumstances may an FCC-licensed amateur radio station communicate with another amateur radio station in a foreign country? [97.89(a)(1)]

2A-21.4 Under what circumstances (other than RACES operation) may an FCC-licensed amateur radio station communicate with a non-amateur radio station? [97.89(a)(1)]

2A-21.5 What is the term used in FCC Rules to describe transmitting signals to receiving apparatus while in beacon or radio control operation? [97.89(a)(1)]

(2A-22 Logging-eliminated by rule change)

One (1) question must be from the following:

2A-23.1 How often must an amateur radio station be identified? [97.84(a)]

2A-23.2 How do I identify my amateur radio station communications? [97.84(a)]

2A-23.3 Do the FCC Rules require an amateur radio station to identify at the beginning of a transmission? [97.84(a)]

2A-23.4 How often must an amateur radio station be identified? [97.84(a)]

2A-23.5 What is the FCC Rule for amateur radio station identification? [97.84(a)]

2A-23.6 What is the least number of times an amateur radio station must transmit its station identification during a 15 minute communication? [97.84(a)]

2A-23.7 What is the least number of times an amateur radio station must transmit its station identification during a 25 minute communication? [97.84(a)]

2A-23.8 What is the least number of times an amateur radio station must transmit its station identification during a 35 minute communication? [97.84(a)]

2A-23.9 What is the longest period of time during a communication that an amateur radio station does not need to transmit its station identification? [97.84(a)]

2A-23.10 What is the least number of times an amateur radio station must identify itself during a 5 minute communication? [97.84(a)]

One (1) question must be from the following:

2A-24.1 What amount of transmitter power may an amateur radio station use? [97.67(b),(d)]

2A-24.2 What is the maximum transmitter power input permitted to be used at an amateur radio station transmitting on frequencies available to the Novice class operator? [97.67(b),(d)]

2A-24.3 In what circuit stage in an amateur radio station transmitter is power input determined? [97.67(b),(d)]

2A-24.4 Which individual circuit power inputs must be included in determining the total power input to the final amplifying radio frequency stage to the antenna? [97.67(b),(d)]

2A-25.1 Should an amateur radio operator receive an Official Notice of Violation from the FCC, how promptly should he/she respond? [97.137]

2A-25.2 Should an amateur radio operator receive an Official Notice of Violation from the FCC, to whom does he/she respond? [97.137]

2A-25.3 Should an amateur radio operator receive an Official Notice of Violation from the FCC relating to some violation that may be due to the physical or electrical characteristic of the transmitting apparatus, what information must be included in the response? [97.137]

2A-26.1 Whom does the FCC hold responsible for the proper operation of an amateur radio station? [97.79(a),(b)]

2A-26.2 When must an amateur radio station have a control operator? [97.79(a),(b)]

2A-26.3 Who may be the control operator of an amateur radio station? [97.79(a),(b)]

SUBELEMENT 2B — Operating Procedures (1 question)

One (1) question must be from the following:

2B-1.1 What does the *S* in the RST signal report mean? [105]

2B-1.2 What does the *R* in the RST signal report mean? [105]

2B-1.3 What does the *T* in the RST signal report mean? [105]

2B-2.1 At what telegraphy speed should a *CQ* message be transmitted? [105]

2B-3.1 What is the meaning of the term *zero beat*? [HBK 8-7]

2B-3.2 Why should amateur radio stations in communication with each other zero beat? [HBK 8-7]

2B-4.1 How can on-the-air transmitter tune-up be kept as short as possible? [106]

2B-5.1 What is the difference between the telegraphy abbreviations *CQ* and *QRZ*? [104, 103]

2B-5.2 What is the difference between the telegraphy abbreviations *K* and $\overline{SK}$? [106]

2B-5.3 What is the meaning of the telegraphy abbreviations *DE, R,* $\overline{AR}$*, 73, QRS, QTH, QSL, QRM* and *QRN*? [103, 104, 106]

SUBELEMENT 2C — Radio Wave Propagation (1 question)

One (1) question must be from the following:

2C-1.1 What type of propagation uses radio signals refracted back to earth by the ionosphere? [109-110]

2C-1.2 What is the meaning of the term *skip propagation*? [110]

2C-1.3 What is the area of weak signals between the ranges of ground waves and the first-hop called? (ANT 1-8]

2C-1.4 What is the meaning of the term *skip zone*? (ANT 1-8]

2C-1.5 What does the term *skip* mean? [110]

2C-1.6 What type of radio wave propagation makes it possible for amateur radio stations to communicate long distances? [110]

2C-2.1 What type of propagation involves radio signals that travel along the ground? [110]

2C-2.2 What is the meaning of the term *ground wave propagation*? [110]

2C-2.3 When two amateur radio stations located a few miles apart are separated by a low hill blocking their line-of-sight path, daytime communications between them on 3.725 MHz is probably via what kind of propagation? [110]

2C-2.4 When compared to skip propagation, what is the usual effective range of ground wave propagation? [110]

SUBELEMENT 2D — Amateur Radio Practice (3 questions)

One (1) question must be from the following:

2D-1.1 How can an amateur radio station can be protected against being operated by unauthorized persons? [HBK 8-7]

2D-2.1 Why should all antenna and rotor cables be grounded when an amateur radio station is not in use? [109, 74]

2D-2.2 How can an antenna system be protected from damage due to a nearby lightning strike? [109]

2D-2.3 How can amateur radio station equipment be protected from damage due to lightning striking the electrical wiring in the building? [109]

2D-3.1 For proper protection from lightning strikes, what pieces of equipment should be grounded in an amateur radio station? [74]

2D-3.2 What is a convenient indoor grounding point for an amateur radio station? [74]

2D-3.3 To protect against electrical shock hazards, the chassis of each equipment in an amateur radio station should be connected to what? [74]

2D-4.1 When working on an antenna mounted on a tower, a person doing the climbing should always wear what type of safety equipment? [108]

2D-4.2 For safety purposes, how high should all portions of a horizontal wire antenna be located? [89-90]

2D-4.3 What type of safety equipment should a person on the ground wear while assisting another person on an antenna tower? [ANT 9-21]

One (1) question must be from the following:

2D-5.1 What is a likely indication that radio frequency interference to a receiver is caused by front-end overload? [67, 66]

2D-5.2 When radio frequency interference occurs to a receiver regardless of frequency, while an amateur radio station is transmitting, what is likely the problem? [67,66]

2D-5.3 What type of filter should be installed on a television receiver's tuner input as the first step in preventing overload from an amateur radio station's signal? [67]

2D-5.4 What is meant by *receiver overload*? [66]

2D-6.1 What is meant by *harmonic radiation*? [66]

2D-6.2 Why is harmonic radiation by an amateur radio station undesirable? [66]

2D-6.3 A multi-band antenna connected to an improperly tuned transmitter may radiate what type of interference? [92]

2D-6.4 What is the purpose of properly shielding a transmitter? [RFI 7-10, 7-11]

2D-6.5 When interference is observed on only one or two channels of a TV receiver while an amateur radio station is transmitting, what is the likely problem? [67]

2D-6.6 What type of filter should be installed on an amateur radio transmitter as the first step in reducing harmonic radiation? [67]

One (1) question must be from the following:

2D-7.1 Why is it important to have the impedance of a transmitter

final-amplifier circuit match the impedance of the antenna or feedline? [91, 92]

2D-7.2 What is the term for the measurement of the impedance match between a transmitter final-amplifier circuit and the antenna or feedline? [91, 92]

2D-7.3 What station accessory is used to measure RF power being reflected back down the feedline from the antenna to the transmitter? [91]

2D-7.4 What station accessory is often used to measure voltage standing wave ratio? [91]

2D-7.5 Where should an SWR bridge be connected to indicate the impedance match of a transmitter and an antenna? [91-93]

2D-7.6 Coaxial feedlines are designed to be operated with what kind of standing wave ratio? [92]

2D-7.7 If the SWR bridge reading is higher at 3700 kHz than at 3750 kHz, what does this indicate about the antenna? [92]

2D-7.8 If the SWR bridge reading is lower at 3700 kHz than at 3750 kHz, what does this indicate about the antenna? [92]

2D-8.1 What kind of SWR meter reading may indicate poor electrical contact between parts of an antenna system? [92]

2D-8.2 High SWR readings measured from a half-wave dipole antenna being fed by coaxial cable can be lowered by doing what to the antenna? [92]

SUBELEMENT 2E — Electrical Principles (3 questions)

One (1) question must be from the following:

2E-1.1 Electrons will flow in a copper wire when its two ends are connected to the poles of what kind of source? [44]

2E-1.2 The pressure in a water pipe is comparable to what force in an electrical circuit? [44]

2E-2.1 What are the two polarities of a voltage? [44]

2E-2.2 What type of current changes direction over and over again in a cyclical manner? [51]

2E-2.3 What is a type of electrical current called that does not periodically reverse direction? [51]

2E-3.1 List at least four good electrical insulating materials. [45]

2E-3.2 List at least three good electrical conductors. [45]

2E-3.3 What is the term for the lowest voltage which will cause a current in an insulator? [45]

2E-4.1 What is the term for a failure in an electrical circuit that causes excessively high current? [48]

2E-4.2 What is the term for an electrical circuit in which there can be no current flow? [48]

One (1) question must be from the following:

2E-5.1 When a voltage is applied to a circuit causing an electrical current to flow, *what* is consumed? [49]

2E-6.1 What is the approximate length, in meters, of a radio wave having a frequency of 3.725 MHz? [63]

2E-6.2 What is the relationship between frequency and wavelength? [62]

2E-6.3 What is the approximate length, in meters, of a radio wave having a frequency of 21.120 MHz? [63]

2E-7.1 Which are higher: radio frequencies or audio frequencies? [60-61]

2E-7.2 Is 3,500,000 Hertz a radio frequency or an audio frequency? [60-61]

2E-7.3 Radio frequencies are considered to be those above what frequency? [61]

2E-8.1 Are audio frequencies higher or lower than radio frequencies? [60-61]

2E-8.2 Audio frequencies are considered to be those below what frequency? [61]

2E-8.3 What frequency range is 2500 Hertz: audio or radio? [60-61]

One (1) question must be from the following:

2E-9.1 What is the unit of electromotive force? [43-44]

2E-10.1 What is the unit of electrical current? [44]

2E-11.1 What is the unit of electrical power? [48]

2E-12.1 What is *Hertz* the unit measurement of? [51]

2E-12.2 What is another popular term for *Hertz*? [51]

2E-13.1 A frequency of 40,000 Hertz is equal to how many kilohertz? [44]

2E-13.2 A current of 20 millionths of an ampere is equal to how many microamperes? [44]

2E-13.3 A current of 2000 milliamperes is equivalent to how many amperes? [44]

2E-13.4 What do the prefixes mega and centi mean? [44]

2E-13.5 What do the prefixes micro and pico mean? [44]

SUBELEMENT 2F — Circuit Components (1 question)

One (1) question must be from the following:

2F-1.1 What is the general relationship between the thickness of a quartz crystal and its fundamental operating frequency? [58]

2F-1.2 What is the schematic symbol for a quartz crystal? [58]

2F-1.3 What chief advantage does a crystal controlled transmitter have over one controlled by a variable frequency oscillator? [58]

2F-2.1 What two internal components of a D'Arsonval meter interact to cause the indicating needle to move when current flows through the meter? [51]

2F-2.2 What does a voltmeter measure? [51]

2F-3.1 Draw the schematic diagram of a triode vacuum tube and label the elements. [54]

2F-3.2 Draw the schematic symbol for a tetrode vacuum tube and label the elements. [54]

2F-3.3 What was one of the earliest uses of a two-element vacuum tube? [53-54]

2F-4.1 What device should be included in electronic equipment to protect it from damage resulting from a short circuit? [48]

2F-4.2 When an excessive amount of current flows through a fuse, what happens to the fuse? The circuit? The current? [48]

SUBELEMENT 2G — Practical Circuits (1 question)

One (1) question must be from the following:

2G-1.1 Draw a block diagram for a simple crystal controlled transmitter. [60]

2G-1.2 Draw a block diagram for a simple transmitter having a variable frequency oscillator. [60]

2G-2.1 Draw a block diagram for a simple superheterodyne receiver capable of receiving A1 telegraphy radio signals. [70]

2G-3.1 Draw a block diagram for a portion of an amateur radio station including a transmitter, an antenna feedline, an antenna and an SWR bridge. [93]

2G-3.2 Draw a block diagram for a portion of an amateur radio station including a transmitter, a receiver, a T-R switch, an antenna feedline and an antenna. [95-97]

2G-3.3 Draw a block diagram for a portion of an amateur radio station including a transmitter, an antenna tuner, an antenna feedline and an antenna. [95]

2G-3.4 Draw a block diagram for a portion of an amateur radio station including a transmitter, telegraphy key, antenna feedline and antenna. [60, 93-95]

2G-3.5 Draw a block diagram for a portion of an amateur radio station showing how two different antennas and a dummy antenna can be switched to the same transmitter. [97]

2G-3.6 Draw a block diagram for a portion of an amateur radio station including a transmitter, an SWR meter, an antenna tuner, an antenna feedline and an antenna. [93]

2G-3.7 Draw a block diagram for a typical Novice station including a transmitter, a receiver, an antenna feedline, an antenna, a T-R switch, grounding provisions and a telegraph key [60, 93-95]

SUBELEMENT 2H — Signals and Emissions (1 question)

One (1) question must be from the following:

2H-1.1 An interrupted carrier wave is considered to be which type of emission? [59]

2H-2.1 What does the term *backwave* mean? [65]

2H-2.2 What is a possible cause of backwave? [65]

2H-3.1 What does the term *key clicks* mean? [65]

2H-3.2 How can key clicks be eliminated? [65]

2H-4.1 What does the term *chirp* mean? [65]

2H-4.2 What can be done to a telegraph transmitter's power supply to avoid chirp? [65]

2H-5.1 What is a common cause of superimposed hum? [65]

2H-6.1 A signal received on 28.160 MHz is the 4th harmonic of what fundamental frequency? [66]

2H-7.1 Spurious emissions from a transmitter may be caused by what problem in the power amplifier stage? [66]

SUBELEMENT 2I — Antennas and Feedlines (2 questions)

One (1) question must be from the following:

2I-1.1 What is the approximate total length in feet of a half-wave dipole antenna cut for 3725 kHz? [63, 87]

2I-1.2 What is the approximate total length in feet of a half-wave dipole antenna cut for 7125 kHz? [63]

2I-1.3 What is the approximate total length in feet of a half-wave dipole antenna cut for 21,125 kHz? [63]

2I-1.4 What is the approximate total length in feet of a half-wave dipole antenna cut for 28,150 kHz? [63]

2I-1.5 How is the approximate total length in feet of a half-wave dipole antenna calculated? [63]

2I-2.1 What is the approximate total length in feet of a quarter-wave vertical antenna adjusted to resonate at 3725 kHz? [63, 93]

2I-2.2 What is the approximate total length in feet of a quarter wave vertical antenna adjusted to resonate at 7125 kHz? [63, 93]

2I-2.3 What is the approximate total length in feet of a quarter-wave vertical antenna adjusted to resonate at 21,125 kHz? [63, 93]

2I-2.4 What is the approximate total length in feet of a quarter-wave vertical antenna adjusted to resonate at 28,250 kHz? [63, 93]

2I-2.5 When a vertical antenna is lengthened, what happens to its resonant frequency? [62]

One (1) question must be from the following:

2I-3.1 What is a coaxial cable? [63]

2I-3.2 What kind of antenna feedline is constructed of a center conductor encased in insulation, which is then covered by an outer conducting shield and weatherproof jacket? [63]

2I-3.3 What are some advantages in using coaxial cable as an antenna feedline? [63, 64]

2I-3.4 What commonly available antenna feedline can be buried directly in the ground for some distance without adverse effects? [64]

2I-3.5 When an antenna feedline must be located near grounded metal objects, which commonly available feedline should be used? [64]

2I-4.1 What is parallel conductor feedline? [64]

2I-4.2 Can an amateur radio station use TV antenna "twin lead" as a feedline? [64]

2I-4.3 What are some advantages in using a parallel conductor feedline? [64]

2I-4.4 What are some disadvantages in using a parallel conductor feedline? [64]

2I-4.5 What kind of antenna feedline is constructed of two conductors maintained a uniform distance apart by insulated spreaders? [64]

Strays

A HAND-HELD RTTY STATION

This article describes a hand-held radioteletype (RTTY) station with roots in two worlds — Amateur Radio and deaf teletypewriter (TTY) communications. Two hand-held RTTY stations were assembled to demonstrate to the deaf how they can use portable radios. It is shared with other radio amateurs to stimulate interest in developing hand-held or portable RTTY systems.

Many deaf people use sign language to communicate face to face with others who know sign language. Others speak to hearing persons, but have to rely on reading lips to tell what the other person is saying. As you can see, neither of these methods of communication can be used on telecommunications systems (such as the telephone) that depend on the user's hearing. Instead, the deaf turned to the TTY to enable them to communicate over the telephone system. The availability of surplus TTYs made telephone communications possible for deaf persons much in the same way RTTY began in Amateur Radio.

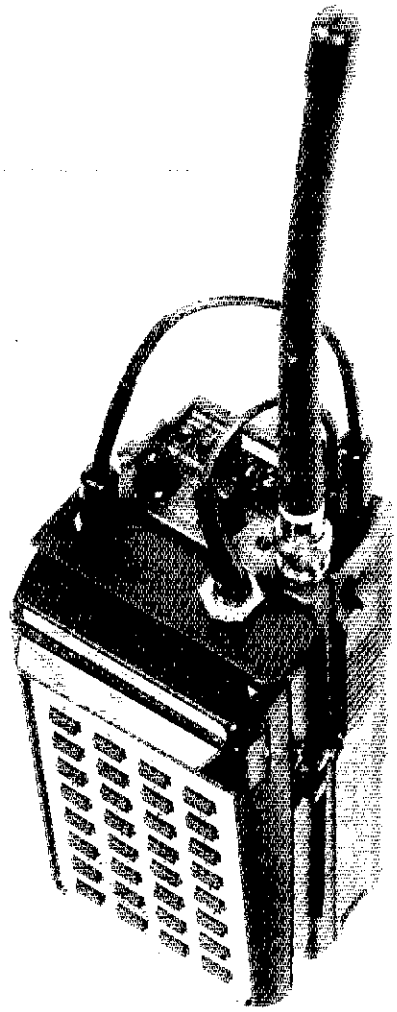
As with RTTY, dc pulses used by TTYs need to go through a frequency-shift keyer (fsk) or audio-frequency-shift keyer (afsk) to modulate a transmitter. Also, a tone demodulator (also called a terminal unit, or TU) is needed between the receiver and the printer. Because the telephone system does a much better job of passing keyed tones that are lower in frequency, current Baudot RTTY tones are not suitable for transmission via telephones. Dr. Robert Weitbrecht, W6NRM, who designed the first deaf TTY modem/acoustical coupler for the telephone, selected the frequencies 1400 Hz for the mark and 1800 Hz for the space. These tones easily pass through either local or long-distance telephone circuits and do not interfere with the telephone system's in-band signaling frequencies. These tones are now standard for deaf TTY and are used in the half-duplex mode (the same pair of tones is used for transmissions in either direction). Unlike amateur RTTY practice whereby the mark frequency remains on the air during pauses, modems for the deaf are designed to stop transmitting the mark frequency within about 1 second after the last key is pressed. That puts the modem in the listening mode, without manual switching.

In addition to using surplus TTYs, the deaf can also purchase a number of newer electronic devices that emulate the TTY. The term Telecommunications Device for the Deaf (TDD) has been coined to include both these electronic systems and their electromechanical forerunners.

The VIP Communicator is the size of a pocket calculator. It is no longer being built, but was manufactured by Automated Data Systems, Inc., and sold for under $200. The two VIP Communicators used for the experiment belong to Elton (Sandy) Sanders, WB5MMB, and his wife Nancy, KB4KAJ, who is deaf.

It occurred to me that the VIP and the popular ICOM IC-2AT 2-meter fm hand-held transceiver would make a good combination. The two could be mated to make a two-way RTTY package that could be held in one hand.

Initial tests showed that the rf output from the IC-2AT rubber flex antenna caused severe radio-frequency interference to the VIP, particularly the LED display. One problem is that the audio input and output jacks of the IC-2AT are located very close to the BNC antenna receptacle.



The end result of mating the VIP Communicator and the ICOM IC-2AT 2-meter fm transceiver is a two-way RTTY package, designed for use by deaf persons, that can be held in one hand.

The actual interfacing proved to be simple. Two cable assemblies were fabricated — one for transmitting, the other for receiving. The transmitting cable connects from the audio output jack of the VIP to the MIC (microphone) jack of the IC-2AT. It has a 56-kΩ 1/8-W resistor in series with the center conductor of the RG-174/U coaxial cable. It was determined experimentally that a capacitor was needed across the male RCA phono plug that connects to the output of the VIP, in order to reduce RFI to the VIP. The value of this capacitor proved to be noncritical; values from 470 pF to 0.001 μF were tried successfully. The receiving cable, RG-174/U, consisted of two mini phone plugs, with an 18-ohm resistor in series with the center conductor. In addition to the RFC capacitor mentioned above, it was necessary to add a metal shield between the VIP and the IC-2AT. Completely wrapping the VIP in metal foil cut the RFI to the VIP display to a negligible amount, but the keyboard could not be accessed. A compromise design of an aluminum plate was arrived at after some experimentation.

Two of the hand-held RTTY systems were demonstrated to a number of deaf people in the Washington, DC area. Two-way communications were established between the two units on simplex frequencies, as well as through a 2-meter voice repeater. One of the systems was used to make an autopatch via the repeater to a TTY telephone number.

This experiment demonstrates that small, portable RTTY systems are practical, not only for radio amateurs but also for use by deaf persons who are licensed radio amateurs. However, it is possible that a similar system could be designed for use in some other radio service (such as Land Mobile) for use by the deaf.

This equipment was not optimized, particularly from an RFI standpoint, because of the use of plastic cases and the proximity of the antenna to the cabling. A one-piece unit that combines the features of the VIP and the transceiver could be built in a package perhaps half the size of the two units.

Although the VIP Communicator itself is no longer available, a good substitute for those wishing to conduct a similar experiment would be the Pocket-Phone II, which is slightly larger and features a membrane keyboard with conventional QWERTY key placement. It is available for under $200 from C-Phone, Inc. Many of the newer TDDs include not only Baudot but ASCII capability along with a Bell 103-compatible modem.

In addition to the devices already mentioned, a number of pocket ASCII terminals are now available for communications with computers via telephone lines. They could also be interfaced with amateur transceivers. Pocket computers could also be used for RTTY and, with proper software, on Baudot, AMTOR and packet radio. — *Paul L. Rinaldo, W4RI, Senior Technical Editor, ARRL*

Manufacturers of Portable Telecommunication Devices for the Deaf

American Communication Corp., 180 Roberts St., East Hartford, CT 06108

Automated Data Systems, Inc. (Ultratec, Inc.), P.O. Box 4062, Madison, WI 53711

C-Phone, Inc., 351 Reis Rd., Baldwin, MO 63011

Krown Research, 11163 LaGrange Ave., Los Angeles, CA 90025

Micon Industries, 252 Oak St., Oakland, CA 94607

Novation, Inc., 18664 Oxnard St., Tarzana, CA 91356

Pocket-Phone, 604 Marcella Place, N.E., Albuquerque, NM 87123

Specialized Systems, Inc., 11558 Sorrento Valley Rd., Bldg. No. 7, San Diego, CA 92121

Manufacturers of ASCII Pocket Terminals

Axlon, 170 N. Wolfe Rd., Sunnyvale, CA 94086

Cybertek, P.O. Box 7500, Menlo Park, CA 94025

G. R. Electronics, Ltd., 1640 Fifth St., Santa Monica, CA 90401

IXO, Inc., 6041 Bristol Pkwy., Culver City, CA 90230

Happenings

Conducted By Carol L. Smith,* AJ2I

- *No Code — ARRL Says "No Way!"*
- *Novice Exams — New Procedure Adopted*
- *Business Communications Rules Clarified*

League Comments Lambaste No-Code Proposal

In a lengthy and detailed document, the ARRL filed its comments to PR Docket 83-28, the proposal for a no-code license in the Amateur Radio Service. The League's position was strong and adamant — no-code licenses have no place in Amateur Radio in the U.S. (See March 1983 *QST*, pp. 9 and 49, for details.)

Preliminary Issues

The League pointed out that the Commission has put the Amateur Radio community in a "catch-22" situation by structuring the proposal "such that two separate issues are raised in a single proceeding, the second presuming a certain response to the first." The Commission first asks whether there should be a no-code license in ham radio, then it asks what the nature and extent of privileges for such a license should be. This begs the questions, and puts commenters in the "untenable position of appearing to accept, or even to advocate" a no-code license.

Many commenters were forced to say that they don't want a no-code license, but if there must be one, let's have one that would minimize the adverse effects. Thus, the level of opposition to the proposal may not be reflected accurately. The ARRL further stated that "the Notice structure is faulty and the League must take strong exception to it. It has produced misleading comments by many, a national misapprehension of the inevitability of a no-code amateur license, and an impression of unlawful prejudgment of the issue on the part of the Commission. It is thus impossible to determine how many of the comments which address the second issue of privileges were so structured because of the misapprehension referenced above."

The League then reiterated its position that "it is both unwise and unfair to enlarge the license examination burden by an additional burden of unknown dimensions until the amateur community has responded to the principal challenge involved in Docket 83-27 (volunteer examining proposal).' The FCC's response to the ARRL request that no-code licensing be postponed was that "[t]he ARRL . . . invited upon the amateur community the burden of the volunteer examiner program," and that "the Commission is not forcing this (volunteer examination) burden upon the amateur community. The Commission has been considering the establishment of a codeless amateur license class for over a decade and we do not believe that any further delay can be warranted."

The ARRL replied that this response was "unfair and irrelevant." The League did *not* "invite the volunteer examination program upon the amateur community"; rather, this was a Commission-initiated proposal. "[T]here is no urgency to the instant (no-code) proceeding, and the failure to defer the same for at least 18 months places in jeopardy a plan to provide adequate opportunities for newcomers to join the ranks of the amateur community," the League argued. It continued, "The code-less license arises from no great outcry on the part of either radio amateurs or the public in general. Its origins appear to lie wholly within the Commission. No more persuasive argument has been offered for the requested deferral of this proposal than the Commission's own statement that 'the Commission has been considering the establishment of a codeless amateur license class for over a decade . . .' It remains a complete mystery why the Commission believes that 'no further delay can be warranted.' This is a particularly inopportune time to introduce *any* new class of license and, on this basis alone, the Commission should not proceed with its proposal to establish a no-code class of amateur license."

> ***"It is* wrong *to eliminate the Morse Code requirement in the Amateur Service"* — ARRL**

League's Position

The ARRL had at first maintained an essentially neutral posture about no-code licensing to "avoid influencing its membership or the amateur community generally to take one position or another." That position, by the way, cost ARRL the memberships of those who felt that the League's neutrality reflected less than full opposition to the proposal. Nonetheless, it bears out the fact that without League influence, the Amateur Radio community registered overwhelming opposition to the proposal.

Ultimately, so strong and united was the opposition to no-code that the ARRL Board of Directors unanimously directed the General Manager and Counsel to file comments stating "in the strongest possible manner the opposition of the League to the creation of an amateur license class that does not require demonstration of a knowledge of the Morse code."

Arguments Against No-Code

The League refuted the Commission belief that a no-code amateur license "will result in attracting to Amateur Radio young, computer-oriented individuals and individuals with a physical handicap that prevents them from being able to successfully complete the Morse code examination." First, there is no evidence that younger, school-aged individuals whose primary interest is computers will be attracted to ham radio by a no-code license. An interest in computers doesn't necessarily lead to an interest in radio. "Moreover," the League comments continued, "young people, above all other amateur license applicants, have most easily learned Morse code. As such, there is not the slightest evidence that the entry-level requirements of knowledge of Morse code at five words per minute presents even an obstacle, much less a barrier, to anyone who seeks to learn it."

The Commission statement that individuals with handicaps would be helped by a no-code license was challenged strongly by the League. Such persons are not presently adversely affected by a license requiring knowledge of Morse code. The FCC, the League stated, makes special efforts to help "handicapped applicants obtain amateur operator licenses by permitting them to demonstrate their operator qualifications in ways that accommodate their particular disability." Thus, applicants with disabilities are not adversely affected by the Morse code requirement and, as demonstrated in the Comments of Handi-Hams, they do *not* want to be given special dispensation for basic requirements!

Indeed, the League pointed out that a no-code license would create a class of amateurs with whom many amateurs with handicaps *could not communicate:* "Many handicapped amateurs rely on Morse code as their *only* means of communication, and indeed their only possible useful pastime . . . Yet the Commission in this proceeding would isolate them from others in the Service. Handicapped amateurs and handicapped would-be amateurs will *not* be helped by this proposal. They will be harmed by it."

Tackling the argument that the code requirement is an "unnecessary obstacle to those wishing to become amateurs but who have no desire to learn or intention to use Morse code," the League made several important points.

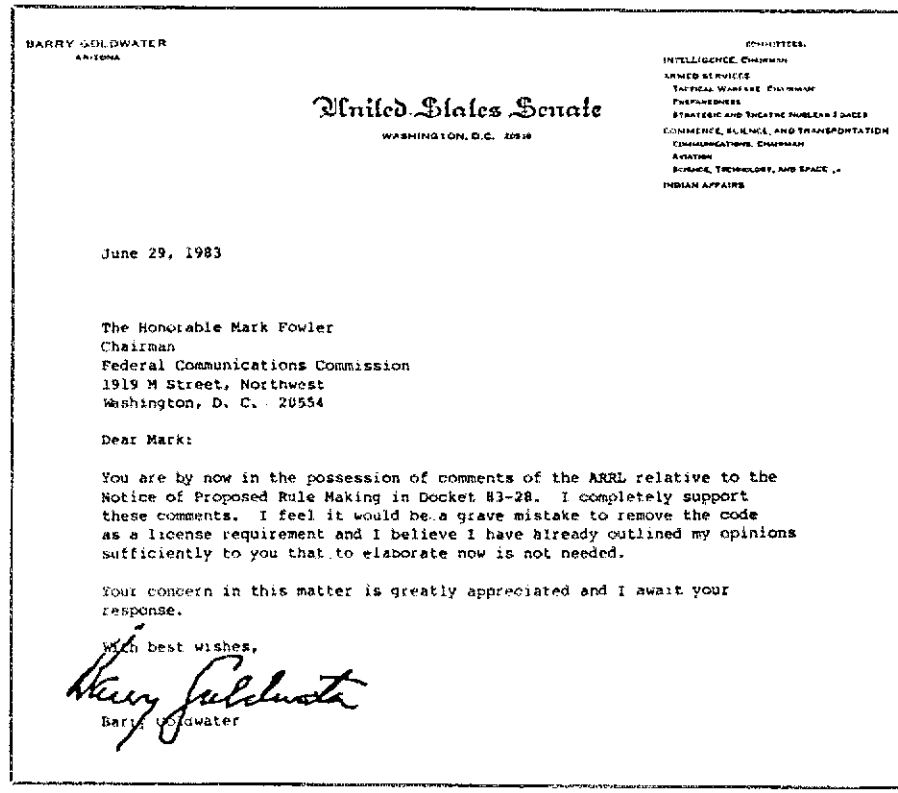
(1) The wish to obtain amateur privileges with the least possible expenditure of time and effort is understandable but *not desirable.* "The public service commitments of Amateur Radio are not served by lowering competence standards in such a way as to create a class of amateurs who are unable to communicate with the main body of amateurs in the most basic and reliable of all transmission modes. Particularly is this of importance in emergency situations, where communications often can be sustained *only* through use of Morse code."

*Membership Services Assistant

(2) Being required to learn the Morse code may be a slight obstacle for some, but this is more of a psychological block than a real block. "The psychological barrier argument is greatly overstressed," the League continued. "'I can't learn' in almost every case may be fairly read as 'I will not commit myself to the time necessary to learn' the code. At the entry level requirement, five-words-per-minute code proficiency is so minimal a requirement as to almost permit one to look up each letter as sent. The investment in time and effort is negligible, and the universality of Morse as a communications mode permits an extremely high return on the investment of time involved."

(3) People won't learn the code unless they are required to. Indeed, amateurs usually don't learn about the exceptional utility and effectiveness of Morse code until after they have learned it.

No-code advocates routinely argue that Morse code has become obsolete because of faster digital communications modes. The League questioned how these new methods "replace the need for a knowledge of Morse code, or threatens its survival in Amateur Radio." History shows that just isn't the case. In the 1920s when voice communications became possible, the "end of code" was heralded by those who didn't understand its intrinsic usefulness. Despite advancement in the development of new communications methods, especially in the '20s and '50s, the numbers using Morse code as primary communications mode grew — and continues to grow. According to the League's Florida State survey and other amateur publication studies, more amateurs today regularly use Morse code than at any time in history.



BARRY GOLDWATER
ARIZONA

United States Senate
WASHINGTON, D.C. 20510

COMMITTEES:
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AVIATION
SCIENCE, TECHNOLOGY, AND SPACE
INDIAN AFFAIRS

June 29, 1983

The Honorable Mark Fowler
Chairman
Federal Communications Commission
1919 M Street, Northwest
Washington, D. C. 20554

Dear Mark:

You are by now in the possession of comments of the ARRL relative to the Notice of Proposed Rule Making in Docket 83-28. I completely support these comments. I feel it would be a grave mistake to remove the code as a license requirement and I believe I have already outlined my opinions sufficiently to you that to elaborate now is not needed.

Your concern in this matter is greatly appreciated and I await your response.

With best wishes,

Barry Goldwater

Senator Barry Goldwater, K7UGA, added his support to the ARRL no-code comments. This self-explanatory letter to FCC Chairman Fowler clearly states the Senator's position.

Benefits of Morse

The League's comments then listed and supported the "benefits of Morse code as an essential ingredient of each amateur's qualifications." Included are its:

1) economical use of frequencies;

2) ease of communications across language barriers;

3) superior communications reliability in interference;

4) use of simpler and more easily maintained equipment;

5) being the most effective communications mode in emergencies;

6) being a useful back-up mode for any other form of radio communications.

The experience of Japan and Canada with no-code licenses was then described. In the case of the Canadian digital license, only about 150 newcomers have been attracted to Amateur Radio in four years — hardly achieving the goal of attracting youthful recruits to ham radio. The situation in Japan is also not as successful as some believe. "As described in a recent issue of *QST*," the League comments continued, "the Japanese amateur license structure has resulted in serious overcrowding, widespread violation of power limits, TVI/RFI, and a well-established tendency for newcomers to lose interest after a year or thereabouts — a consequence of the ease with which they obtained the license in the first place."

Morse Factor in Rules Compliance

The ARRL then showed that the respect one feels for one's license is directly proportional to the pride one takes in operating and abiding by the rules. Amateur Radio has a proud history of rules compliance and self-regulation. Lowering the standards of admission to ham radio by eliminating the Morse code requirement will lower the level of commitment.

League comments used the Citizens Band Service as an example. "It is obvious that the Commission created in the Citizen's Radio Service an uncontrollable radio system in which rules are unenforceable. Illegal uses of CB radio are legion, to the point that the spectrum in *and around* that allocated for CB use is of no utility whatsoever. The lawless activity in the CB radio 'service' is traceable directly to the level of respect for the privilege of operating in the radio service. That, in turn, is dependent on the ease with which one obtains such a license. Lawless activity in the Amateur Service will undoubtedly result, and the Service will depreciate, if standards are lowered . . . Self-regulation can continue in Amateur Radio only if a basic level of respect for the Service and the privileges conferred is maintained. This proposal is antithetical to that objective."

In conclusion, the ARRL stressed that opposition to no-code comes from members and nonmembers, amateurs and nonamateurs, newcomers, would-be amateurs and long-term amateurs. "Opposition to this proposal doesn't arise from a selfish desire on the part of amateurs to exclude newcomers; on the contrary, the record supports amateurs' claims of actively attracting and training new amateurs. Rather, deep concern is felt for the integrity of the Amateur Service and that we wish to avoid in our bands what the Commission has permitted to take place in other parts of the spectrum. We seek to avoid spectrum pollution, just as other segments of society are concerned with protection of the environment. Deregulation in any field must proceed with the greatest caution in order to assure that controls essential to the fabric of society are preserved. In the Amateur Service, the Morse code requirement is necessary to insure communications capability under almost any circumstances. It is *wrong* to eliminate it."

NEW NOVICE EXAM PROCEDURE ADOPTED

In a Report and Order in PR Docket 82-727, the Commission changed the procedure by which Novice exams are administered. (Details of the new program, effective August 31, 1983, are on pages 56-59 of this issue.) Most comments to this proposal favored eliminating the procedural "mailback" step, but did not favor allowing individual examiners to prepare exam questions without some kind of Commission approval of the questions.

The Report and Order reflected these wishes. Under the new procedures, a volunteer examiner will create an individual exam for a Novice applicant from questions contained in FCC PR Bulletin 1035A (available from ARRL Hq. or from any FCC Field Office for an s.a.s.e.). The volunteer examiner will also administer and grade the exam, and mail it back to the FCC (who will issue the license). Certain changes in the qualifications for Novice volunteer examiners were made, including a ban on employer-employee and employee-employee test giving situations. The employee-employee restriction has created a stir, and the ARRL Executive Committee has decided to ask for reconsideration of a ban on that situation. Current Novice exam procedures are in effect until August 30.

BUSINESS COMMUNICATIONS STILL FORBIDDEN

On July 12 the Commission released an Order formalizing and clarifying the prohibition of the transmission of business communications in the Amateur Radio Service. Saying that it "con-

tinues to receive inquiries asking whether business messages are permitted," the Commission included in Part 97 a rule that specifically forbids the sending of business communications. "These amendments result in a clearer statement that the prohibition against business communications applies to both third-party communications and non-third-party communications. The term 'business communications,' in this instance, is used in the broadest context. It includes all types of communications which are intended to facilitate the regular business or commercial affairs of any party, whether individual or organization, whether for profit or not-for-profit, whether charitable or commercial, and whether government or non-government."

Changes to Part 97 of the Rules include:

§97.3 Definitions.

(bb) *Business communications.* Any transmission or communication the purpose of which is to facilitate the regular business or commercial affairs of any party.

§97.110 Business communications prohibited.

The transmission of business communications by an amateur radio station is prohibited, except for emergency communications as defined in this part.

3. In Subpart E of Part 97, entitled Prohibited Practices and Administrative Sanctions, a new section is added, between new Section 97.110 and present Section 97.112, as follows:

§97.111 Limitations on international communications.

Transmissions between amateur radio stations of different countries, when permitted, must be limited to messages of a technical nature relating to tests and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified.

§97.114 Third party traffic.

(c) Except for emergency communications as defined in this party, third party traffic consisting of business communications on behalf of any party.

The FCC and the ARRL both received numerous inquiries about this Rules clarification. In fact, the ARRL Counsel wrote a letter to the Commission requesting more information. The reply (see this month's Washington Mailbox for details) reaffirmed that no drastic changes in hams' public-service activities were intended. In fact, hams can carry on as usual with their communications activities in this area, while being aware of the ban on business communications in third-party traffic.

TELEPHONY EXPANSION OF HF BANDS — FURTHER COMMENTS OF ARRL

The ARRL submitted its comments to the further notice of proposed rulemaking in PR Docket 82-83, further expansion of the hf telephony bands. (The 20-meter phone band was expanded in May. This Further Notice of Proposed Rulemaking deals with the remaining hf phone-band expansions. See October 1982 *QST*, page 51, for background information.) The Commission specifically sought comments on expansion of the 75, 15 and 10-meter phone subbands, and also on a proposal to authorize telephony on 7075-7100 kHz in the state of Hawaii.

• *75 Meters* — Proposed frequencies for this band are 3850-4000 kHz (General, Advanced and Extra); 3775-3850 kHz (Advanced and Extra); 3750-3775 kHz (Extra). The ARRL

> has "consistently favored expansion of the General-class 75-meter telephony subband and is of the opinion that the proposed 25-kHz expansion most equitably serves the interests of all licensees. Extra Class licensees will gain access to an additional 25 kHz of the international amateur phone band, thus increasing the prospects for intercontinental (DX) operation, particularly since the amateur band in ITU Region 1 (Europe and Africa) is limited to 3.5-3.8 MHz; Advanced class licensees will be allowed access, for the first time, to the telephony band below 3.8 MHz, and the congestion of the General class segment should be eased considerably. These substantial benefits more than outweigh any minor detrimental impact caused by the possible need to relocate some domestic telegraphy operations to lower frequencies on the 75-meter band should Canada decide, in response to telephony subband expansion here, to extend its telephony subband lower in frequency.

Table 1

FCC-Proposed Phone Allocations

3.5-4.0 MHz, 80 Meters	
3.850-4.000	General, Advanced and Extra
3.775-3.850	Advanced and Extra
3.750-3.775	Extra
7.0-7.3 MHz, 40 Meters	
No change	
21.0-21.45 MHz, 15 Meters	
21.300-21.450	General, Advanced and Extra
21.225-21.300	Advanced and Extra
21.200-21.225	Extra
28.0-29.7 MHz, 10 Meters	
28.300-29.700	General, Advanced and Extra

• *15 Meters* — The League similarly felt that the proposed 50-kHz phone expansion (21.2-21.45 MHz) would relieve the pressure of overcrowding on all license classes. "In particular," it said, "(the expansion) will allow Extra Class licensees to operate on a 25-kHz exclusive segment, as they do on all other bands, rather than on the 20 kHz to which they were restricted in 1972."

• *10 Meters* — The ARRL encouraged equal access to the proposed 10-meter phone subband expansion frequencies (28.3-28.5 MHz) by all U.S. licensees so as to encourage the greatest possible use of the band during periods of low solar activity.

> By opening this to U.S. telephony operation, as it is currently employed by telephony stations outside the U.S., peak-period congestion can be alleviated and terrestrial interference to amateur satellite operations higher in the band can be reduced. Expansion of the 10-meter band should not, however, curtail Morse code operation and digital communication (radioteleprinting) on these frequencies. Nor is it believed that expansion down to 28.3 MHz will cause any non-U.S. stations to significantly increase operation below 28.3 MHz, or cause interference to beacon stations operating at 28.2-28.3 MHz.

• *40 Meters* — Saying that the need for expansion of the 40-meter (7.0-7.3 MHz) subband is still of great concern to it, the ARRL nevertheless reaffirmed the opposition to expansion here at this time. It will, however,

> continue to study solutions to this problem together with the amateur community as a whole, and it is hoped that it will be possible to revisit the matter of 7-MHz telephony subband expansion at a later time. The present status of 7 MHz is unsatisfactory in that non-U.S. stations can only communicate with U.S. stations on a split frequency basis, the former transmitting at 7.075-7.100 MHz, and the latter at 7.150-7.300 MHz.

• *Hawaiian 40 Meters* — The League supports the proposed authorization of frequencies 7.075-7.1 MHz for telephony operation in the state of Hawaii. Calling it a "unique situation that demands unique relief," the League felt that this proposal would "accrue to the benefit of Hawaiian amateur operators without incurring any disadvantages for other U.S. operators."

Noting that the "Commission's proposal duplicates that adopted by the League's Board of Directors after lengthy discussion, and it reflects a consensus among the reasoned, yet often disparate, opinions within the amateur community," the ARRL requested that PR Docket 82-83 proposals be adopted at an early date. Action is expected later this year.

LICENSE TERM, GRACE PERIOD EXTENSION PROPOSALS, ARRL COMMENTS

The League "wholly supports" PR Docket 83-337 proposals to extend operator and station license terms to 10 years. The proposal to reduce grace-period terms from the current five years to two years did not, however, receive the same enthusiastic support. Neither, though, did the League oppose the reduction, saying that "the five-year grace period was wholly satisfactory, but its reduction will probably not adversely affect or inconvenience the Amateur Service in view of the proposed license extension." (An amateur would thus have his or her license for a total of 12 years before reexamination would be required.)

The implementation of the proposed 10-year license terms was scrutinized in League comments. The FCC suggested issuing a blanket five-year extension to all current licenses. The ARRL felt that "this particular alternative is impractical as it will generate a great deal of confusion among licensees which, in turn, will prompt numerous inquiries to the Commission; the additional burden which responding to each inquiry will entail threatens to undo the advantages in terms of time saved which will accrue under the license term extension." Instead, the ARRL supported a plan to "phase-in the new 10-year licenses as the current licenses come up for their appointed renewal." This alternative, the League believes, would be the easiest to implement and would be the least confusing for all involved.

VIOLATIONS IN ONE SERVICE GROUNDS FOR LICENSE REVOCATION IN OTHER SERVICE

Walter N. Russell, ex-WA6WFN

The Commission has concluded that flagrant violations of the CB Radio Service Rules by Walter N. Russell (of Reseda, California) warrants not only revocation of his operator's CB station license, but also revocation and suspension of his Amateur Radio station and General class operator licenses. In 1980, an Administrative Law Judge found that Russell's CB license should be revoked because he "willfully operated a modified CB transmitter on an unauthorized frequency in violation of Sections 17(a) and 19 of the CB Rules, and because he failed to identify his station with an authorized call sign in violation of Section 30(a) of the CB Rules." The ALJ also found that there were no violations of the Amateur Rules and concluded that there was no basis for revoking Russell's Amateur Radio station license or suspending his amateur operator's license.

The Private Radio Bureau (PRB) filed an Application for Review with the Commission, contending that Russell's "willful violation of the CB Rules warranted both revocation of his license for WA6WFN and suspension of his amateur operator's permit." The Commission agreed with the PRB's assessment. It said, "The record establishes that Russell knowingly operated his CB station on an unauthorized frequency, using a modified radio, and that he did not identify his transmission with an authorized call sign because he was operating illegally and because he wanted to avoid detection by the Commission. These undisputed facts clearly establish that Russell willfully operated his CB station with a

flagrant disregard for the Commission's Rules. These willful violations evidence a substantial danger that Russell will violate additional Commission Rules for other services in which he is authorized to operate. . . . Thus Russell's willfull violations of the Commission's CB Rules fully warrant the revocation of both his Amateur Radio and CB station licenses and the suspension of his Amateur operator's license." — *FCC Release*

NEW POWER DEFINITION AND MEASUREMENT

Effective August 29, 1983, Amateur Radio transmitting power will be measured and defined in terms of peak envelope power (PEP) output present at the antenna terminals. See December 1982 *QST*, pp. 68-69, for background information about PR Docket 82-624. Other important changes include allowing, in general, 1500 watts maximum PEP output; defining effective radiated power (erp) based on transmitter power delivered to the antenna, as measured in PEP terms; and for the a-m dsb mode, allowing operators to use the old definition, limits and measurement procedures for seven more years.

The majority of comments to the NPRM favored the proposal (except the section concerning a-m dsb operation). Many pointed out the advantages of output power measurement and the safety factors involved. Concern was expressed by many commenters, though, regarding the manner in which amateur operators would be required to measure their transmitting power. The FCC reiterated that "we are not going to require amateur operators to have specific equipment on hand to make any power measurements. We will only require that operators comply with the rules regarding the power actually used."

The Commission determined that a "measurement standard for output power that both amateurs and the FCC recognize as valid" is needed. Until such time that other standards might be appropriate, the following standard is in effect:

The output power will be determined while the station is operating as indicated by:

1) the reading of a thru-line peak reading radio frequency (rf) wattmeter, properly matched, or

2) calculation of the power using peak rf voltage as indicated by an oscilloscope or other peak reading device.

The Commission pointed out that "the most significant concern expressed in the comments was the effect that the proposal would have on a-m dsb operations. Typically, these operations would be limited to half of the maximum operating powre that is currently used." Most commenters said the proposed five-year grandfather period was inadequate. The FCC said that it "remains sympathetic to the effect the proposed rule change will have on these operations; however, we still cannot justify a permanent and continuous expense in terms of equipment and training that would be necessary for us to be prepared to make a special power measurement for this class of operations." The grandfather provisions will end on June 1, 1990. "If it appears there is any justifications to do so, we will reconsider the matter at that time," the Commission concluded.

There were few comments about the special power measurements to be made for pulse emissions. The Commission "considered the matter and decided that, as with a-m dsb emissions, it would not be practical to make a special exception at this time. We may revisit this matter if it appears that this emission mode is becoming more popular in the future or that this limit is hampering serious experimental or communications activities."

The Commission remarked on several comments that the maximum authorized operating power should be lowered substantially for all modes of operation. It emphasized that "*maximum* operating power is *not* the primary governing rule for amateur transmitting power. Amateurs are required by statute to use the *minimum* power necessary to carry out the desired communications."

Part 97 Rule changes are:

§97.3 Definitions.

⋮

(t) *Transmitting power.* The radio frequency (RF) power generated by operations of an amateur radio station, including the following:

(1) *Transmitting power.* The peak envelope power (output) present at the antenna terminals (where the antenna feedline, or if no feedline is used, the antenna, would be connected) of the transmitter. The term "transmitter" includes any external radio frequency power amplifier which may be used. Peak envelope power is defined as the average power during one radio frequency cycle at the crest of the modulation envelope, taken under normal operating condition.

(2) *Effective radiated power.* The product of the transmitter (peak envelope) power, expressed in watts, delivered to an antenna, and the relative gain of the antenna over that of a half-wave dipole antenna.

§97.61 Authorized frequencies and emissions

⋮

(2) Operation shall be limited to:

States of:	Maximum dc plate input power in watts 1900-1925 kHz Day/Night	1925-1950 kHz Day/Night	1950-1975 kHz Day/Night	1975-2000 kHz Day/Night
Maine, Massachusetts, New Hampshire, Rhode Island	150/35	0	0	150/35
Connecticut, Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Vermont	300/75	0	0	300/75
Kentucky, North Carolina, Ohio, South Carolina, Tennessee, Virginia, West Virginia	750/150	0	0	750/150
Florida, Georgia, Illinois, Indiana, Michigan, Wisconsin, Alabama, Arkansas, Iowa, Minnesota, Mississippi, Missouri	1500/300	300/75	300/75	1500/300
The remainder of the States and Territories	1500/300	1500/300	1500/300	1500/300

⋮

(7) In the following areas, the peak envelope power output of a transmitter used in the Amateur Radio Service shall not exceed 50 watts, except when authorized by the appropriate Commission Engineer-in-Charge and the appropriate Military Area Frequency Coordinator:

(i) * * *
(ii) * * *
(iii) * * *
(iv) * * *
(v) * * *
(vii) * * *
(viii) * * *

§97.67 Maximum authorized transmitting power.

(a) Notwithstanding other limitations of this section, amateur radio stations shall use the minimum transmitting power necessary to carry out the desired communications.

(b) Each amateur radio transmitter may be operated with a peak envelope power output (transmitter power) not exceeding 1500 watts, except as provided in paragraph (e) of this section. Other limitations of this section and §97.61 also apply.

(c) * * *

(d) The peak envelope power output (transmitter power) of each amateur radio transmitter shall not exceed 200 watts when transmitting in any of the following frequency bands:

(1) 3700-3750 kHz;

(2) 7100-7150 kHz (7050-7075 kHz when the terrestrial location or the station is withing region 1 or 3);

(3) 21100-21200 kHz;

(4) 28110-28200 kHz;

(e) An amateur radio station may transmit A3 emissions on or before June 1, 1990 with a transmitter power exceeding that authorized by paragraph (b) of this section, provided that the power input (both radio frequency and direct current) to the final amplifying state supplying radio frequency power to the antenna feedline does not exceed 1000 watts, exclusive of power for heating the cathodes of vacuum tubes. Limitations of paragraphs (a), (c) and (d) of this section and limitations of §97.61 still apply.

§97.77(d)(6)(ii)

No amplifier shall be capable of amplifying the input RF driving signal by more than 15 decibels. (This gain limitation is determined by the ratio of the input RF driving signal to the RF output power of the amplifier where both signals are expressed in peak envelope power output of less than 1,500 watts, the gain allowance is reduced accordingly. For example, an amplifier with a designed peak envelope output power of 500 watts shall not be capable of amplifying the input RF driving signal by more than 10 decibels.

OSCAR 10 AND YOU

The ARRL Foundation has received a major contribution of $1000 from the San Diego County Amateur Radio Council in support of the Foundation's Satellite Program. The contribution was recommended by the Amateur Radio Club of El Cajon.

This donation comes at a very exciting moment in the history of Amateur Radio. AMSAT-OSCAR 10 was successfully launched on June 16 and is now undergoing in-orbit checkout and orbit adjustment. Launch-related expenses for AMSAT and other sponsoring organizations have been quite heavy, and the funds from SANDARC will help ensure that the amateur satellite program is financially able to continue building and launching satellites. SANDARC can take pride in having contributed to the beginning of a new era in Amateur Radio communications.

Why not recommend to your club's officers and directors that they make a club donation to the ARRL Foundation in support of the Amateur Space Program? A contribution of any size will ensure that your club will be placed on the ever-growing list of groups who have made a commitment to the future of telecommunications and the amateur satellite arena. Get your club on the space bandwagon! Send your donations to the Amateur Space Program, ARRL Foundation, 225 Main St., Newington, CT 06111.

Washington Mailbox

Conducted By Richard K. Palm,* K1CE

Ajax Halibut Company "Run-for-the-Halibut" Marathon

Q. Is it okay for our local ham club, the Rehobeth Radio Ruminators, to provide communications in the upcoming Ajax Halibut Company's "Run-For-The-Halibut" Marathon?

A. For the public's benefit, yes; for the direct benefit of the sponsor, no. Business communications are strictly out-of-bounds in Amateur Radio.

The FCC recently addressed this issue in an Order (see Happenings, this issue) designed to crystalize the no-business-communications aspect of our Service. A rule more clearly stating the business prohibition for both non-third-party-traffic (97.110) as well as for third-party traffic (97.114) spells out the Commission's long-standing policies. Business communications includes all types of communications intended to facilitate the regular business or commercial affairs of any party, whether individual or organization, profit or non-profit, charitable or commercial, government or non-government.

In a recent letter clarifying the rulemaking Order, FCC emphasized that the Order does not prohibit Amateur Radio operators from participating in the routine events of traditional public service activities:

Christopher D. Imlay, Esq.
Office of Legal Counsel, ARRL
1302-18th Street, N.W.
Washington, D.C. 20036

Dear Mr. Imlay:

This is in reply to your letter of July 14, 1983, requesting clarification of the Commission's Order, released July 12, 1983, concerning business communications in the Amateur Radio Service. We, too, have received a goodly number of inquiries since the Order and its accompanying News Release were issued, thus indicating to us that it is not as clear as it could have been. Since the matter is being misinterpreted, we are delighted to have this opportunity to elaborate more fully on the propriety of business communication in the Amateur Radio Service.

We want to emphasize that the Order does not prohibit amateur radio operators from participating in the routine events of traditional public service activities. For example, amateur radio operators may provide communications for municipal parades, marathons, walkathons, Eye Bank activities and the like. Although they may incidentally "benefit" the sponsor, their main purpose is to provide a service to the public which is the real beneficiary. Direct promotion to assist in the sale of a sponsor's product would, of course, be forbidden. Although it is not feasible to give you a list of every type of activity for which amateur licensees might be called on to provide communications assistance, we do want to assure you that we concur in all of the examples that you mention in your letter, including the permissibility of public service communications for neighborhood bike races, fireworks displays, and the Olympic games. We agree that an amateur licensee's providing public service communications enhances any event which a particular organization offers as a part of its normal functions.

The Order was not intended to impose any new restrictions or to cut back on what amateur operators have legitimately been doing all along. What was intended was to alert the amateur community to the fact that the Amateur Radio Service should not be used in lieu of other radio services for the transmission of business messages. I think that we can all agree that a businessman, who also happens to be an amateur radio operator, should not use amateur radio facilities to call his office about details that surround his business transactions. On the other hand, the same businessman should feel free to use his amateur radio station if a member of his family becomes ill, if there is a safety factor in traveling on the highway, such as the need for a tow truck, etc.

I hope that this letter of explanation and clarification will be useful to you in allaying the concerns of the members of the American Radio Relay League. If I can be of further assistance, please let me know.

Sincerely
James C. McKinney
Chief, Private Radio Bureau

FCC WRAP-UP

The Washington Deregulators have hit their mid-season stride, and their formidable bats have been responsible for blasting many rules clear out of the M Street Ballpark. As the dust settles on the playing field, this Washington Mailbox sports editor is pleased to bring you this post-game wrap-up.

Novice Exams

Q. What's this I hear about FCC getting out of the Novice exam business?

A. FCC *isn't* getting out of the Novice exam business, but a few changes have been made. Under these new procedures, a volunteer examiner will create an individual written exam for a Novice applicant from questions contained in FCC PR Bulletin 1035A (copy available from ARRL Hq.; s.a.s.e. please). The examiner will then administer and grade the exam. The volunteer examiner then simply sends a successful candidate's application (Form 610) to the FCC at Gettysburg, Pennsylvania, for issuance of the Novice ticket. A notation of certification that the Novice applicant has passed both the code and written theory exams must be made on the Form 610 (97.28). In addition to the prohibition against relatives testing each other, the Commission added a prohibition against employee-employee and employer-employee relationships among those testing and being tested. It also added prohibitions against owners or employees of firms and associations that sell radio equipment or publish training materials from serving as examiners. This provision brings the Amateur Rules into compliance with Public Law 97-259, the so-called Goldwater-Wirth Amateur Radio law. These new procedures will become effective on August 31, 1983.

Q. Do these changes affect testing for higher classes of licenses?

A. No. However, watch for Commission action on sweeping changes for higher-class exams in the near future. For information on the Volunteer Examiner Program proposal in PR Docket 83-27, see April, June and July 1983 *QST* Happenings.

Station I-d

Q. Is it true that we TVers and digital types don't have to i-d anymore?

A. Well, not quite. Thanks to a recent FCC action, U.S. hams using radioteleprinter codes or fast-scan TV no longer are required to identify in international Morse code or plain-language voice. If using Baudot, ASCII or AMTOR, stations may identify using the digital code employed at the time of transmission. If using other digital codes above 50 MHz, stations may identify using Baudot, ASCII or AMTOR. Fast-scan TV transmissions may be identified in video using the U.S. 525 scan-line standard described in Part 73 of the Rules. The cw or plain-language voice i-d requirement still applies to facsimile and SSTV transmissions. Note: Amateurs still have the option to continue using cw or voice i-d for their radioteleprinter or fast-scan TV operation, if they so desire (97.84[g]).

A Shift in the Shift

Q. Did FCC look at frequency shifts for digital teleprinter operation recently?

A. Yes, indeed. The Commission raised the maximum frequency shift for digital communications from 900 to 1000 Hz for operation on the hf bands. Above 50 MHz, the maximum shift will depend on the signaling rate, in baud. The frequency shift, in hertz, must not be greater than the sending speed, in baud, of the transmission, or 1000 Hz, whichever is greater (97.69[a][2]).

Logs Axed

Q. Is it really true that FCC doesn't require hams to keep logs anymore? Say it ain't so.

A. Sorry, it's a fact, Jack. U.S. hams no longer must keep station logbooks — goodbye Sections 97.103 and 97.105. This includes records of third-party traffic. Repeater stations no longer need to tape-record autopatch and other third-party messages. FCC engineers-in-charge, however, have been given the authority to require a station licensee to maintain such operating and maintenance records as may be necessary to resolve conditions of interference or deficient technical operation. Hams may still, of course, keep logs voluntarily.

Q. What about nonroutine items such as repeaters, auxiliary stations and remotely controlled transmitters? Don't these operations mandate log entries?

A. Information about nonroutine operations must be kept as part of the *station records*, to borrow the Commission's terms.

Control operators. FCC presumes that the station licensee is always the control operator unless documentation exists to the contrary (97.79).

Repeaters. If a repeater's effective radiated power (erp) is greater than 100 W (29.5-420 MHz) or 400 W (420-1215 MHz operations), then information relating to the location, and height above average terrain (HAAT) of the repeater antenna, and transmitter power, feed line losses and antenna gain must be included in the station records (97.85[g]).

Remote control. Station records must be kept when the station is operated by remote control: names, addresses and calls of authorized control operators, and a functional block diagram of the control link (with technical explanation of its operation) (97.88[f]).

Auxiliary stations. When a station has one or more associated stations (that is, stations in repeater or auxiliary operation), a system network diagram must be included in the station records (97.90). A system network diagram shows each station and its relationships to the other stations in the network, and to the control point(s) (97.3[u]).

Q. Do these records have to be kept for a year?

A. Station records must be kept only during the periods of the above types of operations. FCC wants a snapshot, not a movie history documentary.

Interim Permits Renewable

Q. My interim permit (instant upgrade slip) has expired and I still haven't gotten my ticket from FCC in Gettysburg. Can I get my interim permit renewed?

A. Yes, thanks to some help from the FCC. The Commission recently eliminated the rule (97.32[f]) that barred renewal of interim permits. If you haven't received your new ticket from Gettysburg and your interim permit is nearing expiration, contact the issuing FCC Field Office for renewal info.

FCC Inspections

Q. If an FCC person knocks on my door, do I have to let him or her in to see my shack?

A. Yes. The Commission has always had this authority to inspect stations they have authorized. A new rule (97.81), however, brings this message home to Part 97.

[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

Canadian NewsFronts

Conducted By Harry MacLean,* VE3GRO

Answers to Your Questions About QSL Bureaus

We're received so many inquiries about the QSL bureau system in Canada that we felt it was worth a column. Hope this answers all.

Q. Who sponsors the incoming QSL bureau system in Canada?

A. There's really only one Canada-wide system and it's sponsored by the League, that is, CRRL-ARRL.

Q. Do you have to be a CRRL-ARRL member to use it?

A. No. The incoming QSL bureau system is for all Canadian amateurs regardless of their affiliation with one group or another.

Q. There must be costs involved. Who pays for these?

A. The League pays or, to be more accurate, Canadian League members pay through their CRRL-ARRL membership dues.

Q. Are these costs extensive?

A. For the 10 individual QSL bureaus in the provinces and territories, the costs are moderate. QSL bureau managers are reimbursed for postage and other expenses incidental to running a bureau. They're also permitted to attend one major hamfest or convention a year at League expense (travel, hotel, registration and meals) — really a very small reward for the hours and hours of work it takes to run a QSL bureau. For the CRRL Central Incoming QSL Bureau in St. John, New Brunswick, it's a bit different. This bureau receives 75-80% of all the cards that enter Canada. It sorts and forwards them to the 10 individual bureaus in the provinces and territories. Postal costs are over $1200 a year.

Q. Why does CRRL maintain a Central Bureau?

A. Most IARU-member societies have one. It permits outgoing QSL bureaus and even individual amateurs in foreign countries to ship Canadian cards to a single address. Result: greater convenience and reduced costs for them. They ship cards, and they ship them often.

Q. Who runs the CRRL Central Bureau?

A. Officially, it's the Kennebecasis Amateur Radio Club, but we all know that Andy McLellan, VE1ASJ, and Maritimes-Newfoundland SM Don Welling, VE1WF, do most of the legwork. Last year, they processed 450,000 cards. Luckily they have understanding wives.

Q. How do I use the incoming QSL bureau system?

A. This was explained well in QSL Corner, pp. 68-69, June *QST*. If the bureau in your province or territory doesn't sell postage credits, we'd recommend putting at least 54 cents of postage on your envelopes. QSL cards are heavy and those grams can add up quickly.

Q. Occasionally, CARF advertises an incoming QSL Service. Should I also keep envelopes on file with them?

A. This isn't necessary. CARF incoming QSL service is provided by the Ontario Trilliums, who also do an outstanding job managing the League-sponsored VE3 incoming bureau. If you live in VE3 and send envelopes to the CARF bureau, you will receive cards the same as if you had sent the envelopes to the League-sponsored VE3 bureau. At present, CARF has no individual bureaus in the provinces or territories. If you live outside of VE3 and send envelopes to the CARF bureau, your envelopes will simply be forwarded to the League-sponsored bureau in your province or territory.

Incidentally, the CARF incoming bureau does act as a central bureau for about 5% of the cards that enter Canada. Cards not bound for VE3 are forwarded to the League-sponsored bureaus in the provinces and territories at CARF expense. The bottom line for everyone is that amateurs should get their cards.

Q. What about outgoing QSL service?

A. CRRL members may ship cards anywhere in Canada, in the U.S. or overseas through the new CRRL Outgoing QSL Bureau. Because it's staffed by volunteers (that Kennebecasis Valley Amateur Radio Club again) and costs are kept low, there is no charge for this service. CARF members may use the CARF Outgoing QSL Bureau (also operated by the Ontario Trilliums), which has given excellent service for many years.

CANADIAN PHONE-BAND EXPANSION

Many Canadian amateurs have contacted CRRL about FCC plans to expand the U.S. phone subbands on 10, 15 and 80 metres. The greatest concern is for 80 metres. CRRL did send a short, formal submission to FCC, informing FCC that expansion of the U.S. phone band on 80 metres will likely result in Canadian amateurs petitioning DOC for a new Canadian phone subband between 3675 and 3700 kHz. This could have serious impact on U.S. cw operation now on these frequencies.

Of course, a 3675-3700 kHz Canadian phone subband is just one possibility. West Coast amateurs have been discussing a 3650-3700 kHz subband, and we have heard that another group may promote the concept of eliminating phone subbands altogether, leaving Canadian phone operation subject only to "gentlemen's agreement." (In the January CRRL-sponsored Survey, 67% of respondents opposed such a plan, 14% were in favour and 19% were undecided.)

Amateur organizations need more input on this important question. CRRL has asked for comments from all Canadian clubs, and would appreciate your personal comments as well.

CORDLESS TELEPHONES

Back in May, CRRL asked Communications Minister Fox to take action to eliminate interference caused by unlicensed cordless telephones operating on or near our 160-metre band. Within weeks, CRRL received a reply. The Minister felt that cordless telephones were here to stay, but that a new TRC-68 would provide interim safeguards. The final solution would be moving the telephones off the 1600-1800 kHz band to make way for a-m broadcasting between 1605 and 1705 kHz, as decided at WARC '79. The Minister felt that the CRRL proposal, to place labels on cordless telephones warning users of possible interference to and from licensed radio services, would be too cumbersome. He did feel that industry would be willing to place such warnings in their operating manuals. There was no hint of a ban on sales of telephones currently on the market, and there was no solution proposed for the interference that continues to be caused by telephones now in operation.

Since receiving this reply, DOC has issued its new TRC-68. DOC sees cordless telephones as low-power devices with a nominal operating range of 100 metres. Under the new rules, the telephones will be exempt from individual licensing provided they are type-approved by DOC. Operating manuals must contain this statement: *"Notice — This cordless telephone uses radio communications between the handset and the base unit, and may not ensure the privacy of communications. Other devices, including other cordless telephones, may interfere with the operation of this cordless telephone or cause noise during operation. Units not containing coded access may be accessed by other radio communicattons systems. Cordless telephones must not cause interference to any licensed radio service."*

"Any licensed radio service" — that's us. We'll never know if that last line in the warning was added as a result of the CRRL letter to Communications Minister Fox, but we like to think so.

DOC AMENDS REGS: LOGGING REQUIREMENTS DELETED

In a surpise move, DOC revoked Section 33 of the General Radio Regulations, Part 2, and eliminated the requirement that radio amateurs keep a log. There are exceptions, however. The holder of an Amateur certificate will have to present QSL cards — and a log showing an average minimum of five cw contacts a week over a six-month period — when applying for a "10-metre phone endorsement." (Incidentally, this endorsement also gives phone privileges on 160 metres and RTTY privileges on 80-10 metres as well.) He will also have to present QSL cards — and a log showing the same average number of cw contacts a week over a one-year period — when applying for fast-scan television privileges.

Another new amendment allows DOC to give the holder of an Amateur certificate temporary Advanced Amateur privileges if he lives in a remote area away from a DOC examination centre. These privileges would last for one year. Finally, DOC changed the official names of the various Amateur Radio certificates. They are now the Amateur Radio Operator's Certificate (AROC), the Amateur Radio Operator's Advanced Certificate (AROAC) and the Amateur Digital Radio Operator's Certificate (ADROC).

NEWS FROM ALL OVER

☐ Newfoundland amateurs kept a close watch on Tom McClean, G3WFQ/MM, while he attempted to set a record for navigating the smallest craft ever to cross the Atlantic. At presstime, it looked as if Tom would be successful. He and his 2.4-metre boat, the *Gilfer*, were only 500 miles from England.

☐ The 1983 Radio Society of Ontario Convention will be held at Inn-on-the Park, Toronto, on September 23-25. If you're there, don't miss the CRRL Forum at 9 A.M., Saturday, September 24.

☐ Finally, congratulations to Ernie Savage, VE7FB, who has recently re-elected British Columbia Section Manager. Ernie has to be the "longest surviving" SM/SCM on record. He held the post between 1949 and 1951, and has also held it continuously from 1961 to the present.

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Correspondence

Conducted By Peter R. O'Dell,* KB1N

All letters will be considered carefully. We reserve the right to shorten letters selected in order to have more members' views represented. The publishers of *QST* assume no responsibility for statements made herein by correspondents.

HOW'S YOUR SKILL

☐ Having been away from RTTY for a while, I got a complete electronic setup eager to get back in the swing. (Glad that the trash I print on the screen is not wasting paper.)

Often I print two stations in solid contact, both having reported the other as 59 copy. After every turnover, each one starts his transmission with a line or two of RYs then follows with lots of repetition. This "junk" on the air is not an occasional thing, but is a bad habit of about half the hams I print.

The RY string is particularly objectionable because it clutters the air for long periods, fills paper (or computer buffers) and is *not* necessary. Maybe, it is useful to establish a frequency for a net about to be called, or to test equipment, but not between stations in solid contact. The multiple KKKK or AR AR AR or SK SK SK are also trash on the air. One K means "I have finished my transmission. Waiting for your reply." One AR is the same, except that contact has not been established yet (used after a CQ). One SK means "I have finished my transmission and do not expect a reply."

In answering another station, all that is necessary is W1AW DE W6GGR, etc., if there is a question as to which station is being addressed. Otherwise, all that is needed is DE W6GGR, etc. for two stations in contact. — *Tom Monroe, W6GGR, Eureka, California*

☐ I heartily agree with the "Lids and Kids" and "...Older Kids" letters in the July issue.

How about adding "Back to you." Or doesn't K mean anything anymore? — *Clement R. Coggin, N5XA, Biloxi, Missippi*

☐ WARNING: Excessive use of the prosign BK can be damaging to one's credibility. BK is: incorrect, inept, misdirecting, misused, time-wasting.

If one is using BK instead of just plain K, one is working too hard. — *Dean E. Lewis, W7TC, Klamath Falls, Oregon*

☐ I have been in ham radio for 20 years and I especially enjoy working cw when I'm active. Over the last three years, I have been most inactive and am practicing to regain my concentration. I am copying cw QSOs on the air for practice, but am greatly concerned at what I hear. The cw today is almost universally sent by automatic electronic keyers, but the code is very sloppy. It's nearly impossible to copy many fists. Many hams strive for speed, but carelessly run all their letters together. Us are sent as Vs, Ss as Hs. The spacing between letters and words is crucial for good cw sending and receiving.

I have brought a great many people into ham radio and have taught several training courses. I couldn't overstress too much the importance and ease of sending and receiving good cw. It has been said by many hams, far more knowledgeable and experienced than I, that a ham is known by his fist. I personally often ask for comments from others about my fist during QSOs. Feedback is a healthy form of constructive criticism and turns a good ham into an *excellent* operator with a fist you can be proud of. So please slow down a little and get your act cleaned up. — *Herbert Lapp, N2GQ, Minooka, Illinois*

QSL BURO

☐ Well, the reason for this letter is the QSL Bureau. My bureau is in Sterling Park, Virginia, and does a great job. I wanted to let you know that they have done a very good job and really do get my cards to me with very good service. I think they don't really get the pat on the back that they should. I don't know if all of the bureaus work like this one does, but if they do then there is no wonder that the ARRL QSL Bureau System works so great. — *Fred Jones, WA4SWF, Louisa, Kentucky*

IS THE FCC GIVING US THE BUSINESS?

☐ What gives with the FCC's definition of "Business Communication"? I know that there are not many hams at the FCC and few in important positions, but where did this "clarification" come from?

If I understand the FCC rule correctly, it will no longer be possible to provide communications for things like a March of Dimes Walkathon unless they occur during a hurricane.

Usually, things like this have some warning before they are released. I would like to see in a future *QST* some history on this clarification if it's available. — *William E. Newkirk, WB9IVR, Melbourne, Florida*

[Editor's Note: Seems like everyone's been asking this question. ARRL's Counsel wrote FCC and asked for a clarification of their "clarification." The FCC's reply indicates that nothing has changed with respect to being able to do public service communications. It was simply a matter of poor choice of words. See this month's Washington Mailbox for details.]

DOING CHESS FINE

☐ Chess & Amateur Radio International, CARI, closed out its first year with nearly 150 members from seven countries, including Australia and New Zealand. It has been an exciting year for those who so thoroughly enjoy the merger of these two fine hobbies.

Although it is not necessarily so that all radio amateurs make good chess players, our experiences seem to indicate a reliable probability that chess players do make good Amateur Radio operators — very good ones, we've learned. CARI seeks nonamateur members as well as licensed ones, and we have a program to help them play chess over the air without the license (radiograms), or to become licensed if they wish. More information is available from CARI, P.O. Box 682, Cologne, NJ 08213. — *Vince Luciani, K2VJ, Cologne, New Jersey*

INTERNATIONAL STANDARD SILLINESS SCALE

☐ I'm amused and amazed by the silliness being promoted in the Oregon Senate and the Massachusetts Department of Public Health.

As anyone with the least training in the physical sciences can verify, all objects not at a temperature of absolute zero radiate incoherent electromagnetic radiation. These absurd regulations would prohibit the use of light bulbs, curling irons and cooking stoves. Rigorously applied, they would require that both states be cooled to absolute zero. While this can be useful in certain aspects of electrical power transmission, it does not really improve the total quality of life.

On the ISSS (International Standard Silliness Scale) these regulations rate right alongside the attempt in one state legislature to round pi off to an even 3.0. Is it asking too much to require that these people actually think through the implications of their proposals? Or have some modicum of understanding of the things they are trying to regulate? — *Denton Bramwell, K7OWJ, Minden, Nevada*

BOOTLEGGERS BEWARE

☐ A short while ago, I was receiving QSLs from stations I never had QSOs with. One ham in Iowa wrote me and said he had a QSO with a station using my call and wondered if it was really me. Someone was using my call! What a strange and surprising feeling. An alert ham later DFed this bootlegger, confronted him and told him if he didn't stop it there would be legal consequences. This guy apparently does not bootleg anymore. I am sure this isn't a first, but if the ARRL through *QST* keeps reminding hams from time to time to be on the alert, it will minimize the problem. — *James G. Swaney, W8UAB, Streetsboro, Ohio*

FEMALE HAMS — A SPECIAL INTEREST GROUP?

☐ I would like to support the statements by Linda Ferdinand, N2YL, in the July issue of *QST*. I, too, am a YL.

If I ever do anything great for Amateur Radio I would like it reported on a "general interest" page. If I do something minor for Amateur Radio, it should be ignored or it should be a "Stray." If it is important for all amateurs, it should be available to all.

My current interest in Amateur Radio is cw DX chasing. The DX stations I work often do not know that I am a YL unless I care to tell them. Certainly it makes no difference in a pileup. Why should it make a difference to *QST*?

There are many special interest groups covered in *QST*: DXers, vhfers, traffic handlers, etc. I do not object to the presence of a special interest group for women. It just isn't the thing for me. — *Susan M. Tannenbaum, KU2Q, Ancram, New York*

HE LIKES US AGAIN

☐ Some years ago, I let my membership expire. I felt that actions were being taken without assessing the membership. What I did not need was a "big brother."

With your June issue, I feel that this condition no longer exists. I refer to the issue of "no-code." I do not agree with the no-code license proposal, but I am pleased that the membership was assessed. As per pages 9 and 10, those were the magic words that changed my feeling. — *Leon V. Hance, W4YFZ, Elberta, Alabama*

*ARRL Public Information Coordinator

FM/RPT

Conducted By Stan Horzepa,* WA1LOU

FCC Endorses Frequency Coordination

The FCC will back repeater coordinators in disputes with renegade repeaters. That is the message contained in a letter from FCC Private Radio Bureau Chief James C. McKinney to Steve Mendelsohn, WA2DHF, president of the Tri-State Amateur Repeater Council (NYC) and ARRL Vice Director. The Council has a long-running dispute with one club that has attempted to put an uncoordinated repeater on frequencies occupied by two nearby repeaters.[1]

It appears that operators of the renegade repeater may be cited for not observing good amateur practices. If they persist, they will be cited for deliberate and malicious interference. In these disputes, the FCC will rely on nationally promulgated band plans, coordination records, correspondence and, absent any other official documentation, The ARRL *Repeater Directory*.

In an interview, Mendelsohn said the council is still negotiating with the renegade group. Apparently, they've attempted to get around the rules by moving their operation halfway between two standard channels. Now, according to Mendelsohn, they are interfering with four repeaters instead of two! (from *The ARRL Letter*, May 26, 1983)

FCC Policy Spelled Out

Chief McKinney's letter to WA2DHF follows (the call signs and locations have been deleted to protect the privacy of the individuals involved):

Dear Mr. Mendelsohn:

This is in response to your recent letter concerning the Commission's views on frequency coordination for amateur repeater stations.

The Commission's fundamental policy in this matter was stated in the Report and Order in Docket 18803 (Repeaters in the Amateur Radio Service):

"The Commission is persuaded by the comments and by observation that regional and national frequency planning and coordination by amateur radio operators themselves can result in the best spectrum utilization appropriate to the service."

The only national planning for Amateur Radio Service frequencies that has come to our attention is that done by the American Radio Relay League. The 1982-83 edition of the ARRL *Repeater Directory* lists over 5600 stations in repeater operation all over the United States and Canada. In view of this widespread acceptance of their band plans, we conclude that any amateur who selects a station transmitting frequency not in harmony with those plans is not operating in accord with good amateur practice. The ARRL *Repeater Directory* lists the frequency pair 144.xx/145.xx MHz as a repeater channel. Therefore, designation of this channel by the regional frequency coordinator in your area is in accord with the ARRL national band plan.

The ARRL *Repeater Directory* does list amateur radio stations W2xxx and K2zzz as being in repeater operation on frequencies 144.xx/145.xx MHz in [deleted], New Jersey, and [deleted], New York. It does not show a listing for a station in [deleted], New York. Additionally, the *Directory* indicates that W2xxx and K2zzz have been coordinated by C. H. Harrison (K2MZ), who is recognized by the ARRL in the *Directory* as the frequency coordinator for Northern New Jersey, Connecticut and New York City-Long Island. Therefore, absent any information to the contrary, it appears that W2xxx and K2zzz are being operated in accordance with the ARRL plans.

Continued transmitting on frequencies 144.xx/145.xx MHz in a manner which creates interference to W2xxx and K2zzz in repeater operation would be cause for the issuance of an Official Notice of Violation of Section 97.78 of the Commission's Rules and Regulations for not observing good amateur practice and could be cause for an additional Notice of Violation of Section 97.125 for deliberate and malicious interference.

Coordinate, or Else?

If you own an amateur repeater, the preceding letter is significant. To ensure the continued operation of your repeater, you should coordinate it with the local frequency coordinator and register it annually with the ARRL for inclusion in the *Repeater Directory*. If your repeater is not coordinated, you will be the loser at the Battle of Gettysburg (so to speak) in a "repeater war" with coordinated repeaters. It's as simple as that! Listing in The ARRL *Repeater Directory* puts others (including the FCC) on notice that your repeater is in operation on coordinated frequencies. Interloping repeater operators will think twice before messing around on your FCC-backed frequencies!

After the FCC stopped licensing repeaters in 1977, any amateur (except Novices) could place a repeater on the air at will. And many did. To prevent the resultant abundance of repeaters from interfering with each other, the FCC now suggests that repeater operations stick to a recognized band plan — the ARRL band plan — which in various forms is administered by local frequency coordinators. In effect, the FCC has passed the job of licensing repeaters to the amateur community, specifically the frequency coordinator. The ARRL *Repeater Directory* is just that — a directory of "licensed" repeaters (although some coordinated private repeater systems choose not to be listed in order to maintain their private status). If your repeater is not coordinated, it is not "licensed" by the amateur community.

Some uncoordinated repeaters do operate within the band plan, i.e., they are operating on a standard repeater frequency pair — for example, 146.34/146.94. These pirates will argue that they are "legal" because they're operating on a standard channel. However, operating according to the band plan is more than simply sticking a repeater on 34/94. Band-plan operation is a coordinated effort requiring cooperation among all repeater operators. And the focal point of this cooperation is the frequency coordinator. Operating on 34/94 without seeking the advice and consent of the rest of the repeater community is as poor an operating practice as operating on a nonstandard frequency pair.

If your repeater is uncoordinated, why not consider getting it "licensed" by the amateur repeater community, and guarantee the continued operation of your machine. Register your machine(s) with the ARRL before November 1 either by mailing a completed form CD-240 (available from Hq.; s.a.s.e., please) or by sending the essential information about the repeater — location, sponsor, input and output frequencies, and call sign.

Frequency Coordination?

The average user may not know (or care) if the repeater he frequents is coordinated. Furthermore, he may not know what coordination means. If his favorite repeater is uncoordinated and the FCC pulls the plug, however, he will find out fast (the hard way).

According to the FCC, good amateur operating practices require that repeaters operate within a recognized band plan. Operation within the plan requires cooperation among all repeaters. The frequency coordinators are the administrators of this cooperative effort.

When an amateur submits a proposal for a repeater to a frequency coordinator, the coordinator attempts to select a pair of frequencies that do not cause interference with other co-channel repeaters; that is, repeaters already operating on the same frequency pair. Co-channel repeaters may be located within the coordinator's jurisdiction or in adjacent jurisdictions. The coordinator checks that there is sufficient distance and/or natural barriers (mountains) between the proposed repeater and co-channel repeaters to prevent interference.

The coordinator must also check for adjacent-channel interference; that is, interference between repeaters operating on adjacent frequencies. Adjacent-channel interference crops up in areas using 15-kHz frequency spacing with repeaters that are physically close to each other.

Once the proposed repeater has passed the muster in regard to co-channel and adjacent-channel interference, the frequency coordinator stamps his seal of approval on the proposal, and the repeater can go on the air interference-free and in operation according to good amateur practices.

REPEATER LOG

According to reports received between May 10 and July 11, repeaters were involved in the following public service events: 39 weather emergencies, 4 crimes, 11 medical emergencies, 232 vehicular emergencies, 10 fires, 4 search and rescues, 91 public safety events, 58 drills/alerts and 6 power failures.

The following repeaters were involved (followed by the number of events): WR1ACZ 1, W1AFX 1, WA1DKL 2, K1FFK 1, K1LT 2, K1XR 2, N2BJ 2, K2BR 1, WA2DQL 2, N2MD 1, W2ODV 5, WA2PAV 11, K2QIJ 7, WB2RUH 4, W2VL 53, WB2ZII 6, WA2ZWP 9, N3AIA 3, N3BFL 9, AA3C 1, W3EUP 1, WA3OHI 1, WA3ROW 1, K3RZF 1, W3UER 3, W4BEJ 1, KA4BQH 2, N4ETG 2, K4HY 1, WD4JXR 1, WB4QES 16, WA4SWF 14, KA4WTT 2, WB4YZF 1, W5ND 1, VE5RRG 1, W5RVT 11, WD6AWP 6, W6GAE 2, KH6H 3, KH6HHG 3, WB6HUK 4, K6JE 5, K6LSB 1, WB6QHB 3, K6TZ 1, WA6ZTT 2, K7CC 4, W7EX 113, KC7FA 1, W7HSG 10, K7OMR 14, WR8AHC 1, K8DDG 15, WA8EFL 8, WD8IEL 14, WD8KRG 1, W8MVE 1, KA8OFE 1, WD8SBD 2, WA8ULB 2, W9AIU 1, W9KXQ 1, W9RF 2, KB9S 1, WB9SBO 1, WA9THF 1, WØAFG 5, WØAK 1, NØBIB 2, WDØBQM 6, WBØFPI 1, WDØGWV 1, WBØHAC 3, WAØMJF 1, WØNYG 1, WAØRDC 2, WBØSBH 3, KØSCM 14, WØVQR 4.

[1]For another discussion of repeater frequency coordination, see Washington Mailbox, August *QST*, p. 63.

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How's DX?

Conducted By Ellen White,* W1YL/4

The Spratly Story — DJ6SI

On April 10 of this year, the Amateur Radio DX world was electrified by the message NØZO/DU2 received from DJ3NG/MM, enroute to the Spratly Islands: "We are being shelled, fire on board." For the 10 days following, all DXers waited fearfully for further news of this now ill-fated venture. In mid-June, DJ6SI sent your DX editor his copyrighted story, edited to fit column space considerations.

DJ4EI, killed off Amboyna Cay on April 10, 1983 during the abortive Spratly DXpedition.

VS6CT with Spratly disaster clippings displayed at the April Visalia DX Convention. *(W1YL photo)*

DJ3NG (rear), who died on April 19, with DJ6SI during happier days, May 1980 on Glorioso.

"In February of this year, several members of the Cologne DX Club met to discuss the possibility of an expedition to Peter and Paul. Gero, DJ3NG, and I doubted that there was sufficient DX interest in that venture, deciding to pool our resources to activate IS. Spratly was needed by many DXers, and there were no tedious licensing procedures to follow. The most likely starting point looked to be Brunei, but we were told that there were no suitable available boats there for the proposed trip to Barque Canada. I discovered an advertisement by a German captain, Peter Marx, who chartered his catamaran from Singapore. In addition to contacting him, we had constant schedules with Henner, 9V1WC, leading to very satisfactory initial preparations.

"Our journey was originally planned to start on March 21, but Captain Marx advised us to delay it slightly since the monsoons had lasted very long this year. The captain's departure preference was for April 3. Thus, on March 31, DJ3NG, DJ4EI, DF6FK and I flew from Amsterdam to Singapore, where we were met by 9V1WC. We made last minute purchases and, on Easter Sunday, took all of the equipment on board, leaving the mooring at 1500 hours local time. During the next few days we sailed through the Straits of Singapore, passing the Anambas and North Natuna Islands.

"With equipment on board, we kept in touch with SEANET, 9V1WC and Cologne. The monsoons were still blowing strongly from the northeast, resulting in our timetable being set back. After passing the Natunas, the ship traffic lessened and we were soon completely alone.

"On April 10, just a week after we started, winds permitted us to go under sail for the first time. However, this resulted in our inability to adhere to our marked destination, which was Barque Canada at 8° 04 'N, 113° 12 'E. Enroute was Amboyna Cay, 7° 53 'N, 112° 55 'E, which we wanted to use for a navigational fix. A landing was not intended. (We were unsure if there was a garrison, or some other similar establishment, on Amboyna Cay.) We reefed the sail and slowly approached Amboyna under engine power. As we could not observe any buildings from that distance, we had the impression that the sandbar was unoccupied. It then occurred to us that if it was indeed unoccupied, we might not need to go all the way to Barque Canada, thus catching up with our timetable which was already two days behind schedule.

"A hut-like building came into view, as well as three antenna masts (but no recognizable antennas), as we approached more closely. There were no people in sight. However, at a distance of about 2 km, we saw a watch tower and immediately changed course. Although we had hoisted the German Flag, we could see no flag on the island. As we changed course, we saw the first person, who was standing on a tower giving hand signs. We knew what his signals meant as the shelling began. The first shot fell short. The second round of three shots on each volley felled the captain, hitting him in the right side of his chest. The third round hit our entire gas supply (approximately 32 gallons), stored on the quarterdeck. That part of the ship also housed the dinghy and the lifebelt with flashlight.

"Gero was on 20 meters at that time, transmitting the fateful message to Pat, NØZO/DU2. On the foredeck, we found that DJ4EI was missing. He had been standing beside the gas tanks before the explosion. Had he been shot? Was he burned? Had he fallen into the sea? Perhaps all of it. I will never forget his last words to me: 'My God, I can't swim.' The ship was now ablaze and poisonous smoke made breathing difficult. The shelling continued without interruption. I was hit on the elbow while connecting empty gas barrels with ropes. DF6FK tore one sleeve off his shirt and applied a torniquet to my arm. Norbert later was hit by shell fragments. The heat was now unbearable. We slipped into the water, grabbed the ropes with which we tied the tanks together, and thought we could swim to Amboyna Cay. A new round of shots made it very clear that we were not to be given a chance. Everything would be destroyed.

"Peter Marx located the dinghy. A fortunate coincidence led to the fire burning through the rope which fastened it to the ship. Peter asked his wife Jenny if she thought she could get to it. Masked by two empty barrels which she held before her, she reached the dinghy and rowed in our direction. Again we called for Diethelm, DJ4EI, but there was no sign of him. At the time of the attack, we were southwest of Amboyna Cay. As the wind blew from the northeast, we drifted away from the sandbar. About an hour later, the shelling ceased as we drifted out of range.

"We were all in minimal clothing. The boat contained just a screwdriver, jar, small basket, cloth and a plastic bottle with the top cut off for scooping. *No* water, *no* food, *no* signaling apparatus. Underneath the waterline midships, we discovered a leak caused by a bullet hole, which we stopped up with rags. The sun went down. Being so close to the equator the night lasted a very long time. The next day we lived with the hope that a big plane would arrive from Manila. Nothing happened. Another day dawned with good weather. No plane. This region was marked as dangerous grounds on the sea charts, an area avoided by ships. On the fourth and fifth days, we were sure than no one was looking for us. We became tortured by thirst. DJ3NG tried to distill water. We greedily swallowed small fish swimming into our basket. To our despair, we even lost the basket.

"I unscrewed the steel plate which was meant to hold an outboard engine and engraved the date of DJ4EI's death. Now Gero, DJ3NG, began to weaken. He had very sensitive skin and was tormented by sunburn and chills. On the 6th and 7th days, ships passed and we knew that now we were being carried into the shipping routes. On the 9th day, at about 1300 hours local time, I had to engrave Gero's death on the steel plate. It was terrible not to be able to help. Norbert told us that Gero had swallowed sea water during the night. At 1400 hours, I said a prayer and we buried him in the sea at about 7° 52 ' N and 109° 44 ' E. I told our crew that I heard a voice, during

*19620 SW 234 St., Homestead, FL 33031

the second night, tell me that we would be rescued on the 10th day. Shortly afterward, I saw an unmarked plane flying in circles. We hoped it was looking for us, but it was interested in a Russian trawler passing on the horizon.

"The following day ships passed in the afternoon, some quite near. Norbert was in a very bad state and had hallucinations. He would not survive another night. The captain's condition was worsening. Suddenly a ship passed closely, about 200 meters away. We waved frantically. It passed very quickly and our spirits dropped. But Jenny noticed that the ship had changed course. It circled, found us again, and we were taken on board.

"The Japanese crew of the *Linden* cared for us marvelously. Our wounds were looked after, cabins cleared for us, clean beds and clothing provided.

"Upon arrival in Hong Kong, we were examined by a physician brought onboard the ship. A police patrol boat then brought us to the dock where we were taken by ambulance to the Queen Mary Hospital. After initial hospital care, we went to the hotel where we received treatment from doctors of our choice. Henner, 9V1WC, and his wife Brigitte welcomed us most heartily when we reached Singapore.

"Our material losses included: Omni, IC-720, IC-730, Matchbox, Elbug, microphones, headphones, beams, masts, dipoles, two generators, tools and about $10,000 U.S. This was in addition to our clothing, money, flight fares, etc. All the material things can be replaced. Not, however, the grievous loss of our dead friends, DJ3NG and DJ4EI.

"I have written to our government and proposed that the captain, first officer and crew of the *Linden* be decorated for their efforts. We will always be grateful. We will never forget them."

The perils of DXing.

FIRST INTERNATIONAL DX AND CONTEST SYMPOSIUM

The 1983 ARRL National Convention, Oct. 7-9 in Houston, Texas, is covered in full elsewhere in this issue. If there is any chance you can be in the area, don't miss it! Among the many outstanding events, sponsored by the Texas DX Society, will be a forum to openly present issues of vital interest to the DX and Contest fraternity: excessive power, list operation, contest ethics, etc. Among the invited panelists who will be attending are N6AA, K4BAI, W9RE, KV4FZ, W6AM, W5IO, KH6BZF, N4IN, KØTO, G3FXB, N4MM, K4FW, W6OAT, W4KFC, K1ZZ and W1YL. Other symposia topics will include Heard Island DXpedition by K8CW, Spratly by K1MM, African DXpeditions by the Colvins, Amateur Radio in China by the venerable W6AM, and super stations. TDXS will host their world-famous hospitality suite, a Friday night Texas-style barbecue, and a code-recognition contest. Check the full story, and make your ticket and hotel reservations now.

DXPEDITION AROUND THE WORLD, 1984-85

N3TM's recent mailing whets the appetite for faraway places. The voyage will leave from Key West on February 18, 1985, with the first-month segment ending in Senegal, continuing from Senegal with further one-month forays, ending, successively, in South Africa, Mauritius, Indonesia, Papua New Guinea, New Zealand, Tahiti, Juan Fernandez, Argentina, Trindade, Trinidad, through the Carribean to Key West. Interested in accompanying a select group of 12 on board a three-masted, steel-hulled schooner designed by the Australians and built by De Graff? Contact Thayer K. Miller, N3TM, Box 48, Harmony, PA 16037, tel. 412-452-7343.

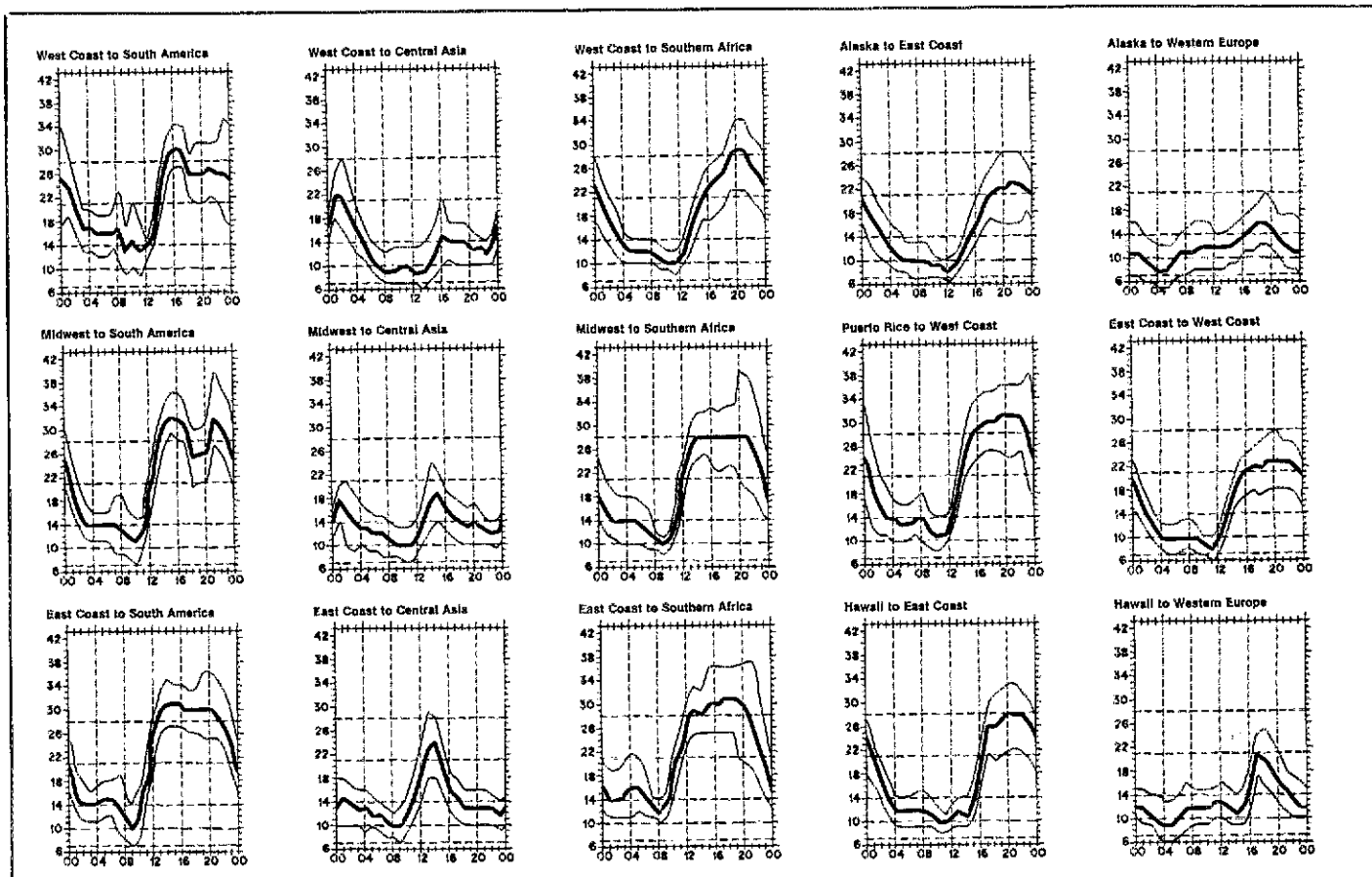
30 METERS

Who can use the new 10-MHz band? Well, the member-societies of the following countries have notified IARU/ARRL Hq. of the availability of all or parts of this band for their amateurs: Algeria, Australia, Austria, Bermuda, Botswana, Canada, Cayman Islands, Colombia, Costa Rica, Denmark, Djibouti, Dominica, Faroes, France, Federal Republic of Germany, Honduras, Indonesia, Israel, Japan, Luxembourg, Malaysia, Malta, Monaco, Netherlands, Netherlands Antilles, New Zealand, Nicaragua, Nigeria, Norway, Panama, Papua New Guinea, San Marino, Solomons, South Africa, Spain, Suriname, Switzerland, Syria, Tonga, Trinidad and Tobago, United Kingdom, USA, Western Samoa and Yugoslavia. This is for your own private country count — no contest/awards credit for this narrow segment!

CHINA

In late March, K6DT was on a business trip to Beijing and furnished some interesting data re BY1PK. Because he was involved with high-level government officials, K6DT was able to make arrangments to visit the station. Ed notes that you must make arrangements with the government to visit practically anyone in China, and that people going through as tourists probably would not be permitted to contact BY1PK unless they have made such arrangements.

As of that time, the new location was in effect, on the top floor of a new five-story building. The TH6DXX is in place on top of a 20-foot steel tower mounted on the roof. The crew has already received the kit to make the antenna into a TH7, and that should occur shortly. They also have an all-band longwire antenna, similar to that being used by the large broadcast station in Beijing. This antenna is suspended between two towers, one of which is the TH6DXX tower,



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. Once 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

about 20 feet above the roof and broadside north-south.

Through an interpreter, Ed spoke with Tong and the secretary of the Chinese Radio Sports Association, Wang Xun. The FT-107 and an HL-2000 linear amplifier were still waiting to be moved from the former location to complete the new installation.

In mid-July, the rumor mill indicated that the ubiquitous K1MM had managed a one-day operation from BY1PK. AS

THE CIRCUIT

☐ Bahrain: In mid-June, after six happy years, A9XCE/A92CE (the one and only cw station) ceased operation. Ed wants to reassure one and all that all cards will be answered. Expect him to be QRV from 5B4 almost immediately.

☐ St. Paul: Look for big doings the last week in September to include ARRL Hq. staffers W1OD, N1CIX/JH1VRQ and W1GNC.

☐ NCDXF Beacon: Page 64 of the April issue detailed the worldwide Northern California DX Foundation Beacon Net on 14,100 kHz. At just about the time that information appeared, the OH2B beacon was officially inaugurated at Helsinki. This beacon, located at the Helsinki University of Technology, is a North European link.

☐ Abu Ail: A note from J28DL/F6GBQ apologizes for lack of the planned May 1 activity. Simple reason — unavailability of a ship. Keep hopeful about F6GBQ/AA; QSL Mgr. F6ESH.

QSL Corner

Administered By Joan Becker, KA1IFO

ARRL-MEMBERSHIP OVERSEAS QSL SERVICE

Send outgoing cards to this address: American Radio Relay League, 225 Main St., Newington, CT USA 06111.

This is an "outgoing" service that allows ARRL members to send DX QSL cards to foreign countries at a minimum of cost and effort. While QSLing direct to foreign amateurs is faster, it is also more tedious. Time spent searching for addresses in the foreign *Callbook*, addressing and stuffing envelopes, and mailing could be better spent operating DX. And, the cost of IRCs, airmail postage and envelopes can be prohibitive.

An unlimited number of QSLs may be sent for distribution 12 times per year. The fee is just $1 per pound or portion thereof (155 QSL cards average a pound).

The ARRL-Membership Overseas QSL Service operates *only* in an "outgoing" capacity. To receive QSLs from DX stations, see "The ARRL DX QSL Bureau System," in December 1982 *QST*, page 77, or send an s.a.s.e. to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.

U.S. amateurs may send SWL reports to foreign shortwave listeners. Unlicensed (associate) members may send SWL cards to foreign amateurs. QSL managers: write for details.

Requirements

1) Presort your DX QSLs alphabetically by call sign prefix (A3, AP, C6, CE, F, FG, G, GI, GM, JA, 3A2, etc.).

2) Enclose the address label from the brown wrapper of your current copy of *QST*. This information shows that you are a current ARRL member. Family members may also use the service by enclosing their QSLs with those of the primary member. Include the appropriate fee with each individual's cards and indicate "family membership."

Sightless members who do not receive *QST* should indicate that the QSLs are from a "sightless member."

ARRL affiliated club stations may utilize the service when submitting club QSLs by indicating the club name. Club secretaries should check affiliation papers to ensure that membership is current.

3) Enclose payment in the form of a check, money order or cash. Sending large amounts of cash through the mail is not suggested. Please do not send stamps.

QSL Information

Here is some 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.

CR1APP CT1 Bureau
CR1OF (CT1OF or WA3HUP)
CT3DJ P.O. 742, Funchal, Madeira
CX7BY (W0IJW)
C3OLA (EA3CTE)
C53DF (G3LQP)
DA1WA/HB0 (DJ0LC)
DU7RLC (VE2FGS)
FM0HOR (K6YRA)
FM0HVL (F6AJA)
HP3JRP (K4WVX)
HT1JCC Box C 89, Managua, Nicaragua
J37AJ (W2KF)
JW0A (LA5NM)
J73YB P.O. 266, Roseau, Dominica
T30AB (W7YL)
T77C (M1C)
TO2KL (F2KL)
TO7GAS Box 444, Guadeloupe
TZ6BMA A. Povin, BP 1981, Bamako, Mali
VP2MIU (AB1U)
VP2MRA (VE5RA)
YL3M (UK3MAA)
ZF2GT (WA0KNF)
3D2CJ (GW3JI)

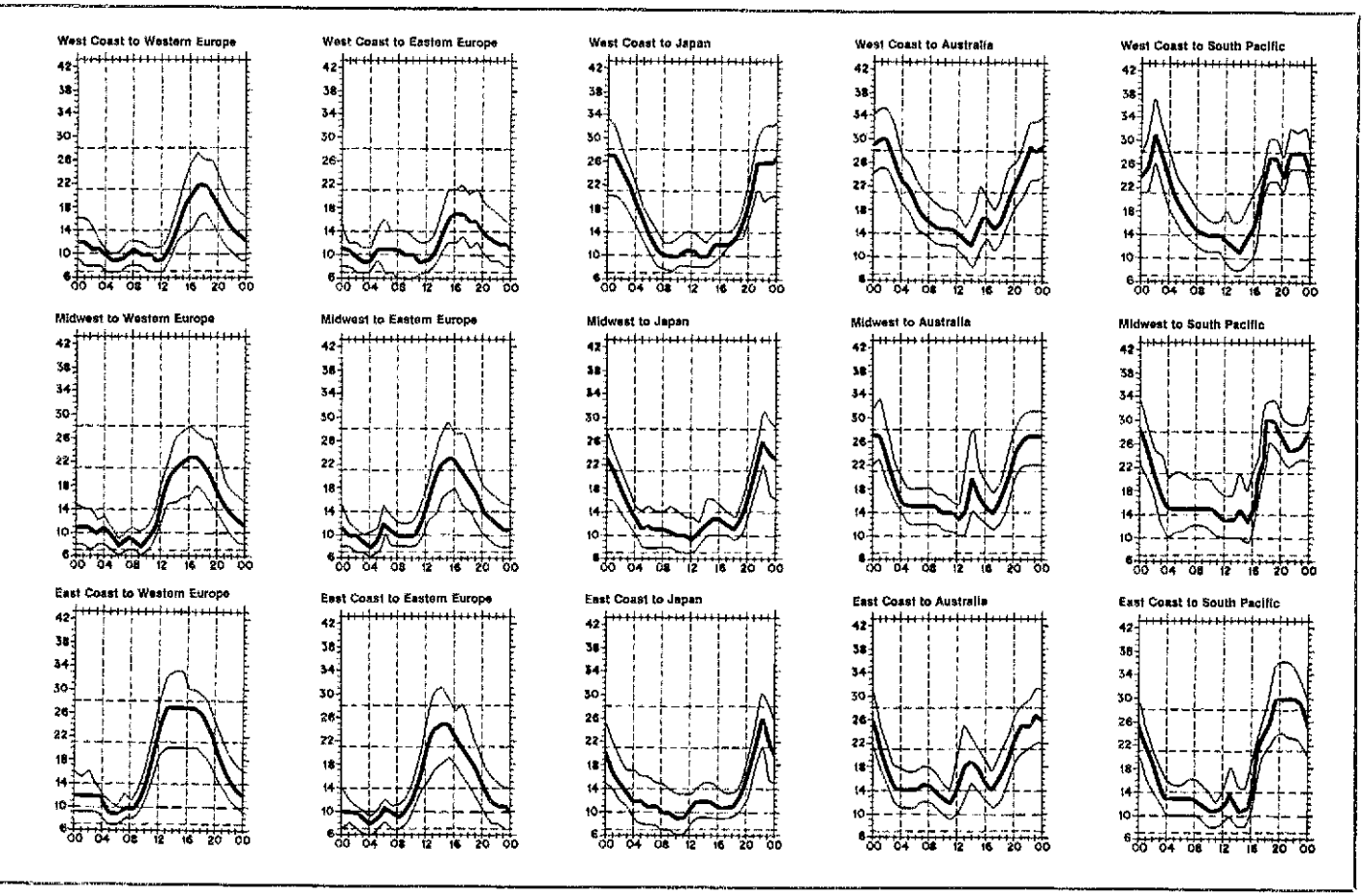
Special Notes

☐ If you had a KZ5 call (Canal Zone) you may have cards at the ARRL Outgoing Overseas Membership Service Bureau. To claim these cards, please send a self-addressed, stamped envelope to ARRL, 225 Main St., Newington, CT 06111.

☐ New VE5QSL Manager: Norm Waltho, VE5AE, 1547 Glendale St. W., Moose Jaw, SK S6H 7B3.

☐ AD1E is not manager for H44SH.

☐ June 1983 QSL Corner, page 69, contains information and addresses for the Incoming Bureaus. For information on bureau operations (Incoming and Outgoing), send a self-addressed, stamped envelope to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.



lowest curve (optimum traffic frequency, or fot). See April 1983 *QST*, page 63, 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 September 15 to October 15, 1983, assume a sunspot number of 73, which corresponds to a 2800-MHz solar flux of 123.

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 June 1 through June 30, 1983. 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

DF6FP/107 HB9AWS/103 JN1AFQ/110 PY2TM/310 XE2AW/206 WA2BUO/102 N4AAA/102 K6HLR/211 N8DLR/124
DF9NN/104 HL9DX/129 JN1JAH/126 SM5MNB/160 XE1XF/262 KB3YJ/105 NN4K/183 KB6WI/139 N9DL/103
DL4DAB/135 I5FLN/330 JE2EDQ/157 SV5FD/108 5R8AL/105 N3BMV/100 WD4ABO/104 KU8P/105 W9ALZ/107
DL9MAB/105 I1BHI/120 JJ3FOZ/106 V3FB/105 9H1FQ/105 W3ANR/110 KT5F/239 W6BDI/310 KØFD/142
EA8RCT/101 J6LT/103 JE6NMH/101 VE1RH/110 K1ANT/110 WB3BJY/103 N5ANH/105 WB6GMM/133 KØIQ/101
EI8EI/107 JA1CJF/117 JA7BWT/130 VE2GIT/126 KB1CN/107 KC4TJ/201 N5CPG/102 K7JPF/134 KNØO/205
EL2AM/104 JA1OHP/110 KL7KV/105 VE7DYX/126 N1AU/181 KC4ZH/130 W5EC/252 KC7TB/105 NØCRK/101
F5OJJ/134 JK1OPL/316 OZ8RY/121 VE7EGD/101 K2SVV/109 KD4W/148 AE6C/101 K8BZ/100 WAØRUD/110
HA5DW/109 JL1BYZ/109 PA3AOA/104 VKØJS/100

Radiotelephone

DF6FP/107 G2DPA/108 JH4KMA/142 V3FB/105 K2ON/100 N3CWP/100 NY4X/174 WA6DGK/106 KQ7U/109
DL7MAE/246 G3OLY/110 JE6NMH/101 VE2GIT/126 KJ2B/118 K4JDJ/109 W4GBT/207 WB6GMM/125 W7MCG/161
DL9MAB/100 G4JCO/113 LU1ABT/103 XE2AQ/150 KW2Z/100 K4UEE/262 KA5GRP/105 WB6UDS/105 KC8OH/148
EA1FP/113 JL1BYZ/108 OZ1ACB/107 6W8DS/102 WA2AKJ/102 KG4ZH/130 KT5F/210 WB6VJO/106 KC9BC/103
EA4BKE/164 JN1AFQ/109 OZ4ZT/115 9Y4RD/SU/110 WA2BUO/100 KB4Q/135 W5DYH/106 WB6WFA/123 WD9JK/125
EA7ARK/115 JE2EDQ/131 PY2TM/299 K1GVN/108 WB2BBA/112 NN4K/157 KE6DN/105 KC7GO/108 KØFD/129
EL2AM/102 JJ3FOZ/106 SM5JPG/106 N1AJK/100 KC3AD/100 NU4D/206 N6GBM/102

CW

DJ2PD/126 LA9XG/162 SM5MNB/157 XE2AQ/126 AF3E/107 W3PLI/181 KZ4V/101 K6HLR/155 ND6U/105
JK1OPL/210 OK1ZP/100 SMØKRN/114 KB1CN/105 K3WS/107 KA4YAE/100 W5HFN/127 KA6GKJ/102 W6NLG/101
JA4FHE/190 OZ1DKG/100 VE4MZ/125 KW2J/102 W3ANR/110 KS4Q/118 W5SG/104 KK6P/206 WA7ZWG/100
JH7UKB/108 PY2TM/295 VE7CJF/102 W2LPV/100

RTTY

OZ1CRL

5BDXCC

AG9S DL6WD KØJCF JA1ITX W6ZKM SV1JG K7EG JA1IBX SMØBZH
KS9Z AF1U HAØDU KB9KD W8ZF ON6HE UK3SAB LZ1WI KE9U
UK2BBB WD8MGQ K1VKO

Endorsements

Mixed

CE6EAT/295 I2MQP/300 SM6AYM/272 N1BRT/154 AE3S/294 N4DX/167 WB4EDD/311 W6NLG/290 WD8CRY/280
DF2HU/282 I2YWR/171 SM6DBB/311 W1ENE/264 K3FN/312 N4HH/309 WB4FTU/291 W6OKX/311 WD8MGQ/301
DF6MB/215 I5EFO/295 SLØZG/228 W1EW/330 KA3CTY/180 N4IA/314 WB4GNT/299 W6RON/290 K9BG/314
DJ1ND/272 JA1SVP/303 SMØKRN/163 W1IKB/309 N3US/310 N4OM/ 311 WB4PAB/309 W6SWM/291 K9UFK/125
DJ1QZ/208 JE1GBI/175 VE1BWP/200 W1MEW/241 W3HVM/203 N4TZ/267 WD4FWE/264 W6UZ/271 K9ZO/305
DJ3NW/313 JH1OJU/306 VE2FEX/279 W1TEE/184 W3KFQ/329 N4VZ/313 WD4HFV/180 W6VD/310 KB9US/300
DJ5PX/136 JH1VRQ/316 VE3XK/313 W1WEF/290 W3KV/331 NE4R/308 WD4IKI/225 W6VW/300 KC9EW/231
DK2UA/297 JR1BLX/291 VE7BAF/271 K2EUH/180 W3PLI/200 NU4N/229 WD4RCO/286 WA6BXV/225 KO9D/262
DK3KD/309 JR1EBE/303 XE1MDX/261 K2IJ/300 W3TVB/305 NZ4Y/274 WI4K/152 WA6TLA/313 KH9J/200
DK8NG/313 JA2DN/250 XE1OZ/153 K2JF/262 W3YY/309 NZ4Z/239 WM4Z/128 WB6RSE/303 W9AG/325
DKØBT/161 JA4FHE/317 YU1GTU/266 K2OLG/294 WA3IIA/128 W4CEB/268 K5QY/300 K7OXB/315 W9LNQ/330
DL3EAP/200 JR6BU/266 YU3AW/300 K2ON/299 AA4KT/305 W4FGX/285 KA5FUI/265 KA7AUH/302 WA9MAG/270
DL6QW/326 JA7FS/319 ZP5ALJ/300 K2OVS/200 K4AEB/315 W4MAF/264 KC5XA/227 KK7Y/169 WA9TVM/317
DL8WD/258 JA8CDT/315 AB1A/288 K2OWE/272 K4ITV/261 W4OWJ/335 KD5MD/252 N6ES/262 WA9VGY/290
DL7CS/330 JA9BAB/283 AD1V/175 K2UO/311 K4JAF/261 W4RIM/319 KD5RO/231 NB7R/225 WB9TIZ/204
DL7MAE/269 KH6CF/308 K1EFI/306 KB2NU/308 K4UEE/317 W4VWW/252 N5CB/260 W7HRD/250 WB9UAO/225
DL8MAG/285 LA5YJ/313 K1KOB/251 KC2YI/125 KA4PKB/239 W4VZB/323 N5XX/311 W7MCG/237 WD9ADB/296
DLØAA/292 OH2KP/272 K1ST/309 KJ2B/251 KC4GR/195 W4WKQ/199 NA5C/260 W7ZI/290 WD9IIC/297
EA3CTI/255 OH2LP/204 K1UO/310 N2BIM/286 KC4IT/295 W4YKH/315 NA5U/155 WA7CGR/206 KAØALX/218
EI2CR/172 OH5OZ/235 K1VHS/298 N2CIC/139 KC4UQ/278 W4ZWE/297 W5SG/300 KA8LAQ/229 KAØE/273
G2GM/305 ON6OS/307 K1VJH/303 N2DT/305 KD4RR/184 WA4DAN/303 W5VJP/304 KC8YW/154 KNØOJY/262
G4ISK/200 ON6YH/246 KA1UE/175 W2HAZ/317 KN4B/308 WA4FVT/301 WD5ELJ/199 KG8V/320 KRØS/125
HB9AFI/305 OZ8AE/199 KB1U/261 W2OEH/298 KR4F/285 WA4JJW/294 AA6AA/307 KO8J/294 NØBG/263
HB9BYZ/207 PY5WD/312 KE1F/291 W2PD/305 KS4Q/207 WA4JZS/185 K6JAD/318 N8AAT/270 WØIJN/223
HB9MO/340 SM4IKU/232 KM1R/125 W2TA/314 KX4R/301 WA4VDE/308 N6CR/309 N8BQI/129 WØKZV/307
HB9WZ/266 SM5ACQ/261 N1AC/304 WA2MTI/301 N4DSS/210 WA4ZBK/257 N6MA/257 N8TN/320 WØUO/293
HKØEHM/271 SM5BFC/307 N1AFC/250 WB2KJL/262 N4DVW/263 WB4BBH/178 W6CRE/302 WB8RJX/298 WAØVBW/224

Radiotelephone

CE3BBW/202 HKØEHM/271 ON6NY/286 KA1UE/167 AE4Z/301 WA4HNL/268 WD5HEG/157 WB6UBR/210 K9PPY/315
CE6EAT/283 I1SBU/239 ON6OS/264 N1AC/293 K4AEB/315 WA4VDE/305 AA6AA/306 K7NW/201 K9UFK/124
DF2HU/275 I2MQP/299 ON6YH/196 W1ENE/190 K4BVQ/330 WA4YED/176 K6DQ/275 K7OXB/300 KB9US/300
DJ1HN/184 I5EFO/293 ON7FK/234 W1FJ/304 K4DLI/252 WA4ZBK/197 K6JAD/316 KA7AUH/300 W9AG/265
DJ1QZ/208 I8IHG/280 PY2AQQ/260 W1NBE/142 K4MG/320 WB4FQP/288 KD6BE/226 KB7HB/253 W9DE/291
DJ2AA/329 JA1GTF/300 PY4VX/301 K2OLG/293 K4URK/291 WB4GNT/298 KD6CN/174 KB7YX/227 W9FNN/285
DJ3CP/298 JA1PNA/316 PY5WD/289 K2UO/309 K4XG/318 WB4HPJ/213 N6CR/309 N7BES/260 W9HUW/126
DJ3NW/202 JH1IFS/318 PP8DD/289 N2BIM/279 KA4PKB/237 WB4KTG/290 N6MU/306 NB7R/217 W9NIO/250
DJ7EV/212 JH1OJU/299 SLØZG/176 N2CIC/139 KB4IT/296 WD4HFV/180 W6AXH/318 W7DSZ/291 W9QQ/314
DK8MZ/301 JH1VRQ/310 SM4IKL/210 W2FG/327 KC4GR/181 WD4IKI/205 W6BDI/310 W7KTI/285 WA9VGY/282
DK8NG/306 JR1BLX/289 SM5BFC/297 W2IOO/312 KC4IT/288 WD4KXB/271 W6CF/276 WB7SGU/222 WB9EBO/312
DL1EV/160 JR1EBE/285 TR8DX/187 W2MIG/316 KC4TJ/201 WI4K/151 W6CRE/293 WB7SGV/202 WD9ADB/296
DL6QW/299 JA3BG/281 VE3BTQ/W4/170 W2OEH/292 KD4RR/182 K5GH/318 W6KON/317 K8EX/262 WD9IIC/255
DL8MAG/179 JA3GM/308 VE3EG/184 W2PD/270 KN4H/278 KA5BWU/177 W6LLV/150 K8GWM/306 WD9IRQ/122
DL9VS/317 JA3MNP/317 VE7AAQ/323 W2RS/263 N4KG/316 KB5HG/259 W6NLG/283 K8NN/306 KØALL/312
EA3BDE/225 JA4FHE/311 VK9NS/265 W2SY/320 N4TZ/163 KC5XA/225 W6RON/282 K8ZR/315 KØIFL/301
EA5BCX/226 JA8BMK/293 XE1MDX/261 WA2NBV/161 NE4R/296 N5UD/305 W6SWM/274 N8BNE/152 KNØL/186
EA5SP/250 JA8UUA/176 XE1OZ/153 WB2DND/280 W4AXR/333 W5FFY/204 W6UY/318 N8BQI/128 KNØO/189
EA7HG/162 JH8MXH/260 YV5ANQ/329 K3UA/300 W4EBO/303 W5SG/289 W6ZYC/321 W8TA/254 WØCD/315
EA7SJ/127 KA2BLJ/142 ZP5JAL/155 K3WS/304 W4JHE/296 W5SGI/284 WA6LOD/236 WD8CRY/274 WØSR/316
F6DZU/301 LA3XI/316 ZP5MJO/202 N3ED/308 W4OMY/263 W5VJP/299 WA6OET/314 WD8MGQ/300 WØYZL/126
G4GED/180 LA5YJ/307 ZP5MJY/157 N3US/300 W4OWY/283 WB5CBJ/290 WA6SGQ/175 WD8MQJ/227 WAØGUD/225
HB9BEI/222 LU1BR/319 K1KOB/230 W3AP/310 W4QQN/331 WB5HGI/216 WA6VHZ/207 WD8MRF/201 WAØVBW/177
HC2RG/208 LU2DX/314 K1ST/294 W3NQA/200 W4RNZ/280 WB5QMZ/134 WB6GUX/127 K9FN/318 WBØOQV/292
HI8LC/300 LU3AJW/301 K1UO/310 W3WYP/DU/144 WA4DAN/298 WB5ROW/261 WB6RSE/264 K9JF/279 WDØAXF/203
HK8BVN/253 LU7MAJ/283 K1VHS/290 AA4S/295 WA4FVT/289

CW

DF2HU/173 JA1GTF/300 JA3MNP/268 SM5CGT/129 WA1AER/294 WB2KJL/177 KE4I/300 KT5F/200 K9BG/275
DJ1XP/271 JA1IBX/280 JA6BSM/297 SM5DAC/135 K2BZT/291 K3UA/283 KR4F/241 W5JW/282 K9GX/226
DJ4EY/184 JA1PNA/226 LA3XI/276 SM6AYM/272 K2IJ/284 KA3R/250 N4KG/287 K6JG/296 K9VAL/150
DK8NG/296 JA1UQP/258 LA7XB/156 AI1S/262 K2OWE/225 KB3MM/204 N4TZ/240 N6MU/280 W9AG/225
DL9YC/200 JH1IFS/290 OH5OZ/197 K1EFI/254 K2UO/301 N3ARK/229 N4VZ/290 W6OKX/265 W9GW/275
EA3CTI/169 JH1VRQ/285 ON6YH/176 K1KOB/129 KF2F/160 W3AX/150 NU4N/139 W6UY/275 WD9IIC/274
F6CRT/270 JR1EBE/282 OZ8AE/187 K1ST/230 W2LZX/280 W3QIR/151 NZ4Y/141 K7NN/230 KØJCF/261
GM3YOR/230 JA2MGE/282 PY2DFR/240 K1VHS/282 W2MIG/295 WB3JRU/235 W4RHZ/148 W7EDA/261 KAØE/255
HB9WZ/256 JA3BG/270 PY5WD/283 K1VJH/151 W2RS/252 K4AEB/178 W4YN/224 W7MCG/193 KRØO/218
HH2VP/206 JA3BQE/292 SLØZG/178 N1AC/287 W2SSC/225 K4ITV/260 WA4DAN/277 KN8Z/214 WØSR/300
HT1JCC/150 JA3CWD/202 SM4IKL/160 N1BAX/127 W2UI/220 K4UEE/252 WA4ZBK/195 K9AB/290 WAØVBW/161
JA1ELY/300 JA3GM/287 SM5ACQ/212 W1ENE/154 WA2CBB/255 K4XG/274 K5AQ/289

Honor Roll

The DXCC Honor Roll is comprised of those call signs which have been credited with at least 306 countries of the 315 current countries on the DXCC list.

MIXED

315

DJ2BW/358
DJ7ZG/342
DL1BO/357
DL1HH/350
DL1JW/353
DL1KB/361
DL3BK/353
DL3RK/358
DL6EN/356
DL7AA/362
DL7AP/354
DL7EN/357
DL7HU/350
DL8NU/337
DL9OH/352
F9RM/350
G3AAE/360
G3FKM/358
G3FXB/358
GM3ITN/349
GW3AHN/360
HB9DX/348
HB9MQ/358
HB9PL/350
HB9TL/357
I2KMG/341
IT9TAL/357
IT9ZGY/356
IØAMU/359
JA1BK/348
JA4ZA/342
LU6DJX/365
OE1ER/363
OH2BC/342
OH2BH/343
OH2QQ/353
OH2QV/346
OH4NS/341
OH5UQ/341
OK1ADM/346
OK1FF/359
ON4NC/361
ON4QJ/344
OZ3Y/355
PAØLOU/353
PY2BKO/341
PY2CK/364
PY2PA/342
PY2PE/342
PT7YS/351
SM3BIZ/358
SM7ANB/351
SMØAJU/353
VE5RU/353
ZS6LW/354
4X4DK/359
4X4JU/356
W1AA/354
W1AFF/347
W1BIH/364
W1CKA/351
W1DGJ/345
W1DK/359
W1FZ/359
W1GKK/367
W1HH/352
W1HX/361
W1HZ/359
W1JR/357
W1NU/355
W1OO/340
K2BK/355
K2BS/342
K2BZT/358
K2FB/348
K2FL/357
K2LWR/355
K2PXX/345
K2TQC/348
K2YLM/341
W2AC/361
W2AGW/365
W2AO/358
W2AYJ/359
W2BHM/354
W2BMK/357
W2BOK/357
W2BXA/365
W2CP/346
W2FXA/353
W2FZY/354
W2GK/342
W2GKZ/343
W2JVU/362
W2LPE/358
W2LV/360
W2OKM/359
W2QHH/361
W2QM/356
W2SSC/357
W2TP/350
W2TQC/354
W2UE/356
W2YY/349
WA2DIG/350
K3CL/359
K3MO/354
W3AFM/354
W3CWG/357
W3DJZ/347
W3EVW/361
W3GH/356
W3GRS/353
W3MP/363
W3NKM/358
K4EZ/347
K4ID/343
K4IKR/339
K4JC/346
K4KQ/359
K4LNM/355
K4PDV/358
K4RPE/349
K4YR/357
K4YYL/341
W4AAV/362
W4ALT/364
W4BFR/349
W4BQY/363
W4DR/357
W4EX/365
W4GD/361
W4NL/336
W4OM/362
W4QM/348
W4QQN/342
W4UG/343
W4VQ/345
W4WV/352
W4YJ/361
W4ZD/351
K5LIL/335
K5YY/338
W5AQ/352
W5HE/342
W5LO/359
W5RC/364
W5LGI/351
W5PQA/359
W5QK/352
K6DC/359
K6GA/349
K6JG/341
K6KII/353
K6WR/346
K6YRA/341
K6ZM/346
K6ZO/365
N6AR/345
N6AV/342
N6CW/338
N6FX/348
W6AM/366
W6BZE/361
W6CF/342
W6EE/362
W6EL/346
W6ET/353
W6EUF/340
W6ISQ/348
W6KNH/336
W6KTE/343
W6PT/358
W6QNM/350
W6REH/347
W6RGG/341
W6RJ/344
W6RT/358
W6ZM/351
W7AQB/353
W7CB/335
W7GN/357
W7IR/360
W7MB/365
WJØF/358
K8DR/352
K8DYZ/341
K8FL/342
K8IFF/332
K8OHG/345
K8ONV/349
W8AH/357
W8CUT/348
W8DMD/362
W8GT/364
W8GZ/364
W8JBI/359
W8JIN/365
W8LKH/360
W8MPW/359
W8OK/352
W8PHZ/356
W8PR/343
W8RT/359
W8ZCQ/354
K9AB/354
K9ECE/350
K9RJ/338
W9CH/348
W9DWQ/354
W9DY/353
W9GIL/358
W9JUV/359
W9RCJ/353
W9SFR/356
W9ZM/364
WØAIH/356
WØAX/362
WØBW/362
WØDU/363
WØELA/364
WØLWC/352
WØMLY/362
WØPGI/357
WØQGI/357

314

DJ1XP/335
DJØKQ/341
DL1CF/344
DL7FT/341
DL7HZ/346
F3AT/351
F8RU/334
F9IE/336
G2FSP/351
GI3IVJ/354
HB9MX/350
I1ZL/352
I8AA/338
OZ1LO/337
JA1BN/345
JA1BRK/343
JA1DM/354
JA1MCU/336
JA1MIN/337
JA2JW/350
JA8ADQ/338
JA1KI/339
LU4DMG/355
LU5AQ/354
OH2NB/361
OK1MP/345
ON4DM/356
PY1APS/336
PY1HX/353
PY3CB/335
SM3CXS/335
SM5BHW/337
SM5CZY/343
SM6DHU/334
VE2NV/357
VE3MJ/338
VE7GI/363
VK4QM/363
YU2DX/335
YV5ANF/345
ZL1HY/364
ZL3IS/353
K1YZW/338
KA1QY/353
W1MTJ/347
W1OT/332
W1SD/346
W1UU/346
W1WY/352
K2CL/335
K2LE/340
W2AX/355
W2CR/357
W2GT/358
W2HTI/356
W2NC/340
W2NUT/356
W2PN/341
K3TT/354
K4AIM/350
K4CEB/334
K4CIA/340
K4DJ/337
K4DY/336
K4MQG/344
K4SM/357
K4XO/333
N4EA/336
N4SU/359
W4EEE/356
W4EO/354
W4HR/350
W4IF/351
W4MGN/348
W4BBP/346
W4SSU/347
W4TM/361
K5FJ/352
W5GO/353
W5HJA/348
W5IR/334
W5MMK/361
W5NUT/353
W5RDA/346
W5SJ/335
K6EC/354
K6EV/346
K6LGF/352
K6OJ/361
K6PU/342
K6QH/340
K6RF/348
K6RN/348
K6RQ/350
N6GM/343
W6BA/359
W6BS/357
W6BSY/356
W6CHV/359
W6FW/344
W6HYG/352
W6KG/351
W6KH/357
W6KUT/359
W6KZL/356
W6ONZ/351
W6RKP/355
W6TZD/360
W6YA/345
WA6GFF/339
WA6ORT/339
K7ABV/338
W7CC/356
W7DX/348
W7DY/339
W7JYZ/348
W7KH/363
W7LDC/358
W7PHO/358
K8EJ/339
K8FF/344
W8ARH/343
W8KPL/356
K9KA/334
K9MM/334
K9PFY/332
W9BW/344
W9HB/354
W9QLD/341
W9RF/330
W9RKP/356
W9TKD/349
W9ZR/332
W9ZRX/333
W9ZTP/346
WØSYK/358

313

DJ2AA/346
DJ6RX/334
DJ7CY/339
DL1DC/351
G3HCT/350
G4CP/360
G5VT/358
HB9AHA/335
I5FLN/330
I8KDB/352
IØJX/333
JA1UQP/332
JA3DY/347
KP4RK/349
LA9CE/334
OE1FT/349
OH3SR/333
ON4IZ/344
ON4UN/335
ON8XA/334
OZ6MT/333
PY1HQ/354
SM6AOU/343
SM6CKS/335
SM6EOC/330
SP7HT/336
VE2WA/347
VE3CTX/330
VE3WT/340
VE3WW/336
VE7IC/334
XE1AE/348
YS1O/353
YV5AIP/348
YU3EY/332
ZL1AJU/345
ZL1ARY/338
ZL1AV/340
ZL4BO/346
ZS6IW/345
ZS6RM/351
K1DFC/334
N1XX/338
W1AXA/355
W1JNV/354
W1RLQ/346
W1YRC/333
K2CM/332
W2GG/353
W2GLF/352
W2HZ/335
K3LI/354
K3RS/330
K3ZR/330
AA4MM/334
AE4X/351
K4FJ/341
K4HJE/333
K4MZU/336
N4WW/336
K4RA/328
N4TO/338
W4EEU/340
W4GTS/335
W4OO/349
W4VPD/354
WA4WIP/338
K5DX/355
K5RC/336
K5UC/359
W5KGX/355
W5TO/338
W5UN/353
K6KA/334
K6OZL/332
W6BVM/353
W6FET/336
W6FF/352
W6HFL/344
W6MUR/351
W6YB/340
W6YK/356
W6YO/337
N7RO/328
W7ADS/357
W7CMO/349
W7QK/352
W8GKM/332
W8JQ/339
W8QY/352
W8RSW/340
W8TA/331
K9RA/332
N9AB/331
W9AQ/339
W9BM/350
W9DC/336
W9FKC/358
W9GU/349
W9HLY/346
W9KNI/345
W9KQD/337
W9KRU/337
WØDEI/350
WØGKL/350
WØZV/347

312

GT2AK/332
DJ5DA/339
DJ7CX/339
DL3OH/334
G2FYT/348
G3JAG/333
G3LQP/330
G3UML/336
HB9KB/351
I2LAG/331
IV3PRK/332
JA1ADN/344
JA1FHK/333
JA1IBX/337
JA1JRK/331
JA2AN/332
JA8JL/334
JA8ZO/334
KH6CD/360
KV4FZ/332
ON5KL/330
PY2DFR/332
SM5APL/334
SM5FC/330
SM6AEK/337
SM6AFH/333
SM6CVX/331
VE3AAZ/350
VE3BWY/350
VE3GMT/332
VE3NE/335
YO3JU/333
YV5BZ/346
ZS6YQ/347
K1DRN/336
K1NA/337
K1RM/333
W1DA/326
W1GX/335
W1JZ/332
W1KG/324
W1PM/352
K2AGZ/334
K2BT/332
K2SHZ/349
W2FG/335
W2IRV/353
W2JB/323
W2PPG/333
W2SAW/354
W2VJN/341
W2XN/352
K3EP/337
K3NL/330
W3AP/329
W3SO/337
AA4S/328
K4KG/340
K4MPE/337
N4XO/344
W4AVY/349
W4BAA/354
W4BRE/336
W4JD/328
W4JVU/336
W4OEL/335
W4ORT/333
W4XR/331
WB4OSS/331
K5AAD/341
K5OS/330
N5RR/332
W5EJT/343
W5FFW/353
W5GJ/345
W5MMD/357
W5OB/348
WA5IEV/332
K6CH/356
K6MA/341
N6UC/331
W6GC/328
W6GMF/346
W6ID/357
W6QL/336
W6SQP/354
W6ZO/359
K7KG/333
W7AO/353
W7IFO/332
W8DCH/335
W8YGR/342
K9AWK/335
K9CJR/337
K9GM/331
N9ZN/343
W9OA/337
W9WM/343
W9YSX/350
W9WY/330
WØBK/346
WØBN/342
WØSD/332
WØWW/340
WAØOAH/332

311

DJ4PI/331
DJ5JH/331
DJ5LA/338
DL3ZI/344
DL8CM/345
G3JEC/334
IIRBJ/333
I4MKN/330
I5ARS/342
I7HH/328
I7WL/331
JA1AAT/331
JA1BWA/337
JA1ELY/323
JA1JAN/329
JA1MJ/334
JA1OCA/330
JA2AAQ/332
JA3APL/330
JA4AFT/329
JA4BJO/338
JA7HZ/325
JA8KB/327
JA8MS/328
LA5HE/348
LA8LF/340
OE2EGL/333
OK3MM/351
ON4PA/348
ON5KD/329
OZ3PO/338
PY2CQ/338
PY2SD/338
SM1CXE/338
SM5DQC/327
SM6CWK/334
SM7EXE/329
UB5WF/350
VE3BX/335
VE3HD/350
VE7SV/336
YU1BCD/340
YU1EXY/329
YV5BBU/334
Z24JS/333
4X4FQ/343
K1BW/327
W1NG/329
K1NJE/327
K2JMY/339
K2LGJ/335
W2FP/331
W2LNB/340
W2MZV/337
W2VUF/334
W3GG/329
W3KA/341
W3PVZ/332
WA3ATP/333
WA3HUP/332
WA3IKK/331
K4BBF/331
K4EWG/330
K4SMX/325
K4XG/331
KE4I/329
N4CC/326
N4KG/332
N4MM/333
N4WF/331
W4AUH/331
W4AXR/351
W4FLA/326
W4FPW/329
W4FX/347
W4KFC/349
W4ML/356
W4ZR/342
K5GO/328
K5UR/331
N5AU/327
W5LZZ/335
W5MQ/330
W5NW/354
W5UR/343
K6AO/337
K6EXO/335
K6XP/330
W6KYJ/334
W6KZS/339
W6QNA/346
W6UQQ/349
W6XI/330
N7NG/335
W7CSW/343
W7LFA/331
W7RV/334
K8IJG/324
K8MEO/333
N8DX/331
W8CNL/331
W8DA/346
W8LLC/333
W8KR/334
W8YA/329
W8ZD/343
WB8EUN/329
K9RF/326
N9AF/333
W9NA/347
W9AZP/342
W9PN/343
W9RN/326
W9TKV/352
KØBS/329
KØBUR/333
KØCD/346
WØBL/332
WØBTD/349
WØCD/330
WØPAH/333
WØUD/333

310

DK5PR/323
DL7BK/345
F9GI/342
G3IOR/345
G5RP/337
GI3OQR/339
HB9IK/339
I1APQ/326
I2DEZ/330
I7ZPB/342
JA1CTF/326
JA1IFP/330
JA1ZZ/335
JA2HNP/330
JA3BG/334
JA7MA/330
OE1FF/347
OK1UZ/333
OE3WWB/326
OH2BCV/325
OH2BGD/327
OH2VB/331
OK2RZ/329
OZ8SS/347
PAØFX/355
PP5UG/333
PY5ATL/326
PY7ZZ/322
SM5BBC/330
UB5WE/324
UR2AR/347
VE7BD/324
VK3YL/347
VK6HD/330
YO3AC/329
ZS4MG/338
W1FJ/339
K2OF/328
W2MJ/346
W2SUA/330
W2ZZ/331
WA2CBB/332
WB2HXD/336
WB2YQH/328
K3AV/342
K3HPG/329
W3AC/337
W3LB/328
W3LPL/327
W3XM/332
AB4H/326
K4AUL/331
N4JF/331
W4DRK/341
W4KN/341
WA4QBX/325
K5JW/330
KD5RP/329
N5DX/334
W5AL/355
W5EDX/331
W5GC/343
W5HDS/348
W5JC/337
W5JW/332
W5MUG/332
K6DT/338
K6OJO/326
K6XW/338
N6AW/328
N6EA/348
N6ET/330
W6ERS/340
W6HX/359
W6LQC/327
W6MI/335
W6SC/336
W6UY/325
W6XP/326
W6YHT/328
W6ZYC/328
WA6DUG/332
K7NN/327
W7BGH/345
W7ETZ/326
W7KR/340
W7LLC/346
W7OM/331
W7TE/324
K8CH/329
KN8Z/329
W8AD/328
W8DAW/359
W8EWS/359
W8QFR/330
W8RCM/331
W9EB/341
K9JF/328
W9CRF/342
W9HJ/345
W9HZ/342
W9LT/343
WA9NUQ/333
KØAB/338
KØCVB/327
WØMYN/329
NØRR/324

309

DJØUJ/323
DK3PO/329
DK3SF/319
F2TU/331
I5UA/349
FZTU/331
I5UA/349
JA1CRR/331
JA1DFQ/331
JA1EOD/329
JA1PNA/321
JA2AH/327
JA2KLT/326
JA3AQ/328
JA3BQE/324
JA3EMU/322
JA3HZT/321
JA3MNP/321
JA6BSM/325
JA/AD/345
JA9BJ/329
LA1K/342
OE8RT/330
ON5NT/323
OZ5DX/332
OZ/YY/321
PY1DH/343
SM2EKM/325
SM3RL/326
SM5AQB/333
SM5CAK/331
SM7ASN/330
SM7DMN/320
UA1CK/339
UA9VB/341
VE1KG/330

VE3GCO/329
VE4OX/337
VE7AAQ/346
YU1AM/325
YU1DD/320
W1AB/340
W1SP/344
K2KGB/328
K2VV/324
N2SS/328
WB2NYM/327
K3SGE/328
K3TUP/326
W3GGS/353
AB4D/329
K4LSP/323
K4MG/324
N4KE/322
N4SA/325
N4XX/327
N4ZC/332
W4NNH/347
W4WG/327
W4YN/337
WA4DRU/326
WA4FFW/328
K5GH/324
W5DOZ/314
N6RT/345
N6RJ/324
W6BJH/324
W6CJJ/332
W6SN/348
W6TWZ/342
W6US/322
W6YMV/340
W7CNL/321
W7EKM/323
W7ORH/327

PHONE

315

DL6EN/354
DL9OH/352
G3FKM/354
I0AMU/359
I0ZV/347
ON4DH/356
OZ3Y/348
PY2CK/363
PY2PA/342
PY2PE/342
PY4TK/356
VE5RU/352
ZS6LW/353
4X4DK/359
4X4JU/352
W1AFF/347
W1DGJ/345
W1JFG/356
W1ONK/356
K2BZT/351
K2FL/348
W2BXA/363
W2ORM/357
W2TP/347
W2YY/344
W3CWG/355
W3DHM/355
W3DJZ/346
W3GH/350
W3GRS/345
W3NKM/357
W4DR/353
W4EX/363
W4UG/342
W4YJ/358
W5ACE/354
W5IO/358
W5PQA/355
K6WR/346
W6AM/364
W6EUF/339
W6GVM/362
W6REH/343
W6ZM/346
W7GN/347
K8DYZ/341
K8VUR/331
W8AH/357
W8GZ/364
W9ZM/352
WØBW/356
WØCM/358
K8IP/332
K8PYD/326
K8RWL/327
N8AA/331
WBCFG/327
WBZET/340
W9DE/325
W9HK/345
W9KR/328
WA9WJE/326
W9TKR/330
AJØX/331
KØJEA/323

308

DJ6VM/325
DJ8CR/325
DJ8NKA/373
DK3GI/325
DL6KC/330
DL6MK/339
DL8FL/325
EA1BC/344
EA3NC/329
F2RS/336
G2BOZ/351
G3HTA/330
I3EVK/331
I3LLD/320
JH1EIG/327
JH1GZE/319
JA2ADH/328
JA2JKV/327
JA3CMD/317
JA3GM/321
JA8BMK/320
JA8EAT/320

314

DJ2BW/350
DL1KB/352
F9RM/349
HB9TL/355
LU4DMC/355
ON4DM/356
ON4SZ/350
PY2PC/338
PY4KL/347
VE3MJ/338
VE3MR/342
VK5MS/359
VK6RU/362
YV5ANF/345
ZL1HY/363
W1AA/353
W1CKA/342
W1HX/352
W2HTI/355
WA2EOQ/339
K4AIM/350
K4HEF/359
K4JC/341
K4YYL/338
W4EEE/356
W4LMX/350
W4POL/349
K5YY/336
W5JWM/350
W5LZW/347
K6CCY/344
W6EL/343
W6HYG/348
W6KNB/335
W6RKP/349
W7DX/344
W7JYZ/348
W8MPW/349
K9ECE/348
W9DWQ/343
W9NZM/344
W9SFR/346
W9WHM/357
WØMLY/352

313

CT1BH/330
DJ7ZG/340
EA2HX/343
EA4JL/333
G5VT/358
I2KMG/337
I4ZSQ/333
I5WT/341
I8AA/337
I8KDB/352
IT9GAI/335
JA3XI/319
OH2BAD/328
OH2BR/330
OZ8BZ/326
PAØTAU/336
PY2ELV/327
SM4EAC/327
SM5AZU/337
XE1KS/327
YS1RRD/320
YU1DZ/317
YU4HA/336
ZL1AMO/330
4X4NJ/327
K1JO/324
W1AM/324
W1ER/327
W1FTX/342
W1GL/323
W1KCH/331
W1QJR/343
WA1AKR/317
K2SB/327
W2AZX/340
W2CJ/341
W2RS/322
W2YD/325
WB2EPG/334
K3WS/320
W3ZN/325
K4EEK/327
K4IR/327
K4TO/324
K4GIA/328
K4XH/324
N4UH/331
W4BYD/351
W4GXB/354
W4WD/331

312

DK2BL/330
DL7FT/339
DL7HU/345
EA8JJ/330
F2MO/341
F8RU/332
G3NLY/336
G4IVJ/350
HB9AAA/332
I2LAG/331
IV3PRK/332
W4YA/327
W4YV/327
WA4JTI/317
K5AQ/329
K5BZU/321
K5OA/322
N5AR/337
K5OA/322
N5AR/337
W5ZWX/326
K6LQA/326
N6DX/340
W6AE/326
W6JZU/324
W6MUM/333
W6PN/335
W6TC/323
W7NCO/330
K8NN/318
K8RA/322
K8ZR/319
W8NGO/350
N9MM/320
W9GB/341
W9SS/323
KØALL/320
WØTJ/352

307

DJ1CG/326
DJ2TI/319
DJ4AX/332
F2VX/322
F9YZ/326
G3GIQ/333
G3RUX/323
G3ZAY/320

311

DL1HH/333
DL8NU/333
F3DJ/345
F9IE/332
G3JEC/334
G3UML/335
I1RBJ/333
HB9AQW/321
I1RB/338
I2VGU/319
I2ZZZ/322
IØDUD/314
JA1AG/344
JH1IFS/321
JA3AAW/330
JA6CNL/320
JA7EHU/326
KH6LJ/352
OH8SR/324
PY2BW/374
SM3EVR/315
SM4DHF/322
SM6CST/323
SMØKV/348
VE4SK/324
YV5AHR/334
YV5BX/346
YV5CWO/320
4Z4DX/316
K1BV/326
K1KI/320
W1GG/330
K2LQ/318
K2NY/324
K2UR/333
K2UVU/343
N2AP/322
W2BAI/323
W2IYX/319
W2SV/325
K3ND/319
N3ED/326
N3LI/319
W3BTX/321
W3EYF/339
W3TV/340
I2LPA/324
I5TDJ/340
I7HH/328
I8YRK/334
JA1ADN/336
JA1IBX/334
JA1MIN/334
JA2AAQ/329
JA2JW/337
JA4ZA/336
OH3SR/330
PY3CB/331
SM5BHW/331
YV5BBU/334
ZS6JM/352
ZS6YQ/345
6W8DY/330
W1SEB/331
K2JMY/339
W2QWS/340
K4BBF/331
N4WF/331
W4JVU/335
W4MGN/337
W4SSU/341
W4ZR/342
W5LZZ/335
W5MQ/330
WA5IEV/331
K6EG/333
K6GA/331
W6ARJ/331
W6BSY/348
W6CCB/329
W6GR/334
W6PT/341
WA6AHF/330
W7EZ/325
W7LFA/331
K8CFU/344
K8IFF/331
W8JTD/332
W8VHY/331
K9MM/331
W9BW/335
W9TKD/336
W9YSX/348
KØBS/329
WØCSZ/340

310

EA4DO/332
EA4LH/330
G3TJW/327
G5AFA/328
I1APQ/326
I2AT/333
I4LCK/328
IT9ZGY/339
JA1JRK/328
JA1OCA/327
K4BVQ/340
K4CEF/326
K4ISV/331
K4XI/320
K4XP/315
N4OL/321
N4RA/323
N4WB/322
W4CPZ/327
W4PZV/325
WA4CXZ/316
K5LM/324
N5KA/324
W5IRG/318
W5SP/325
W5XJ/325
K6IR/322
K6JR/328
K6LU/339
K6PZ/324
K6SVL/323
ED6PY/319
N6MU/327
W6ABA/335
W6BYH/334
W6DN/323
W6GPB/354
WB6APX/323
W7JYX/339
W7KSC/326
WB7ABK/336
K8CW/324
K8ST/322
K8VUR/333
W8KCJ/323
W8ZCR/336
A19J/336
K9CT/321
K9FN/321
JA1UQP/329
JA7HZ/324
JA8ADQ/330
KH6BB/334
KV4FZ/328
OE2EGL/332
OK1MP/336
PAØHBO/351
PY2CYK/334
PY3BXW/330
SM6EOC/326
SMØAJU/337
UB5WF/333
VE3CTX/330
VE3NE/332
YO3JU/330
ZL3QN/328
W1CKK/347
W3CG/376
W3RX/330
WA3ATP/331
WA3IKK/330
K4IKR/333
K4PDV/339
KE4I/327
W4EEU/335
W4VQ/324
K5UR/328
W5GC/343
N6NA/339
W6KUT/340
W6XP/326
W6ZKM/332
W7CMO/338
W7KR/339
K8LJG/323
W8KST/333
WA8AJI/337
W9ZR/326
WA9NUQ/333
KØBUR/332
WØMYN/329

309

EA1IY/325
F5IT/330
F5VH/325
F6AOI/327
G3ZBA/326
HB9AHA/329
I1CKA/325
IK1BGJ/326
I2YBC/319
I5UA/349
JA1ELY/320
JA1JAN/325
JA3APL/327
JA7MA/329
KP4CL/338
OA4OS/329
OE3WWB/325
K9OTB/335
K9SM/337
K9XJ/321
W9GW/326
W9VNE/327
WØIZ/324
WØPT/337
WØSR/319
WAØKDI/327

306

DJ5AI/373
DJ5VQ/334
DJ6TK/324
DK9FB/321
DL1PM/335
G3KDB/322
G3MCS/322
G3SJH/318
HB9AMO/320
I7TCT/317
JA1HGY/322
JA1NRH/313
JH1CJQ/325
JA2JSF/317
JA7MGE/317
JA6HUG/311
JR7TEQ/312
JA8DNZ/315
JAØSZ/327
OE7UDH/329
OZ4RT/338
OZ7JZ/324
SM6CMU/317
SM7BIP/324
SM7QY/349
SMØCCE/346
PY2DSC/327
PP5UC/332
SM5DQC/325
UB5WE/323
VO1CU/320
ZL1ARY/328
K1NJE/325
W1SP/343
W2FP/326
W2SUA/328
K4EJ/331
K4XO/327
N4MM/329
K5JEA/342
K5OS/327
K5OVC/328
W5HJA/347
W5SJ/330
W5TIX/333
W5UAW/331
K6OJO/325
W6KOE/328
W6KZS/331
W6LQC/326
W6YB/331
W6YMV/339
K7NN/326
N7KO/322
W7EPA/335
W7UPP/330
W8CUC/326
W8ZET/340
W8BEUN/326
AJØX/331
N9AF/330
W9ZRX/328
KØCD/327

308

DJ2YI/348
DJ4PT/325
EA7GF/339
F9GT/336
I1UW/323
IØMPF/316
JA1AAT/328
JA2ADH/328
JA2AH/325
JA4AFT/325
JA9BJ/327
LA5HE/343
LA8LF/333
OZ3PZ/322
PY2ED/326
SM4EAC/327
SM5AZU/334
SM6AEK/329
XE1KS/327
XE3EB/327
YS1RRD/320
W1DNZ/324
W2MPK/324
W2XN/344
K4ESP/322
K4SM/344
N4WW/327
K5JW/328
W5JJA/338
W5UR/329
N6AW/326
W7EKM/322
W8CFC/325
W8CNL/325
W8JIN/348
W9BEK/336
W9CU/325
W9HB/346
W9SS/323
KØRPE/330

307

CT1UB/324
D4CBS/324
DJ8NRA/322
DJØUJ/321
DL1JW/335
DL6KG/327
DL7AA/343
EA4JF/324
EA7IR/328
F2RS/333
F9MD/335
I1RB/338
I1YG/322
I2BOX/322
I2VGU/319
I7SCA/331
IØDUD/314
JA1EOD/327
JA3BQE/321
JA6BSM/322
KH6OR/343
KP4GK/334
LA1ZI/322
LU3YL/W4/317
ON5NT/321
PY2BU/322
VE3GCO/327
VE7WJ/318
VK6LK/324
YV5AHR/334
YV5CWO/320
W1NG/320
W1SD/333
WA1AER/316
K2KGB/324
K2YLM/332
N2SS/326
W2LYX/319
W2VO/322
WA2VEC/325
WB2HXD/333
WB2NYM/325
W3FWD/338
W4AVY/329
W4BBL/328
K5OA/321
W5EDX/328
K6IR/322
K6SVL/323
WA6RTA/324
W7JYX/339
WA7DRP/319
W8IIC/327
W9HZ/337
W9ILW/338
W9LA/327
NØRR/318
WØYDB/324

306

CT1FL/326
CT1RM/317
DJ1KP/319
DK3PO/326
DL9DY/327
EA3OJ/319
EA3NG/322
F5JA/320
G3SJH/318
I7DEZ/326
I2SLA/322
I3ADI/321
I7TCT/317
JA3CMD/314
PY5GA/323
UA1CK/337
UR2AR/335
VE3BX/322
XE1J/321
YV5DFI/322
W1DO/326
W1HGA/326
W2QK/333
WB2VEC/323
W3AC/332
W3XM/331
K4XH/322
W4OTX/325
W5RNG/333
K6DT/319
K6EXO/330
K6YXR/333
K6XI/321
W6KPC/330
K8PYD/322
K8SQE/319
KN8Z/325
W8CMF/336
W8NXF/331
K9HMB/314
K9RF/320
W9BVX/34

CW

308

W9KNI/316

306

K2TQC/310
N4WW/314
K9MM/312

305

DL6EN/311

K2FL/309
W8AH/311

304

ON5NT/309

K3FN/309
N4RJ/310

302

K4PI/308
W6PT/309
K8MFO/307

301

DJ2BW/307
JA1JRK/309
K6GA/308
W9DWQ/306
W9ZM/306

300

DL8AN/305
SM3EVR/306
K4XO/304
AA6AA/302
W1NG/304

WA6TLA/305
NØRR/305

299

OZ1LO/305
K9QVB/302
W4VQ/304

298

F3AT/303
SM5BHW/304
SMØAJU/304
W3GRS/302
K8WW/302
K9AJ/303

W9SFR/302

297

W2FP/302
WB6RSE/301
W8RSW/302
W9BW/302

DXCC NOTES

New Country

The ARRL Awards Committee has accepted the recommendation of the DX Advisory Committee to add Peter I Island (3Y) to the DXCC list when the first creditable operation occurs from there.

Reminder: Those wanting to upgrade their DXCC totals for the December 1983 *QST* DXCC listing must submit confirmations during the month of September. They must reach Headquarters on or before September 30, 1983 to be listed. You must comply with DXCC rule 5 including the once-a-year exception to update the listing.

ARRL QSO Party Rules

Turnout was excellent for the first ARRL QSO Party held last January. The October exercise will provide a good opportunity to check the station out for the fall and winter operating season, so plan now to get on the air and join in the excitement.

The ARRL QSO Party is similar to the annual open CD Party, formerly held in April. Entry forms are available from ARRL Hq. for an s.a.s.e. Everyone sending in a log will receive a copy of the results, and everyone making more than 200 QSOs will be listed in *QST*. Please note that the deadline for *receipt* of logs at Hq. is November 14, so mail early.

If you're interested in getting involved in the ARRL Field Organization in one of the many areas served by volunteers, contact your Section Manager or Section Communications Manager (listed on page 8 of *QST*), or write to Hq. for more information. We would love to have you take a more active role in Amateur Radio and the ARRL Field Organization.

ARRL QSO Party Facts and Figures

Cw	*Phone*
Starts: 1800Z Oct. 8	Starts 1800Z Oct. 22
Ends: 0600Z Oct. 9	Ends: 0600Z Oct. 23

Eligibles: Member, Life Member, Charter Life Member, President, Vice President, Past President, Past Vice President, Honorary Vice President, Director, Past Director, Director Emeritus, Vice Director, Assistant Director, Counsel, Canadian Counsel, Treasurer, Secretary, Advisory Committees, Technical Advisor, Intruder Watch, QSL Manager, NTS Official, Section Manager, Section Communications Manager, Asst. SCM, SEC, STM, ACC, BM, OO/RFI Coordinator, PIO, SGL, PGL, TC, DEC, EC, NM, OBS, OES, OO, ORS, PIA, Hq. Staff.

Rules: Exchange "status" (MBR, ORS, SM, etc.) and ARRL section. Overseas members may participate and should send DX for their section. You may work stations once per band. Operate a maximum of 10 hours; off-times must be at least 30 minutes each and must be marked clearly in the log. Log times must be in UTC, not local time. Number new sections as worked. Phone and cw contests are separate. Include dupe sheets with entries of 200 QSOs or more total. Entries must be mailed in time to reach ARRL Hq. by November 14, 1983.

Scoring: Final score equals number of QSOs times number of different ARRL sections plus VE8/VY1 worked (max. 74). "DX" does not count as a multiplier.

Suggested Frequencies: Phone — 1.865 3.870-3.910 7.200-7.245 14.265-14.295 21.340-21.360 28.600-28.630; cw — up from 1.815 3.535 3.715 7.035 7.115 14.035 21.035 21.115 28.035 28.115. Try 10 on the hour from 1800-2100 UTC and 160 at 0430 and 0530 UTC. Check the Novice bands frequently. Don't forget 6 and 2 meters.

Strays

THE ADVENTURE BEGAN IN NICE 60 YEARS AGO

As every radio amateur in the world knows, the short-wave era began on the night of November 27, 1923 when contact was established between the Frenchman Léon Deloy (8AB) and the American Fred Schnell (1MO). The situation late in 1922 was thus: The station most widely heard in the U.S. was the French station 8AB in Nice (in those days, the Code F was not used and 8 meant France). The first attempt to make a two-way transatlantic call was made in January 1923, but failed. Here, too, the European station taking part in the experiment was station 8AB. It belonged to Léon Deloy. The son of a Nice croupier, he might have chosen many other hobbies, but decided instead to be the first to communicate with the other side of the Atlantic.

In the summer of 1923, Deloy went to the U.S. to study American radio amateurs' methods, saying that he wished to be first in the field. After attending the National Congress of the American Radio Relay League (ARRL), he bought American radio equipment and consulted John L. Reinartz (1QP — 1XAM) on the new station. He had but one aim: to lead the field.

Returning to France early in the autumn of 1923, he took advantage of all the information he had gleaned, set up his new station and tried it out in October with the British station 2OD. In November, he cabled F. Schnell, the organizer of the transatlantic tests in the U.S., that he would be transmitting on 100 meters from 2100 to 2200 from November 25 onwards.

The entire ARRL network was alerted, and many stations started listening in. From the outset, 8AB and its identification code "GSJTP" were audible at Hartford, where ARRL had its headquarters. The following night, November 26, Deloy transmitted again and, learning by telegram that he could be heard, sent two messages that were picked up not only by Schnell and K. B. Warner at 1MO, but also by Reinartz at 1XAM. One was a message from French radio amateurs to American "wireless operators," while the other gave the programme of a two-way test call set for the following night.

Schnell and Reinartz transmitted on the night of November 27, 1923, Schnell having obtained special permission from the radio service controller at Boston to transmit on 100 meters. Everything was ready. At 2130 precisely, 8AB's 25-Hz signal came through. He called America for a whole hour, sending two new messages and closing down at 2230 with a request for confirmation. There were long calls from 1MO and 1XAM before Deloy, asking Reinartz to be patient, sent this historic message to Schnell:

"RR QRK UR SIGS QSA VY ONE FOOT FROM PHONES ON GREBE FB OM HEARTY CONGRATULATIONS THIS IS FINE DAY PSE QSL NR 12."

Hf waves were linking the American and European continents for the first time on what was certainly a great day for Deloy. Deloy then called Reinartz, 1XAM, whose transmitter design was used by all three stations. Schnell, 1MO, sent a message to the well-known General Ferrié, Chief of the French Communication Services, and further tests were organized.

This is more or less how the event was described in *Two Hundred Meters and Down, the story of Amateur Radio*, written in 1936 by Clinton B. DeSoto.

On a recent trip to the Cote d'Azur in February 1983, I searched for traces of this 60-year old event. Thanks to Lucien, F8TM (Paris), and Father Blondin, F5IK (Nice), I was able to contact Richard Jamas, F8QQ, who lives in Nice and may be the only survivor. In the 1920s, he had been an engineer with the Compagnie générale de télégraphie sans fil (CSF) in Saigon (now known as Ho Chi Minh City) and had met Deloy during home leave. He had even attended with him the Congress held at the Sorbonne in Paris in 1925, which had set up the International Amateur Radio Union (IARU). According to Richard (formerly F18QQ), Deloy died in Monte Carlo on January 21, 1969. His body now lies in the Deloy family plot in the cemetery at Nice's Chateau de Mont-Boron.

A far more lasting monument to the memory of this pioneer in communications will surely be the success of World Communications Year which, 60 years after the event, will signify the further development of communications throughout the world so that links of goodwill and peace can be established between people of all races, regardless of their politics, philosophies or jobs. — *M. Joachim, OK1WI, Ambassador of the International Amateur Radio Club (IARC), as reprinted from the* ITU Telecommunication Journal, *June 1983*

Mini Directory

As a convenience to our readers, here is a list of items of particular interest and when they most recently appeared in *QST*.

Advisory Committee Members	Oct. 1982, p. 46
Amateur Radio Station Call Sign Assignment System	June 1983, p. 61
License Renewal Information	Jan. 1983, p. 53
Major ARRL Operating Event and Conventions — 1983	Jan. 1983, p. 54
Pending Dockets Affecting Amateur Radio	June 1983, p. 64
QST Abbreviations List	Dec. 1982, p. 65
Reciprocal-Operating Countries	Nov. 1982, p. 64
September VHF QSO Party Rules	Aug. 1983, p. 85
Third-Party-Traffic Countries	April 1983, p. 81
U.S. Amateur Frequency and Mode Allocations	Jan. 1983, p. 53

Moved and Seconded...

MINUTES OF EXECUTIVE COMMITTEE
No. 407
July 23, 1983

AGENDA

1. Approval of minutes of April 20 and April 22 meetings
2. Recognition of new Life Members
3. Affiliation of clubs
4. Approval of conventions
5. Review of local antenna/rfi matters
6. Review of FCC matters
7. Report of General Manager on Board Meeting directives
8. Proposal to transfer Amador County, California, from the San Joaquin Valley to the Sacramento Valley section
9. Resolutions opening ARRL accounts at Security National Bank and Eastern Savings Bank, both of Lynn, MA
10. Security clearances for certain officers and staff
11. Supplemental appropriation for Management & Finance Committee
12. Appropriation for Ad Hoc Committee on Digital Communication
13. Report of the Ad Hoc Committee to Establish the ARRL Scholarship Endowment Fund Honoring Senator Barry M. Goldwater, K7UGA
14. ARRL contribution to U.S. Council for World Communications Year
15. Planning for general membership meeting at 1983 National Convention
16. Reports of Ad Hoc Committees

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 8:30 A.M. Mountain Standard Time, Saturday, July 23, 1983, at the Camelback Inn, Scottsdale, Arizona. Present were President Victor C. Clark, W4KFC, in the Chair; First Vice President Carl L. Smith, WØBWJ; Directors Paul Grauer, WØFIR, Jay A. Holladay, W6EJJ, Gay E. Milius, Jr., W4UG, and Leonard M. Nathanson, W8RC; and General Manager David Sumner, K1ZZ. Also present were Vice Presidents Larry E. Price, W4RA, and Gar Anderson, KØGA, and Counsel Christopher D. Imlay, N3AKD.

1) On motion of Mr. Milius, the Minutes of the April 20 and 22 meetings (Nos. 405 and 406) were accepted in the form in which they were distributed.

2) On motion of Mr. Nathanson, the Committee recognized the names of 223 newly elected Life Members, and directed the General Manager to list their names in *QST*.

3) On motion of Mr. Holladay, the affiliation of the following clubs was approved (Category I unless otherwise indicated):
Cimarron Amateur Radio Association, Fairview, OK; Codex Amateur Radio Club, Mansfield, MA; Evergreen Amateur Radio Service, Port Townsend, WA; Ft. Madison Amateur Radio Club, Ft. Madison, IA; Moose Horn Amateur Radio Club, Kenai, AK; International ARS, Inc. (North America Chapter), Glendale, CA (Category II); North Central Texas ARC, Wichita Falls, TX; Northeast Missouri ARC, Inc., Adair County, MO; Northern Nevada ARA, Winnemucca, NV; Rockaway Beach Jr. High School ARC, Rockaway Park, NY (Category III); Salt Creek Radio Club, Wood Dale, IL; Schoolcraft College ARC, Livonia, MI (Category III); Susquehanna County ARC, Montrose, PA; Three Rivers Amateur Radio Assn., Poplar Bluff, MO; Tonto AR Association, Payson, AZ; Tuscola County Amateur Radio Club, Caro, MI; 220 Spectrum Management Assn. of Southern California, Van Nuys, CA; Valley Amateur Radio Association, Shelton, CT; West Morris Wireless Society, Flanders, NJ.

With this action the League has the following number of affiliated clubs: Category I, 1698; Category II, 11; Category III, 186.

4) On motion of Mr. Nathanson, the Committee approved the holding of the following ARRL conventions: Kentucky State, September 24-25, 1983, Louisville, KY; Ohio State, February 25-26, 1984, Sharonville, OH; North Carolina State, March 17-18, 1984, Charlotte, NC; Illinois State, August 19, 1984, St. Charles, IL.

5) Mr. Imlay reviewed the status of local litigation involving Amateur Radio as follows:

5.1) *Spencer (ABØI) v. County Court of Clay County, Missouri.* A finding very favorable to Mr. Spencer and to Amateur Radio is being appealed by the defendant. A request for ARRL financial support during the appeals process has been received from Mr. Spencer's attorney, but is being held in abeyance pending clarification of certain aspects of the case.

5.2) *Borowski, et al. v. City of Burbank, Illinois.* A motion for summary dismissal of the case, filed by the City, has been denied by the Court. The City's answer to the suit has been filed; in the meantime, the antiamateur ordinance has been modified slightly, but in its new version is no less onerous to the amateur community than the old. As a result, the plaintiffs' complaint also will have to be amended slightly.

5.3) *Goumas, et al. v. City of Cerritos, California.* Mr. Smith, as chairman, with assistance from committee members Holladay and Imlay, reported on the work of the special committee created at Minute 80 of the 1983 Annual Meeting of the ARRL Board of Directors. Prospects for a negotiated settlement which would protect the rights of the amateurs in the community are being explored. ARRL has requested an opportunity to make a presentation to the City Council to acquaint its members with the benefits provided by Amateur Radio.

6) FCC matters were reviewed as follows:

6.1) On motion of Mr. Nathanson, Counsel Imlay was authorized to file reply comments in PR Docket No. 83-28 bolstering ARRL's opposition to a no-code amateur license. The Reply Comments note that of the more than 1500 comments filed, comments opposing a no-code license outnumber those favoring such a license by approximately 25 to one, that not more than *ten* comments favoring the no-code license came from prospective licensees, and that the public record in this proceeding shows that no benefit would be gained from the creation of such a class of license.

6.2) Counsel Imlay informed the Committee that General Docket No. 83-114 presented an opportunity to make the case, once again, against the ban on ten-meter external amplifiers on the grounds that the ban is an example of unnecessary over-regulation. On motion of Mr. Grauer, Counsel was authorized to file comments to that effect.

6.3) Draft comments in PR Docket No. 83-524, concerning the expansion of frequencies available for RACES operation, were reviewed. On motion of Mr. Holladay, Counsel was authorized to file comments supporting the opening of all two-meter repeater frequencies for RACES operation.

6.4) Mr. Anderson, as chairman, reported on behalf of the Ad Hoc Committee on Preparations for Monitoring and Licensing Activities. During the course of his report, the Committee recessed for lunch from 12:03 to 1:19 P.M. There was extended discussion, without formal action, of the status of efforts to obtain reimbursement of administrative expenses of the Volunteer Examination Coordinator (VEC). The Committee also examined a draft training guide for an FCC Amateur Auxiliary to assist in monitoring activities, which will be given further review and will be circulated to Section Managers before being finalized.

6.5) After review of the Notice of Proposed Rule Making in PR Docket No. 83-485, concerning expansion of the 10-meter repeater subband, on motion of Mr. Nathanson, Counsel was directed to file comments opposing expansion at this time as being premature, with the request that the matter be revisited at a later date, after action in PR Docket No. 82-83 (phone band expansion) has been completed. The Committee's concerns included the impact of any expansion on other operations, including satellite, fm simplex, ssb and a-m.

6.6) The Committee reviewed the FCC Report and Order in PR Docket No. 82-727, concerning Novice examination procedures. On motion of Mr. Holladay, Counsel was directed to file a Petition for Partial Reconsideration seeking to overturn the ban on examiners and examinees having an "employee-employee" relationship.

6.7) Counsel Imlay then reviewed the status of the ARRL petition, RM-4040, seeking to ban cable television use of frequencies in the amateur 144 and 220 MHz bands. On motion of Mr. Grauer, Counsel was authorized to file a motion for expedited action, citing the large and growing number of unresolved interference complaints.

6.8) Also discussed, without formal action, were the recent FCC release "clarifying" the rules concerning business communications in the Amateur Service and the subsequent correspondence between ARRL and FCC to affirm that no substantive changes had been made; the rules governing alien reciprocal operating privileges in the U.S.; and the status of the ARRL band plans in view of the increasing reliance being placed upon them by FCC in resolving amateur-to-amateur interference problems.

7) General Manager Sumner presented a written report on actions taken in response to 1983 Annual Board Meeting directives.

8) On motion of Mr. Nathanson, and in accordance with the expressed wishes of the affected members, it was unanimously voted to transfer Amador County, California, from the

San Joaquin Valley Section to the Sacramento Valley Section of the Pacific Division.

9) On motion of Mr. Milius, the following resolution was unanimously adopted:

Resolved,

a) that Security National Bank and Eastern Savings Bank, both of Lynn, Massachusetts, are hereby designated as depositories of the American Radio Relay League, Inc.;

b) that the Treasurer or Controller is authorized to endorse for deposit to the credit of the League's account in said banks, or for collection for the benefit of the League, any checks or other negotiable instruments, or cause the same to be endorsed by rubber stamp;

c) that the funds of the League on deposit in said banks be subject to withdrawal or change at any time by checks or orders for payment of money when signed or drawn on behalf of the League by the following or their successors (two signatures required: one from 1 or 2, and one from 3 or 4):

1. General Manager — currently David Sumner
2. Senior Staff Assistant — currently E. Laird Campbell
3. Treasurer — currently James E. McCobb, Jr.
4. Controller — currently Michael R. Zeigler.

10) The question of whether it was desirable for certain officers and staff to obtain security clearances, to facilitate work in conjunction with the memorandum of understanding between ARRL and the National Communications System, was discussed without action.

11) On motion of Mr. Nathanson, the General Manager was authorized to reimburse an additional $4500 in expenses of the Management and Finance Committee during 1983.

12) On motion of Mr. Nathanson, the General Manager was authorized to reimburse $3000 in expenses of the Ad Hoc Committee on Digital Communication for the period between the 1983 Annual Meeting of the Board and the end of 1983.

13) The Committee discussed, without formal action, a preliminary report of the Ad Hoc Committee to Establish the ARRL Scholarship Endowment Fund Honoring Senator Barry M. Goldwater, K7UGA.

14) On motion of Mr. Grauer, a contribution of $1000 was authorized to the U.S. Council for World Communications Year to help offset the expenses associated with the League's participation in the Council.

15) The Committee discussed the scheduling and format to be used for the general membership meeting at the 1983 National Convention in Houston (Minute 35 of the 1983 Annual Meeting of the Board).

16) Progress reports were provided to the Committee by Mr. Smith, as chairman of the Ad Hoc Committee on Washington Representation, and by Mr. Price, as chairman of the Ad Hoc Committee on the ARRL Interference Reporting Service (AIRS).

There being no further business, the Committee adjourned at 5:57 P.M.

Respectfully submitted,

David Sumner, K1ZZ — General Manager

Victor C. Clark, W4KFC — President

LIFE MEMBER APPLICANTS
July 23, 1983

List No. 1: Douglas M. Abbott, N1AIM; William J. Barber, Jr., WA2ROJ; James A. Bassett, KA1FPP; Larry Bettencourt, N6IFP; Sam Boomer, AK1B; Ross P. Chaney, K3MUD; Douglas L. Charette, N6AYW; Glynn D. Coates, KB4WT; David W. Coleman, N2AOB; Comway C. Conner, KA6ISX; John P. Conner, II, WDØFHG; Michael A. Crain, KC4TY; Robert J. Doll, N4DUH; Samuel Lee Doney, W4DDP; Elwood E. Dore, KD6LH; Pat Dougan, KI5R; George Dover, WA7UCJ; Forrest Eubanks, KB5WW; Kay Fasulkey, W3BBN; Helen Ann Williams Gerli, KA1KBY; W. David Gerns, KA1CB; Ronald Scott Gray, N7CTF; Claude M. Green, Jr., WD5JCB; Ted Gustafson, WBØTDV; George W. Hammon, WA6CQW; James R. Hanson, WB9DRN; Claude Haring, Jr., W3IIM; Fred L. Haring, KF9U; Richard M. Hefley, KB6FN; Charles B. Hoelzel, N4BJX; Jeffrey R. Imlay, KA8GPN; Albert R. Kavanaugh, WA2CTC; Garth D. Keesler, KE4FF; Richard R. Kempf, WD9HRU; Mary Ann Klemundt, WA6NOO; Dennis D. Kromer, WB3AJK; Richard M. Kuharich, KA5HXI; Terry Lamb, N9AOJ; Henry C. Lee, Jr., KC8IP; Earl R. Lorenz, Jr.; Fred Luther, Jr., KA4CSK; Charles N. McDonald, WA3MJI; William S. McDonald, KA1DXW; Joseph J. Milazzo, WB2UKO; Joseph C. Moran, KA4RQX; Steve A. Moyer, KC7KC; Terrance M. Neal, AA6TN; Dale A. Pensgen, WB2YQI; Raymond V. Pillow, WA4FGJ; Gary W. Ralles, KT8O; Frank Sanders, KN8KAZ; Michael Ter Sarkissoff, N6DBZ; R. F. Sawtelle, KC5EA; Grover W. Sherlin, K3OTO; Bart W. Simpson, WA4IBZ; Michael D. Snider, N9BRK; Stephen A. Tolnai, W7WSV; Vincent G. Trobbiani, KA9KUJ; Del F. Wachter, WB8TJO; George I. Wagner, K5KG; Sterling M. Washington, K9YVJ; David Wilson, N4ABK; Maxey R. Wynn, WD5CWA.

List No. 2: Henry I. Alarcon, NP4DU; Robert J. Batten, KB8J; Charles Battenslag; Anthony J. Becker, AEØM; Frank Cantelmo, Jr., WB1FWS; Virginia R. Carey; Randy J. Carter, NØEEU; L. Gene Clark, WA4FRY; Barbara A. Cochran, KC8CN; Michael W. Colesante, KC8C; Jorge Ruben Colmenarejo, LU2CC; Brian G. Connelly, N1CLD; Robert A. Curran, KA3GCC; Richard E. Duncan, K9IKP; Robert B. Flint, W2HND; R.W. Fontes, W6TEX; Guy Hardwick, WD5HZZ; Duane Harkness, KØRA; Lorraine K. Hastings, N6FSL; Patricia S. Hopkins, KA4NZO; Stephen E. Horne, WB7UFF; Elli E. Hunt, KAØFNY; Charles P. Jaworski, W1CJ; Alvin Jewler, N3BIN; Lyle V. Johnson, WA7GXD; Kenneth B. Kelley, KR8E; Vincent J. Lawrence, NØUA; Paul S. Lemmon, WD6BNO; Neil Lewis, WB6VIV; Marvin Maybury, WB2YHA; Robert P. Millard, KE6JI; Robert J. Plechaty, K9CGD; J. David Power, WB2VLA; Doug Princehorn, KA8RQO; Edward Miles Riley, Jr., WB4LAB; Edward J. Roser, KA5COA; Joseph F. Roth, Jr., WA3VJK; Larry L. Samons, NØBZA; Haim Sandel, KB2IV; Virginia S. Schietecatte, N8EOA; Richard L. Sine, KB3WN; Robert Odell Smith, NA6T; Robert B. Sturges, WB3HSO; George Theodore, KBØVQ; Philip R. Wallace, KA2QIP; Charles L. Warren, KA6MMY; R. James Wennblom, WAØARZ; Douglas E. Williams, KD9Q; Jim A. Wright, WA7HIF; Marvin G. Zeigler, KAØCUW; Toni Zimmerwoman, KN3T.

List No. 3: Deanna J. Almy, WA2UWF; Jack J. Babkes, W2GDG; John Robert Ball, WB1ESJ; Ronald L. Beaver, WB4OQL; Melbourne G. Briscoe, W1IAY; Bobby J. Brown, KD5CR; Eldon Brown, Jr., KA4MON; W.L. Bush, KAØCLY; Gene Christianson, N6CFO; James L. Cole, WB7DOZ; Christopher D. Colvin, N6GDL; William N. Cool, WD8KNW; Mary Alice Curran, KB8LK; Ronnie L. Darby, WB5KAN; Michael J. Dinelli, N9BOR; Robert Duffield, WBØWNB; Bob Dugan, KN1W; Kenneth P. Eland, K4UJB/ON8GA; James R. Elledge, KB2XJ; Thomas R. Fergus, WA2GIB; William E. French; H.E. "Buddy" Graham, KB5QA; R.N. Graham, N4GLZ; Marvin S. Grossman, W8AZO; Charles J. Gspann, W2ZEE; Larry L. Henderson, KA6LDP; Albert J. Huber, KC4CT; John J. Ibes, KA9FUI; Jas B. Johnson, Jr., WA4AWT; Stephen W. Judd, WB8YLO; Virgil F. Kain, K5RYS; Paul N. Katz, W5NTQ; Edward B. Kidd, II, KA5AQY; James E. Knapp, KC8AU; Howard I. Kortis, KB2RD; Alan F. Lautz, WB3ECR; Richard K. Leavitt, WD4PSQ; Lionel Leblanc, VE2AUA; Leslie A. Lines, K5SDF; Stephen Mallner, Jr., WBØRIC; Jeff Maney, KG4F; W.J.D. Marshall-Gratrix, KA7Q; Roger Melen, WB6JXU; Kevin L. Milner, NØCYQ; Clarence O. Moen, VE5MO; Sandy Moneypenny, KB8WQ; George W. Murray, Jr., W1FWD; John S. Neely, WDØCVV; Alta Jean Nicolai, KA7IQJ; Henry T. Nicolai, KC7S; Lyle D. Olmsted, KB7PI; Orville M. Otis, K8IU; Billy D. Parten, WB5OMC; Stan C. Payne, KC7IH; Gary L. Phillips, KS8K; Terry D. Pieper, WA5TSV; James Barclay Porter, KE2C; David A. Pruett, K8CC; Jonathan L. Reise, WA9JBR; Kirk Drake Richert, KA7FWO; Juan J. Rivero, WA4TLE; Michael D. Roper, KØQJK; Joseph Russo, Jr., WB4VMX; John R. Sanders, NC4E; De Los A. Sanderson, W7JHV; Francis B. Smith, KA7QLP; Susan R. Spriggle, N3COH; Jeff Steinman, KRØY; Douglas B. Stevens, Jr., WA2BBS; Johnnie W. Strickland, KA5IMT; Susumu Takakubo, JA1KZP; Claude E. Tavernier, Jr., KA6PBU; Lewis B. Taylor, KA2MMN; Steve Taylor, K5MR; David Bradley Toth, VE3GYQ; Leo J. Vetter, Jr., N2AGA; Heinz Weickert, WA2EZJ; Keith A. Wester, K6DGN; Donald R. Whitney, WB9TNK; Roger T. Yokubaitis, WB5YJN.

List No. 4: Joseph R. Agee; Barbara K. Bellocchio, N2ARD; Chris Carrell; Luis Chartarifsky, XE1LCH; Bernard Crouzel, WB2AET; Dean K. Custis, WD4PSM; Robert F.J. Fruehe, NJ6C; William R. Goslin, Jr., WB6WWW; Paul Hammerlindl; Wayne Hernandez, KA7ILE; Elizabeth B. Howard, N4ECZ; Maurice I.K. Jacobson, KD4JS; Louis V. Kaufman, W3HJD; H. Scott Langdon, AA4OO; Michael J. Mellinger, WAØSXV; Stuart Montgomery, KB1HZ; Rosemarie R. Pitz, N6BCY; Maurice B. Polayes, N1CRK; Jorge Ramirez, NC6C; Donald E. Root, Jr., WB6UCK; Harold J. Sandwick, N9DVL; N. Carol Shrader, WI4K; Elmer L. Steingass, WB8LLD; Richard N. Suhadolc, N9CKL; John H. Taylor, Jr., KC2JO; David M. Upton, WB1CMG; Louise H. Van Andel, N9EAN; Thomas A. Weatherley, III, ADØO; David Mark Wyers, WB6PUN.

Life Members Elected April 20, 1983

Edwin Jay Fleischer, K1JRE, Nathaniel Stein, KA2IKA.

The New Frontier

The World Above 1 Gig

Conducted By Bob Atkins,* KA1GT

23-Cm Band Plan

In response to several requests, I am listing here (at the right) the current ARRL band plan for the 1240-1300 MHz band.

No official band plans yet exist for the bands above 1300 MHz. By common agreement, the following subbands (all harmonically related to 1152 MHz) are used for narrowband and weak-signal work:

2304-2306 MHz
3456-3458 MHz
5760-5762 MHz
10,368-10,370 MHz
24,192-24,194 MHz

In general, most activity takes place at the low end of these subbands. On 10-GHz wideband fm, the frequencies 10.250 and 10.280 GHz have often been used with a 30-MHz i-f to provide duplex communication. Above 24 GHz, the frequencies 76.032, 145.152 and 248.832 GHz have been suggested for narrowband use (again, all are harmonically related to 1152 MHz) when work begins on these bands.

1240-1246	ATV Channel 1	Video carrier at 1241 MHz (Note 1)
1246-1252	Fm relay and links no. 1	(Note 2)
1248-1258	ATV Channel 2	Video carrier at 1253 MHz
1258-1264	Fm relay and links no. 2	(Note 2)
1260-1270	Satellite uplink	(Note 3)
1260-1270	ATV Channel 3	Video carrier at 1265 MHz (Note 4)
1270-1276	Fm relay and links no. 3	(Note 2)
1272-1282	ATV Channel 4	Video carrier at 1277 MHz
1282-1288	Fm relay and links no. 4	(Note 2)
1284-1294	ATV Channel 5	Video carrier at 1289 MHz
1294-1295	Fm relay and links	(Note 2)
1295-1297	Weak-signal work	(Note 5)
1297-1300	Fm relay and links	(Note 2)

Notes

1 — Vestigial sideband filter required.

2 — Standards for fm are currently under development.

3 — OSCAR 10 has an uplink band at 1269.05-1269.85 MHz.

4 — Note that this band may possibly interfere with the satellite uplink band.

5 — Official calling frequency is 1296.0 MHz, but since this is the nominal EME frequency, most stations now use 1296.100 MHz as the calling frequency for ssb and cw.

WIDEBAND/TV

Bill Munsil, N7AOU, has written with information on ATV in Arizona. The fast-scan TV club (AAA5) has a repeater with 434-MHz input and 1253-MHz output, and the club is also coordinated on 2320, 2340, 2360 and 2380. Bill would like to see more wideband (and TV) information in The New Frontier. Well, I'm afraid I'm not active in this area and I can't contribute much personally, but if any readers have items they would like to send to me about work in this field, I would be happy to print them.

POWER TRANSISTORS FOR 1296 MHz

Dave Mascaro, WA3JUF, has passed on some information about the SD1520 (1-W) and SD1511 (8-W) transistors that have been used by a number of stations in 1296-MHz power amplifiers based on designs developed by members of the Pack Rats radio club. He has arranged for these devices to be assigned new part numbers so that they may be sold to hams through a distributor. The reassigned part numbers are SD1598 (was SD1520) and SD1599 (was SD1511).

Dave indicates that these devices should be available from RF Gain Ltd., 100 Merrick Rd., Rockville Center, New York 11570, tel. 800-645-2322 or 516-536-8868 (in NY). When I called, there seemed to be some difficulty in finding the prices of these transistors, but I was eventually quoted a price of around $35 each in unit quantities.

MID-ATLANTIC STATES VHF CONFERENCE

This year's conference, sponsored by the Mt. Airy VHF Radio Club (commonly known as the Pack Rats), will be held October 1 at the Warrington Motor Lodge, Warrington, Pennsylvania. The famous HAMARAMA flea market will be held the next day at the Bucks County Drive-In Theatre, Warrington. Mark these dates on your calendar. These events are always well-organized and provide lots of information and equipment for those interested in the bands from 50 MHz on up (not to mention the excellent hospitality suite!).

BELGIANS MAY LOSE MICROWAVE BANDS

In a message from G3WDG, the RSGB microwave columnist, is relayed information that a bill is soon to be read before the Belgian Parliament calling for a number of cuts in their Amateur Radio allocations, including the loss of 432-434 MHz and the 23, 13, 9 and 6-cm bands. This is a potentially serious situation for Belgian amateurs, and could set a precedent that might affect others. Since it seems very likely that this measure will go though, amateurs in Europe are planning to send QSL cards with messages of support to ON6AT/RTT, Box 71, Ghent, Belgium, in preparation for a petition to regain these frequencies. Further information will appear as it is received.

2304-MHz NEWS

W8YIO has sent details of a low-power contact over an 85-mile path with WA8TXT. W8YIO was running 30 mW to an 8-ft dish, and WA8TXT was only running 200 μW to a 4-ft dish. Signals were strong enough for solid copy on both ends (up to + 30 dB out of the noise). No particular enhancement was noticed on the lower bands at the time of the contact. On the morning of July 7 GMT, W8YIO heard W4HHK (at a distance of almost 600 miles). Signals were weak but positively identified. W4HHK was running 1-kW input to an 18-ft dish, but because of receiver problems was not able to listen for W8YIO.

LATE NEWS!

W8YIO and W4HHK finally made a 2304-MHz contact on July 27. Both stations were running klystron amplifiers with about 300 watts of rf output. Signals peaked at 4 and 5 on cw. The distance between these stations is about 590 miles.

OTHER NEWS

☐ The RSGB *Microwave Newsletter* has some interesting statistics on microwave operation in the UK. On the higher bands, it shows 14 stations QRV on 3.4 GHz, 12 on 5.7 GHz, 109 on 10 GHz and 11 on 24 GHz. What might be especially surprising to a U.S. reader is the fact that 46 stations are QRV on 10.368-GHz narrowband.

☐ Still plugging the RSGB, a new edition of the excellent *VHF/UHF Manual* is now available from ARRL Hq. for $17.50. This book is recommended to anyone active on the vhf/uhf or microwave bands.

☐ From the Southeastern VHF Society newsletter come some interesting comments on contesting in Europe and the USA:

"G4ANB of Maidenhead Grid locator fame made some interesting points about European UHF and above activity.[1] Picture, if you will, contests which are run on the honor system. John says there is no real problem with people saying they worked someone when they didn't in Europe. No cards exchange hands necessarily to verify awards. Contests are frequent, and to win you must reach rates approaching low band contest work. Stations without 10 GHz are severely handicapped. Mountaintop contest stations are located every few miles and coexist simply by gentlemen's agreement as to which 100-kHz segment belongs to which mountaintopper. Exchanges even on the microwave bands are: signal report, full 6-digit grid locator, calls and even serial number. Often, Range scoring is utilized with the judging stations entering log locators into computers to figure scores for the participants.

"To think, we are having stations complain at even exchanging signal reports *or* 4-digit locator codes. As you see, the Europeans are much more highly motivated by personal achievement and the complex goals of 3 GHz and up work.

"Here in the U.S., 3.3 and 5.5 GHz are the forgotten bands, with less than a dozen capable of even getting on. In Europe, they run power on these bands and need them for competition.

"In short, here in the U.S. we greet contests not as experimenters welcoming the increased activity, but as lawyers looking for loopholes to take advantage of."

[1]Editor's Note: Currently, the QRA locator system used in Europe is five characters long, but they may change over to the full six-character worldwide locator system in the next few years. I'll leave it to the reader to judge the conclusion, but it does provide food for thought!

*103 Division Ave., Millington, NJ 07946

IARU News

Conducted By Richard L. Baldwin,* W1RU

Honors Come to Radio Amateurs

By Royal Decree dated April 20, 1983, Philip Huis, PAØAD, was awarded the decoration of Member of the Order of Oranje Nassau. PAØAD is the immediate past president of the Vereniging voor Experimenteel Radio Onderzoek in Nederland, Dutch member-society of the IARU. The award by his government is not only a recognition of his own many contributions, but also an expression of appreciation by the authorities of the importance of the Amateur Radio Service.

Another royal award was issued when Queen Elizabeth II named Tom Clarkson, ZL2AZ, to be a Member of the British Empire, in recognition of his many years of service in the field of telecommunications. In his professional life, Tom was with the New Zealand Post Office Department, and served with distinction. On the Amateur Radio side, he was a founding member of the Region 3 IARU Association and a member of the Board of Directors of that group until 1982. He was also a member of the IARU WARC-79 team in Geneva in 1979, where his advice and his knowledge and his good humor were invaluable.

The JARL has named Noel Eaton, VE3CJ, past president (and now president emeritus) of IARU as an honorary member of the Japan Amateur Radio League, complete with personalized gold badge.

*President, IARU

W1AW REGION 2 BULLETIN SERVICE INITIATED

On September 7, W1AW initiates an on-the-air Baudot bulletin service to IARU Region 2. This provides up-to-the-minute information for the Region 2 member-societies, which are encouraged to share it among their members. Transmissions are bilingual, first in English and then in Spanish.

With the W1AW antennas pointed south, the Region 2 bulletin will be transmitted simultaneously on 3.625, 7.095, 14.095, 21.095 and 28.095 MHz on Wednesdays at 2230 UTC. With the change to standard time on October 30, bulletins after that date will be sent at 2330 UTC.

Any information for bulletin consideration may be sent to IARU Region 2 Secretary Alberto Shaio, HK3DEU (see address at top of page).

In Training

Conducted By Jonathan Towle,* WB1DNL

Amateur Radio and Continuing Education

One goal of an efficient training program is to reach as many persons as possible with up-to-date teaching materials and effective instructors. With this in mind, many continuing-education programs have sponsored Amateur Radio courses that usually require a nominal fee. These are frequently taught by radio amateurs who are compensated for their time. While this may sound like "ham radio for hire," it really is not. The point is, no person may be paid for Amateur Radio *operation*. Therefore, you can't be paid and operate your radio as part of an Amateur Radio course. You can, however, invite a friend (not compensated) to give a demonstration to the class. The following observations on teaching Amateur Radio courses in a continuing-education program were submitted by James Apsey, K8JA.

"Should Amateur Radio license classes be taught by paid instructors in adult- and continuing-education departments of our nation's schools? Is it ethical and legal to hold such classes?

"Many radio amateurs answer these questions in the negative. They usually cite the 'no pecuniary interest' part of the rules to support their belief that no one should be paid for teaching about Amateur Radio. This view is reinforced by the fact that most Amateur Radio classes are sponsored by clubs or by groups of public-spirited, enthusiastic radio amateurs. And, it is reasonable to assume that Amateur Radio quite possibly would not have survived without those classes.

"There is no apparent reason, however, that the growth and well-being of Amateur Radio should not be enhanced by the existence of courses within the expanding continuing- education programs for which tuition is charged. In the first place, the modest fees charged for continuing-education classes here in the Great Lakes area do not cover the cost of administering, teaching, providing classroom space, heat, lights, telephone and audio-visual equipment, and the myriad of other expenses that plague administrators of every institution. In spite of these costs, some schools, such as the University of Toledo, grant fee waivers to students who have reached their 60th birthdays.

"In the second place, the academic environment encourages learning. For example, the schedule of the classes and the presence of peers in an atmosphere of learning gives the student a sense of urgency, a sense of seriousness and a sense of commitment. Furthermore, because of the tuition fee and the endorsement of the course by the school, the student can expect to find a qualified instructor. Also, the student can expect that the classes will meet on schedule and that the course content will be presented within the time specified. Moreover, the student will receive nationally recognized Continuing Education Units (CEUs) for his or her work. For these reasons, the course fee represents something of value.

"There are other facets of Amateur Radio that represent something of value. For instance, the spirit and the letter of the FCC rules governing Amateur Radio do not proscribe such activities as manufacturing transmitters, receivers, antennas, towers and accessories for profit. Nor is it deemed wrong for tradesmen to charge for their services of installation and repair of Amateur Radio equipment. Surely then, for the above reasons, no one should object to the modest stipend that a radio amateur might receive for his or her instructional services in the classroom."

*Training Manager, ARRL

A Viable Alternative

Adult- and continuing-education programs are a very valuable part of our educational system. They provide the educational resources for those not enrolled in a high school or a university degree program. They should not be regarded as a replacement for classes sponsored by Amateur Radio clubs or individuals. They are a viable alternative for those who want a structured learning environment or are unable to find a club or individual sponsoring a class in their area. All instructors should remember, however, that §97.112 states: "An amateur station shall not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised." Thus, if you get paid to teach, then leave your radio at home!

The Training Branch maintains a file of registered, active Amateur Radio instructors. If you need help or know of someone who does, drop us a line and we will send you the name of an ARRL instructor in your area. Remember, you are never too old or too young to learn.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

N1AOZ, Georgiana Smith, Vernon, VT
WB1AQT, Howard Cookson, Waterbury, CT
W1ATX, Richard H. Cook, Norwood, MA
N1COR, John J. Ganley, Sr., Bethel, CT
W1GAI, Mary C. LeVan, Waterford, CT
W1HF, John J. Roach, Warwick, RI
*W1JTI, Leon D. Tallman, South Effingham, NH
W1NA, Willard F. Richards, Plymouth, MA
W1NWO, S. Willard Bridges, Marion, MA
K1QGR, Frank W. Jordan, North Attleboro, MA
K1RYH, Warren R. Godfrey, Bremen, ME
W1SSS, John H. Dowd, New Bedford, MA
W2AZL, Carl E. Scheideler, Holmdel, NJ
K2DQT, George Kupp, Belleville, NJ
W2HMG, Gordon M. Cavanaugh, Poughkeepsie, NY
WB2KTS, Norman Potter, Woodstock, NY
W2SSY, William H. Jones, Troy, NY
WB2TDN, Irving Solomon, Port Jervis, NY
K2UKQ, Kathleen G. Stine, Ft. Lauderdale, FL
WA2VHP, John F. Nolan, Trenton, NJ
KA3BSA, John E. Russell, Allentown, PA
W3DH, Harry E. Stahl, Morrisville, PA
W3DIG, Francis J. O'Brien, Sayre, PA
W3EWR, Richard S. Wenger, Lancaster, PA
KA3GFR, Francis G. Buongiorne, Clayton, DE
W3KIF, Robert Stephenson, Bryn Mawr, PA
W4APN, Nicholas Bourisk, St. Petersburg, FL
WD4EEM, Bruce B. Gralow, Richmond, VA
KF4EX, Robert W. McDougall, Orange Park, FL
AC4F, Richard C. Sample, Louisville, KY
WB4GCC, Ann C. Laxson, Hialeah, FL
W4IWB, Lawrence C. Cox, Pelzer, SC
WB4JEA, Joseph P. Wolfe, Columbus, GA
WA4JYW, George E. Gerber, Sandston, VA
W4LB, George R. Boardman, Springfield, VA
KD4LK, William R. Patton, Knoxville, TN
K4LTS, Robert E. Galloway, Blythe, GA
W4PIY, Marshall H. Gillespie, Haughton, LA
K4SO, Stanley G. Flack, Jekyll Island, GA
WB4YFL, Willard S. Taylor, Greensboro, NC
W4YOL, Leo R. Comer, Shenandoah, VA

*Life Member, ARRL

N4ZI, Ray H. Rowland, Centre, AL
WD5BLS, Beverly Hatchett, Tijeras, NM
W5FVM, James A. Ideker, Houston, TX
W5NPM, Samuel M. Meeks, Farmersburg, IN
WA5OVX, Anna H. Morgavi, Metairie, LA
*W5SE, Jesse L. Miller, Fort Smith, AR
W5USS, Herman A. Hageman, Albuquerque, NM
W5VEZ, Jesse C. Hayes, Keller, TX
K6AO, John W. Fogg, Pine Grove, CA
K6BPZ, Marvin C. Wood, San Francisco, CA
W6DBB, Barton A. Wood, Amador City, CA
WD6DFR, Marcel A. Goyette, Vacaville, CA
WB6DRX, Hubert E. Philby, Chula Vista, CA
N6DYO, Robert S. Clark, Oceanside, CA
N6EVY, Paul M. Warnick, Jr., Santa Maria, CA
W6FLW, Emile A. Duval, Whittier, CA
KD6FS, Donald L. Stinson, Onyx, CA
WD6GFC, William S. Berryhill, Madera, CA
N6HY, Daniel S. Lewis, II, Paso Robles, CA
KA6IEN, William C. Okulski, San Diego, CA
KA6JUI, Virginia L. Hutchinson, Thousand Oaks, CA
W6JYK, John F. Pensyl, Santa Barbara, CA
W6LBU, Joseph J. Lyons, Alhambra, CA
*W6NRM, Robert H. Weitbrecht, Redwood City, CA
W6QOG, Helen J. Leonard, Los Angeles, CA
K6RB, Kenneth H. Wilder, Atherton, CA
W6SCP, Clinton B. Wells, San Marcos, CA
WB6TKT, Bruce H. Thrasher, Santa Cruz, CA
K6TXB, James L. Hay, San Diego, CA
K6TXR, William J. Vette, Santa Clara, CA
WB6YFC, Carl F. Reupsch, San Diego, CA
W7AME, Raymond C. Stennett, Portland, OR
W7BYX, Vernon R. Anderson, Lewistown, MT
W7NEG, Milburn H. Parker, Missoula, MT
WA7OFZ, Edward J. Moulaison, Jr., Redmond, WA
*K7WLY, Guy P. Felton, Reno, NV
*W8CN, Robert H. Todd, Saline, MI
W8JZU, William D. Stone, Charleston, WV
W8KJI, Ross J. Plaisted, Painesville, OH
W8LN, Harry G. Crofts, Scottsdale, AZ
KA8NPB, Russell W. Decess, Holt, MI

KA8PHR, Bruce L. Bernson, Southfield, MI
WD8SEF, John V. Grogan, West Salem, OH
WA8WYG, Glen H. Rolston, Wapakoneta, OH
N9AHC, Warren D. Montano, Muncie, IN
W9CI, Eric G. Shalkhauser, Washington, IL
W9DN, Paul E. Luecke, Ft. Wayne, IN
W9DQ, Homer B. Courchene, Lakeland, FL
W9DQG, Erwin G. Kraetzner, Lowell, WI
W9EYR, Stanford M. Heide, Kenosha, WI
KA9HGV, Jack S. Cody, Chicago, IL
W9HZ, Merrill W. Price, Indianapolis, IN
W9LDL, Joe E. Boyers, Ft. Wayne, IN
WØBK, Arthur A. Jablonsky, St. Louis, MO
WAØCHN, Erwin G. Kraftzik, Hastings, NE
KAØCTC, Jeffrey P. Andrews, Parker, CO
NØCZ, Clifford E. Hurst, Red Feather Lakes, CO
WØDIN, Joseph Francis, Conway Springs, KS
WØMFR, Kenneth W. Dahlmeier, Sturgeon Lake, MN
KØRIR, Don D. White, Brentwood, MO
WAØUIT, Theodore H. Ramsborg, Robbinsdale, MN
WBØUQA, Eugene P. Loesch, Moberly, MO
WAØUUG, Charles R. Anderson, Littleton, CO
WØUWM, Lucien R. Gallais, Florissant, MO
KP4BHM, Hipolito Tirado-Lopez, Aguada, PR
VE1BKA, Keith A. Lyne, Dartmouth, NS
VE3LW, George "Norm" Irwin, Whitby, ON
VE3MLG, Alfred I. Brodie, Rexdale, ON
VE4TQ, Joseph Dembrowski, Meleb, MB
VE7DU, Henry T. Scott, Victoria, BC
VO1DY, Joseph H. Patey, St. Anthony, NF
ZS6ADT, I. J. Henning, Transvaal, South Africa

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*.

50 Years Ago

September 1933

☐ As promised last month, we find complete details on our new regulations, in addition to the expanded voice privileges and the d.c. power supply requirement previously publicized. New Classes A, B and C replace the old Temporary, First Class and Extra First Class licenses and the Unlimited 'Phone Endorsement. The license physically will be one document combining operator and station privileges, and is good for three years.

☐ The new regs pose some questions, one of which is "What *is* an 'adequate' filter?" George Grammer answers the question, along with providing some typical circuits and info on chokes and condensers as filter components.

☐ Hugo Romander describes an adaptation of the ultraudion circuit to form an "inverted" amplifier (grounded grid, "hot" filament), which he claims does not need neutralization.

☐ For another of his hobbies, Ross Hull built midget receivers and transmitters for 56 Mc. and carried them on soaring flights, particularly at the National Soaring Meet at Elmira, New York. A one-tube receiver does a good job because the glider produces no engine ignition noise to eliminate.

☐ We welcome the new RK-18 transmitting tube from Raytheon, designed after consultation with the *QST* staff, as an ideal intermediate-power tube rated between the type '10 and the 852. Sylvania similarly has a new 830, and RCA an 800.

☐ A one-page report on results of the first Field Day exercise shows nearly 50 participating stations. Power supplies ranged from B batteries through dynamotors to gasoline generators in trailers. W9ZZAL, of the Central Illinois Radio Club, made top club score — 98 points, 15 sections!

☐ The *Liga Mexicana de Radio Experimentadores* is representing the International Amateur Radio Union at the North American Radio Conference in Mexico City. Broadcasting, the "tropical" kind, is our main concern.

☐ Attendees at the Kansas State Convention in Topeka will get free lodging with cots and blankets in the National Guard Armory. Registration fee: $2.50.

☐ W6CAL, W2TP, W1SZ, W9EL, W9DZX and W9GFZ are among the pioneers getting results on the barren 10-meter band.

☐ W8CMY shows us a low-pass filter circuit with sharp cutoff and an attenuation "notch" ideal for 160-meter 'phone types who are trying to alleviate interference to neighbors' BC sets.

25 Years Ago

September 1958

☐ FCC's Field Engineering and Monitoring Division pulled a surprise inspection on a number of amateur stations in the Los Angeles area, and found several running well over the kilowatt limit. The Editor welcomes the action, because while we are generally careful about most regulations, the one on power is too often winked at.

☐ W1HDQ designed a halo antenna to work both 50 and 144 Mc. on a mast mounted on the bumper of a small sports car.

☐ W2AWH says we are much too fanatic about standing-wave ratio and line impedance matching. He shows that in some cases a high (e.g., 3 to 1) ratio may have insignificant lowering of the power delivered to the antenna.

☐ Soldering is perhaps the first fundamental skill in building one's own gear. Novice helpmate W1ICP outlines the proper tools and procedures to do a good job.

☐ Heavy battery filament drain or dynamotor buzz is nonexistant when one switches from tubes to transistors, W1CUT points out in describing a fully solid-state modulator complete with power supply for mobile operation.

☐ The Viking Adventurer is a popular commercial rig, and W4UWA outlines a simple modification to include 50-Mc. capability.

☐ Another common xmtr is the DX100 by Heath, but with keying problems because the designer apparently concentrated on voice operation. WØCGZ solved his problem with a VR-tube break-in keyer system.

☐ WA2BCW presents Part 2 of his extensive description of slow-scan TV for amateur use.

☐ The *Handbook* has long had design graphs for pi network tank design in terms of reactance. This issue carries complementary curves based on inductance and capacitance.

☐ W9LZV's 650-watt amplifier, using 4X250Bs, is compact enough — complete with power supply — to sit on the operating desk top.

☐ Contest operating champ W9IOP lets us in on a few of his thoughts concerning equipment, skills in c.w. techniques, logging shortcuts and physical preparation for a 48-hour nonstop grind.

☐ Attorney W4NJF describes effective procedures used before an Arlington, Virginia, zoning board to reassure the public that K4LMB's new antenna tower would not be the cause of uncontrollable TVI. — *W1RW*

The World Above 50 MHz

Conducted By
Bill Tynan,* W3XO

The Grids Are Off and Running

Notice a difference in how the vhf and uhf bands sound of late? Since the appearance in January *QST* (page 49) of the article by W1XX announcing implementation of the "Maidenhead" grid designator system and initiating the VUCC awards, things haven't been the same. Those who previously had merely spun their dials looking for a new state or a contact at least 500 miles away are now actually QSOing locals, semilocals and inhabitants of states worked many times over. The new awards based on the grid system can certainly be credited as a major contributor to this revised behavior.

The Spring Sprints introduced many to the grid concept and provided a great opportunity to see how they would work as contest multipliers. The summer E_s season has provided still further exposure for the grid designators. Very few operators that this conductor has encountered on 6 meters were unaware of their square. I have been told that the situation on 2 meters is not quite as good, but I have not personally observed the problem in more than a few isolated instances. On a 2-meter E_s opening that I caught the evening of July 14, everyone I heard and worked were readily providing designators.

Another major test of the system will take place this month with the League-sponsored September VHF QSO Party (see page 85 of the August issue). This will be the first use of grids as multipliers in place of ARRL Sections in a "major" League-sponsored vhf contest. This follows the recommendation of the VHF Contest Ad Hoc Committee, on which this conductor has been proud to serve. The goal of this significant change in contest format is an attempt to equalize, as much as possible, the number of multipliers available within a given radius for stations located in various parts of the country. Obviously, it is impossible to completely "equalize" the availability of potential multipliers in all areas because of differences in population density and proximity to large bodies of water; but with grids, at least the size of the real estate defined as multipliers is nearly the same for all areas.

Some have expressed displeasure with the new system on the basis of its use of 2° by 1° blocks instead of the 1° by 1° size formerly employed in the UHF Contest. The reasons for this, and the general subject of grid systems, were covered in considerable detail in three installments of this column in September 1979, September 1980 and February 1981 *QST*. Space does not permit a recap of all the material presented, but suffice it to say that the system announced last January was concluded to be the only one that could possibly gain acceptance throughout the world. In fact, it *is* rapidly becoming a worldwide standard. True, it was narrowly rejected in favor of their existing QTH Locator System by the Region 1 (Europe and Africa) IARU Amateur Radio societies at a meeting held in 1981. But that was before the rest of the IARU member-societies had been properly briefed on it and had a chance to express their views. Resistance of the Europeans to abandoning their existing, "QTH Locator System" is understandable. After all, it has been in use on the Continent since the mid-'50s. This reticence can also be appreciated in light of their perception that the rest of the world, especially the U.S., was not interested in establishing any kind of grid system. But, the QTH Locator System was configured in such a manner as to make it virtually impossible to extend it to worldwide coverage, and the world now appears to be ready for a grid system.

The degree to which the situation has changed since the Region 1 IARU meeting can be summarized by the following events. Last year, use of the new system, originally proposed by SM5AGM and G4ANB and often referred to as the Maidenhead System (from the resort town in England where it was first presented), was given a positive response by a Region 3 (Asia, Australia and New Zealand) IARU Conference. And, at the recent meeting of the representatives of the various Western Hemisphere Amateur Radio IARU societies held in Cali, Colombia, it was recommended for use in Region 2.

With acceptance by the other Regions and the enthusiastic reception accorded it by vhfers in this country and Canada since initiation of the VUCC Awards, it is obvious that apathy over a grid system is a thing of the past. It is now almost a foregone conclusion that, at their next meeting, the Maidenhead System will be approved by Region 1, replacing (or at least supplementing) the current QTH Locator System.

The importance of having a worldwide grid system on which to base awards and contest multipliers has rapidly become apparent. On 6 meters, this conductor has already exchanged grids with one LU, a KH6 and a number of Caribbean stations. The first VUCC Award issued went to W1JR. Joe earned it on 70 cm using moonbounce as well as terrestrial contacts to amass the 50 grids needed on that band. Similarly, VUCC number 2 went to K8WW for the same band. I'm sure Dave also took full advantage of EME and the large number of active Europeans. The first, and so far only, 2-meter VUCC Award has been earned by K9MRI. Collecting 100 grids on that band certainly requires a great deal of effort, and Joe is to be congratulated for this outstanding accomplishment. Coming up with 100 grids on any vhf band entails a lot of operating and the patience and fortitude to acquire the required confirmations. K8WKZ was the first 6-meter operator to accomplish the feat, and Dave has recently received an endorsement for an additional 25 grids. Others who have obtained the VUCC Award on 6 meters, as of early July, are KB4CRT, W1QXX and N4MM. To VUCC holders and those to follow — congratulations!

But the game isn't over. There are still those endorsements to earn. Since it is a worldwide system, there are a lot more grids out there waiting to be worked, and vhfers of all countries are welcome to participate.

For those who have not started collecting grids on whatever vhf/uhf band is your favorite, you're missing a lot of fun. And bear in mind that grids will be used as exchanges and multipliers for the September QSO Party. More contests using this format will probably follow. Your suggestions on this are welcome. Opinions on the use of the system in the June QSO Party, when 6 meters is frequently wide open, are particularly sought. And remember to put your grid on all of your QSLs. It saves the person at the other end a lot of trouble. W3XO will be looking forward to handing out FM19 to as many as possible.

*Send reports to Bill Tynan, W3XO, P.O. Box 117, Burtonsville, MD 20866, or call 301-384-6736 to record late-breaking information.

SEVENTH ANNUAL MID-ATLANTIC VHF CONFERENCE

An event that has become one of the mainstays on the vhf conference scene is coming up Saturday, October 1. It's the mid-Atlantic VHF Conference and Flea Market sponsored by the Mt. Airy VHF Radio Club, popularly known as the Pack Rats. The Conference, featuring well-known and accomplished vhf and uhf experimenters, will run from 0900 to 1700 Saturday, October 1, followed by a buffet dinner and social gathering. All of these events will be held at the Warrington Motor Lodge, 4.5 miles north of Pennsylvania Turnpike Exit 27, on Rte. 611. The next day, at the nearby Bucks County Drive-In Theater, one of the East's best flea markets will take place. Advance registration is $4, which includes the Flea Market. The buffet dinner is $12. Checks made payable to the Mt. Airy VHF Radio Club, Inc., should go to HAMARAMA, P.O. Box 311, Southampton, PA 18966. Motel reservations can be made by calling 215-343-0373. I'll be looking forward to seeing as many of you as possible at this first-class event.

ON THE BANDS

6 Meters — How to characterize the 1983 sporadic-E season? It's rather like the old story of the group of blind people describing an elephant. One's perception of conditions depends on location and how much attention was paid to the band. I think it's fair to conclude that, this year, the eastern part of the country had the most interesting time. But even here, those who checked the band only infrequently and casually probably concluded that this was a so-so season. All areas did receive a goodly portion of single-hop and many double-hop E_s openings, but foreign DX was somewhat of a rarity west of the Mississippi.

Certainly, the biggest story is the successful 50-MHz two-way crossing of the Atlantic via E_s. In addition to the contacts reported last month by VE1YX and VE1BNN, I now have the pleasure of reporting the first work by U.S. stations. The *big* day came July 1, when WA1OUB New Hampshire began hearing TV buzz in the band starting as early as 1145Z. Bob says that 10 meters was dead at the time. At 1840, he noticed European 10-meter beacons coming in very well. A CQ on 6 meters brought a crossband QSO with SM6PU at 1848Z. At 1850, G4GLT was worked via the same route. This was followed by GM4COK at 1900 and DF2AO at 1909Z. Repeat 6-to-10 contacts with SM6PU were made at 1920 and 2033Z. At 2220 and 2223, WA1OUB crossbanded with GM3DOD and G4GLT. The latter told Bob to listen for him in seven minutes on 50.096. Bob began calling at 2228Z and stood by at exactly 2230. Unfortunately, he did not hear G4GLT, but there was GJ3YHU calling him with 529 signals. WA1OUB received a 559, and what is probably the first 50-MHz two-way E_s contact between the U.S. and the U.K. went into the vhf record books. Bob heard no other signals from across the pond, but a report from G5KW, Land's End in Cornwall, notes reception of WA1OUB on July 1. Ken was disappointed not to have been able to be heard, as the U.S. would have been country number 10. Since receiving one of the 40 off-TV hours 6-meter permits in February, G5KW has

worked G, GI, GW, GM, GJ, GU, ZB2, VE and, interesting enough, TF1T. In issue number 6 of the U.K. Six Metre Group's publication *Six News*, kindly passed along to me by G4JCC, four Gs report 6-meter two-way contacts with that station, who I assume to be our old friend TF3T with a slightly different call.

But, WA1OUB and GJ3YHU were not the only fortunate ones to make a historic transatlantic 6-meter E_s two-way contact that evening. After hearing the GB3SIX beacon on 50.018 and the ZB2VHF beacon on 50.035 from 2100 until 2229Z, KA1PE Maine completed a two-way contact at 2235 with GI3ZSC for probably the second such QSO in history.

These were not the only openings across the Atlantic so far this season. On June 16, three days prior to his history-making U.K. contacts, VE1YX reports hearing the GB3SIX beacon from 2204 to 2315Z. Two evenings earlier, W4CKD copied the ZB2VHF beacon up to S9 at about 2315, after completing a crossband QSO with CT2EE. Bob reports several other crossband QSOs with CT2EE — one on June 27 and another on July 13. Perhaps the greatest DX for crossband, and a rather unusual meeting, occurred June 14. Needless to say, KC2TX/5 San Antonio was quite pleased to make the grade with his brother-in-law CT2EE.

Even though transatlantic contacts have not yet turned out to be for the masses, there were some pretty nice goodies available for many of the rest of us. The DXpedition to St. Kitts by K8EFS and a group of his Michigan cohorts provided VP2K contacts for many stations. There was also the North Jersey DX Assn.'s trek to FS7 as FG0DDV/FS. Although they experienced equipment problems, it is understood that they worked quite a number of stations. I hope to have details of both of these operations next month. The other major DXpedition of the period covered by the report was that of W3OTC to Guadeloupe as FG0HZW. In his two weeks on the island, Bob managed contacts with 160 stations in the all U.S. call areas except 6, 7 and 9. The farthest-west QSO was with W5FF and K5FF near Albuquerque. In addition to U.S. stations, FG0HZW worked VEs 1, 2 and 3, C6A, J6, HI8, VP2K and KP2.

One DXpedition on which many were counting for a rare new country was that of W6JKV/TI9. Unfortunately Jim's great effort in traveling to Cocos Island netted only 40 6-meter QSOs, all from Florida to Maine and all on the evening of June 15. The rest of the week on the island, he was forced to while away his time with hf and 2-meter EME. It is understood that three contacts were completed via that mode. Another DXpedition, this one by K1FJM under the call ZF2EW, had quite good luck during the ARRL June QSO Party. Pete ran up 220 contacts in 36 Sections. No direct word has been received, as of this writing, on the luck of the K6MYC and K6HCP DXpeditions to HR and 6Y5, but these calls do appear in a number of reports. The K1TOL journey to FP8 also provided considerable excitement during the contest and a few days before and after.

Resident activity was also in evidence and afforded some very nice DX catches, with HI8DAF an example of one station heard on a number of occasions. HK1BAU and TG9NX have been active, both assisted in getting on 6 meters by WA4IYS, who is handling their 50-MHz QSLs. Here on the East Coast, the evening of June 28 was particularly productive with PJ7GIL, VP2MO, J6LOV and other Caribbean stations being worked widely. The previous evening saw a tremendous multi-hop opening to the West Coast. But the star attraction on that one was KH6IAA, who responded to a CQ from N4MM for John's last state. A number of others completed WAS as a result of this surprise appearance. Another outstanding multi-hop session took place the evening of July 3. Many Pacific Northwest stations were worked from here in the mid-Atlantic states with very good signals, but the unique feature of this opening was that propagation continued well into the wee hours of the following morning. This last West Coast station that this conductor heard was N7BLS at 0531Z July 4. That's 1:31 A.M. EDT.

2 Meters — It goes without saying that the news this month concerns E_s. The period between mid-June and mid-July, when this is being written, produced several excellent openings of this type. As has been the case for the past several years, one of the better ones occurred during Field Day. One wag even suggested that the dates for Field Day and the June VHF QSO Party be swapped in order to improve conditions during the vhf contest. In any case, many Field Day setups were treated to some great 2-meter conditions for several hours Saturday evening. W5FF expresses doubt that some of them were surprised at working 1000 miles on 2 meters with 10 W and a 5-element beam. After all, Fred, they do it every year! W5FF reports contacts with 28 stations in 11 states between 0020 and 0200Z June 26 from his location just east of Albuquerque. Best DX was W3WKP/4 Virginia. He probably could have worked quite a few more, but he spent about one-half hour of the time attempting to make contacts on 1-1/4 meters, to no avail. Another interesting report comes from KX0O, the new call for WA0LSH. From his Colorado Springs QTH, Lauren, with relief help from visitor WØRSJ, worked 65 stations in seven southeastern states, from North Carolina to Florida, between 0014 and 0232Z.

WA4LYS Jacksonville was particularly pleased with the opening. Paul has been trying to work Wyoming for state number 49 for six years. His EME capability was of no help here, as no one has been on with that mode in the state since Paul got his setup running several years ago. A phone call from neighbor W5HUQ/4 alerted him that the long-sought state was coming in. Sure enough, KC7QJ Cheyenne was worked at 0031, and the long quest was over. Perhaps the most outstanding contact that has come to my attention was between K8AXU Marietta, Ohio, and W7CI Siera Vista, Arizona. This took place at 0050Z, and AI says that W7CI was S9 plus at the time, but only in for about four minutes. The distance works out to be approximately 1700 miles. From here in the Washington area, W3ZZ reports contacts with Texas and Oklahoma stations. In addition, Gene is certain that he heard W5FF immediately after Fred's contact with W3WKP/4, and thinks that he might have also heard W7CI on a very short burst. W3ZZ notes that the evening of July 3 also produced a good E_s opening. On this occasion, stations in Texas, Oklahoma, Arkansas and Louisiana were worked, including W5SFW Amarillo. On the evening of the 14th, it was Nebraska, Kansas and Iowa. Even this conductor got in on this one.

Included in a letter from K2RIW outlining some very interesting doings on 70 cm is an account of another 2-meter E_s opening on the Sunday evening following Field Day. Between 2305 and 2325Z June 26, VP9IB worked VE2DFO, K2OS, WB1GQR, W2AV, W2CNS and WB2CLB.

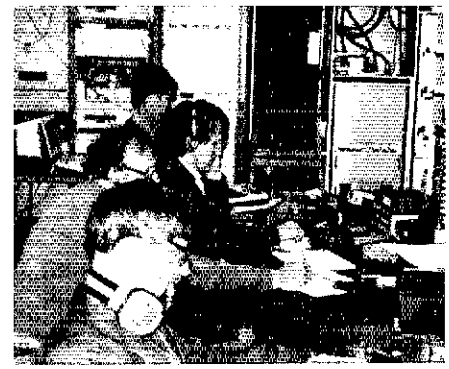
W5UWB Kingsville, Texas, reports interesting conditions on the evening of July 11. During a very intense 6-meter opening, John kept checking 2 meters for signs of E_s. Instead, he found FAI. With his beam aimed about 45 degrees north of the direct path, he worked Florida stations W4EMB at 0040Z on the 12th and W5HUQ/4 at 0200Z. The usual aurora sound was noted on the signals. K7ICW Las Vegas reports a similar sound during a contact with W5UN Midland, Texas, about 0205Z June 8. AI notes the characteristic "auroral-like" sound and says that 6 meters was hot at the time, but does not mention an unusual beam heading. Possibly, this was another instance of FAI propagation.

70 Cm and Down — Although much has been happening on the lower frequency vhf bands, 70 cm has produced some excitement of its own. K2UYH started the ball rolling by establishing a nightly schedule with VP9IB beginning June 1. On the 15th, K2RIW joined the schedule and three evenings later received a phone call from VP9IB that his signals were being received in Bermuda over the 756-mile path. The next opportunity Dick had to try was at 0050Z June 24. On that occasion, a contact resulted with K2RIW's signals first reported as S 3 and VP9IB's 10 W being received on Long Island at S 1. During the 30-minute QSO, signals from Bermuda reached 7 dB above noise and Dick's report climbed to S 8. They tried again the following morning at 0950, with S 2 and S 3 signals being exchanged.

By 0050Z on the 28th, VP9IB had put in a 30-W amplifier. His signals got up to 15 dB above noise, while Dick's peaked at S 9 plus 10 dB over a 2-hour period. During that time, VP9IB also worked N2MB with S 5 signals and KA2INY, W2VC and K2UYH all at S 2. Others actively trying to make the grade without success were W3IP, K4QIF, K1PXE and W1JR. K2RIW and VP9IB worked again on July 1 and 2 with lower signal levels, so with a good enough setup at one end, it appears that the path is negotiable a fair percentage of the time.

K2RIW runs 1 kW to 16 RIW 19-element Yagis at 100 feet, while VP9IB's setup consists of 30 W (after June 28, 10 W before) to four 19-element Tama Yagis at 20 feet. Tom's land is only six feet above sea level, but in the direction to K2RIW there is a 75-foot hill. This surely adversely affects 70-cm signals. Dick writes that Tom is building a 300-W amplifier, which should make a considerable difference once it's on-line.

K2RIW also updates results of some of his long-standing schedules. With K4CAW Greenshoro, North Carolina (480 miles), whom he skeds every Tuesday evening beginning at 2300, Dick says they have completed contacts on 290 occasions over the past three years. On the evening of July 1, signals got up to 44 dB below free space level. A more typical value is 77 dB below free space. At that point, AI could copy Dick with 1 W to a single Yagi. Results on schedules with W5UKQ Baton Rouge, Louisiana (1215 miles), have not been as successful. The two have yet to complete a contact after a year or more of trying. On June 14, each heard a loud ping, but still no cigar.



The operating position at K8HUH during the May EME tests using the 140-foot dish at the National Radio Astronomy Observatory in Green Bank, West Virginia. Shown, front to back, are K2AOE, K8HUH, W3IWI and an unidentified observer. *(photo by WA4MVI)*

K2RIW includes in his letter some very interesting ideas for beam pointing and calling time schedules. I will cover Dick's suggestions in an upcoming column. Speaking of operating procedures, K6UQH passes along information on what the West Coast 23-cm gang has agreed to in terms of frequencies. Bill says that 1296.1 is the general calling frequency, with 1296.025 used for DX work between northern and southern California. No transmitting is done on 1296.0. This frequency is used only for listening for the KH6 beacon. He says that from his location near San Jose he can work the Los Angeles area any time beams are aimed in the right directions.

DAYTON NOISE FIGURE RESULTS

The noise-figure session at the Dayton Hamvention produced some interesting results. If a star can be declared for such events, this time it is clearly the MGF-1402. K2VXO took the 2-meter preamp category with a noise figure of 0.3 dB using one of these devices. All of the 2-meter preamps for which I have results measured well under 1 dB, which another MGF-1402 by K2VXO coming in at 0.64 dB. WB6NMT, with two of his Lunar preamps, posted a 0.42 and a 0.46, while one of W1VD's ARRs measured 0.5 dB. VE3DSS, with a homebrew unit (type of device not stated), showed 0.45 dB.

In the 220-MHz category, VE3CRU took the gold star with an amazing 0.18 using an MGF-1402. A Lunar prototype using a D-432 displayed a value of 0.26, while another MGF-1402 in the hands of K2VXO clocked in at 0.28 dB. One brought by KB9NM measured 0.33, and a MGF-1200 unit by K2UYH was pegged at 0.35 dB. There was a raft of 70-cm preamps, with a MGF-1402 unit owned by WA8HGX leading the pack with a noise figure of 0.5 dB, and K3WHC placing with a reading of 0.54 using an MGF-1400. JA3IAF was in the show spot with 0.56 dB. In all, 24 preamps displayed results under 1.0 dB.

VHF PIONEER CARL SCHEIDELER, W2AZL

It is with deepest regret that I inform the readers of the column of the passing of one of our foremost vhfers. Anyone around in the '50s and '60s knows of the famous W2AZL 2-meter converter design. It was truly one of the major contributions to the vhf art and was instrumental in demonstrating to many skeptics the consistent long-haul capability of our 144-MHz band.

Carl Scheideler, W2AZL, the originator of that much reproduced design, passed away July 18 after a protracted bout with cancer. I am sure I am joined by all readers of The World Above 50 MHz in extending to his widow, Agnes, our heartfelt sympathy.

In addition to being well-known for the W2AZL converter, Carl was active on 2-meter EME as well as on 70 cm, where he had completed a number of aurora and m.s. contacts. He was one of the founders of the Central States VHF Society and had served on its board of directors since its inception, as well as on the selection committee for the Society's prestigious John Chambers Award.

W2AZL's fine signal will be missed on the vhf bands, as will Carl's smiling face and gentle manner at the annual CSVHF conferences. He had not missed one of these affairs since they began in 1968.

YL News and Views

Conducted By Jean Peacor,* K1IJV

A Converted XYL

The following is a guest editorial by Debra T. Stohlman, of New Orleans, Louisiana.

It was August 1979 when I first met my husband to be. We were both attending college at night for a course in the principles of accounting — my first love, his last. At first, I was not quite sure if he was more interested in my accounting talents, or just me.

Well, things progressed nicely and he finally asked me out. It was after our first date that I was sure it was me that he was interested in and not just my homework. He did the whole bit — flowers, wine and expensive restaurants. I was impressed. During our conservations over dinner, he casually mentioned that he was a "ham." My response was a very uninterested "oh, how nice." End of conversation. One thing led to another, and we were engaged before the end of the semester then married in early spring of the next year.

Robert, WB5QVN (I will now identify him, as I know now that "everything" has to be identified every 10 minutes), was a police detective at the time. I was a clerical worker for the local utility company. Times were rough (money-wise, I mean!). Our savings were depleted from wedding expenses, rings and settling into a house. Since money was scarce, our royal nights of dining pleasure slipped into eating "out" at his parents. It was there that I started to find out what radio amateurs did with their hobby: Every time they go to old places of residence, such as parents' homes, they bring out old radio gear from dark hiding places and bring them home to stay. Every time we visited, Robert would come home with another radio. I couldn't believe it; wasn't one radio enough?

The fateful day finally came when he was home, off from police work, and I was away from the house working: Robert had set up his "shack." When he told me, my response was, "What do you mean 'shack?' Our house is no mansion, but a shack?"

Later that afternoon, I arrived home from work to find that all those radios that he had brought home with him from his parents had reappeared. They were placed on a big table with wires all over the place. I asked, "Where do all these wires go?" I'm sure you can guess from there; he brought me outside and showed me *more* wires strung from our trees. I was horrified, to say the least. It was bad enough that our German shepherds had made a genuine Louisiana swampland out of our once-green backyard, but now the wires he had strung were replacing the moss in the trees.

I managed to keep my cool, with difficulty, when the family meals and our time together were shared with what I thought to be nothing more intelligible than static. I was none too happy about sharing my husband with "static," so I urged him not to pursue his hobby any longer. Shortly thereafter, I realized that I was being a bit unreasonable, so I asked him to explain what it was that he was doing with all of that junk. And, as any reader of this journal can attest to, I became hooked on the idea of communicating with others around the globe via "junk" on the dining room table and wires hanging like moss in the south Louisiana trees. After my first hamfest, I was really hooked. Imagine me, listening for rare DX!

Much to my dismay, I have not yet received my own ticket, but I am working on it. Ham radio is a great hobby, and I always know where my husband (WB5QVN — time to identify) is — either working the gear, or on the roof trying to get his antenna higher or better. You know, this hobby is really something. If Robert has something go wrong with a radio project, I won't hear a sound out of him; but, cover your ears if he has trouble with anything else around the house!

So, for all you XYLs and YLs out there who hear "static" when those rare DX stations are calling "CQ CQ," give up, surrender and try out what your OM seems to be crazy about. Believe me, it is definitely contagious!

COMMENDATION FROM THE PRESIDENT TO WA1OPN

News of Gayle Sabonitis, WA1OPN, of Worcester, Massachusetts, graced this page in September 1982. Gayle has continued her activities and has been most helpful to others in the process.

Bill Stempel, W1BBJ, of Greenwich, Connecticut, a ham for 52 years, offered an example of Gayle's assistance to others. As a result of her coaching and helpfulness, Bill's brother-in-law Peter Ferron, of Dublin, Ireland, blind since birth, may soon become an Amateur Radio operator.

In June 1983, Gayle was moved to tears upon receiving a letter from President Ronald Reagan commending her for her help in the HANDI-HAM System. Gayle has not allowed her own disabilities to stand in the way of helping others. She's ham spirit personified!

The SPARCYL Net (Sabina Parish ARC) meets at 1800 UTC daily on 7.262 MHz and at 0130 UTC Mondays on 3.961 MHz. Pictured (l-r) at the recent Little Rock Hamfests are daily Net Control Stations N5DSY, KC0PY, WB5YLI, WD5EMZ and WA9QQE.

*Country Club Dr., Monson, MA 01057

Laura Vacek, KA5QMR, of Houston, is a very active cw operator on 15 and 40 meters. She passed the Technician class exam and has just completed the fourth grade at age 10. Laura's dad is KN5A.

RESULTS, DXYL TO NAYL CONTEST

Phone

DXYL		*NAYL*
IT9JLA	Gold Cup	WD4NKP
DJ0EK	Second Place	KA3CUF
VK3KS	Third Place	NY4H

CW

DXYL		*NAYL*
DJ0EK	Gold Cup	KA3CUF WD4NKP NY4H
DL2SAP	Second Place	VE1BWP
VK3KS	Third Place	WD5FQX WA3HUP

Plaque Winners (Combined Scores)

DXYL	*NAYL*
DJ0EK	WD4NKP

Phone

DXYL

IT9JLA 1026; DJ0EK 936; VK3KS† 487; DJ1JE† 472; CT1YH† 288; DL7AFJ† 234; PA3EBB† 175; G4EZI† 135; DL2SAP† 96; DK6FM 80; PA3ADR† 68; IS0LLJ† 52; PA0HIL† 25; DL4NX† 24; H18RPD† 20; DK6EH† 18

NAYL

WD4NKP† 1322; KA3CUF 780; NY4H 612; VE1BWP† 542; WD5FQX† 525; WA3HUP 525; WA2WVJ 275; KB8RT† 270; KM8E† 191; KA3ESQ 113; VE2JZ 31

CW

DXYL

DJ0EK 99; DL2SAP 96; VK3KS† 90; CT1YL† 25; DK6EH 10; DL2SAP† 1

NAYL

WD4NKP† 78; NY4H† 78; KA3CUF† 78; VE1BWP† 70; WD5FQX† 15; WA3HUP 15; KM8E† 6

†Low-power multiplier

FIRST CALL LETTERS IN OFFICIAL U.S. HOT AIR BALLOON RIDE?

On May 6, 1983, the Eau Claire (Wisconsin) Post Office sent up an official U.S. Hot Air Balloon Mail Carrier to commemorate the Air and Space Bicentennial. The official Mail Carrier took off from Eau Claire with hundreds of letters aboard in a timeless rendezvous with the past. All the envelopes were stamped with a commemorative seal and signed by the pilot.

Ed, N9DBD, John, N9DBE, Mony, N9DDW, Max, N9DDX, and Victor, N9DJW — all members of the Rutsch Family — were there. If not the first call letters to be mailed by Hot Air Balloon, theirs were certainly the first family call letters mailed from Bloomer, Wisconsin.

Club Corner

Conducted By Sally O'Dell,* KB1O

LICENSE EXAMINATIONS AND CLUBS: AN EXCITING NEW RELATIONSHIP

By now you have probably heard about the major changes brewing in the U.S. Amateur Radio license testing process. The FCC is expected to issue a Report and Order shortly establishing the new Volunteer Examiner Program. This means that licensed radio amateurs, rather than the FCC Field Office staff, will be conducting the test sessions for Technician and higher radio amateur licenses.

While the individual Volunteer Examiners used in this program will need to meet certain criteria and be accedited formally, there is also a crucial role for others to play in making the program work. This is a situation in which the resourcefulness of *all* of your club's members can be used.

The FCC had not finalized the rules establishing the Volunteer Examiner Program at the time of this writing. The ARRL crystal ball, however, shows several things that your club can do *now* to help smooth the transition from FCC-administered tests to the new Volunteer Examiner Program.

We Need Examiners

First, a Volunteer Examiner Program needs (what else?) volunteer examiners. Many individuals and several clubs have already given ARRL the names of licensed radio amateurs who want to help administer tests for Technician and higher radio amateur licenses. The response so far is good, especially since it was unsolicited. Now, we are asking for "a show of hands": Who among you are willing to administer license examinations periodically? This need not be a major investment of time or resources if your club can organize a team of several Advanced and Extra Class licensees. The rules will probably require each test session to be supervised by a minimum of three examiners, but a group of a dozen or so examiners should be able to handle sessions every three months with little individual inconvenience.

We Need Examining Rooms

The second obvious need to be met is to locate a suitable test site. Here again, club members who are not accredited Volunteer Examiners can play a crucial role. Check through your club roster; you will probably find a professor, public school teacher or someone employed in business or industry who has access to a large meeting room. We recently received a letter from Paul Thompson, KCØVG, the dean of a community college. He noted that 90% of the U.S. population lives within 25 miles of a community college, making such institutions natural test sites with good facilities, a community-service orientation and easy availability. In addition, many schools have language laboratories that are perfect for administering the Morse code tests.

We Need Publicity

The third hurdle to leap in establishing a viable Volunteer Examiner Program is the logistical one of getting applicants connected with examiners. Here again, *all* club members can help spread the word that a test session will be offered in your area. The artists among you can compose eye-catching posters. Maybe someone in your club has access to photocopiers or ditto machines so the posters could be reproduced at very low cost. You all have social and business contacts; each club member could hang a few posters around the area in local businesses (after getting the owners' permission). The traffic handlers among you could check into local and area nets and mention your club's license examination session on the air. Obviously, you would contact any ongoing or planned Amateur Radio classes, possibly scheduling the session shortly after the intended conclusion of the class.

It Takes Some Planning

We won't know all the specifics of the Volunteer Examiner Program until the FCC issues of the Report and Order, but there is a likelihood that all tests will be given *by appointment only*. Your club should plan test sessions at least three months in advance to allow time for sufficient advance publicity, registration of applicants and the shipping of the necessary test papers to the examiners from the Volunteer Examiner Coordinator (VEC).

You should set up tentative examination-session dates as soon as possible. This will give you time to make all the arrangements at your end and register your test session with the VEC (which is likely to be the ARRL). If your club sponsors a hamfest or flea market each year, a license examination session would be an attractive addition to your program. Don't forget to have a call-in station prepared to give directions to the test site. This will be helpful even if the test session is not associated with a hamfest or club meetings.

Getting Started

If you want more information about the Volunteer Examiner Program, refer to the In Training column in last month's *QST*. You may also write to us at ARRL Headquarters with your questions and comments. Informal registrations of Volunteer Examiner Candidates and tentative test sessions are welcome now. Once the FCC formally adopts the Report and Order establishing the Volunteer Examiner Program, we will get back to you with further information. Meantime, stayed tuned to W1AW and the *ARRL Letter* for the latest progress reports.

It is well to point out that Volunteer Examiners may nominate themselves and need not be members of the ARRL or any club to be eligible. The Volunteer Examiner Program is designed to serve *all* of the Amateur Radio community. It seems fitting to point out here, however, that clubs certainly can play an important — a crucial — role in removing the test session stranglehold on Amateur Radio licensing. The FCC is about to put the ball in our court. Let's show them that we know the game, and can play it well! — *Curt Holsopple, K9CH, Manager, ARRL Volunteer Examiner Program, ARRL*

*Club Program Manager, ARRL

SSC Kudos and Contacts

Congratulations to the League's newest Special Service Clubs. These clubs are recognized for extended efforts on behalf of Amateur Radio and service to their communities. For further information on these clubs, contact them at these addresses.

Cenois Amateur Radio Club, Inc., K9HGX
c/o 430 W. Main Street
Decatur, IL 62522
Club Membership — 49

Fox River Radio League, W9CEQ
c/o P.O. Box 443
Aurora, IL 60507
Club membership — 200

Indianapolis Red Cross Amateur Radio Club, WA9LGQ
c/o 441 E. 10th Street
Indianapolis, IN 46202
Club membership — 56

Monroe County Radio Communications, Assn., WA8MTX
c/o 202 S. Macomb Street
Monroe, MI 48161
Club membership — 116

Murgas Amateur Radio Club, Inc., K3YTL
c/o P.O. Box 1094
Wilkes-Barre, PA 18703
Club membership — 84

"NOARS" - Northern Ohio Amateur Radio Society, K8KRG
c/o P.O. Box 354
Lorain, OH 44052
Club membership — 692

Sandy River Amateur Radio Club
c/o P.O. Box 533
Wilton, ME 04294
Club membership — 28

Professor Ian O. Ebert, W8SM, served as faculty advisor and trustee of the Michigan State University ARC for more than 30 years, until his death in 1982. The club station was dedicated to his memory, and a commemorative plaque was installed at the station. Among those participating were Professor Ebert's wife Doris, his daughter Barbara, and ARRL General Manager and MSU alumnus David Sumner, K1ZZ.

Central Division Director Ed Metzger, W9PRN (left), presented a charter of affiliation to Bob Heil, K9EID, representing the Marissa (Illinois) ARC, last April.

Strays

I would like to get in touch with...

☐ other amateurs who play the board game "Diplomacy" and would like to form a net. Leonard Kay, KB2R, 24 Maple Terr., Belmont, MA 02178.

☐ any amateurs who were radio operators at Signal Corps Station DAAA/AGA, U.S. Army Hq., Frankfurt, Germany, Jan. 1947-Dec. 1948. Bill Blaumer, K7ZED, 11462 S.E. Stanley Ct., Milwaukie, OR 97222.

☐ anyone who has worked on an RCA CRV-46148 Navy receiver, Model RBC-1. Richard Brant, KA6VRW, 1131 Waverly Heights Dr., Thousand Oaks, CA 91360.

QST congratulates...

☐ the Hamfesters ARC, of Chicago, Illinois, on being honored by the Disabled American Veterans for meritorious service to disabled persons in the state.

☐ William P. Risk, III, WB7OJS, of Tempe, Arizona, on receiving an honorable mention in competition for the 1982 Alton B. Zerby Outstanding Electrical Engineering Student Award.

Coming Conventions

By Marjorie C. Tenney,* WB1FSN

September 2-4	**September 25**
Southwestern Division, Anaheim, CA	**Great Lakes Division, Cleveland, OH**
September 23-25	**October 22-23**
Dakota Division, Sioux Falls, SD	**Tennessee State, Chattanooga**
September 24-25	**November 26-27**
Kentucky State, Louisville	**Florida State, Clearwater**

ARRL NATIONAL CONVENTIONS	**July 20-22, 1984 New York, New York**
October 7-9, 1983 Houston, Texas	**September 27-29, 1985 Louisville, Kentucky**

DAKOTA DIVISION CONVENTION
September 23-25, Sioux Falls, SD

The ARRL Dakota Division Convention will be held September 23-25 at the Howard Johnson's Motor Lodge in Sioux Falls. Registration and entertainment begin Friday evening. On Saturday, there will be forums, exhibits, flea market, code- and voice-recognition contests, 3900 club luncheon and women's activities. ARRL President Vic Clark will lead the ARRL forum. The Saturday night banquet promises to be a fun-filled evening for hams and nonhams alike. Guest speaker will be KELO-TV Agri-business commentator Jim Woster. The convention will end Sunday morning with a worship service and a 2-meter transmitter hunt.

Convention pre-registration prior to September 1 is $5; $6 at the door. Convention and banquet pre-registration is $15; $16 at the door. Banquet only is $10. Reduced motel rates are available. Talk-in on 16/76 and 52. For additional information, write to Sioux Falls ARC, P.O. Box 91, Sioux Falls, SD 57101.

KENTUCKY STATE CONVENTION
September 24-25, Louisville

The Thirteenth Annual Greater Louisville Hamfest and the 1983 Kentucky State ARRL Convention is Saturday and Sunday, Sept. 24 and 25, at the West Hall of the Kentucky Fair and Exposition Center (take Exit 12B on I-264 in Louisville). Gigantic indoor exhibitors area and flea market with over 100,000 sq ft of floor space, completely air conditioned. There will be a full slate of meetings and forums for both days of the hamfest, such as traffic nets, MARS, ARRL, ATV, ARES, antennas and technical forums. Our DX forum will feature Fred Fischer, K8CW (ex-VKØCW). There will be an interesting Women's Program both days. Also a gala Saturday night banquet. Registration in advance is $4; at the door, $5; children 12 and under are free. For information, call 502-368-6657 (exhibitors call 502-634-0619), or write to The Greater Louisville Hamfest, P.O. Box 34444, Louisville, KY 40232. Remember: We are the 1985 ARRL National Convention.

GREAT LAKES DIVISION CONVENTION
September 24-25, Cleveland, OH

The ARRL Great Lakes Division Convention and Cleveland Hamfest, 1983, presented by The Cleveland Hamfest Assn., will be held Saturday, September 24 and Sunday, September 25. The banquet will be held on Saturday, and the hamfest on Sunday, from 8 A.M. to 5 P.M. There will be a new location: Cleveland Aviation High School, near Burke Lakefront Airport, North Marginal Rd., between E. 55th St. and E. 9th St., off I-90 or I-77.

Forums, commercial exhibits, women's activities; breakfast and lunch served. Free parking in a secure area; overnight parking available. Flea market opens at 6 A.M., at $2 per space. General admission $3. For advance tickets, send a check or money order for $2.50 before August 31 to Cleveland Hamfest Assn., P.O. Box 93077, Cleveland, OH 44101. Mobile check-in on 52, W8QV.

*Convention/Travel Coordinator, ARRL

Hamfest Calendar

†**Alabama:** Hospitality Hamfest, sponsored by the Mobile ARC, will be held at Al's Party Palace, 2671 Dauphin Island Pkwy. (south off I-10), Mobile, on Saturday, Sept. 10 (9 A.M. to 5 P.M.), and Sunday, Sept. 11 (9 A.M.-1:30 P.M.) Swap tables, entertainment, ARRL & MARS meetings, dealers. Saturday night eyeball QSO Party. Adequate parking, most reasonable overnight rates, good food and good ham fellowship. Y'all come! Talk-in on 22/82. For further information, contact Jim Wilder, N4GUC, 424 Cody Road South, Mobile, AL 36609, tel. 205-343-7365, or Kit Reeve, WB4OCU, 4719 Princeton Dr., Mobile, AL 36618, tel. 205-342-4915.

California: Sonoma County Radio Amateurs, Inc., will hold their giant indoor ham radio flea market on Saturday, Sept. 17, from 9 A.M. to 3 P.M., at the Sebastopol Community Center, 390 Morris St., Sebastopol, 5 miles west of Santa Rosa, just off Hwy 12. Admission and parking are free. Indoor flea market spaces are $3 ($6 with table) at the door or $2.50 ($5) in advance — reserve early for the best spots. Vendor set up starts at 8 A.M. Talk-in on 13/73. Radio clinic, refreshments, auction in the afternoon. For tickets and information, write to SCRA, Box 116, Santa Rosa, CA 95404.

Colorado: The Boulder ARC will sponsor its fall swapfest, "Barcfest," on Sept. 25 at the National Guard Armory, 4750 N. Broadway, Boulder, from 9 A.M. to 3 P.M. Admission is $3 per family, and includes one seller's table. Free parking, snack bar and indoor-outdoor swapfest. Talk-in on 10/70 and 52. For more information, contact Tim Groat, KRØU, 1000 East 10th Ave., Broomfield, CO 80020, tel. 303-466-3733.

Connecticut: The Candlewood ARA annual flea market will be held on Sunday, Sept. 18, at the Elks Lodge, 346 Main St., Danbury (Exit 5 on I-84), from 10 A.M. to 4 P.M. Admission is $1. Tables are $6.50. Activities include dealers and a magic show for the kids. Talk-in on 72/12. Over 50 sellers last year, so don't wait. For advance table reservations, send to C.A.R.A., P.O. Box 188, Brookfield Center, CT 06850. For information, call George, KC2QF, at 914-533-2758; Ken, N1BVS, at 203-744-6953; or George, AF1U, at 203-438-0549.

†ARRL Hamfest

†**Connecticut:** The Natchaug ARA will hold a giant flea market on Sunday, Sept. 25, from 9 A.M. to 4 P.M., Elks Home, off Rte. 32, Willimantic. Advance tables, inside and outside, $5; at the door, $7. Rain or shine. Food and drink. Admission $2; under 16 free. Free parking. Talk-in on 30/90 and 52. For further information, contact Ed Sadeski, KA1HR, 49 Circle Dr., Willimantic, CT 06226, tel. 203-423-7137, or Clifton Pease, KA1HYW, 268 Main St., Willimantic, CT 06226, tel. 203-456-1432, after 4 P.M.

†**Florida:** The 18th Annual Platinum Coast Hamfest, sponsored by the Platinum Coast ARS, will be held at the Melbourne Auditorium, Melbourne, on Sept. 10-11. Hours are 9 A.M. to 4 P.M. on Saturday and 9 A.M. to 4 P.M. on Sunday. Admission is $3 in advance and $4 at the door. Meetings, forums, MARS, commercial exhibits, swap tables, net meetings, awards, QCWA, ARRL forum and technical talks. Food service and free transportation between hamfest and headquarters. Talk-in on 25/85 and 52. Further information and reservations from PCARS, P.O. Box 1004, Melbourne, FL 32901, tel. 305-254-5116.

†**Georgia:** The Central Georgia ARC, Inc., will sponsor the Central Georgia Hamfest at the Recreation Center, 800 Watson Blvd., Warner Robins, Sept. 10, from 9 to 5 and Sept. 11 from 8 to 3. No admission charge. Flea market spaces are $3 inside, $2 outside. Bring your tables. Dealer displays, indoor/outdoor flea markets, all net meetings: GA SSB, GA Cracker, GA State CW Assn., MARS (AF), ARES, ARRL forum. Activities for women and children. Good food. Pickin' and Grinnin'! Hospitality room. Plenty of restaurants and shopping nearby. Talk-in on 25/85 and 3.975 MHz. Further information may be obtained from Jim Piper, W4HON, Chairman, 618 American Blvd., Warner Robins, GA 31093, tel. 912-922-0392.

†**Georgia:** The Lanierland ARC will sponsor its 10th Annual Lanierland Hamfest in Holiday Hall at the Holiday Inn, Gainesville, on Sept. 25, starting at 9 A.M. No admission charge. Free tables and inside display for dealers reserving in advance. Left Foot CW Contest. Women's country store. Large flea market and boat anchor auction. Talk-in on 07/67. For information and reservations, contact Phil Loveless, KC4UC, 3574 Thompson Bend, Gainesville, GA 30506, tel. 404-532-9160.

†**Illinois:** Shawnee ARA will hold its 27th SARAFEST on Sept. 11 at John A. Logan College in Carterville. Doors open at 7 A.M. Admission at the door is $3. Offerings include air-conditioned flea market, forums, computers, refreshments and contests. Talk-in on 25/85, 52 and 3.925 MHz. For details, QSL Bill May, KB9QY, 800 Hilldale Ave., Herrin, IL 62948, tel. 618-942-2511 (days).

†**Illinois:** Peoria Superfest '83 sponsored by the Peoria Area ARC will be held at Exposition Gardens, W. Northmoor Rd., Peoria, on Sept. 17-18. Gate opens at 6 A.M.; commercial building at 9 A.M. Admission is $3 in advance and $4 at the gate. Activities include Amateur Radio and computer displays; huge, free flea market, free bus to Northwoods Mall on Sunday. Full camping facilities on the grounds. Saturday night informal get-together at Heritage House Smorgasboard, 8209 N. Mt. Hawley Rd., Peoria. Talk-in on 16/76. Information and reservations by sending s.a.s.e. to Superfest '83, 5808 N. Andover Ct., Peoria, IL 61615.

†**Illinois:** Radio Expo, sponsored by the Chicago FM Club, will be held at the Lake County Fairgrounds, Rtes. 45 & 120, Grays Lake, on Sept. 24-25, from 8 A.M. to 4 P.M. Advance admission is $3; at the door $4. Women's programs, computers and computer programs, manufacturers' and distributors' displays, WX Seminar and RTTY demos. Talk-in on 16/76 and 222.5/224.1. Further information and reservations from Gerald Spearman, P.O. Box 451, Oak Lawn, IL 60454, tel. 312-582-6923.

Illinois: The Eighth Annual New Berlin Hamfest sponsored by the Sangamon County Fair Assn. will be held on Sunday, Sept. 25, at the Sangamon County Fairgrounds in New Berlin. The event will be held rain or shine. Camping is available, and a model railroad train meet will be held in conjunction with the hamfest. For details, write to K9QFR, Box 2, Pleasant Plains, IL 62677.

Illinois: The Northern Illinois DX Assn. will sponsor the 31st Annual W9DXCC Convention on Saturday, Sept. 17, at the Itasca Holiday Inn, 860 Irving Park Rd., Itasca, IL 60643, near Chicago, starting at noon. Advance registration is recommended. DXers worldwide are welcome. An afternoon DX program and an evening banquet are planned. Further information from Howard Huntington, K9KM, 65 South Burr Oak Dr., Lake Zurich, IL 60047.

Indiana: The 4th Annual Grant County (Indiana) ARC

Hamfest will be held on Saturday, Sept. 10, at McCarthy Hall, St. Paul's Catholic Church, Marion. Doors open at 8 A.M. Refreshments, free parking. Donation is $2 advance, $3 at gate. Table reservations: $2 for 8-ft table. For information/tickets, send s.a.s.e. to Jerry Richards, KA9DLJ, P.O. Box 1146, Marion, IN 46952.

Iowa: On Sunday, Oct. 2, the 9th annual CVARC Hamfest will be held in the Hawkeye Downs Exhibition Bldg., Cedar Rapids. Doors open at 7 A.M. Manufacturers and dealers welcome. ARRL representatives. Ample parking, overnight camping, picnic facilities. Cedar Rapids Airport nearby. Tickets are $2 in advance and $3 at the door. First table is $5; others $7. Talk-in on 16/76, 34/94 and 52. For advance tickets and reservations, write to CVARC Hamfest, P.O. Box 994, Cedar Rapids, IA 52406.

Kansas: The Sandhills ARC will hold its annual "Eye-Ball QSO Party" at the Finney County Fairgrounds, Garden City, on Sept. 25. Doors will open at 9 A.M. For more info, send an s.a.s.e. to SHARC, P.O. Box 811, Garden City, KS 67846.

†**Maine:** The 1983 Windsor Hamfest, sponsored by the Augusta Emergency ARU, will be held at the Windsor Fairgrounds, Windsor, on Saturday, Sept. 10, from 8 A.M. to 10 P.M., and Sunday, Sept. 11, from 8 A.M. to noon. Admission is $1 for all. Net meetings, club meetings, League officers, flea market, Saturday supper, commercial displays. Light lunches available. Maine's largest hamfest. Talk-in on 10/70. Further information available from Donald A. Hanson, N1AZH, RFD 2, Box 3678, Greene, ME 04236, tel. 207-946-7557.

†**Maryland:** The Foundation for Amateur Radio 1983 Hamfest will be held on Sunday, Sept. 11, at the Montgomery County Fairgrounds in Gaithersburg. Doors open at 7 A.M. Admission is $4. Commercial exhibits, indoor flea market, tailgating. Oscar 10 demonstration station. Antique Wireless Assn. demonstration. Activities for women and children. Talk-in on 52. For further information, contact Bob Moore, N3CKD, Foundation for Amateur Radio, P.O. Box 1068, Laurel, MD 20707, tel. 301-776-3571 (evenings).

Michigan: The Grand Rapids ARA, Inc., will hold its annual Swap and Shop on Saturday, Sept. 17, at the Hudsonville Fairgrounds. There will be dealers and a food concession. Indoor sales area and an outdoor trunk swap area. Gates will open at 8 A.M. for swappers and the public. Talk-in on 16/76. For more information, write to Grand Rapids ARA, Inc., P.O. Box 1248, Grand Rapids, MI 49501.

†**Michigan:** The L'Anse Creuse ARC 11th Annual Swap and Shop will be held on Sept. 18, from 9 A.M. to 5 P.M., at L'Anse Creuse High School, Mt. Clemens. Admission is $1 in advance, $2 at the door. ARRL table, FCC table, 10-10 International Table, free parking, food and drinks. Talk-in on 69/09 and 52. For info and advance tickets, send s.a.s.e. to William Chesney, N8CVC, 215 Elizabeth, Mt. Clemens, MI 48043, tel. 313-463-1412.

Michigan: The 11th annual hamfest sponsored by the Adrian ARC will be held on Sunday, Sept. 25, at the Lenawee County Fairgrounds in Adrian. Programs, games. Tickets are $2 in advance and $3 at the door. Tables: $6 per 8 ft, $4 per 4 ft, $2 per 8-ft trunk space. Limited tables available. Table reservation by check or cash no later than September 17. Talk-in on 31/91 and 52. Information, tickets, tables: Adrian ARC, P.O. Box 26, Adrian, MI 49221.

Minnesota: The Viking ARS of Waseca will be holding its 13th annual Southern Minnesota Swapfest on Saturday, Oct. 1. The doors will open at 9 A.M. at the Waseca High School. Talk-in on 34/94. For further information, please write to VARS, P.O. Box 3, Waseca, MN 56093.

†**Mississippi:** The 7th Annual Hamfest sponsored by the Mississippi Coast ARA will be held at International Plaza (west end of Biloxi/Ocean Springs bridge), Biloxi, on Saturday, Oct. 1, from 8 A.M. to 5 P.M., and Sunday, Oct. 2, from 8 A.M. to 2 P.M. No admission charge. Tour, seafood/shrimp boil, MARS meeting, ARRL, computer and DX forums. Limited free parking and hookups for self-contained RVs. Talk-in on 13/73, 144.73/145.33 and 52 simplex. Further information from Joyce Anderson, WB5LKC, 3877 Pat La., Biloxi, MS 39531, tel. 601-388-2824.

Missouri: The Ozarks ARS will hold its 2nd Annual Ozark Amateur Club Congress and Swapfest on Sept. 11 at the Monett (Missouri) City Park, located at the junction of Missouri Hwy. 37 and U.S. Hwy. 60 at Monett, approximately 40 miles southwest of Springfield and 30 miles southeast of Joplin. Flea market opens at 11 A.M., and a covered-dish luncheon will be held at 1 P.M. No admission fee. Amateurs and their families are welcome. Amateur clubs are invited to attend as a group. Talk-in on 146.97 MHz, 7.250 MHz and 52 simplex. For further information, write to OARS, Box 327, Aurora, MO 65605.

Missouri: The Missouri Single Sideband Net will hold its annual picnic on Sept. 18 at Binder Lake in Jefferson City. Talk-in on 146.40/147.00. All hams and families welcome. Bring a covered dish. Soft drinks will be provided. Bring your horseshoes, ball gloves or whatever and have some good ol' family fun.

New Hampshire: This year, on Sept. 25, the Connecticut Valley FM Assn. will hold its 6th Annual Hamfest and Flea Market at King Ridge Ski Area, Sutton, from 9 A.M. to 5 P.M. — rain or shine. General admission $2; dealers and flea marketeers $5. Food available on premises. Overnight camping for self-contained units only (no hookups). Take Exit 11 on I-89. Talk-in on 16/76 or 52 simplex.

New Jersey: The South Jersey Radio Assn. will present its 35th annual hamfest on Sept. 18 at the Pennsauken Sr. High School, Hylton Rd., Pennsauken, from 8 A.M. to 4 P.M. Advance tickets $2.50; $3.50 at the gate. Tailgaters $5. Refreshments available. Talk-in on 22/82 and 52. For more info, contact Fred Holler, W2EKB, 348 Bortons Mill Rd., Cherry Hill, NJ 08002, tel. 609-795-0577.

New Jersey: The Bergen ARA Ham Swap 'n Sell will be held on Oct. 9 at Bergen Community College, Parking Lot "B," 400 Paramus Rd., Paramus. Hours are 8 A.M. until 4 P.M. Buyers admitted free; sellers $3. Bring your own tables; thousands of spaces. Talk-in on 19/79 and 52. For more info, contact Jim Greer, KK2U, 444 Berkshire Rd., Ridgewood, NJ 07450, tel. 201-445-2855.

New Jersey: The De Vry Technical Institute ARC will have its annual flea market this year on Oct. 1 in the school parking lot at 479 Green St. (between Rtes. 1 and 9), Woodbridge. Admission is free to buyers and $3 for sellers. No electricity available. Hours are 9 A.M. to 4 P.M. If further information is needed, call WB2JKU at 201-787-0818.

†**New York:** The Seaway Valley Hamfest Committee will sponsor the Seaway Valley Hamfest at the Louisville Firemen's Arena, Louisville, on Sept. 10, from 9 A.M. to 4 P.M. Setup at 7:30 encouraged. Advance admission is $2.50; at the gate $3. ARRL forum, technical talks, AMSAT presentation, magic show, flea market, on-the-air station, snack bar and movie (*The World of Amateur Radio*). The Arena's all-weather building, with parking and picnic area, is 1 mile off Rte. 37 near Massena. Talk-in on 31/91, 04/64 and 52. Further information available from Lois G. Ierlan, WA2RXU, 725 Proctor Ave., Ogdensburg, NY 13669, tel. 315-393-3297.

†**New York:** The Hall of Science ARC annual indoor/outdoor (rain or shine) hamfest will be held on Sunday, Sept. 11, from 9 A.M. to 4 P.M., at the Municipal Parking Lot, 80-25 126th St. (1 block off Queens Blvd.), Kew Gardens, Queens. Sellers donation $3; buyers $2; women and children free. Walk/talk-in on 52. For information, contact Tony Russo, WB2OLB, tel. 212-441-6545, or John Powers, KA2AHJ, tel. 212-847-8007.

New York: The Elmira ARA will present the Eighth Annual Elmira International Hamfest at the Chemung County Fairgrounds on Sept. 24. Gates open at 6 A.M. Free flea market, breakfast and lunch available, tech talks, dealer displays and the usual great time for all. Advance tickets ($2 each) are available from John Breese, 340 West Ave., Horseheads, NY 14845. Gate tickets are $3 each.

New York: The Radio Amateurs of Greater Syracuse (RAGS) will hold their annual Hamfest and Computer Display on Saturday, Oct. 1, from 9 A.M. to 6 P.M., at the Art and Home Center, New York State Fairgrounds, Syracuse. Featured will be commercial exhibitors, a large indoor-outdoor flea market, tech talks, ARRL booth, displays, women's activities, contests and entertainment. Hot food and beverages will be served. Admission is $3 at the door. Talk-in on 90/30, 31/91 and 52. For further information, contact RAGS, Box 88, Liverpool, NY 13088.

New York: Come see the Yonkers Electronics Fair and Giant Flea Market sponsored by the Yonkers ARC. Two floors of big value sales on new and used equipment at Yonkers Municipal Parking Garage (maximum height 6 ft 10 in.), corner of Nepperhan Ave. and New Main St., Yonkers. Sunday, Oct. 2 (rain or shine), 9 A.M. to 4 P.M. Gates open to sellers at 8 A.M. Demonstrations all day — Amateur Radio, computers, electric car, satellite TV, video recording, slow-scan TV, hi-fi/audio, CB radio. Giant auction at 2 P.M. Admission is $2 each; children under 12 free. Sellers — $6 per parking space (1 admitted); bring tables. For further information, call 914-969-1053.

†**North Carolina:** The Maysville Hamfest, sponsored by the Maysville Hamfest Club, Inc., will be held on Oct. 9, from 9 A.M. to 4 P.M., at Community Park, Maysville. No admission charge. Flea market, socializing, barbecue lunch. Talk-in on 146.685. For further information, contact Grover Cook, WA4PID, 1101 Plantation Dr., Cary, NC 27511, tel. 919-467-0424.

†**Ohio:** The Findlay Hamfest, in its 41st year and one of the oldest in the U.S., sponsored by the Findlay RC, will be held at the Hancock Recreational Center, 3430 North Main St., Findlay, Sunday, Sept. 11, 6:30 A.M. to 5 P.M. Advance tickets $3; at the door $4. Cutoff for advance tickets is Sept. 1. Tables are $6 each in the arena. Flea market outdoor car spaces are $6. Talk-in on 147.75/15. Information and reservations from Findlay Radio Club, P.O. Box 587, Findlay, OH 45840.

†**Ohio:** The original 46th Annual Cincinnati Hamfest, sponsored by the Greater Cincinnati ARA, will be held at Stricker's Grove, SR 128, Venice (Ross), on Sept. 18, from 6 A.M. to 5 P.M. Admission is $5. Group and net meetings. Flea market opens at 5 A.M. (radio releated only). Sensational air show, hidden-transmitter hunt, good food available. Talk-in on 16/76 and 07/67. Additional information available from Elmer Schubert, W8ALW, 3965 Harmar Ct., Cincinnati, OH 45211, tel. 513-574-9512; John Haungs, WA8STX, 10615 Thornview Dr., Cincinnati, OH 45241, tel. 513-563-7373; Lillian B. Abbott, K8CKI, 317 Greenwell Rd., Cincinnati, OH 45238, tel. 513-451-5668.

Ontario: The 1983 RSO Convention will be held on Sept. 23-24 at the Inn on the Park, Toronto. Activities will include commercial dealers, technical forums, banquet, women's luncheon and special rate admission to the nearby Ontario Science Centre. The whole family will have something to do. Registration is $8 at the door, in advance $7. RSO members — registration at the door $7, in advance $6. Hotel rooms to be booked direct with the Inn on the Park (specify RSO Convention). For further information and registration, write to Radio Society of Ontario, Inc., Box 246, Port Credit Postal Station, Mississauga, ON L5G 4L8.

Ontario: The first annual Golden Anniversary Fleamarket, sponsored by the Hamilton ARC, will be held on Saturday Oct. 8, 8:30 A.M. to 2 P.M., in Hamilton, at the Canadian National Institute for the Blind, 1686 Main St., W. For information, contact Glen Simpson, VE3DSP, 61 Briarwood Cres., Hamilton, ON L9C 4C3 Canada.

Pennsylvania: The 34th annual W3PIE Gabfest will be held on Saturday, Sept. 10, on the club grounds located on the Old Pittsburgh Rd. just off Rte. 51 and the 119 bypass in Uniontown. This event, sponsored by the Uniontown ARC, will have activities for all. Pre-registration fee is $3 each or 2 for $5. Talk-in on 147.045/645, 144.57/145.17 and 52. For further information, contact UARC Gabfest Committee, c/o John T. Cermak, WB3DOD, P.O. Box 433, Republic, PA 15475, tel. 412-246-2870.

Pennsylvania: The Butler Hamfest, sponsored by the Butler County ARA, Inc., will be held at the Butler Farm Show Grounds at Roe Airport, Butler, on Sunday, Sept. 11, from 9 A.M. to 4 P.M. Admission donation is $1; children under 12 free. Plenty of parking; overnight campers welcome. Free outside flea market. Indoor flea market — vendor's space $5 per 8-ft table. Overnight accommodations available at area motels. Check-in on 96/36 and 52; directions on 84/24. For information, contact John Varljen, K3HJH, 174 Oak Hills Heights, Butler, PA 16001, tel. 412-283-9403.

Pennsylvania: The Skyview Radio Society will hold its annual hamfest on Sunday, Sept. 18, from noon to 4 P.M., at the club grounds on Turkey Ridge Rd., New Kensington. Talk-in on 04/64 and 52. Registration fee $2; vendors $4.

†**Pennsylvania:** The York Hamfest and Specialized Communications Expo, sponsored by the York County ARCs, will be held at the York Fairground, York, on Saturday, Sept. 24, from 11 A.M. to 5 P.M., and Sunday, Sept. 25, from 8 A.M. to 4 P.M. Admission is $2 on Saturday and $3 on Sunday; women and children under 12 are free. Special student admission is $2 for both days. Specialized communications seminars and demonstrations on ATV, computers and home robotics. Women's activities on Sunday. Banquet on Saturday at 6 P.M., $10. Reservations required; closing date is Sept. 16. Flea market/tailgating on Sunday only. In conjunction with the hamfest, *A5 ATV Magazine* will conduct its 4th Annual Fall ATV Conference. Conference programs will be presented on Friday evening and all day Saturday. For details regarding A5 ATV Conference, write to A5 Magazine, P.O. Box H, Lowden, IA 52255. Overnight camping, nearby motels (Best Western, York, tel. 717-767-6931; ask for special rates). For additional hamfest info, write to York Hamfest, Box W, Dover, PA 17315. Please send an s.a.s.e.

Pennsylvania: The Pack Rats (Mt. Airy VHF ARC) cordially invite all amateurs and their friends to the 7th Annual Mid-Atlantic VHF Conference on Saturday, Oct. 1, at the Warrington Motor Lodge, Rte. 611, Warrington, and our 12th Pack Rat HAMARAMA on Sunday, Oct. 2, at the Bucks County Drive-in Theater on Rte. 611, Warrington. Admission to the flea market is $3, with selling spaces at $5 each. Gate will open at

7:30 A.M., rain or shine; bring your own tables. Advance registration for the Conference, including a Hamarama admission, is $4. Send to HAMARAMA "83," P.O. Box 311, Southampton, PA 18966, or call Lee A. Cohen, K3MXM, tel. 215-635-4942.

South Carolina: The 32nd annual Rock Hill Hamfest will be held on Oct. 2. For information, contact YCARS, Box 4141CRS, Rock Hill, SC 29730.

†**Tennessee:** The Bristol, Kingsport and Johnson City ARCs will sponsor the 3rd annual Tri-Cities Hamfest on Saturday, Sept. 10, at the Gray Fairgrounds in Gray, midway between the three cities, just off I-81. General admission is $2 in advance, $3 at the gate. Flea market $5. Everything indoors. Computer enthusiasts welcome. For tickets or info, write to Tri-Cities Hamfest, P.O. Box 3682 CRS, Johnson City, TN 37601.

†**Tennessee:** The Memphis Hamfest, the last big one of the season, will be held at the Memphis Fairgrounds (Mid South Bldg.), Saturday and Sunday, Oct. 8-9. Computer displays and software in addition to regular radio displays and flea market. Tables on site. Dealer and flea market setup Friday evening the 7th until 9 P.M. Activities include radio and computer forums, women's programs and a hospitality party on Saturday night. On-site hookups. Talk-in on 28/88 and 34/94. For more information or reservations, contact Clayton Elam, K4FZJ, 28 No. Cooper, Memphis, TN 38104, tel. 901-274-4418 (daytime) or 901-743-6714 evenings. Sponsored by the six Memphis Radio Clubs. You all come now!

†**Texas:** The Wichita ARS Hamfest will be held in Wichita Falls on Saturday, Sept. 24, from 8 A.M. to 6 P.M., and Sunday, Sept. 25, from 8 A.M. to 2 P.M. Advance admission is $4; at the door $5. Flea market, ARRL update, QCWA and MARS meetings, programs and demonstrations. Fly-in service, free RV parking, shopping trips. Talk-in on 34/94 and 75/15. For info and advance tickets, write to WARS Hamfest, P.O. Box 4363, Wichita Falls, TX 76308, or call Jerry Woods, WB5POQ, tel. 817-692-0219.

†**Virginia:** The Tidewater 8th annual Amateur Radio Hamfest-Computer Convention-Electronic Flea Market will be at the Virginia Beach PAVILLION on Saturday and Sunday, Oct. 8-9. Featured are dealers, special displays, forums, computers, satellite equipment. Bring the family and stay at beautiful Virginia Beach. Visit the fantastic new Waterfront Festival Marketplace at nearby Norfolk waterfront. Show time is 9 A.M. to 5 P.M. Admission of $4 is good for both days. Flea market tables $5 one day, $8 both days. Commercial table space in exhibition area $15 both days; commercial booths $30 both days. For info and tickets, write to or call Jim Harrison, N4NV, 1234 Little Bay, Norfolk, VA 23503, tel. 804-587-1695. Talk-in on 37/97 and 19/79.

Washington: The Walla Walla Valley RAC will hold its 37th Annual Hamfest, Sept. 24-25, at the Milton-Freewater (Oregon) Community Bldg. Doors open at 8:30 A.M. each day. Free registration. Dealer displays, swap shop, antique and homebrew displays, women's craft sale, Tesla coil and spark gap demonstration. ARRL booth, repeater meetings, MINOW Bazaar Sunday. Dinner Sunday noon is potluck. Camping facilities at Fort Walla Walla Park. Talk-in on 52. For more details, write to W7DP, P.O. Box 321, Walla Walla, WA 99362.

Wisconsin: The St. Croix Valley Repeater Assn. will sponsor its seventh annual hamfest in Baldwin, at the American Legion Hall, on Saturday, Sept. 24, from 9 A.M. to 2 P.M. Admission will be $2. Talk-in on 93/33 and 52. For further information, please write to Bruce Olson, N9BLU, Box 91, St. Croix Falls, WI 54024.

Wisconsin: The Kettle Moraine RAC will hold its annual ham, computer, video fest on Sunday, Oct. 9, at the Waukesha County Expo Center, Hwys. F and FT, Waukesha, starting at 8 A.M., rain or shine. Indoor facilities. Commercial exhibitors, food. Tickets are $2 in advance, $3 at the door. Reserved tables are $3 for each 4-ft length. Reservations accepted until Sept. 26. Send check payable to KMRA Club, P.O. Box 411, Waukesha, WI 53187.

[Attention those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes of any kind and games of chance such as bingo.]

Note: Sponsors of large gatherings should check with League Hq. 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.

Amateur Satellite Program News

Conducted By
Bernie Glassmeyer,*
W9KDR

AMSAT-OSCAR 10 IS OPERATIONAL

AMSAT engineers have tested all of the OSCAR 10 systems and proclaim the mission a success. During the major events of the last few months, the AMSAT organization has gained recognition as a leader in space communications. One of the most significant facts is that AMSAT is the *first* nongovernment, noncommercial organization ever to fire a spacecraft kick motor in space. The firing took place on July 11 at approximately 2230 UTC. This 170-second kick-motor burn placed the new OSCAR in an orbit with a higher inclination angle — a monumental achievement for AMSAT. Few will ever know the complexity involved in the successful burn of the OSCAR 10 spacecraft kick motor.

The mission's success is a true demonstration of the ability and knowledge of the AMSAT engineering team, as many obstacles have been overcome. The signals being received from OSCAR 10 testify to the professionalism of the AMSAT organization.

ESA Gives OSCAR 10 a Bump

AMSAT received a press release from ESA (European Space Agency) on July 15 giving the first confirmation of what caused the unexpected satellite attitude and spin rate after separation. Excerpts of that release follow.

"The first acquisition of telemetry from the OSCAR 10 satellite five hours after launch indicated that there were gross errors in attitude and spin rate. The satellite authority took rapid and effective action to guarantee the immediate survival of the satellite so that the situation could be analyzed and further corrective action taken. During the past weeks, the AMSAT project authority has established full control of the satellite and brought it into the correct attitude for a first firing of the restartable liquid propellant apogee motor. In doing so, the AMSAT project authority has demonstrated the extraordinary operational flexibility of the design of its satellite and of the people who operate it.

"Examination of the launcher telemetry has shown that the dual launch system SYLDA had functioned nominally and that the original separation parameters (including satellite attitude and spin) had been correct. This has been confirmed by stored satellite data.

"Detailed investigation of both launcher and satellite data indicates with a high degree of probability that 53 seconds after separation the third stage caught up with the satellite. This would explain the attitude and spin-rate anomalies observed subsequent to separation. This supposition of a physical contact is reinforced by observation of small shocks registered at that time by launcher vibration sensors and by indications that at least one of the satellite's antennas is slightly damaged.

"The most likely reason that the third stage caught up with the satellite is that the thrust due to programmed venting of the oxygen tank was significantly higher than predicted and annulled the margins taken for setting up the sequence of operational maneuvers.

"Following separation of each satellite, the Ariane third stage performs an attitude and spin change program which is then followed by a lateral distancing maneuver of this stage. This sequence includes opening and closing of the third-stage oxygen vent valves to control residual tank pressure and to provide thrust for the distancing maneuver.

"For future launches, the higher residual thrust level and additional margins will be taken into account, and the sequence of operations will be adjusted accordingly so this kind of problem will not be encountered again."

Space Shuttle STS-9 Operating Frequencies

AMSAT, NASA and ARRL have finalized the operating frequencies for the flight of Orbiter *Columbia*. The mission has been rescheduled for liftoff on October 28 for a nine-day mission. Details of this operation are in August *QST*, page 50.

Operating Frequencies for the Space Shuttle STS-9 Mission

Space to Earth (MHz)	*Earth to Space (MHz)*		
145.250	144.650	144.850	145.010
145.530	144.700	144.910	145.030
145.550 (primary)	144.725	144.930	145.050
145.570	144.750	144.950	145.070
	144.775	144.970	145.090
	144.800	144.990	145.350
	144.825		145.450

Do not call ARRL Hq. for Shuttle information. All late-breaking news will be reported on regularly scheduled WIAW bulletins, and real-time announcements of last-minute changes in Dr. Garriott's operating schedules during the mission (often to be decided with only an hour's lead time) will be relayed immediately by W5RRR, the Johnson Space Center ARC station, on their hf STS-9 net (frequencies to be announced over WIAW).

Motorola Amateur Radio Club Builds First Radio

The first training radio for the STS-9 mission, built by the Motorola ARC, was delivered to the Johnson Space Center in Houston for a "Dress Rehearsal" on July 15. This rehearsal involved Astronaut Dr. Owen Garriott, W5LFL, members of Johnson Space Center ARC station W5RRR and NBC's Roy Neal, K6DUE, and his production crew that was taping the new ARRL recruitment videotape, *Amateur Radio's Newest Frontier*. (The tape will be available around September 1 from ARRL Hq. in 3/4-inch U-Matic and 1/2-inch VHS format.)

Dr. Garriott and members of the JSC club staged several QSOs using the new radio and a prototype antenna (designed by Lockheed just for this mission). The antenna was mounted in the window of the Shuttle Trainer while Dr. Garriott operated the radio. Everything worked very well, and further training sessions are planned. (See photo, page 50.)

Monthly Listings

☐ *ASR* (Amateur Satellite Report) is available for $22 ($30 overseas) for 26 issues (1 year) from Amateur Satellite Report, 221 Long Swamp Rd., Wolcott, CT 06716.

☐ Project OSCAR 1983 Annual Orbital Predictions for every orbit of AMSAT-OSCAR 8 and RADIOs 5, 6, 7 and 8 are available for $10 postpaid in Canada, Mexico and the U.S.; $12 elsewhere. Send to Project OSCAR, Inc., P.O. Box 1136, Los Altos, CA 94022.

☐ ARRL members only: Send a 4- × 9-in. self-addressed, stamped envelope with your call sign to ARRL Hq. Club and Training Department for a complete, monthly orbit schedule for all operating amateur satellites. A year's supply of s.a.s.e.'s may be sent at one time; be sure to include 1 unit of postage for each s.a.s.e.

☐ Further information on the Amateur Radio Satellite Program can be obtained free of charge from ARRL Hq. The OSCAR locator package (satellite plotters and details) is now available for $8 U.S., $9 elsewhere.

*OSCAR Program Manager, ARRL

Public Service

Conducted By Robert J. Halprin,* K1XA

Handling Instructions — Who Wants 'Em?

This is still very much an open question, first asked in August 1980 *QST* under the headline "Handling Instructions — Who Needs 'Em?" In fact, this question has even more significance now, as we get closer to Amateur Radio traffic handling on digital modes, which will enable a quantum leap in accuracy and efficiency. At the threshold of implementation, is it worthwhile to continue an antiquated, enthusiasm-sapping traffic-handling bureaucracy such as handling instructions? Or to put it another way, what purpose do these museum pieces (thanks to K6XI for the terminology) serve? Here's what August 1980 *QST* had to say:

"Handling instructions are an optional component of the preample in a formal radiogram message. These instructions are signified by the letter group HX, plus at least one other letter, denoting which instruction has been chosen. Complaints have been registered that traffic handlers ignore the HX designators, as messages make their way through the network. It's alleged that the seven HX indicators are hard to memorize, and the problem is often compounded with the assumption that the handling instruction only applies to the delivering station. The question is — are handling instructions necessary for the proper handling of traffic, or are they just so much excess baggage, causing amateurs to withdraw from traffic activities altogether?

"First, let's take a look at the official definitions of the instructions:

"*HXA* — (Followed by number.) Collect landline delivery authorized by addressee within ____ miles. (If no number, authorization is unlimited.)

"*HXB* — (Followed by number.) Cancel message if not delivered within ____ hours of filing time; service originating station.

"*HXC* — Report date and time of delivery (TOD) to originating station.

"*HXD* — Report to originating station the identity of station from which received, plus date and time. Report identity of station to which relayed, plus date and time, or if delivered report date, time and method of delivery.

"*HXE* — Delivering station get reply from addressee, originate message back.

"*HXF* — (Followed by number.) Hold delivery until ____ (date).

"*HXG* — Delivery by mail or landline toll call not required. If toll or or other expense involved, cancel message and service originating station.

"Now, let's try to gauge the practical utility of each:

"*HXA* — Would this one be used more than once in a lifetime? It is said that HXA comes in handy during emergency-related situations. Sure, but is it not a long-standing practice that crisis traffic is delivered immediately from any level?

"*HXB* — The cancellation indicator is helpful during SET, and so on. But the same purpose can be served by an operator's note.

"*HXC* — This one eases the non-delivery paranoia, and involves only the delivering station. It doesn't drag everyone into the morass, unlike HXD. But ARL SEVEN (from the numbered radiogram list) could accomplish the same thing, while putting some real, i.e. third-party (not ham-to-ham) traffic into the system.

"*HXD* — This prosign makes the IRS regulations look attractive. A real classic. If anything is going to be ignored, this one is; HXD makes excessive demands on one's traffic handling consciousness. Furthermore, should FCC go ahead and eliminate the need to keep a message file, HXD will be blown right out of the saddle.

"*HXE* — ARL SEVEN and this designation are similar, if not matching.

"*HXF* — Hey baby, you'll be lucky if the message gets there at all!

"*HXG* — At last, the one with the most merit. But whether we like it or not, for the most part, delivery by mail or toll call shouldn't be expected. After all, in normal times, the person signing the message can call or write (same for HXA). For example, sending a message to a post office box is pointless. We do not, however, recommend refusal to deliver *after the fact*. No one is forced to accept a radiogram, but once an amateur does so, he/she should see it through to delivery. If it was understood in the traffic realm that cost-delivery isn't expected, then HXG would no longer be necessary.

"On the other hand, there are amateurs who feel the trace procedure (HXD) should be more formal and exacting. But then trafficking becomes more cumbersome, derogating recruitment efforts. A school of thought has it that the message trace is actually a punitive measure, since it can't resurrect a lost message after it's obsolete. The trace procedure won't turn back the clock, although it may reform the miscreants. But the overriding issue does not involve tracing, or handling instructions, if the truth be known. What is of major concern is that hams must be responsible and reliable when it comes to accepting traffic for delivery. It's that simple. Again, traffic squads are composed of volunteers. But, once that voluntary commitment is made, it is common courtesy to get the message to its destination, or take all measures to that end.

"To take it one step further, the rapid movement of traffic from origin to destination is not the only objective of the National Traffic System (which is the primary means of traffic exchange in modern times). The other goal, of equal import, is the training of amateur operators in the handling of written traffic and participating in directed nets. This is why net hopping and other transient activities, though expediting delivery now and then, are contrary to NTS guidelines. Since the two objectives often conflict, one should not get too worked up if a given message does not reach its destination 'immediately.' The fact remains that, under routine conditions, a message of a crucial nature should not be in the amateur circuits in the first place. Thus, there is little need for handling instructions that make traffic handling less pleasant for the participants and hinder the growth of the system itself. It may be viewed as sacrilegious in some quarters to say this, but the best and most efficient way to communicate a piece of critical, time-valued information, not in the context of a communications emergency, is to use the telephone."

Note that the August 1980 column mentioned the possibility of HXD being snuffed pending the eventualization of FCC deregulatory efforts. As of June 9, 1983, FCC indeed eliminated the requirement that amateurs keep logs of routine amateur activities, including third-party messages. Shouldn't traffic-handling simplification keep pace with FCC deregulation? In short, without mandatory logging, amateurs are — for one example — relieved of being drawn into the HXD quagmire.

This also impacts service messages. Amateurs have been given the freedom not to keep a message file, so what happens when K1XA receives a service message pertaining to a message not on file because the file no longer exists? Many conscientious radio amateurs will always keep a message file, and every encouragement should be given to those who do so. But this is an individual decision. The absence of a message file does not mean an absence of conscientiousness. Cleansing oneself of superfluous paperwork is not evil.

The name of the game is *not* handling instructions or other instant turnoffs that are utterly incapable of resuscitating messages that have already been declared legally dead. Nor can the prolonging of traffic-handling red tape add anything to the rejuvenation of a perhaps flagging interest area of our service. The more streamlined traffic handling becomes, with the net landscape populated by responsible operators, the more appealing and enjoyable it will become to the amateur community, thereby making our contribution to the world at large so much more vigorous. That is the name of the game, as we approach the 21st Century.

*Deputy Communications Manager, ARRL

ALPINE EMERGENCY

The night of Feb. 28/March 1, 1983, was probably the worst I've ever seen in the Sierra Nevadas. With heavy, cold rain turning to sleet and snow at the higher elevations, it was not a night to be alone and lost on snowshoes.

Yet upon returning to my car at 9 P.M. following evening classes at the University of Nevada at Reno, I had no sooner switched on my 2-meter rig to 146.610 MHz when W6ITR (about 70 miles distant) informed me that my wife, Virginia, N6IWC, had become wet, cold, fatigued and disoriented while on route to our cabin, located in a roadless, wilderness area of Alpine County, California.

A combination of inappropriate clothing, heavy pack, weak flashlight batteries and very inclement

weather eventually made it impossible for her to continue. Using a 2-meter hand-held (that she carried in the seemingly extremely unlikely event that it would ever be needed), she began calling for help about 7 P.M. on 146.610 MHz. She was answered immediately by several amateur stations in the repeater's service area. Particularly helpful was KA7IUI, whose calm, reassuring cold-weather-survival suggestions were exactly what she needed.

Shortly thereafter, W6ITR in the nearest town (Markleeville) came on frequency and directed the emergency communication on 01/61 until 9 the following morning. He called Paula Pennington and Gwen Walter on the landline, and within 90 minutes these two experienced cross country skiers and survivalists were racing with their gear through near zero visibility to the canyon where hypothermia was gradually claiming Virginia as a victim.

By this time, WB7UXO had cleared the 01/61 machine for the emergency. Offers of aid ranging from snowmobiles to helicopters were received. Friends and acquaintances throughout the enormous service area of the 01/61 repeater anxiously awaited the outcome. W6ITR was able to communicate with the two women rescuers who had his radio, and we all monitored their progress as they pursued the meandering snowshoe trail that was rapidly fading.

Alpine County Undersheriff Kuhl, an experienced mountain search-and-rescue man, rounded up a snowcat and a crew. Armed with snowshoes and vhf hand-helds tuned to the sheriff's frequency, we finally set off after the skiers.

Just before 11 P.M., Paula announced that they had located Virginia. She was still conscious, and they immediately changed her clothes, stuffed her into a down sleeping bag, put up a tent, put her in it, crawled in with her, and poured hot tea into her. I found them all huddled together about 3 A.M. in a tent that was beginning to get wet. Tossing a down jacket in to Virginia, I set off at once, breaking a snowshoe trail to our cabin, sinking 2 feet into the wet, heavy snow with every step.

Once there I fired up the 4.5 kW gas generator for lights and communications, built a roaring fire, melted and heated massive amounts of snow for hot tea and coffee, and hooked up my 2-meter rig I had hurriedly ripped out of my car.

What an ordeal! But nothing compared to the disaster averted only by that little HT that Virginia had not forgotten to take along. — *John Stanley York, N7DSN, Markleeville, California*

MARITIME RESCUE

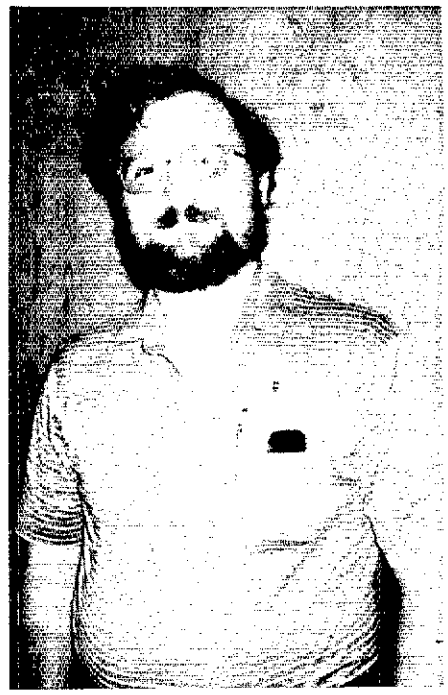
June 4, 1983: The Maritime Mobile Service Net was in normal session when a breaker identifying himself as the sailboat *Afternoon Delight* broke in with an emergency. This vessel was in the Sea of Cortez, near Baja California. The operator of the radio was not licensed, nor was there a licensed amateur on board, nor anyone else trained to operate the various radios. The person transmitting complained of a diving accident, believed he was suffering from the bends, and requested emergency aid. N5BHU and KØIND/4, handled the situation in a totally professional and outstanding manner. The net shifted to 14.318 MHz from the normal 14.313 MHz to allow the rescue communications to go on uninterrupted. N5BHU was the direct link between the stricken diver and the U.S. Coast Guard, handling all communications with them by telephone. While he was doing this, KØIND/4 maintained contact with *Afternoon Delight,* gathering the answers to questions from USCG.

Once the rescue operation was firmed up, and aircraft were on the way, the net resumed normal operations on 14.313 MHz, pausing every half hour to check on the condition of the diver. Once the air ambulance and the USCG C-130 aircraft were ready to land at the nearby country strip, the diver was instructed to leave the ship and go to the aircraft for evacuation. Another person remained on the vessel to maintain the radio communications link. Besides making countless calls on the telephone with the USCG, N5BHU also placed calls to relatives of the diver to apprise them of the situation, all at no cost to the diver or family.

The whole operation took several hours due to the logistics of arranging the rescue several hundred miles from the nearest U.S. source. Net discipline and cooperation were excellent throughout. Other amateurs helped out, but none made the total commitment or rendered the aid like these two dedicated public servants. — *Gerald E. Murphy, K8YUW*

THERE IS A RIGHT TIME...

Late in the morning of April 19, Sam Selders, WØHJX, of Greeley, Colorado, and I were QSOing through a 2-meter repeater. We'd been discussing details about a new QCWA chapter we were forming. Cliff Hurst, NØCZ, monitored the repeater frequency often from his remote Crystal Lakes QTH, and was expected to break into the QSO at any time.



Gary, W2CS, is a key player in the League's National Traffic System, currently serving as a director of the Transcontinental Corps of NTS. *(W1YL photo)*

Instead, Cliff's wife Aldene broke into the QSO and said Cliff had collapsed and she was unable to help him. She asked if we could get assistance. Immediately, I headed for their home, while Sam called the nearby volunteer fire department, the sheriff's department and the nearest hospital with ambulance service.

When I arrived at their home, I found two EMTs already giving oxygen to Cliff and communicating his vital signs on the sheriff's vhf channel. The ambulance arrived, but paramedics called for a helicopter to get Cliff to the hospital. After he had arrived there and more complete tests had been run, Cliff's illness was diagnosed as a mild stroke. The fast action in getting help had apparently improved his chances for recovery. Unfortunately, Cliff suffered a major stroke the next day and died on the 22nd.

Cliff had taught his wife how to operate his Amateur Radio station for when they went sailing by themselves on long ocean trips. But in the secluded mountain community where they lived, about 50 miles northwest of Fort Collins, there are no telephone connections and the vhf rig turned into the only communications tie with medical help. Aldene Hurst is not a licensed amateur, but she certainly exercised proper judgment when she called for help on her OM's 2-meter rig. — *Hugh H. Drake, WØIPT, Fort Collins, Colorado*

PUBLIC SERVICE DIARY

☐ Spanish Fork Canyon, Utah — April 14-19. A mud slide developed, causing a road to rise about two feet per hour and later forcing the closing of the road. Two nets, one on 2-meter simplex and the other on 40 meters, were established so that amateurs and sheriff's personnel could communicate over the entire canyon area. A 2-meter beam was erected so the WB7RPF repeater with autopatch capability could be used by local, state and federal officials who were investigating the problem. (WB7RPF, EC Utah County)

☐ Mercer County, Pennsylvania — May 29-30. Local telephone service was knocked out for several hours by a thunderstorm. Emergency management officials requested that the Mercer County ARC provide backup communications; W3HV initiated the call-up on the W3LIF repeater, and K3SAN assumed net control. During the net, W3HV, K3QMR and KA3AIE set up and operated stations at local fire stations. The 29 local amateurs who participated in the emergency conducted phonepatches to the fire officials and provided additional security checks until phone service was restored early the next morning. (K3TUA, Mercer Co. Radio Officer)

AMATEUR RADIO EMERGENCY SERVICE REPORTS

☐ Jeffersontown, Kentucky — May 1. After two days of heavy rains, the National Weather Service contacted W8INY, who notified DEC K4KWN that reports of local conditions were needed. Water-level advisories and damage reports were collected on the 6th District ARES Net and then passed on to the NWS headquarters, where K4KWN was operating the amateur station. Over 40 Bullitt County hams helped out in the net, which was conducted on both the W4BDC and KA4WTT repeaters. (K4KWN, DEC 6th District, Kentucky)

COMMUNICATIONS SERVICE OF THE MONTH

A local net for the Springfield, Missouri, area was called to session on the WØEBE repeater about 5:30 P.M. Friday, April 29, when the local weather station reported that a threat of a tornado existed for the vicinity. The watch was to be in effect until 9:30 that evening.

WAØFAC, in Republic, about 10 miles west of Springfield, reported that a storm was moving rapidly to the southeast toward the city. From WAØFAC's vantage point, the storm looked to be a bad one.

A tornado materialized and touched down about one mile south of WAØFAC's QTH. The tornado then moved very fast to the east. Although it stayed on the ground for only a short time, it damaged or destroyed about 25 homes near Republic. By that time, many local hams were on the repeaters, and the Springfield CD had sounded the sirens. The tornado reached Springfield quickly and touched down again just inside the city limits after passing over the Federal Medical Center (prison). It cut a path about four blocks wide and three miles long. During that stretch, about 400 homes and businesses were either damaged or destroyed.

American Red Cross Disaster Coordinator NØDGI and his wife NØDGJ quickly moved the ARC communications van to near the touchdown site and put the mobile radio unit into operation. Local hams began arriving in the stricken area to give first-hand damage-assessment reports to the city officials. People who were injured during the storm were moved to the local hospital only a few blocks away. One person who sustained storm-related injuries died later, apparently from a heart attack, and a 16-year-old girl was killed when the tornado first touched down in Springfield. These were the only fatalities.

Because telephone service was knocked out by the twister, the WBØYEX/R autopatch was put to very quick but effective use. We worked well into the night, and handled a large amount of Health and Welfare traffic. Our thanks go out to KØUA, who relayed much of the traffic, and also to the many operators who helped out during the crisis. — *Elgie Ray Morris, WBØTNX, DEC Christian, Dallas, Greene, Lawrence and Webster Counties, Missouri*

ARRL SECTION EMERGENCY COORDINATOR REPORTS

☐ For June, 41 SEC reports were received, denoting a total ARES membership of 22,795. Sections reporting were: AL, AB, AZ, CO, CT, EMA, ENY, IN, IA, KY, LA, ME, MI, MN, MO, NE, NH, NLI, NC, NFL, NTX, OH, ON, ORG, PAC, SV, SDG, SJV, SC, SD, SFL, STX, TN, VA, WA, WMA, WNY, WPA, WV and WI.

NATIONAL TRAFFIC SYSTEM

The United States and Swaziland, 3D6, have entered into a third-party agreement, effective immediately. Certificates for 2RN/c2 went to WD2AFI, KC2QQ, W2UYE and KB2WI. 2RN/c4 certificates: W2DBQ, WB2VUF, KU2N, K2MT, WB2UJD, KC2SW (1st annual); K2UL (4th annual). RN6/c4 certificates were awarded to N6GIW, KD6BR and KA6CVM.

June Reports

1	2	3	4	5	6	7
Cycle Two						
Area Nets						
EAN	30	792	26.4	.616	93.9	
CAN	30	814	27.1	.533	100.0	
PAN*	59	726	12.3	.442	97.2	
Region Nets						
1RN	59	273	4.6	.234	69.7	100.0
2RN	60	296	4.9	.288	83.3	100.0
3RN	30	206	6.9	.407	96.7	96.7
4RN	60	485	8.1	.333	83.3	100.0
RN5	60	561	9.3	.329	95.8	100.0
RN6						98.3

RN7	90	428	4.8	.340	89.0	98.3
8RN	60	262	4.4	.282	98.3	96.7
9RN	60	326	5.4	.293	100.0	100.0
TEN	30	388	12.9	.390	84.8	100.0
ECN						70.0
TWN	60	208	3.4	.256	74.3	95.0
TCC						
TCC Eastern	109[1]	512				
TCC Central	76[1]	345				
TCC Pacific	89[1]	411				
Cycle Four						
Area Nets						
EAN	30	1538	51.3	1.289	91.7	
CAN	30	822	27.4	.835	100.0	
PAN	30	1024	34.1	.964	99.4	
Region Nets						
1RN	49	745	15.2	.574	94.9	96.7
2RN	90	720	8.0	.523	94.1	83.3
3RN	60	330	5.5	.516	93.3	93.3
4RN						100.0
RN5	60	466	7.8	.442	89.5	100.0
RN6	60	685	11.4	.578	100.0	100.0
RN7	60	567	9.4	.818	92.8	100.0
8RN	51	345	6.8	.392	75.0	80.0
9RN	60	390	6.5	.369	99.2	100.0
TEN	58	315	5.4	.425	72.3	100.0
ECN						96.7
TWN	58	447	7.7	.405	90.0	98.3
TCC						
TCC Eastern	107[1]	641				
TCC Central	55[1]	330				
TCC Pacific	98[1]	613				
Sections[2]	6691	26,028	3.9			
Summary	8075	43,037	5.3			
Record	10,319	50,268	18.4			

*PAN operates both cycles one and two.
[1]TCC functions not counted as net sessions.
[2]Section and local nets reporting (241): APSN ATN (AB), AENB AEND AENQ AENR AENW AENY AENZ ATNM MCEN (AL), ACN ATEN HARC (AZ), NCN NCTN SCN/1 SCN/2 SCN/V (CA), DTN SEN (DE), BEN DEN ENMC FAST FMSN FMTN FPON FPTN GN LCEN NFPN PEN PRVAN QFN QFNS SEFTN SPARC SVTN SWFTN TPTN (FL), ILN ITN (IL), ITN QIN (IN), CSTN KMWN KPN KSBN KWN QKS QKS-SS (KS), 3ARES 4ARES 5ARES 7ARES 11ARES BARES CARN KEN KNTN KRN KSN KYN KYPON MKPN PAEWTN SEKEN TSTMN WTEN (KY), CI2MN EM2MN EMRI EMRIPN EMRISS HHTN NEEPN (MA/RI), MEPN MMN MTN WRIN (MB), AEN CMEN MPSN PTN SGN (ME), MACS MITN MNN OMN UPN (MI), MNAMWN MSN MSPN MSSN (MN), ACE CMEN HBN IFN JCC MEOW MON MOSSB NEMOE PHD RARC SARN STAN (MO), MTN (MS), CEN CMN CNCTN (NC), CN CSN (NC/SC), BVARES CC2MN EN2MN MNARES NCHN NCN NE40 NMPN NSN PV2MN SBARES TCARES WNN (NE), GSFM GSPN NHN RCARES (NH), JSARS NJM NJN NJPN NJSN OBTTN SJVN TCETN (NJ), NSN (NV), CDN CNYTN EPN HCATEN HVN NLIPN NYPON NYS OCTEN SCVHFTN STAR WDN (NY), ALERT BN BNR BRTN BSSN LCTN MCTN NCTW NEON O6MN OSN OSSN RARA VWN (OH), NWOSN OLZ ONON OPEN OTN OTWN QCWA STN (OK), KTN OLN OPN OSN2 OSND TIN (ON), BSN ORARES OSN PDXARES PTTN SOFM (OR), NWPA2MTN WPA WPA2MTN WPAPTN (PA), QSN WQVUARESN (PQ), BR2MN GPD2MN LC2MN SCNTN SCSSBN (SC), NJQ SDEEN SDEN SDMN SDN SDPN SDTIN (SD), TNCW TNPN TNVN TSRN (TN), DFW HATN NET TEX TSN TTN (TX), BUN DCEN UCN (UT), STARES SVEN VLN VN VSBN VSN VTN (VA), EWTN NTN NWSSB PSTS SCARES WARTS WSN (WA), BEN BWN NWTN WIN WNN WSSN (WI), WVARN WVMDN WVN WVNN (WV).

1 — NET
2 — SESSIONS
3 — TRAFFIC
4 — AVERAGE
5 — RATE
6 — % REP.
7 — % REP. TO AREA NET

Transcontinental Corps

1	2	3	4	5
Cycle Two				
TCC Eastern	120	90.8	1036	512
TCC Central	90	84.4	731	345
TCC Pacific	120	74.2	822	411
Summary	330	83.1	2589	1268
Cycle Four				
TCC Eastern	138	77.5	1295	641
TCC Central	60	91.7	653	330
TCC Pacific	120	81.7	1204	613
Summary	318	83.6	3152	1584

1 — AREA
2 — FUNCTIONS
3 — % SUCCESSFUL
4 — TRAFFIC
5 — OUT-OF-NET TRAFFIC

TCC Roster

The TCC Roster (June) *Cycle Two* — Eastern Area (AF8V, Director) — N3ADU AA4AT N1BHH N2CER K1EIC VE3GOL WB3GZU KO2H WA2HEB WB1HIH VE3HTL WA4LJI WD8LRT AH2M K8OZ WB4PNY W8QHB W1QYY KB3UD AF8V AK1W N2XJ W1XX WB8YDZ. Central Area (W9JUJ, Director) — N5AMH N5AMK N5BT N5CRU W5CTZ N5EFG W0FRC W4JL W9JUJ K5KJN W5KLV KD5KQ WB9NVN W9NXG WB5OXE WB9WGD WF4X WB5YDD. Pacific Area (W0HXB, Director) — NI6A KT6A N0ACW N7AFZ N6ANL N7CSP N0CXI KU6D W7DZX W0EJD WD5ESV KB7FE W7GHT N6GIW K6HAD W0HXB KM6I W5JOV KB0MB WB0MTA K6OWA WA7OYI KF7R ND5T W7TGU WB7TQF KV5U K6UYK W7VSE WB7WOW KM7Z. *Cycle Four* — Eastern Area (W2CS, Director) — W3ATQ W3BBN KI3C WA4CCK W2CS W1EFW W2FR W2GKZ WB3GZU KN1K AH2M W8PMJ WB4PNY W3PQ WA2SPL W4UO VE1WF W2XD N8XX K4ZK. Central Area (W5GHP, Director) — W0AM W9CXY K0EZ K5GM W0HI W5LQ K5OAF W5RB N5TC W5TFB K5TL WB9UYU KB9X W4ZJY. Pacific Area (K0DJ, Director) — AD0A WD0AIT KN7B K0BN KC0D K0DJ W7DZX N2EC W6EOT W7EP W7GHT WA7GYQ W0HXB WA7KHE K7KSA W7LCF W7LG W7LYA KA0NLI ND5T WA7TEH W7VSE W6VZT VE6ZK.

Public Service Honor Roll June 1983

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 SM). 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, no max. This listing is available to Novices and Technicians who achieve a total of 40 or more points. Stations that are listed in the Public Service Honor Roll for 12 consecutive months, or 18 months out of a 24-month period, will be awarded a special PSHR certificate from Hq.

325
K7VW
295
WB7OGA
277
KA1EFO
175
K5CXP
169
KA1GBS
159
WB7WOW
158
WD4COL
144
K4SCL
141
WD8LRT
131
WB1GXZ
KA3DLY
130
KU0G
129
KC0OO
126
WB2UVB
123
WA4PFK
KF8J
122
WF4X
WB1HIH
KA5KRI
120
AF8V
118
N2AKZ
K4JST
116
KC9CJ
115
KA0EPY
114
W9YCV
K0DKM
112
WA4QXT
W4ANK
111
WB3GZU
W1EOF
109
WB2ZJF
AK1W
108
KB5EK
107
WD4ALY
W0OYH
KS7I
K4ZK
AL7W
106
WB4WYG
N4PQD
K8KQJ
104
KK1E
KB0MB
103
WA4JDH
WA4CCK
W0KJZ
102
WA7MEL
WA4YPQ
W9JUJ
KC2QQ
101
WB2IQJ
WA7LGN
W0LAE
N5AMK
KZ8Q
KA3GJT
K2VX
100
W7VSE
N5EFG
99
KA8GJV
98
W2MTA
KT9I
KA8CPS
KA4GFU
KV5X
97
WA0TFC
W6NTN
VE3BDM
N8EES
N1ARI
KR4V
KA1AVU
K4VWK
96
WA3WIY
WA2FJJ
W5DTR
W1TN
VE3HTL
KA5HDT
95
W9DM
N8DSU
KT6A
AG9G
94
WB5YDD
KI1M
K9BVE
WD4CNQ
93
WD8RHU
W7LG
W1PUO
KU4W
92
W3VA
VE3DPO
N4GDT
KA8IAF
KA4GUS
K2ZM
91
WB2VUK
W4CKS
N1BGW
90
WD5GKH
WB2ZCM
WA2CUW
N1BJW
K4IWW
89
W5CTZ
N5TC
KD5FR
KB4OZ
KA4BCM
88
WD8MIO
WB9IHH
WB2OWO
N8AWH
KA2GSX
KA1EPO
87
WD9FRI
WA1YNZ
W8VOM
W3YVQ
VE3GT
N3COY
N2XJ
KB0Z
86
WD4AWN
WA2ARC
KJ3E
85
WA4LXP
N2CER
KC2TF
84
WB2RBA
WB0MTX
K4EV
83
N8CXI
KA8NCR
KA3EJG
82
W0FRC
N7FKA
N4PL
KA7ELI
KA2BHR
K5OAF
81
WB2KLF
WB2IDS
W6INH
W2AET
N2DPN
KT5Z
K3JL
80
WB2GHN
79
KY4U
KL7IJG
K9CMO
78
VE3KK
N1AJJ
KA1TJ
77
WB8MTD
WB2OHR
W9NXG
N9ATP
KA1T
AA4AT
WB4WII
76
KT6D
KC2SW
KB4WT
KB4LB
KA5AZK
75
W5KLV
KC5NN
KA4SAA
K1JHC
74
WA1TBY
KA0BWM
KA0BCB
AC3N
K2ZVI
K4ZN
73
WD0AIT
WA5QFD
WA2KOJ
W6RNL
VE3GOL
N5BT
KB3FW
72
VE2EDO
N8DNC
KA9IKR
71
WB7WVD
WA3UNX
N6GIW
KY2P
AE1T
70
WA4EYU
W2XD
NP4D
N2BLX
KB4OG
KA2MBP
69
WB6QBZ
WB2QMP
WA6ZUD
W7LNE
W0HXB
K7LCA
68
WB4TZR
WA7GQO
W2ZOJ
KD4TY
67
WA2YBM
W0OUD
N0CFS
KC4WN
KA1GCW
KA0ARP
WB4HRR
66
WD4HBP
W4HON
N3CKQ
KA4BBA
KA1BHT
K8JDI
65
WB3FKP
WB0HOX
W4ZJY
KA4IUM
K3ZJJ
W4FMZ
64
WA8DHB
WA6QCA
W6IPL
KD9K
KA4MTX
63
WA4JTE
W6CPB
W3DKX
KD7G
KB3DW
K6TWJ
K0SI
62
WD4OCW
N5EZQ
KA9NOT
AK1J
61
WD4BSC
W5KMF
W1RWG
NN4I
N3ADU
N0EEH
KD5GM
60
WB6DOB
WB5LBR
W9EI
N7BGW
KA8MEB
K6UYK
K6AGD
57
WA1DXT/T
53
WB8NHV/T
52
N5FDL/T
50
KA1BBU/T
48
N6EPG/T
44
KA8GGZ/T
42
WB5NRN/T
K1LCQ/T

Brass Pounders League June 1983

A BPL Medallion (see April 1979 *QST*, page 77) has been awarded to the following amateur since last month's listing: AC3N.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SM 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	644	1011	1336	91	3082
K3NSN	209	811	1771	61	2852
KA9CPA	23	1333	158	928	2442
N0BQP	30	1264	175	750	2219
KA1EFO/MM	545	281	545	277	1648
WB7OGA	95	385	417	47	944
WA0TFC	0	348	472	2	822
AK1W	7	395	384	13	799
W1EOF	2	272	485	25	784
W9JUJ	0	401	323	1	725
KC0AS	57	511	129	17	714
W3VR	233	201	250	22	706
WB7WOW	16	281	306	28	631
WF4X	6	307	287	26	626
WD8MIO	37	323	262	4	626
N7FKA	76	216	292	28	612
AF8V	15	300	274	14	603
KT6A	11	342	222	6	581
W7DZX	11	285	274	3	573
W7VSE	2	292	269	6	569
WA4JDH	0	320	255	2	559
KA1GBS	3	268	199	63	533
WA0RUF	265	0	265	0	530
WB5YDD	5	260	223	35	528
KB0MB	117	156	222	22	517
K8NCV	17	239	252	3	511
BPL for 100 or more originations plus deliveries:					
KH6B	127				
WB2UVB	115				
WD4COL	105				
Multioperator station:					
WA0VTU	102				

1 — CALL
2 — ORIG.
3 — RCVD.
4 — SENT
5 — DLVD.
6 — TOTAL

Independent Nets (June 1983)

1	2	3	4
Amateur Radio Telegraph Society	30	407	247
Central Gulf Coast Hurricane	30	249	2104
Clearing House	—	38	123
Early Bird	30	835	343
Empire Slow Speed	28	38	308
Golden Bear	30	239	1927
IMRA	26	648	1343
Midwest RTTY	30	54	193
Mission Trail	30	355	1021
Vermont Sideband	30	160	473
West Coast Slow Speed	30	85	370
75-Meter ISSB	30	383	1023
7290 Traffic	48	582	3143

1 — NET NAME
2 — SESSIONS
3 — TRAFFIC
4 — CHECK-INS

Special Events

Conducted By Mark J. Wilson,* AA2Z

St. Catharines, Ontario: Niagara Peninsula ARC will operate VE3VM on weekends *throughout September and October* during the Grape and Wine Festival. Operation on 40-meter ssb. QSL via Box 692, St. Catharines, ON L2R 6Y3, Canada.

Clemmons, North Carolina: WB4TAL will operate *during September* from the Clemmons United Methodist Church to celebrate its 200th anniversary. Operation in General class hf phone bands. QSL via P.O. Box 366, Clemmons, NC 27012.

Lake County, California: Lake Co. ARS will operate W6ZS from 2100 to 0400Z daily *Sept. 1 to 5* from the Lake Co. Fair. Frequencies: phone — 7.270 21.370; cw — 7.060 7.140 21.060 21.140. Certificate via P.O. Box 814, Kelseyville, CA 95451.

Fredericksburg, Virginia: Rappahannock Valley ARC will operate N4QD from 1300 to 2400Z *Sept. 3* during the Fredericksburg Agricultural Fair. Operation in the lower 40, 20 and 15-meter General class phone bands and the 40- and 15-meter Novice bands.

Independence, Missouri: FM ARC members will operate *Sept. 3 and 4* during Santa Caligon Days. Operation 10-30 kHz from lower General and Novice class band edges.

Twin Falls, Idaho: Idaho Soc. of Radio Amateurs, Magic Valley Chapter, will operate WB7CYO from the Twin Falls Co. Fair and Rodeo from 1700 to 2359Z daily *Sept. 6 to 10*. Operation 25 kHz up from lower General class band edges. Certificate via Box 294, Twin Falls, ID 83301.

Norwalk, Connecticut: Greater Norwalk ARC will operate WA1RXA from 2200-0100Z *Sept. 9*, 1500-0200Z *Sept. 10* and 1500-0000Z *Sept. 11* during the Norwalk Oyster Festival. Frequencies: phone — 3.890 7.240 14.305 21.385 28.600; cw — 3.720 7.120 14.090 21.090 28.090. Certificate via J. Beck, 26 Ambler Dr., Norwalk, CT 06851.

Sterling, Virginia: Sterling Park ARC will operate KW4I from 1600 to 0000Z *Sept. 10* to commemorate the city's 20th anniversary. Operation 5 kHz up from lower General class phone bands and 60 kHz up from low end of cw bands. Certificate and QSL via 313 West Derby Ave., Sterling, VA 22170.

Canaan, Indiana: Madison ARC will operate W9EFU from 1400 to 2200Z *Sept. 10* to commemorate the Pony Express. Operation 20 kHz up from lower General class band edges. Certificate via E. Taylor, Rte. 1, Hanover, IN 47243.

Tuscaloosa, Alabama: West Alabama ARS will operate W4WYP from 1300 to 2400Z *Sept. 10* to celebrate the birthday of the late football coach Bear Bryant. Operation in the lower 25 kHz of the 40-15 meter General class phone bands and in the lower portions of the Novice bands. Certificate via P.O. Box 1741, Tuscaloosa, AL 35403.

Northfield, Minnesota: St. Paul RC will operate KØAGF from 1400 to 2300Z *Sept. 10 and 11* during Jesse James Days. Frequencies: phone — 3.948 7.267 14.288 21.377; cw — 3.552 7.107 14.057 21.057. Certificate and QSL via P.O. Box 30313, St. Paul, MN 55175-0313.

Oglesby, Illinois: Starved Rock RC will operate W9MKS on *Sept. 10 and 11* to celebrate 50 years of club Amateur Radio operation. QSL via RFD 1, Box 171, Oglesby, IL 61348.

Flush, Kansas: KSUARC will operate WØQQQ from Pottawatomie County from 1500 to 2100Z *Sept. 10* on 14.235 and 21.360; from 2100 to 2300Z *Sept. 10* on 14.054 and 7.054; and from 0300 to 0500Z *Sept. 11* on 14.235 and 21.360. Certificate via KSUARC, Dept. of Elect. Eng., Durland Hall, Manhattan, KS 66506.

Bellevue, Nebraska: Bellevue ARC will operate WØWYV on *Sept. 10 and 11* from the Strategic Air Command Museum. Operation in lower portion of General class hf phone bands, 40- and 15-meter Novice bands, and some vhf.

Atlantic City, New Jersey: Southern Counties ARA will operate K2BR from *Sept. 13 to 17* from the Miss America Pageant. Frequencies: phone — 25 kHz inside General class phone bands; cw — 65 kHz up from lower band edges; Novice — 7.125 21.150. QSL via Box 121, Linwood, NJ 08221.

Morton, Illinois: Morton ARC will operate W9EEB from 2300 to 0200Z *Sept. 14 to 17* during the Pumpkin Festival. Operation 25 kHz up from lower 40, 20, 15 and 10-meter General class phone bands. Certificate via WD9AEU, 701 Columbus Ave., Morton, IL 61550.

Monaca, Pennsylvania: Beaver Valley RA will operate W3SGJ from 1400Z *Sept. 15* to 0200Z *Sept. 17* from the Beaver Valley Mall. Operation on all bands and modes, with concentration on 7.265 and 14.300. QSL via KG3L.

Medina, New York: Orleans Co. ARC will operate WA2DQL from 1200 to 0200Z *Sept. 16 and 17* during the Medina Canal Festival. Operation on 7.265 and in General class portion of 15-meter phone band, as well as in the 40- and 15-meter Novice bands. QSL and certificate via OCARC, c/o Office for Disaster Preparedness, County House Rd., Albion, NY 14411.

Visalia, California: Tulare Co. ARES will operate KB6AR and KB6CC from 0100Z *Sept. 17* until 0100Z *Sept. 19* during the California Balloon Festival. Frequencies: 7.235 14.285 21.360 28.510. Certificate via KB6AR.

Keytesville, Missouri: Chariton ARS will operate KBØCC from 1400 to 2200Z *Sept. 17* during General Sterling Price Day. Operation on 7.280 and 21.400.

Audubon, Iowa: Area amateurs will operate KAØLZT from 1300 to 0100Z *Sept. 17* during the 33rd Operation T-Bone celebration. Operation 15 kHz inside General class phone bands and Novice class bands. Certificate via 201 Poplar, Audubon, IA 50025.

Cumbres Pass, New Mexico: Northern New Mexico ARC will operate from 1430 to 2030Z *Sept. 17* from the Cumbres and Toltec Railroad. Operation on 14.260 and 21.360. Certificate and QSL via N5ACP, 560 Bryce, Whiterock, NM 87544.

Cincinnati, Ohio: Farout ARC will operate WB8SMC from 0000 to 2359Z *Sept. 17* to celebrate the club's 10th anniversary. Operation 5 kHz up from lower General class phone- and cw-band edges. QSL via 5326 Brainard Dr., Kettering, OH 45440.

Flint, Michigan: Genessee Co. RC will operate W8ACW from 1300 to 0100Z *Sept. 17 and 18* to mark the club's 50th anniversary. Frequencies: 14.275 146.52. Certificate via P.O. Box 474, Grand Blanc, MI 48439.

Dubuque, Iowa: Great River ARC members will be active from 1700 to 2400Z *Sept. 17 and 18* during Dubuque Riverfest celebrations. Operation 25 kHz up from lower General class phone-band edges.

Clyde, Ohio: Clyde ARS will operate N8AGN from 1600-0000Z *Sept. 17* and 1600-2200Z *Sept. 18* from the Winesburg Fall Fair. Frequencies: phone — 7.250 21.375; cw — 7.125 21.150. QSL via N8DYR, 302 Hamer St., Clyde, OH 43410.

Walnut Creek, California: Mount Diablo ARC will operate W6CX from 2100 to 2300Z *Sept. 17 and 18* during the 46th Annual Walnut Festival. Operation near the top of the 40, 20 and 15-meter General class phone bands. QSL info given on the air.

Baker County, Oregon: Eastern Oregon ARS and the Hams from LaGrande will operate W7NYW from 1600Z *Sept. 17* until 2300Z *Sept. 18* from the Sumpter Valley Railroad Project. Frequencies: phone — 1.865 3.965 7.265 14.265 21.365 29.000; cw — Novice bands. QSL via P.O. Box 124, Baker, OR 97814.

East Chicago, Indiana: Inland Steel Employees RA will operate KB9PQ to call attention to "the largest blast furnace in the Western Hemisphere" from 1300 to 0000Z *Sept. 17 and 18*. Operation 10 kHz above lower General class and Novice class band edges. Certificate via 7605 Southeastern, Hammond, IN 46324.

Warren, Michigan: Firebird ARC members will operate from 1400 to 1900Z *Sept. 17 and 18* from the Fisher Body General Offices to celebrate the 75th anniversary of General Motors. Operation around 7.277 14.277 21.377 146.49. Certificate.

Southwestern Wyoming: Sweetwater ARC will operate WA7USI from 1800Z *Sept. 17* to 1800Z *Sept. 18* from a historic site. Operation 40 kHz above lower General class phone-band edges; some Novice operation. QSL via KC7QY, 2018 Kennedy Ave., Rock Springs, WY 82901.

Kent Island, Maryland: Bowie ARC will operate N3GR/3 from this Chesapeake Bay site starting at 1400Z *Sept. 17*. Frequencies: cw — 30 kHz up from low end and some Novice operation; phone — General class hf bands. Certificate via N3GR.

Bellingham, Massachusetts: Foxboro Company ARA members will be active from 1300 to 2100Z *Sept. 18* during the annual Foxhunt Contest. Work club station WB1EMT and then work two other Foxboro stations you will be directed to find on the band. Each Foxboro station will send a serial number starting with F, O or X. Look for WB1EMT on 7.265 and 21.365. Certificate for collecting serial numbers from stations worked via W1XA, 42 Saddleback Hill Rd., Bellingham, MA 02019.

Marathon County, Wisconsin: Wisconsin Valley RA will operate W9SM from 1200 to 2359Z *Sept. 18* from the intersection of the 45° N parallel and the 90° W meridian. Operation 25 kHz up from lower General class band edges. QSL via Box 363, Wausau, WI 54401.

Toledo, Ohio: Firebird ARC will operate KN8K from *Sept. 21 to 23* from the Hydra-Matic Division plant to celebrate the 75th anniversary of General Motors. Operation on 20 and 40 meters, phone and cw. QSL via 6905 Blossman Rd., Toledo, OH 43617.

Warren, Ohio: Fisher Body Lordstown ARC will operate W8KKZ from 1200 to 0300Z *Sept. 22 to 24* to celebrate the 75th anniversary of General Motors. Operation in the lower portion of the 20- and 40-meter General class phone bands and in the 15- and 40-meter Novice bands. QSL info given on the air.

Smithfield, Ohio: N8CUX will operate from 2300Z *Sept. 23* to 0400Z *Sept. 24* during the Smithfield Apple Festival. Operation on 3.900 and 7.110. Certificate via 259 Hill St., Smithfield, OH 43948.

Meriden, Connecticut: Meriden ARC will operate W1NRG from 1330 to 0230Z *Sept. 23 to 25* from the Harvest Festival. Operation on phone and cw, 80 to 10 meters. QSL via 66 Hourigan Dr., Meriden, CT 06450.

Uniontown, Pennsylvania: Uniontown ARC will operate W3PIE from 1300 to 2100Z *Sept. 24* to celebrate Fayette County's 200th anniversary. Operation on 7.235 14.285 21.360. QSL via P.O. Box 433, Republic, PA 15475.

Redford Township, Michigan: Area amateurs will operate KG8W from 0000 to 2400Z *Sept. 24* to commemorate the town's 150th anniversary. Frequencies: phone — 3.880 7.215 14.215 21.340 28.600; cw — 3.600 3.710 7.065 7.110 14.050 21.090 21.110 28.090 28.110. QSL via RSES 150, 18800 Beech-Daly, Redford, MI 48240.

Findlay, Ohio: Findlay RC will operate W8FT from 1600Z *Sept. 24* to 2200Z *Sept. 25* to commemorate the 75th anniversary of the composition of Tell Taylor's barbershop classic, "Down By the Old Mill Stream." Operation in General class 40- to 10-meter phone and cw bands. QSL via Box 587, Findlay, OH 45840.

Corpus Christi, Texas: Armadillo Gang will operate KC5UN from 2200Z *Sept. 30* to 0300Z *Oct. 1;* 1500Z *Oct. 1* to 0300Z *Oct. 2;* and 1700Z *Oct. 2* to 0200Z *Oct. 3* from the Bayfest 83 Family Festival. Frequencies: 7.260 14.280 21.375 28.600.

Wayne County, Missouri: Bootheel Gang Old Timers Reunion will operate WØBIU from 1500 to 2400Z *Oct. 1*. Frequencies: lower 20 kHz of 40- and 20-meter General class phone bands. Certificate via WØBIU, Rte. 2, Box 240B, Poplar Bluff, MO 63901.

Albuquerque, New Mexico: KN5D will operate from 1400 to 1800Z daily *Oct. 1 to 9* during the 12th Annual International Hot Air Balloon Fiesta. Operation 20 kHz above lower General class phone-band edges. QSL via P.O. Box 997, Corrales, NM 87048.

Note: The deadline for receipt of items for this column is the *15th of the second month* preceding publication date. For example, your information would have to reach Hq. by September 15 to make the November issue.

*Assistant Communications Manager, ARRL

Results, June VHF QSO Party

Persistence: "Stubborn or enduring continuance, as in a chosen course; resoluteness; tenacity" — *Webster's New World Dictionary*

By Mark J. Wilson,* AA2Z

A quick look at the various tables and boxes accompanying this write-up pretty much tells the story of the VHF QSO Party held last June 11 and 12. Conditions were not outstanding, but that would have been too much to expect for two years in a row. This time last year, we were writing about the great aurora, tropo and double-hop E_s of the 1982 contest.

Delving a bit further into the history of the June vhf contest, however, we see that this past event was par for the course. A total of 510 hams sent in logs. The top single-op score was around 75K, and the top multi around 300K. There was single-hop E_s to be worked on 6 meters. There was some aurora for the last half hour or so. There were big mountaintop efforts and little mountaintop efforts. There were big home-station efforts and little home-station efforts. Everyone had a great time.

The single-hop E_s on 6 gave the South and the Midwest the opportunity to rake in the multipliers. N5KW and crew found the most — 61 — followed by WD4MBK and crew at 57, single-op KC5GB at 55, and multiops AAØL and W9UD at 54. Besides the same old stateside stuff, there were a few DXpeditions to work. Thanks to C6ADV, FPØSM (K1TOL), XE2XW (W5XW and friends) and ZF2EW (K1FJM) for taking the trouble to make the contest more exciting for everyone.

Two meters took a bit of a beating this time. Reports from all call areas indicate that general activity was not as good as in other years, and that things were especially slow on Sunday. As it turned out, the June contest was also one of the first decent weekends of the season weather-wise in many parts of the country. For many ops who normally spend the second weekend of June glued to their radio sets, the lure of the beach and barbecue was just too much. This same weather, however, made a wonderful weekend for mountaintopping. The aurora during the last half hour made 144.100 sound like the low end of 20 during a DX contest, adding to section totals and general excitement.

Activity on the higher bands has been growing every year as more and more people move upward and commercial equipment becomes more and more available. Just four years ago, in June 1979, top multiop W1FC posted a single-band 220 score of 2006 points (59 QSOs in 17 sections). This year, W3BBS had 26 multipliers and almost three times the score. The 432-MHz QSO total to beat this year was 172 by W2SZ/1. A quick comparison of the top three multiop logs shows that there were about 200 QSOs to be had (nobody ever works them all!). And on 1296 all call areas appeared. The big mountaintoppers are getting more serious about this band all the time — the W3BBS group lugged a 16-ft dish and a 500-W amplifier to their site.

The scores reflect the mediocre conditions and lower activity levels. Only the top two single-op stations — AA2Z and K1PXE — would have made last year's Top Ten listing. And without any spectacular 6-meter openings, the top scores all came from the Northeast. No W9IP, WB8IGY or W9OEH near the top of the list this time. Among the multiops, the W2SZ/1 group cashed in their microwave chips again this year and won by quite a bit. The familiar W3BBS call sign took second place, while W1VD made third. All of the Top Ten single ops this year were home stations, while all of the top multiops except W1VD and N2SB were mountaintoppers.

Only two of the Division Leader scores reflect new all-time records. Single-op AA2Z added 31,000 points to the Atlantic Division record held previously by K3SXA from the 1981 contest. In the Midwest Division, W9UD and crew traveled to Missouri, where they erased the 1979 WØOHU record by 11 kilopoints.

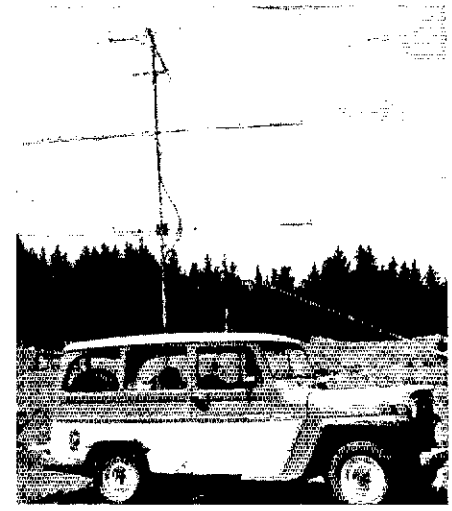
When band conditions are only average at best

*Assistant Communications Manager, ARRL

Top Ten

Single Operator		*Multioperator*	
AA2Z/3	76,356	W2SZ/1	298,560
K1PXE	50,130	W3BBS	203,145
K2CBA	44,932	W1VD	161,536
WA1UQC	38,802	K1TR	173,476
K1EM	33,820	K3YTL	119,416
KA1APR	30,723	W1TKZ	108,300
WA2TEO	30,388	WA2SNA	108,226
KA2BTD	29,852	W8VP	103,621
K3HP	29,700	W1QK	84,800
W2EIF	28,440	N2SB	84,148

Are these guys nuts, or what? The W4BFB crew took their traveling road show on a 22-hour round trip to Woodall Mountain in Mississippi. Operators (l-r) included N4VC, AA4ZZ, WD4ABZ, KU4V, WA4VCC and KS4S.



WD5CAW and K9IKI lugged their gear up a New Mexico mountain in this 1961 Jeep. *(K9IKI photo)*

Division Leaders

Single Operator		*Division*	*Multioperator*	
Call	*Score*		*Call*	*Score*
AA2Z/3	76,356†	Atlantic	W3BBS	203,145
VE3ASO	21,868	Canadian	VE3VHF	31,570
W3EP/9	8925	Central	K9MRI	30,400
WØXG	8924	Dakota	KØALL	3914
N4JS/5	14,400	Delta	W4BFB/5	40,107
WB8BKC	19,825	Great Lakes	W8VP	103,621
K2CBA	44,932	Hudson	WA2SNA	108,226
NØLL	10,600	Midwest	W9UD/Ø	80,004†
K1PXE	50,130	New England	W2SZ/1	298,560
W7ZSL	5852	Northwestern	N7NW	21,462
N6CT	12,150	Pacific	K6GSS	46,400
WD4GXN	17,536	Roanoke	K3LNZ/8	83,106
W5FF	8140	Rocky Mountain	AAØL	34,950
W4ODW	18,666	Southeastern	WD4MBK	65,700
WB6DTA	14,577	Southwestern	WA7LYI	37,468
KC5GB	21,376	West Gulf	N5KW	61,288
ZF2EW	8028	DX	XE2XW	7095

†Indicates new division record

Top Single Band Scores

50 MHz		144 MHz		220 MHz		432 MHz		1296 MHz	
WA1OUB	16,250	K1KA	13,680	AA2Z/3	1740	K2RIW	6116	W2VC	1155
WB8IGY	16,000	K1FO	7946	K1PXE	1394	K1PXE	3916	K1PXE	891
KC5GB	13,805	WB2KEC	7392	K9HMB	1344	W2VC	3400	WA3JUF	780
AF1T	12,556	N2BJ	5334	W9SR	1190	N1BC	3384	N6CA	594
KA1APR	10,841	AA2Z/3	5313	K8DIO	1122	KA2BTD	2844	K8WW	570
WD4MGB	10,692	WA2TEO	5208	W2EIF	1014	AA2Z/3	2516	AF1T	459
WB5DSH	10,458	W1QXX	5060	W3BBS†	5512	N2BMN	2484	W3BBS†	1800
AA2Z/3	9945	W0RLI	4968	W2SZ/1†	4600	W3IP	2108	W2SZ/1†	1710
W3ZR	9328	K3HP	4374	W1VD†	4320	W4DFK	2070	K3YTL†	1014
CY1YX	8569	KA2BTD	4368			W2TC	2040		
W1VD†	23,100	W2SZ/1†	16,392			W3BBS†	8262		
N5KW†	22,997	W3BBS†	14,160			W2SZ/1†	8256		
W2SZ/1†	21,216	K1TR/1†	13,725			W1VD†	7682		

†denotes multioperator stations

Multiplier Leaders

Single Operator

50 MHz	144 MHz	220 MHz	432 MHz	1296 MHz
WA1OUB — 50	K1FO — 29	K1PXE — 17	K1PXE — 22	K1PXE — 11
K2CBA — 40	KA2BTD — 24	W2EIF — 13	K2RIW — 22	W2VC — 11
	WA2TEO	K2CBA		
AA2Z/3 — 45	WA3FYJ — 23	AA2Z/3 — 15	AA2Z/3 — 17	WA3JUF — 10
			W3IP	
WB8IGY — 50	WD4GXN — 24	WD4DGF — 11	K4CAW — 15	W3IY/4 — 5
			W4DFK	
			WD4GXN	
KC5GB — 55	W5RCI — 12	W5RCI — 8	W5RCI — 9	WA5VJB — 1
N6CT — 31	N6AMG — 13	WB6DTA — 6	AJ6T — 7	N6CA — 9
K1SC/7 — 30	WA1JXN — 20	(7 stns) — 2	WB9AJZ — 5	(4 stns) — 2
WB8BKC — 32	WB8DRR — 20	K8DIO — 17	K8WW — 16	K8WW — 10
W3EP/9 — 33	WB9MSV — 23	W9SR — 17	W8UT/9 — 6	—
N0LL — 41	WB0SWD — 15	K0DAS — 8	K0DAS — 10	—
		N0CIH		
CY1YX — 41	VE3ASO — 23	VE3BFM — 8	VE3FN — 12	VE3BFM — 2

Multioperator

50 MHz	144 MHz	220 MHz	432 MHz	1296 MHz
W1VD — 50	K1TR — 25	W1VD — 24	W2SZ/1 — 24	W2SZ/1 — 15
	W1VD			
N2SB — 42	K2NE — 23	N2SB — 19	WA2SNA — 21	K2BWR — 10
	N2SB	WA2SNA		
W3BBS — 42	W3BBS — 30	W3BBS — 26	W3BBS — 27	W3BBS — 15
WD4MBK — 57	AB4L — 25	W4IY — 13	AB4L — 17	WD4MBK — 4
N5KW — 61	N5DL — 17	N5DL — 9	N5DL — 11	N5KW — 2
W6XJ — 33	K6GSS — 11	K6GSS — 11	W6XJ — 15	WB6AAG — 6
	K6HXW			
	W6XJ			
WA7LYI — 41	WA7LYI — 9	WA7LYI — 6	KA7CVV — 7	WA7LYI — 5
			WA7LYI	
WD8ISK — 52	W8VP — 32	W8VP — 23	W8VP — 22	W8VP — 6
WB8HUC — 40	K9MRI — 28	K9MRI — 10	K9MRI — 8	K9IMM — 1
AA0L — 54	W9UD/0 — 25	W9UD/0 — 14	W9UD/0 — 16	W9UD/0 — 4
W9UD/0				
VE3VHF — 33	VE3LNX — 20	VE3LNX — 12	VE3VHF — 12	VE3LNX — 4
				VE3VHF

and activity is down, what is the key to a winning operation? One of the most important qualities an operator can possess is persistence. This is true of all contests to some degree, but it is most important in a contest with a limited number of stations to work. When the QSO rates on Sunday are down to five per hour, the successful op will hang in there. While the others who found five contacts an hour too much to stomach are off sleeping or watching TV, the winning ops will be there slowly building their contact totals and even occasionally working a new multiplier. After all, 10 slow hours can produce 50 or so QSOs that a less-persistent op won't get.

The other thing a successful op can do when there isn't much to do is find new things to do. For example, Alaska is probably the closest thing to a vhf wasteland. Yet WL7ACY submitted a 161-QSO 6-meter single-band entry — filled with 160 JA contacts. W2SZ/1 added another microwave band this year and picked up four multipliers on 5.7 GHz.

EME is growing in popularity during the vhf contests. Single-op WA1JXN/7 and multiop AA0L used this mode to boost their 144-MHz section totals to 20 and 17, respectively — great totals from the boonies! K1FO got on 144 EME also and posted the top first-call-area section total for that band. Speaking of EME, we got single-band 432 logs from DL9KR and JA9BOH. Who did they work? Look at the 432 section totals for W6XJ and W3BBS for starters. There are ways of increasing the score when things aren't great. It's just a matter of identifying these ways and then doing them.

The rules changes adopted for this past June contest were generally well received. Most ops agreed that dropping the mandatory off-time was long overdue. Most of the big multiops and a few of the single ops took advantage of the new rule and operated 'round the clock. Generally, the new ending time was appreciated, although some stations expressed disappointment that the best opening of the weekend occurred just after the contest ended. The expanded multiplier scheme brought favorable comments. All four VE1/VO multipliers were active this year, including an expedition to New Brunswick by W1JR.

Although this June's vhf contest had its problems, it was still a great way to spend a weekend. Certificates will be in the mail by September 15. Are your ready for the September VHF QSO Party in a few weeks?

SOAPBOX

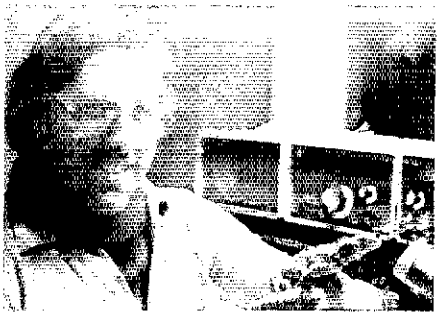
The homebrew 4CX250B amp dumped one power transformer Saturday with a shorted primary. The remaining power transformer shorted the secondary on Sunday and sent a 5-ft blast of "chapopote" and smoke with all the fury of "El Chichonal." The fuse, per Murphy's Law, protected itself and will be reused next year (XE2XW/W5XW). The last 19 minutes of the contest made the rest of the slow, sometimes boring 32 hours and 41 minutes all worthwhile. Just wish that the aurora had arrived sooner (WA1STO/W1VD). This was our trial run at contesting from a very famous vhf mountaintop location, Cadillac Mountain, near Bar Harbor, Maine. Cadillac Mountain is the highest point on the entire Atlantic seacoast in all of North and Central America; at over 1500 feet directly above the ocean, and on an island, it is a superb site. We only operated for 4-1/2 hours and made 130 QSOs using low-powered solid-state gear and simple antennas, but could tell that the site is terrific and we're looking forward to returning in June '84 for an all-out effort...we did manage a few 600-mile contacts on 220 and 432 MHz, using only 80 W to single Yagi antennas...If you've never been to Cadillac Mountain, you cannot imagine what a really clear sky looks like. Breaking down our antennas at 2 A.M. became a major effort because we were so distracted by the dazzling array of stars overhead. Mother Nature put on quite a show, and we view constellations that we had only heard about previously, and are *never* visible in the NY/NJ area (WA2VUN/1). Our operation this contest was from the summit of Green Mountain, west of Boulder, Colorado, at an elevation of 8144 feet. No roads exist to the summit, so all equipment was backpacked up to the site (W1XE/W0IA). I always thought that Rhode Island was a "rare" Section, so I decided to be "big DX" and operate from my sailboat in East Greenwich Harbor in Narragansett Bay. Well, others had similar ideas. I found out that 10 W to a dipole swinging on an anchor does not compare to 150 W to an F9FT Yagi. I was buried, or shall we say, drowned (W1JP). This was the best aurora I've caught in six years of vhf work. I never worked east of PA before on aurora. The signals were *so* loud (W0RT). Our best vhf contest yet. Addition of 432 and 10 GHz kept things interesting. Good 6-meter openings really livened things up. Would prefer to exchange grid squares in all future vhf/uhf contests. We hope to have a 4-ft dish at 200-plus feet for the uhf contest on 10 GHz. In Montreal, there are six or seven people on 10 GHz (VE2CUA). First perfect weekend in over 13 weeks (hot and sunny), and I contest. Thanks to my very understanding family (WA2ABN). As for contesting out West, it's the pits! I'd be ashamed to turn in a score like this in Virginia, but out here (UT) things are different. Mountains, long distances and a paucity of vhfers make the contest a definite challenge (WA4GPM. . .260 QSOs and 15 bug bites for a whopping rate of 17.3 QSOs per bite (QPB?)...you know things aren't going well when the chair that you are using collapses midway through the contest (WB1GQR). The last three QSOs of the contest added almost 370 points, or 16%, of the final score. I think that the contest is won or lost on Sunday afternoon (VE7ASI). You cannot imagine how difficult it is to explain to a DX station during a cw contact via moonbounce what that station is supposed to send for an exchange. Actually, they must think we're crazy since we already know what country they are in from their call. I actually had one station start again and do the contact right from the beginning. He obviously thought that if I kept asking for his country that I could not possibly have his call correct...Of course, it would be more sensible to use some internationally understood exchange if the contest is to continue to be open to DX stations. Until then, however, I suggest that the rules be changed to permit DX stations to give a signal report instead of their country name (WA1JXN). We didn't have any objections before the contest about the earlier ending time, but if you are going to end the contest at 11 P.M., why did you have to schedule that beautiful aurora to start at 10:30? It sure caused quite a rush at the end, but it would have been nice if we could have had more time to work it. On the other hand, if the contest had not ended early, we would not have had the chance to go outside and actually see the aurora, which was quite a sight as viewed from Mt. Equinox (W1TKZ). Finally, at long last, I worked Arizona on 144 MHz. And he answered *my CQ* (K5MAT)! My 4-element beam on 6 meters was a 6-element beam on 6 meters until the tornado hit (KC5GB).

FEEDBACK

Please refer to Sept. 1982 *QST*, page 77, for the following corrections. In the multiplier leader box for single-op stations, WA2GSX should be listed as the 144-MHz second call area leader, with 28 sections; W2VC should be listed as the 1296-MHz second call area leader, with 11 sections; and W0RWH should be listed as the 144-MHz tenth call area leader, with 20 sections. In New Mexico, the second-place single op is really W5RKS, not WB5RKS. In Michigan, the call sign of the top multiop should read *WD8MJQ*. In Washington, add WA6NHB/7 with a line score of 3097-163-19-AB to the single op list; we found his log with the Field Day entries.

W9UD and friends traveled to Missouri this year to set a new all-time Midwest Division record.

KC5GB took full advantage of the good single-hop E_s openings to net 55 6-meter multipliers and win the single-op West Gulf Division title.



WA7PVE and his pal Skeksis the Spiny Tailed Iguana teamed up for 70 QSOs from Washington State. Quite a pair, huh?

SCORES

Scores are listed by ARRL section. Within each section, single-operator, multiband scores are listed first, then single-operator, single-band scores starting with the lowest frequency band, and then multioperator scores. From left to right, each line score lists: call, score, number of QSOs, number of multipliers, bands operated (A — 50 MHz; B — 144 MHz; C — 220 MHz; D — 432 MHz; E — 1296 MHz; F — 2.3 GHz; G — 3.4 GHz; H — 5.7 GHz; I — 10 GHz; J — 24 GHz; K — 48 GHz; L — light). The call sign of the top single-op station in each section is indicated in bold-face type. The single-band award winners are indicated by **bold-face** type for the letter(s) denoting the band(s) won. For example, in Connecticut, K1PXE is the single-operator section award winner, and he also had the highest single-band scores on 220, 432 and 1296-and-up MHz. WA1UQC had the top 50-MHz score, and K1FO had the top 144-MHz score. W1VD is the top-scoring Connecticut multiop.

1

Connecticut

K1PXE 50,130- 373- 90- ABCDE
WA1UQC 48,802- 371- 87- ABCDE
K1EM 33,820- 383- 76- ABCD
K1GX 7514- 221- 34- AB
W1FAJ 6885- 117- 45- ABCD
KA1BXB 4736- 124- 37- BCDE
WA1HYN 4120- 100- 26- BCD
WA1ZNI 4120- 104- 40- AB
K8CH 2492- 66- 25- ABD
WA1GTP 1106- 48- 21- AB
W1AW (WB2TRN, opr.)
192- 14- 8- BD
K1FO 7946- 274- 25- B
W1FXS 2560- 160- 16- B
W1CNU 900- 60- 15- B
AB1U 450- 45- 10- B
N1CLW 70- 14- 5- B
KB6WZ 45- 15- 3- B
W1VD (+K1JX, KA1GD, WA1S(D))
181,536-1203-124- ABCDI
W1QK (+K1UOH, KA1s KCB, UC, FJR, TD, W1s NG, FV, WA1s FMA, WXV, WB1s CVN, EZL)
84,800- 700-100- ABCDEI

Eastern Massachusetts

AD1C 22,685- 254- 65- ABCDE
W1GXT 16,728- 212- 56- ABCDE
WB1FKF 13,255- 164- 55- ABCDE
KA1DHO 8550- 174- 45- ABCD
WA1JOF 733- 161- 17- BDF
W1FM 5215- 142- 35- ABD
W1JOT 530- 18- 10- BCDE
KA1AMR 38- 11- 8- AB
WA1AYS 8576- 208- 41- A
K1DAT 1071- 63- 17- A
W1QXX 5060- 230- 22- B
WØRLI 4968- 207- 24- B
WA1YKN 1751- 103- 17- B
KA1EVG 1326- 102- 13- B
N1CKM 54- 9- 6- B
N1BLC (+N1BCG)
12,098- 250- 56- ABD
W1XM (W1XG, WA4TTG, oprs.)
6,79- 80- 49- ACDF

Maine

W1JR/1 2830- 65- 34- ABCDE
W3HQT/1 860- 30- 19- BE
W1PLX 600- 50- 16- B
K1BZ 209- 19- 11- B
K1WHS (+K1s LL, ANS, WB1FGW)
39,076- 400- 77- ABCDE
WA2VUN (+K1ZB, WB2WIK)
7380- 128- 45- ABCD

New Hampshire

W1RJ 22,496- 219- 75- ABCDE
AE1T 17,816- 309- 52- AB
AC1J 10,080- 197- 45- ABCD
N1BC 4600- 106- 23- BD
WA1CDR 1752- 73- 24- AB
WA1OUB 16,250- 325- 50- A
K1KA 13,680- 570- 24- B
W1JSM 2100- 100- 21- B
W1HNZ 1330- 95- 14- B
N1CR 80- 16- 5- B

Rhode Island

W1AJR 4012- 118- 34- AB
K1DT 243- 18- 9- BCD
W1IP 216- 24- 9- B
K1DS (+KA1FRL, RMX, W1s IL, SO, N4HY)
40,086- 353- 69- ABCDE

Vermont

WB1GQR 11,792- 260- 44- ABCE
WA1TBV 756- 42- 18- A
W1TKZ (K1s TK, UR, N1s ADT, CGE, CPF, W1s GCI, OOP, WA1POY, N2AWG, oprs.)
108,300- 763-114- ABCDEFI
K1TR (+KA1BAQ, KF1R, WA1FCD, WB1s EDA, ESV)
7106- 182- 38- ABC

Western Massachusetts

KA1APR 30,723- 336- 77- ABCD
AC1I 14,336- 207- 56- ABCD
N1XZ 7686- 149- 42- ABCD
W1RIL 7110- 181- 30- BD
WA1UOL 338- 26- 13- AB
W1NY (W1FF, opr.)
3136- 112- 28- A
W2SZ/1 (AG1M, K1DH, KA1s DZV, ZE, WA1s UGK, AAM, WB1s GBH, HIH, KO2X, K2s TR, UF, KA2QHF, KW2T, N2ABO, WA2s AAU, SPL, WB2s ILR, PKO, AE4L, NK4FM, CA8USA, oprs.)
298,560-1464-160- ABCDEFGHIJ
K1TR/1 (+K1s BA, EA, KA1R, N1s AFQ, BEM, RC, WB1s ONB, PBU, VEJ, K3WM)
173,476-1153-126- ABCDEI

2

Eastern New York

K2CBA (WB2ONE, opr.)
44,932- 402- 94- ABCDE
WA2TEO 30,388- 375- 71- ABCDEF
N2BJ 17,172- 306- 54- BD
W2IP 1008- 54- 16- BD
WA2LEP 10- 3- 2- BL
K2OE 5906- 186- 31- B
N2AWK (+AB2I, AB2J, K2DPL, WA2s ENM, IIF, WB2s DVV, FHR, KMY)
81,140- 705- 95- ABCDE
KA2Q (K2AGA, W2s GXU, TJO, WA2s ADV, NKP, WB2OPL, oprs.)
800- 50- 16- B

N.Y.C. & Long Island

K2OVS 11,221- 200- 49- ABD
N2BAR 6168- 188- 36- AB
WA2SLY 6534- 198- 33- AB
K3JNZ 3861- 122- 27- ABD
WA2EUS 1818- 80- 18- BDI
K2MUB 3780- 105- 36- A
WB2KEC 7392- 336- 22- B
WB2ICQ (WB2RNT, opr.)
3171- 151- 21- B
K62N 2360- 118- 20- B
KA2KPP 900- 75- 12- B
K2RIW 6116- 139- 22- D
K2QQ (+WB2PSU)
1768- 104- 17- B

Northern New Jersey

KA2BTD 24,852- 353- 68- ABCD
WB2OQQ 27,537- 374- 67- ABCDE
WB2WIH 26,532- 318- 66- ABCD
N2BMN 27,320- 294- 60- ABCD
WA2CWA 20,473- 347- 59- AB
W2TC 10,008- 218- 36- BD
W2VC 5525- 170- 31- DE
WB2IMD 7854- 187- 42- AB
WA2IOI 7106- 181- 38- ABD
WA2CEZ 6120- 176- 30- AD
N2BMP 4640- 160- 29- AB
K4BNC 3927- 119- 33- AB
WB2CUT 3870- 215- 18- B
WA2ACM 1560- 104- 15- B
KR2G 1515- 101- 15- B
KA2HZA 24- 12- 2- B
WA2SNA (K2s BJG, TZL, KA2s IVS, NDS, OVR, N2s AAZ, CIL, CTF, W2s RS, WFF, WA2s JSW, PIX, OPR, WB2s ANK, RFB, oprs.)
108,226- 806-106- ABCDE
N2BOW (+N2CEI, KA2MKO, WB2WCM)
54,624- 475- 84- ABCDEI
K2NI (+K2PM, KA2s RBF, BLW, PSL, WB2s EF, HZ, KR2T, KU2C, W2GD, WB2NQV)
45,075- 496- 75- ABCDE
WB2UNA (+N2CYM)
18,880- 237- 39- ABCDE
WA2EKB (+WA2PTZ, WB2QBI)
13,410- 288- 45- ABCD

Southern New Jersey

W2EIF 28,440- 292- 76- ABCDE
KS2I 23,374- 379- 67- ABD
W2HRW 13,840- 263- 50- ABD
WA2KOK 9016- 169- 46- ABCD
K2JF 7770- 193- 37- ABC
N2BYE 4857- 130- 29- ABC
Z1TD 2028- 71- 26- ABD
WA2UNK 5086- 227- 18- B
N2CRK 1316- 94- 14- B
KB2GW 966- 69- 14- B
WA2DFH 420- 42- 10- B
N2SB (+KA2NYF, WB2s NPE, RVX)
54,148- 558-109- ABCDE
K2NE (+KA2s COX, RRK, KB2s ANJ, FFS, UVB, KF3I, WA3RKM)
47,163- 520- 79- ABD
K2RWR (+K2ZKJ)
36,566- 266- 94- ABCDE
N2AUZ (+KS2U, N2CIW, N2s ADZ, JAL, WA2s LLN, WVJ, WB2s CWQ, STV)
26,609- 366- 59- ABCD
WA2JSG (+WA2ZMN)
16,121- 292- 49- ABCD

Western New York

K2LK 11,220- 161- 55- ABCDE
WB2KCW 9290- 169- 55- ABD
K2CZF 9164- 146- 56- ABCD
K2OS 7778- 179- 32- AB
K2MDY 5577- 143- 39- AB
WA2ABN 5456- 139- 31- BD
KC2AW 192- 24- 8- AB
N2BHQ 1450- 58- 25- A
W2UNS 3565- 155- 23- B
K2PQI 1066- 82- 13- B
KC2IQ 187- 66- 11- B
W2WLL 490- 35- 14- B
W2AWF 253- 23- 11- B
WB2YTZ 64- 12- 6- B
N2MPK 30- 15- 2- D
W2RCX (KA2OQZ, WA2TTM, WB2s IFY, UBH, WA1PXH, oprs.)
16,896- 231- 64- ABCD
K2HK (KA2s KGK, MGG, W2UCZ, oprs.)
6720- 151- 40- ABD
K5IR (+KC2FY, WA2OEV)
3748- 115- 28- ABD

3

Delaware

KA0HE/3 12,693- 306- 61- ABCD
K3CNH 1798- 52- 24- AB
AC3T (+K3WJV, KA3s K, KZL, N3s SYE, AHS, UPY)
25,720- 545- 40- ABCD

Eastern Pennsylvania

AA2Z/3 76,356- 617-101- ABCDE
K3HP 27,700- 404- 60- ABCD
WB3JYO 20,399- 315- 55- ABCD
K3TUR 13,908- 223- 57- ABD
KB3NO 7511- 214- 29- BCD
W3CL 3016- 79- 29- ABCD
N3EI 4004- 182- 22- B
WA3DNM 3740- 187- 20- B
K3SY 3192- 152- 21- B
KY3M 1222- 94- 13- B
WB2BJH/3 924- 66- 14- B
WB2MBM/3 228- 38- 6- B
KA3EJG 6- 6- 1- B
WA3TUE 780- 26- 10- E
W3BBS (K3s II, RLM, RYE, N3s AAX, CCW, W3GPY, WA3s BRW, IAO, KPP, LBI, PUL, UCP, WAK, WB2s IJL, ZEH, WB3s KFI, ESQ, ESS, JZE, oprs.)
203,145-1054-145- ABCDEFI
K3YTL (K3MKZ, KA3s CWR, EEO, ILE, N3s CXB, DAP, OAK, W3DZH, WA3s JWP, TON, WB3s CAT, FAA, FKQ, FYT, oprs.)
119,416- 792-118- ABCDE
W1AD (K3HEC, N3s BCZ, BNA, W3s CWE, IPX, OLV, WA3s HMK, PHL, WB3BNB, oprs.)
40,964- 464- 77- ABD
WB3LNZ (+KC2TJ, KB3s IB, ZS, N3ADC)
25,080- 336- 66- ABCD
W3LP (W3s GFN, JUZ, WA3CUO, oprs.)
20,724- 255- 66- ABCD
W3HZU (K3s GU, HPL, N3s ZIA, ADO, W3SSL, WB3AWI, oprs.)
5934- 129- 46- ABD
K3NYX (+KA3IQ, K3LT, W3s IVG, TI)
1445- 85- 17- B

Maryland

W3IP 25,047- 147- 64- ABCDE
K3AKR 6292- 110- 46- ABCD
W3IPI 2700- 100- 27- AB
N3API 2444- 94- 26- AB
W3MSN 308- 23- 11- ABCD
K1BC 6295- 137- 45- A
WA3FAE 3097- 163- 19- B
N3CDA 1344- 79- 16- B
N3CDB 51- 17- 3- B
K3ONW (+K3s ARN, EDG, W3CJK, WB3s FWF, GJK)
40,824- 578- 68- ABCDE

Western Pennsylvania

W3CSA 3432- 104- 33- AB
W3KJM 416- 26- 16- A
WA3FYJ 3243- 141- 23- B
WB3EUM 220- 22- 10- B
W3GNR/3 (+K1LK, KA3s AHL, DEO, DWR, WA3s BUX, FTC, TRV, WB3KKX)
53,663- 574-103- ABCDE
K2SPO/3 (+AF2K, KA2s FND, FNO, KS2Z)
8772- 158- 51- ABCD
W3EE (+K3s EAS, FGW)
3078- 105- 27- ABD

4

Alabama

WA4CQG 16,934- 263- 59- ABCD
N4GEWA 14,701- 227- 61- ABD
W5WZF 2232- 62- 36- AB
WA4VUG 58- 17- 4- B
KA4AOK (+KA4GEZ)
1794- 78- 23- A

Georgia

NA4I 6396- 152- 41- ABD
AK4I 4604- 97- 37- AB
KA4KKF 2610- 89- 29- ABC
W4ISS 854- 61- 14- BD
N24Q 238- 27- 7- BD
WB4SLM 6475- 185- 35- A
KE4WJ 1664- 64- 26- A
WD4MBK (+AA4GA, N3AHI, N4HSH, W4VHH, WA4OTH, WB4NMA, WB8DTM, WD4ILS)
65,700- 576-100- ABCDE
K4CKS (+WD4JLI)
15,045- 250- 59- ABC

Kentucky

KC4EG 15,870- 190- 69- ABCD

- WB4IIXY 10,089- 155- 57- ABCD
- KF4ST 1180- 59- 20- A
- N4AK 3040- 152- 20- B
- N4ELQ (+KA4s TAY, TET, NO4R) 9592- 199- 44- ABD

North Carolina

- K4CAW 4480- 118- 28- BD
- K2CJP/4 1633- 64- 23- ABD
- WD4ODS 920- 46- 20- AB
- WA4VDS 1118- 86- 13- B
- KA4VUB 328- 41- 8- B
- KA4NMA 100- 25- 4- B
- N4YN (+KA4s, TDT, ZBX, W1GFM, WA4QCO, WC4Z) 17,110- 265- 59- ABCD
- KA4WZQ/4 (+K4YBC, KA4HKK, N4CYG, WA4s NOF, WZP, WD4CQU) 14,248- 244- 52- ABCD
- WB4TQD (+NT4T) 2375- 85- 25- ABCD

Northern Florida

- W4ODW 18,666- 378- 61- ABCDE
- W4CSS 3815- 109- 35- AB
- K4KJP 360- 23- 12- ADE
- W4WHK 6201- 159- 39- A
- W4HJW 2700- 90- 30- A
- W4ZBB (N4s DXS, HZH, oprs.) 1408- 64- 22- AB

South Carolina

- N4CNN 7548- 135- 51- ABCD
- N4DT 5280- 121- 40- ABCD
- WA4LDU 5040- 107- 42- ABD
- N84S 836- 76- 11- B
- K4JLA (multiop) 5808- 176- 33- AB

Southern Florida

- W3ZR 11,178- 243- 46- AB
- W4WSA 396- 57- 6- BDE
- WA4OFS 235- 38- 5- BD
- WB8ICY 16,000- 370- 50- A
- WD4MCB 10,692- 243- 44- A
- WB2QLP/4 3915- 135- 29- A
- W4OD 1587- 69- 23- A
- K4KUZ 299- 23- 13- A
- WB4CRT (+K9IJ, WB4OOJ) 9030- 201- 43- ABDE

Tennessee

- WD4DGF 6384- 136- 42- ABC
- WA4QYK 5085- 88- 45- ABCDE
- KE4HX 2697- 93- 29- AB
- AD4E 605- 35- 23- A
- WA4PTZ (+KA4PWQ, KC4TS, WA4s LOH, SJB, WUQ, WB4EPG, WD4JTN) 4173- 96- 39- ABD

Virginia

- WD4GXN 17,536- 235- 64- ABD
- N4MM 7740- 172- 45- AB
- N4RA 6600- 149- 40- ABD
- W3IY/4 4620- 76- 28- CDE
- K4MSG 2340- 117- 20- B
- W4UEK 2070- 69- 15- D
- W4IY (K4HWG, KB8YH, KØRI, KA4CKI, N4CD, NØKV, WA7EPP, WD4SKQ, oprs.) 43,587- 614- 87- ABCDE
- AB4L (+KA4NZD, N4s AZC, IF, W4AAH, WA4s IVF, LPR, PCI, ZRP, WB4s SSS, WTC, YJC, WD4s BWL, DUT, DUU) 43,492- 469- 83- ABDEI
- W4DO (+AA4D, KA4LXS, KB3KJ, WA4MTP) 18,386- 278- 58- ABD
- W4NFR (+KA4MRS, N4GRH, NZ4N, W4NHJ) 7038- 153- 46- AB

5

Arkansas

- WA5FDF 7236- 134- 54- AB
- N5DL (+K5LG, KD5WD, WA5OOE, WD5s CAN, CAP, JWA) 31,457- 333- 83- ABCD
- K5GO (+KFØM, WAØVJF, WBØUKP) 11,660- 203- 53- ABD

Louisiana

- W5UKQ 990- 66- 11- BD
- N5JM 4795- 137- 35- A
- W5QEP 3990- 105- 38- A
- W5FYZ 385- 55- 7- B
- WB5NIF (+WA5YOU) 13,340- 220- 58- ABCD

Mississippi

- N4JS/5 14,400- 222- 60- ABCDE
- W5RCI 3480- 87- 29- BCD
- W5UCY 2363- 67- 33- ABD
- W4BFB/5 (AA4ZZ, KS4S, KU4V, N4VC, WA4VCC, WD4ABZ, oprs.) 40,107- 425- 87- ABCD
- WA5WDX (+N5FKH) 5425- 152- 35- ABD

New Mexico

- W5FF 8140- 183- 44- ABC
- W5RKS 1694- 74- 22- ABD
- K5MAT 266- 30- 7- ABC
- WD5CAW (+K9JKI/5) 1520- 70- 20- ABC

Northern Texas

- K5GMX 10,638- 197- 54- AB
- WB5KTC 7298- 176- 41- ABD
- WA5VJB 5096- 137- 28- ABCDEI
- W5ETG 3128- 90- 34- ABI
- K5DHU 1846- 58- 26- ABD
- WB8TGY/5 144- 18- 8- A

Oklahoma

- WB5OSB 18,144- 321- 54- ABD
- WD5AGO 8775- 204- 39- ABD
- K5WE 6864- 142- 44- ABD
- W5EJK (K5SW, opr.) 1932- 70- 21- BCD
- K7CW/5 1515- 67- 15- BD
- N5DUB 1488- 62- 24- A
- WD5FEH 800- 100- 8- B
- WB5GZQ 750- 75- 10- B
- K5KW (+K5CM, N5CG, WØRRY) 61,788- 601- 94- ABCDE
- W5NZS (+KJ5Q) 8415- 167- 45- ABCD
- DB7SQ/W5 (+KD5BQ, WB5LMJ) 2565- 95- 27- AB

Southern Texas

- KC5GB 21,376- 325- 64- ABD
- KC2IX/5 1008- 56- 18- AB
- KA5CAW 4095- 105- 39- A
- WA5TYX 3366- 99- 34- A
- N5FUE 1248- 52- 24- A
- K5LZO (+WB5RUS, WBØNFY) 21,186- 319- 66- ABCD
- W5UWB (+WA5TBE) 16,576- 285- 56- ABD

6

East Bay

- N6AMG 10,857- 178- 47- ABCDE
- WD6CHL 9920- 233- 32- ABCDE
- K2CMY 650- 35- 13- ABDF
- WA6LHD 1034- 94- 11- B
- WB5MAC/6 42- 14- 3- B

Los Angeles

- WB6DTA 14,577- 267- 43- ABCDE
- NN6Z 3735- 183- 15- ABCD
- W6PFE 2904- 106- 24- ABC
- K16P 1680- 61- 20- ABCD
- WA6HXM 369- 41- 9- B
- N6CA 594- 22- 9- E
- WB6AAG (+WB6s JCD, PZJ) 11,835- 311- 45- ABCDE
- K68PC (KA6YSY, WA6HXD, WB6YVP, oprs.) 6630- 191- 30- ABC
- WD6FIC (+WA6ANL) 1215- 60- 15- ABCD

Orange

- K6LMM 8976- 205- 33- ABCDE
- K6PVS 2916- 78- 27- ABDE

Sacramento Valley

- NR6A 2144- 115- 16- ABCD
- K6AAW 162- 27- 6- B

San Diego

- KA6FTP 3275- 124- 25- ABC
- W6TIK 420- 42- 10- A
- W6XJ (+K6JYO, KD6R, WB6INV, WB6OKK) 34,408- 407- 68- ABCDE

San Francisco

- N6CT 12,150- 265- 45- ABC
- WA8LL 2716- 87- 28- ABD
- W6MSN 2646- 89- 27- ABD
- NI6E 864- 53- 16- AD
- WB9LOZ 384- 44- 6- ABC
- WAØJRB 42- 14- 3- B

San Joaquin Valley

- WA6SLF 182- 24- 7- BC
- KE6NS (+KF6GY) 4888- 188- 26- AB
- WA6BAI (KD6WW, WB6VGL, WD6s CNV, DET, oprs.) 2604- 113- 21- ABCD

Santa Barbara

- W6RIC 1530- 78- 18- ABC
- WA6IJZ 2331- 111- 21- A
- KD6JY 126- 18- 7- B
- KA6VVO 96- 16- 6- B
- AA6Q/6 8- 4- 2- B
- K6MEP (K6VMN, KH6N, N6BIH, WA6s DJS, FPK, oprs.) 23,359- 387- 47- ABCDEI
- K6HXW (+KA6JOE, W6OAL, WA6OYS, WB6s HJW, YQN, WD6EVS) 22,380- 312- 60- ABCDEFI
- WA6RKE (K6YZR, KJ6R, N6DKV, W6s HDO, MSG, WB6DPG, oprs.) 696- 55- 12- BD

Santa Clara Valley

- K9TCT/6 2496- 104- 26- AB
- K6FV 1314- 62- 18- ABD
- KA6ING 1273- 67- 19- AB
- KD6PY 1040- 52- 20- A
- N6RZ 790- 79- 10- B
- N6MG 272- 34- 8- B
- WA6OCV 153- 17- 9- B
- AJ6T 504- 36- 7- D
- K6GSS (+W6YKM, WA6s AZP, HCI, VEF, WB6s KBZ, YIY) 46,400- 613- 58- ABCDE

7

Alaska

- KL7WE 45- 14- 3- ABC
- KL7OX 6- 3- 2- AB
- WL7ACY 322- 161- 2- A

Arizona

- K2DNR/7 5322- 151- 22- ABCD
- K1SC/7 4470- 149- 30- A
- WB7FDQ 3225- 129- 25- A
- WB5TCO 9- 3- 1- E
- WA7LYI (+K7OO, WA6JTM) 37,468- 482- 68- ABCDE

Idaho

- N7EIJ 2438- 106- 23- AB
- KAØDYU 432- 36- 12- A

Montana

- WA1JXN 600- 30- 20- B
- KB7Q 45- 9- 5- B

Nevada

- K3ZAP/7 1938- 83- 19- ABCD
- WB9AJZ/7 836- 66- 11- BD
- KA7CVV (+KB7BZ, N7BPA, WA7JDD) 14,256- 259- 44- ABCDE

Oregon

- N7DB 5796- 179- 28- ABCD
- W7TYR 3750- 102- 25- ABCDEFGHI
- K7HSJ 3340- 125- 20- ABCDE
- W7UDM 3120- 127- 20- ABCDE
- W7YTN 120- 23- 4- BD
- K7AUO (K7RUN, NA7P, W7s ADV, BKN, WB7s REC, UNU, oprs.) 10,075- 258- 31- ABCDEFGHIK

Utah

- N7BHC 1120- 62- 16- ABCD
- WØETT/7 1500- 75- 20- A
- K7SOD 55- 11- 5- A
- WA4GPN 22- 11- 2- B

Washington

- W7ZSL 5852- 349- 22- ABCD
- W7UGK 2346- 129- 17- ABC
- KK7B 678- 33- 12- ABCDEFGI
- W7ERH 803- 60- 11- ABCD
- WA7PVE 770- 70- 11- AB
- W7FI 4128- 172- 24- A
- N7NW (+K7ND, N7AMX, W7YOZ, WA6NHB, WB7DTI) 21,462- 439- 42- ABCDEFGI
- WA3RMX/7 (+W7VRM) 3528- 93- 24- ABCDEFGHI
- WB7PEK (+KA7ICT) 3444- 145- 21- ABCD

Wyoming

- W7LFL 640- 40- 16- AB
- W7XF 1826- 83- 22- A
- KC7QY 960- 60- 16- A
- KA7GPN 72- 12- 6- A
- WB7RSM 180- 36- 5- B

8

Michigan

- WB8BKC 19,825- 237- 61- ABCDE
- WA8FTA 4482- 166- 27- AB
- WA8RUJ 1748- 92- 19- B
- KA8DDQ 414- 46- 9- B
- WB8KAY (+N8CKH, WA8ZVK) 21,842- 295- 67- ABCD

Ohio

- N8AXA/8 8550- 150- 50- ABCD
- K8WW 3370- 63- 26- DE
- N8CCC 1554- 67- 21- ABCD
- K8DW 1534- 42- 26- ABCDE
- WB8JHT 750- 50- 15- A
- WD8BTU 806- 62- 13- B
- W8LCY 451- 41- 11- B
- N8BJQ 216- 27- 8- B
- K8MR 35- 7- 5- B
- K8DIO 1122- 33- 17- C
- K8TL 16- 4- 2- D
- W8VP (K8AL, KA8s DFX, FRI, N8CQX, W5UA, W8s DJY, PR, TN, ULC, WA8s AHD, HTO, WB8s OQE, ERB, TRK, TSI, WB9YCX, oprs.) 103,621- 647-131- ABCDE
- WD8ISK (+KC8RD, N8s BPB, ECH, WA8s BBR, OGS) 45,848- 465- 88- ABCDE
- ND8JPP (+WA8ZWJ) 7840- 190- 35- ABCD
- K8CQA (+WB8s JAY, TEI) 4368- 156- 28- AB
- K8UZW (AB8Z, KA8s HOZ, HXX, KC8OU, oprs.) 1280- 62- 20- ABD

West Virginia

- KB8MH 147- 21- 7- A
- N8II 3420- 180- 19- B
- WB8DRR 1940- 97- 20- B
- WBAEC 720- 30- 12- D
- K3LNZ/8 (K2UOP, K3s DUA, LCH, WA3s EOQ, NZL, OYW, W4s NVW, PSJ, oprs.) 83,106- 599-114- ABCDE
- KBCC/8 (+KB8ZM) 270- 23- 10- ABDI

9

Illinois

- KC9OA 1100- 50- 22- AB
- K9PW 385- 32- 11- ABD
- WB9NSV 3933- 171- 23- B
- KA9HDZ 1044- 87- 12- B
- K9SB 783- 87- 9- B
- K9HMB 1344- 42- 16- C
- KA9DVY (+KA9HHC, KC9XM, KS9O, N9RZR, WA9RSD) 4000- 125- 32- AB

Indiana

- W3EP/9 8925- 175- 51- AB
- N9AZC 5280- 102- 44- ABC
- K9DZS 1525- 61- 25- AB
- W8UT/9 616- 33- 14- BD
- K9WZB 2916- 162- 18- B
- W9SR 1190- 35- 17- C
- K9MRI (+K9s SLQ, TVZ) 30,400- 366- 80- ABCD
- WB8HUC/9 (WB8s GEW, GEX, GEY, GFA, TCU, WD8BMC, oprs.) 16,225- 264- 59- ABD

Wisconsin

- WA9LZM 1375- 55- 25- A
- N9TD 768- 64- 12- B
- KA9HKL 392- 56- 7- B
- K9GDF 16- 8- 2- B
- N9DII 3- 3- 1- B
- K9IMM (+KB9NM, WA9s ETW, KGQ) 15,694- 241- 59- ABCDE
- N9CDT (+N9CIQ, WA9HCZ) 400- 50- 8- B

Ø

Colorado

- KØOST 2862- 101- 27- ABC
- WAØVSL 1365- 64- 21- ABD
- WA6ERB/Ø 135- 24- 5- BD
- W9MHL 2407- 83- 29- A
- KØADG 40- 8- 5- A
- AAØL (+ADØO, KB9YO, KXØO, KYØS, N9NC, NØs DV, EBM, WA2VMS) 34,950- 451- 75- ABCD
- NØBRI (+KØs CL, DU, NØDVL, WØKEA) 22,825- 393- 55- ABCD
- WØIA (W1XE, WA8ZIA, KAØDKM, KRØU, oprs.) 864- 67- 12- ABC

Iowa

- WBØZKC 8729- 190- 43- ABD
- KØDAS 6644- 119- 44- ABCD
- NØCIH 1199- 105- 11- BC
- N9BD/Ø 990- 55- 18- AB
- WBØUSU 660- 47- 12- ABD
- KØJJA 120- 15- 8- AB
- WDØFOY 1150- 50- 23- A
- WBØSWD 1680- 112- 15- B

Kansas

- NØLL 10,600- 200- 53- AB
- WØRT 9770- 189- 45- ABCD
- WBØISW 3948- 116- 28- ABCD
- AEØG 1953- 93- 21- AB
- KOØW 900- 50- 18- AB
- KØVUA 495- 44- 9- BD
- WAØCFQ 408- 34- 12- AB
- WØSP 240- 40- 6- B
- KØFPC 231- 33- 7- B

Minnesota

- WØXG 8924- 194- 46- AB
- WØRGU 3808- 101- 32- ABCD
- WØVB 1598- 82- 17- ABCD
- KCØP (+KAØCRO) 441- 48- 9- ABC

Missouri

- WAØNOK 8528- 172- 41- ABCD
- KØTLM 3910- 109- 34- ABC
- WØFY 2470- 89- 26- ABD
- WØJRP 2233- 77- 29- AB
- KØCB 1472- 62- 23- ABCD
- KAØNNO 1372- 49- 28- A
- W9UD/Ø (+AE9M, AKØP, K9s AKZ, CHZ, W9IP, WØOHU, WB9QPT, WD9FSA) 80,004- 610-113- ABCDE

Nebraska

- NØAJU 4224- 132- 32- AB
- KFØY 3810- 127- 30- AB
- KØUS 3255- 93- 35- AB
- KAØCRI 1728- 72- 24- AB
- NØUS (+KØNG, KAØs ABA, JGH, KCØs BM, OG, QR, WAØWRI, WBØs DGF, HXY) 8448- 174- 64- ABDEFG

North Dakota

- KØALL (+KNØA, KQØC) 3914- 99- 38- ABCD

VE

New Brunswick

- W1JR/CY1 1620- 55- 27- ABCD
- VE1AHM 24- 8- 3- B

Nova Scotia

- VE1UT 1386- 53- 27- BCD
- CY1YX 8569- 209- 41- A

Quebec

- VE2FUT 2607- 70- 33- ABC
- VE2KW 144- 16- 8- ABI
- VE2CUA (VE1BCZ, VE2s BAB, DUB, oprs.) 4440- 101- 40- ABCDI
- VE2ADE (+VE2EHN) 846- 94- 9- B

Ontario

- VE3ASO 21,868- 281- 71- ABD
- VE3FGU 11,628- 228- 51- AB
- VE3BFM 7176- 139- 39- ABCDE
- VE3FGN 7120- 168- 40- ABD
- VE3EYR 4278- 126- 31- ABD
- VE3FN 3937- 105- 31- BD
- VE3FDP 1243- 54- 23- AD
- VE3VHF (VE3s ABG, AIA, CRU, DSS, oprs.) 31,570- 336- 77- ABCDE
- VE3LNX (+VE3s ADJ, MCW, NSQ) 21,352- 248- 68- ABCDE
- VE3CKU/3 (+VE3BXI) 5508- 150- 36- ABCD

Saskatchewan

- VE5RA 286- 22- 13- A
- VE5XU 36- 9- 4- A

British Columbia

- VE7ASI 2244- 93- 22- ABCD
- VE7PRC/7 (VE7s BHM, DMT, oprs.) 1680- 120- 14- AB
- CY7NOR (VE7s ASY, EIE, EKT, oprs.) 100- 50- 2- B

DX

Bahamas

- C6ADV 1092- 52- 21- A

Fed. Rep. of Germany

- DL9KR 36- 6- 6- D

St. Pierre Is.

- FPØSM (K1TOL, opr.) 6990- 233- 30- A

Japan

- JA2DDN 15- 5- 1- A
- JA1RJU 9- 4- 2- A
- JA9BOH 18- 3- 1- D

Mexico

- XE1GE 54- 18- 3- A
- XE2XW (K5HVC, KA5DTN, W5XW, oprs.) 7095- 215- 33- A

Cayman Is.

- ZF2EW (K1FJM, opr.) 8028- 223- 36- A

Checklogs

KA1BJ, WA1LKJ/Ø, W3PGA, W3WFM, WB3HGU, WA4GZA, KA5LVP, W6LLP, WB6GVB, KO7IY, W7IDZ, W8CAP, W9YCV, KQØJ.

Results, First ARRL VHF/UHF Spring Sprints

"This grid system is the greatest thing that has happened to vhf since the 'Twoer' " — KA1ECL

By Mark J. Wilson,* AA2Z

Wow! Interest in the Spring Sprints last April and May soared above everyone's expectations. The first round of Sprints attracted 446 entries from 250 different stations. The first contest use of grid squares went smoothly. Almost everyone in the contests knew their grid-square locator, and the handful who didn't found out with a little push in the right direction. The combination of one band per evening and a short period made for a fun, relaxing contest.

The 144-MHz Sprint on April 18 brought us 184 entries, making this band by far the most popular. Although band conditions in all areas of the country can be best described as "average," there were plenty of stations to work. As usual, contact totals in the Northeast were the highest, but the Midwest produced outstanding multiplier totals. For example, compare W1VD's 194 QSOs in 25 squares with K9MRI's 119 QSOs in 44 squares. Fig. 1 shows what each station worked.

We received 52 entries for the April 26 220-MHz Sprint. Again, conditions were average. To generate a little more interest on the West Coast, K6GSS took his show on the road and traveled to two different grid squares.

*Assistant Communications Manager, ARRL

Watt's Happenin'?

Band (MHz)	Stations Using Less Than 20 W	Stations Using Less than 150 W	Stations Using More Than 150 W
50	20%	42%	38%
144	22%	29%	49%
220	33%	33%	35%
432	24%	50%	26%
1296	59%	41%	—

The 432-MHz Sprint on May 4 produced 77 entries. Multiplier totals from well-equipped stations in NLI, EPA and OH were all similar. Activity was good; as K2RIW noted, the 432 totals from the six-hour sprint were about the same as the first day of the January, June or September vhf contests.

May 12 and the 1296-MHz event had a great turnout. The 36 logs show activity from every call area. More and more people are migrating up to 1296 after nailing down the other bands, and the availability of commercial equipment certainly helps.

The last Sprint, 50 MHz on May 21, provided plenty of excitement in the form of E_s. The W4s were crushingly loud in the Northeast; K7HSJ in OR worked K1TOL in ME; the W8s and W9s worked Northeastern and Southeastern stations; and C6ADV put FL13 in a number of logs. Only the W6s missed out on the E_s. Most of the 97 logs received show fewer QSOs than might be expected, but good multiplier totals. See Fig. 2 for an idea of what was workable from SFL.

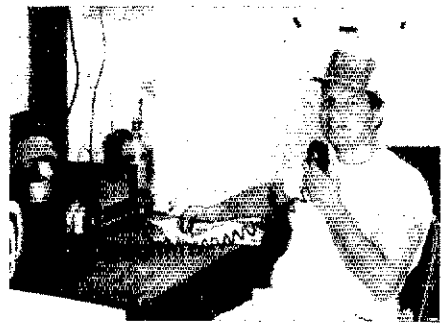
On the Sprint Summary sheets, we asked for output power. From this information, we prepared a table showing the percentages of those running 20 W or less, generally corresponding to a barefoot transceiver or transverter; 150 W or less, corresponding to "brick" power levels; and more than 150 W, corresponding to tube-type power amps. There are quite a few high-power vhfers out there!

Based on the success the Spring Sprints enjoyed, we won't make you wait another year for the next round of fun. The first fall Sprints will be held on the following dates: 1296 MHz, Nov. 10; 432 MHz, Nov. 16; 220 MHz, Nov. 22; 144 MHz, Nov. 28; 50 MHz, Dec. 11. Complete rules will appear in October *QST*.

Thanks for making the Sprints enjoyable!

SOAPBOX

First location was the Sunnyvale City Dump on the edge of San Francisco Bay. Due to the lack of activity, I drove across the Santa Clara Valley up to the high-rent foothills and operated from a 900-foot-high plateau. I sure hope that we figure out how to get more folks on for next year's Sprint, as I think we just hit a new low in contesting (K6GSS). Congratulations on establishing a new phase in vhf contesting (VE3DSS). Contest was slow, but active stations were all enthusiastic. Grid exchanges went very easily (W3EP/9). I think that this was the best contest yet on 6 meters — not too short, not too long. Six hours is the perfect length. You can even get out of bed the next day by noon (WB8IGY). Interesting contest (144 MHz). Very few grid squares can be worked from here. No squares to the east, north or west. To work 15 or 20 grid squares will take years (VE7ASI). A lot of fun (144 mHz) and only 92 grid squares to go (Hi!) (WA3YGQ). Enjoyed the short contest format, but would have preferred a Friday or Saturday night. Maybe there would have been more activity (K6PVS). Just finished the 2-meter Sprint and had a great time. Congratulations on this activity to bring to life an otherwise dead band. Sounded like 75 on Saturday night (AJØX). The premiere of this contest couldn't have been more exciting with six open for its entirety (K1DAT). The 20-minute (6 meter) double-hop opening to the East Coast was the highlight of the evening (K7HSJ). Next year, convert the vhf contests from section multipliers to grid multipliers (WD8OXK). For the 6-meter Sprint I took my car by two-hour ferry to Block Island, RI, to operate from a 200-foot bluff overlooking the Atlantic Ocean. Operated portable from the car with a 5-el Yagi, an IC-502 and a brick. Best fun was working C6ADV (W1XX). The grid system is great. Now just about everybody is DX (WA2RUW). Didn't anyone invite the W4s to participate? I only worked six stations south of the 39th parallel (KA3B/3). Quite different, but fun. Our only problem was wondering if a rare grid worked was also a new state worked (WA3FYJ). Great! Just got on 2 meters in January of this year. Having a ball with the grid square award incentive (K5YY). I helped to figure the grids of a lot of other operators who were unaware of what a grid locator was (WB8KAY). I think the starting and ending times should be universal for all stations. Reason: The band may be open to an area where the contest hasn't started, yet only to "close" when it comes time for them to start the contest (WA8FTA). I noticed contest activity was best during the first couple of hours of the Sprint. After 0333Z, activity dropped way off. Believe a Friday or Saturday night Sprint on 2 meters would be better for those of us who have to work during the week. This probably explains the sparse activity after 10 P.M. local (WAØVJF). My first contest on 2 meters (WAØTKJ). In order to concentrate activity still more, the higher band events (220, 432, 1296) should be shortened to two hours each. For 1296 MHz, the first hour could be for 1296 MHz and the second hour for 2304 and up (AF1T). Almost didn't bother, but lashed gear together at the last moment. T/R switching was by the "move the coax" method (K2QR). For a new contest in the middle of the week, it had surprisingly good activity (K2RIW). The amp blew up at 9:30 P.M. I couldn't operate any longer because of the fumes (WA3YON).



K1DS/FN41 operated all five sprints.

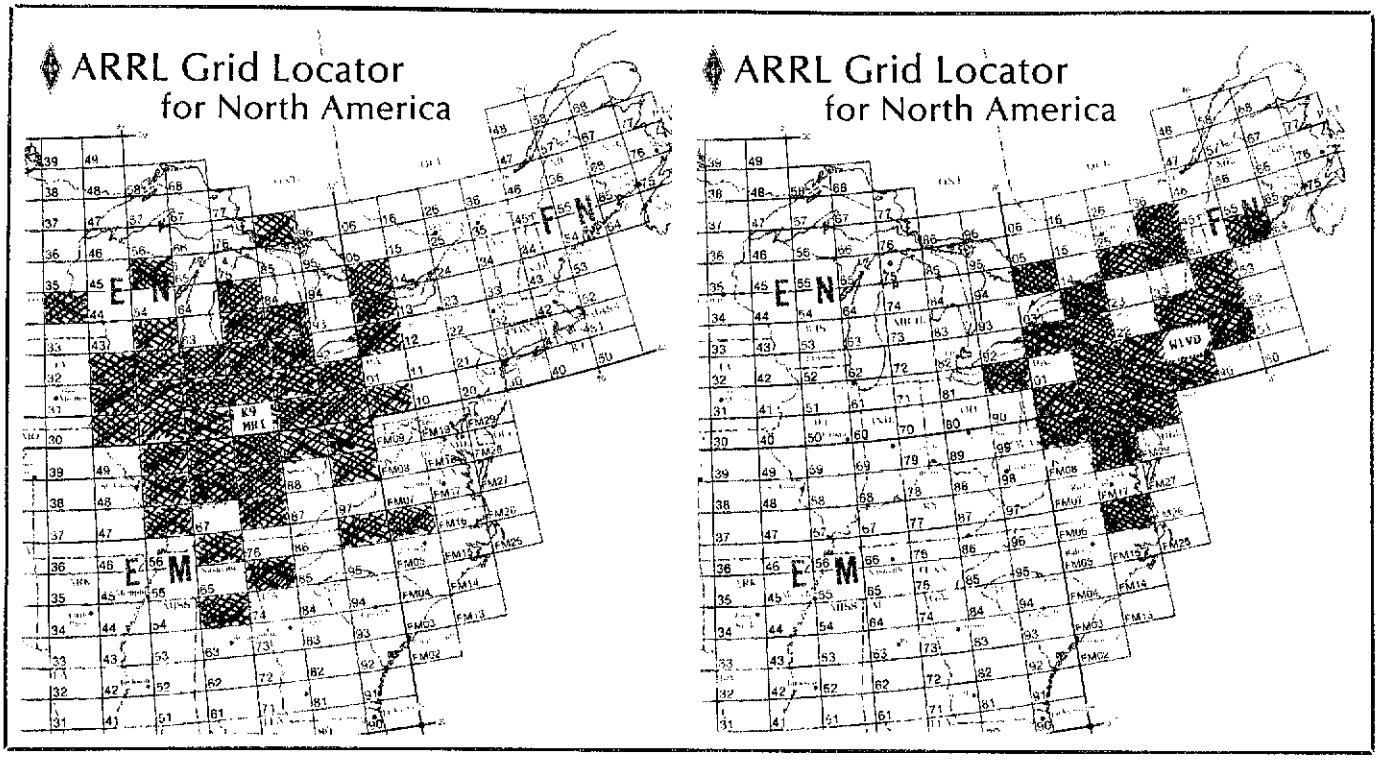


Fig. 1 — K9MRI/EN70 worked 44 grids on 144 MHz, while W1VD/FN31 worked 25.

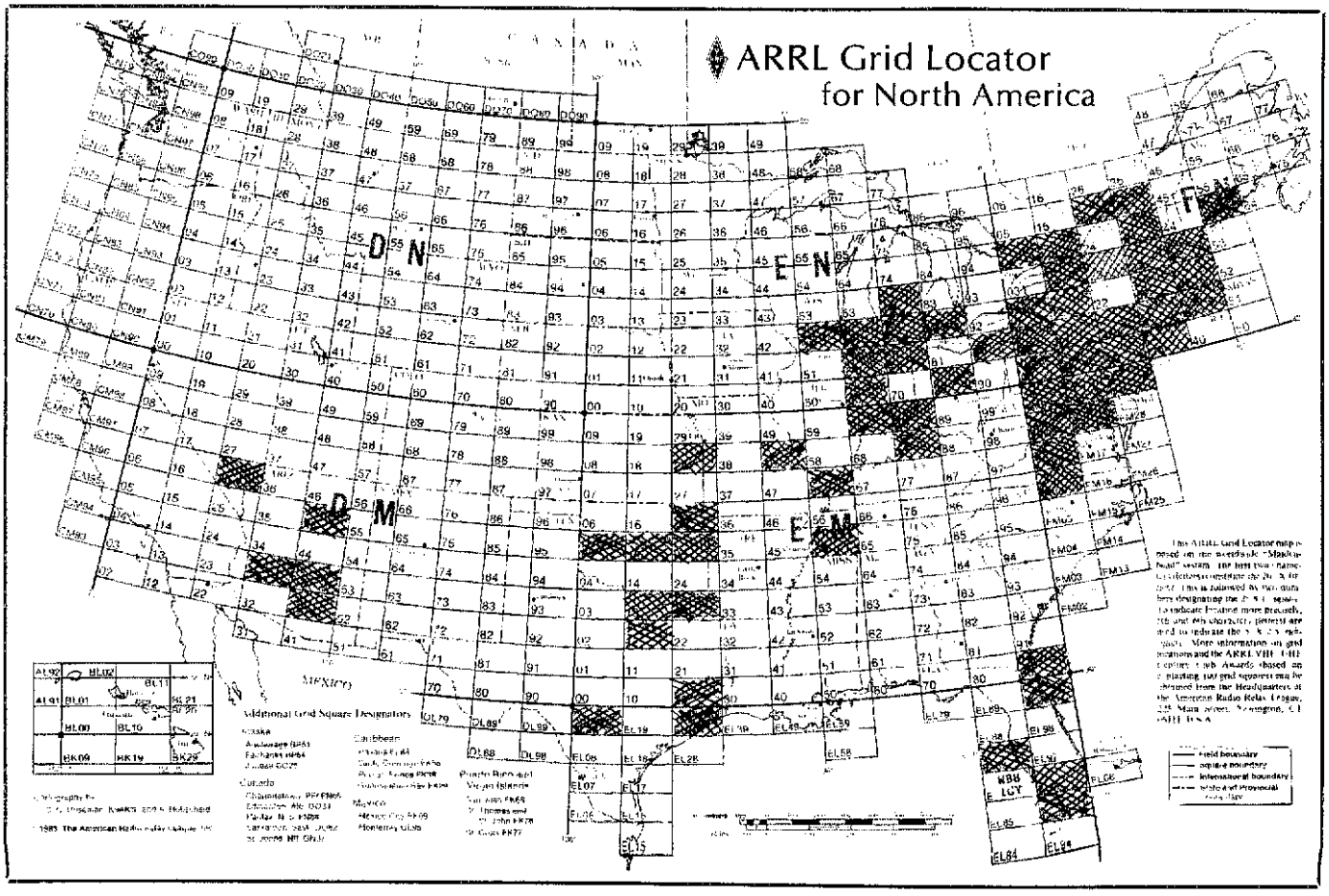


Fig. 2 — WB8IGY/4 in EL86 worked 67 grids on 50 MHz, but he couldn't scare up a contact in his own square.

Scores

Scores list call sign, number of QSOs, number of grids, ARRL section. The scores are arranged by band, from 50 MHz through 1296 MHz. Under each band heading, the scores are arranged by call area. Within each call area, the scores are listed in descending numerical order.

50 MHz

1

WA1OUB 6912-128-54- NH
WA1LOK 3420-112-35- CT
K1DAT 2204- 76-29- EMA
WA1AYS 2070- 69-30- EMA
K1TOL 1914- 58-33- ME
AF1T 1888- 59-32- NH
W1QXX 1800- 72-25- EMA
W1XX/1 1464- 61-24- RI
AC1J 602- 43-14- NH
K1DS 403- 31-13- RI
WA1TBV 384- 24-16- VT
W1JR 364- 28-13- EMA
W1GXT 198- 22- 9- EMA
KA1CZR 66- 11- 6- EMA

2

N2CEI 2225- 89-25- NNJ
KS2T 1904- 68-28- SNJ
KA2BTD 1846- 71-26- NNJ
N2BOW 1656- 72-23- NNJ
W2RHQ 1617- 49-33- WNY
W2EIF 1368- 57-24- SNJ
N2BMP 760- 40-19- NNJ
WA2FUZ 612- 36-17- NLI
K8ZES/2 500- 25-20- WNY
K2BJG 406- 29-14- NNJ
K2CK 378- 27-14- WNY
N2BHN 378- 27-14- NNJ
KC2AW 70- 10- 7- WNY

3

AA2Z/3 3996-108-37- EPA
N3RB1 2940- 84-35- EPA
WA3YON 1950- 75-26- EPA
W3XO 1770- 59-30- MDC
K1JL 1612- 62-26- MDC
W3TWU 1456- 56-26- EPA
WB3FYT 1325- 53-25- EPA
WA3IAO 1276- 58-22- EPA
W3CL 1040- 52-20- EPA
W3IIT 989- 43-23- EPA
N3BHS 612- 36-17- EPA
W3IP 595- 35-17- MDC
K3ACR 363- 33-11- EPA
W3GNR/3 (+KA3AWL,WA3JBV)
1947- 59-33- WPA

4

WB8IGY 12,127-181-67- SFL
W4OO 11,115-171-65- SFL
W5HUQ 8880-185-48- SFL
WD4FAB 7544-164-46- NFL
WB7QLP/4 7434-126-59- SFL
K1FJM/4 7112-127-56- SFL
KB4CRT 4488-102-44- SFL
N4MM 2812- 76-37- VA
WD8ISK/4 2346- 69-34- KY
W4ODW 2100- 70-30- NFL
K4CKS 1620- 54-30- GA
KC4EG 392- 28-14- KY
N4VC 266- 19-14- TN
AK4T 153- 17- 9- GA
WA4QYK 150- 15-10- TN
WB4SLM 98- 14- 7- GA
WA4LDU 40- 10- 4- SC

5

WA4GBE 960- 40-24- STX
N5FUE 640- 32-20- STX
W5NZS 594- 33-18- OK
W5UCY 480- 30-16- MS
KC5WX 434- 31-14- NTX
WA5VJB 420- 30-14- NTX
WB5KTC 392- 28-14- NTX
WA5IYX 315- 21-15- STX
K5WE 150- 15-10- OK

6

N6ICV 144- 24- 6- EB
WA6BYA 126- 21- 6- SCV
WD6CHL 105- 21- 5- EB
NI6E 80- 16- 5- SF
W6EMD 60- 15- 4- SCV
WA6LLY 48- 12- 4- SF
K6GSS 20- 10- 2- SCV
K6FV 1- 1- 1- SCV

7

WA7JTM 912- 38-24- AZ
WA6NHB 175- 25- 7- WA
WB7UNU 120- 20- 6- OR
K7HSJ 52- 13- 4- OR
N7BHC 40- 10- 4- UT

8

WB8KAY 600- 30-20- MI
WB8BKC 273- 21-13- MI
N8AXA 96- 16- 6- OH
WD8OXK 9- 3- 3- OH

9

WB9NTL 946- 43-22- IN
W3EP 240- 20-12- IN
K9PW 176- 16-11- IL

Ø

WØRCU 364- 26-14- MN
KOØW 132- 12-11- KS
NØLL 108- 12- 9- KS
WAØCFQ 42- 7- 6- KS
KCØP 16- 4- 4- MN
WØVB 1- 1- 1- MN

VE

VE3FGU 1496- 44-34- ON
CY1YX 468- 26-18- MAR
VE5JQ 442- 26-17- SK

DX

C6ADV 1980- 66-30- DX

144 MHz

1

W1VD 4850-194-25- CT
KA1BXB (K1GX,opr)
1322-151-22- CT
K1KA 1853-109-17- NH
AF1T 1649- 97-17- NH
KA1EC1 1596-114-14- CT
WB1BXS 1358- 97-14- CT
W1XX 1344- 96-14- CT
WA1JOF 1332-111-12- EMA
WØRLI 1309- 77-17- EMA
AA2Z 1200-100-12- CT
W1PDO (WA1FCD,opr)
1168- 73-16- WMA
WA1LOK 1020- 85-12- CT
W1AIM 988- 52-19- VT
WA1IOU 857- 71-12- CT
AJ1E 845- 65-13- EMA
W1JR 754- 58-13- EMA
K1GW 741- 57-13- NH
K1FWF 682- 62-11- EMA
WA1AYS 639- 71- 9- EMA
W1FJH 612- 51-12- WMA
KA1FVG 459- 51- 9- EMA
K1ISW 432- 48- 9- WMA
AC1J 414- 46- 9- NH
KA1CZR 405- 45- 9- EMA
K1DS 380- 38-10- RI
KA1DHO 336- 42- 8- EMA
K8CH 280- 35- 8- CT
W9KDR 161- 23- 7- CT
WB1DBR (WB1GOO,opr)
155- 31- 5- CT
WA1STD 95- 19- 5- CT
N1BC 84- 21- 4- EMA
K1ZZ 80- 20- 4- CT
AB1U 70- 14- 5- CT
K1BZ 54- 9- 6- ME
KH6WZ 45- 15- 3- CT
N1BKE 28- 14- 2- CT
W1CNC 16- 8- 2- CT
KF1R 4- 4- 1- WMA
KA1CRX 2- 2- 1- WMA

2

K2IWE 4825-193-25- NNJ
WA2TTF 3800-152-25- ENY
K8ZES/2 2580- 86-30- WNY
N2BOW 2460-123-20- NNJ
K2OS 2349- 81-29- WNY
WB2QOQ 2220-111-20- NNJ
WB2ODH 1722- 82-21- WNY
W2HRW 1547- 91-17- SNJ
N2BJ 1517-108-14- ENY
WB2WIH 1472- 92-16- NNJ
K2AN 1449- 63-23- WNY
WB2ELB 1426- 62-23- WNY
WB2JLR 1407- 67-21- WNY
N2CEI 1216- 76-16- NNJ
KE2N 1110- 74-15- NLI
KS2T 1080- 72-15- SNJ
WA2EXX 869- 79-11- NNJ
KQ2K 800- 40-20- WNY
KA2BTD 740- 74-10- NNJ
WB2TCQ 730- 73-10- NLI
K2BJG 726- 66-11- NNJ
WA2SZY 646- 38-17- WNY
KA2JKC 630- 45-14- SNJ
K2TTL 624- 39-16- WNY
WA2ODT 560- 56-10- NNJ
N2BMP 550- 55-10- NNJ
WA2RUW 410- 41-10- ENY
N2BMN 406- 58- 7- NNJ
KC2AW 114- 19- 6- WNY
WB2ENW 95- 19- 5- NLI
WA3PXH/2 65- 13- 5- WNY
K2CK 60- 15- 4- WNY
K2QR 60- 10- 6- WNY

3

K3ONW 4128-129-32- EPA
KA3B/3 2964-156-19- EPA
W2EIF 1710- 95-18- SNJ
WA3NUF 1605-107-15- EPA
KB3NQ 1545-103-15- EPA
KB3YY 1400-100-14- EPA
WA3FYJ 1320- 55-24- WPA
W3IP 765- 51-15- MDC
N3BHS 957- 87-11- EPA
K3MD 731- 43-17- WPA
WA3YON 672- 42-16- EPA
KC3CL 456- 38-12- WPA
WA3JUF 343- 49- 7- EPA
WB2BJH/3 270- 45- 6- EPA
W3IIT 252- 28- 9- EPA
W3CL 234- 39- 6- EPA
WB3IND 88- 22- 4- EPA
WA3YGQ 64- 8- 8- WPA

4

KC4EG 1696- 53-32- KY
K4CKS 1392- 58-24- GA
KØRI/4 1088- 68-16- VA
N4ELQ 988- 52-19- KY
AA4ZZ 578- 34-17- NC
NB4S 493- 29-17- SC
W4ODW 276- 23-12- NFL
WB4NMA 187- 17-11- GA
WA4QYK 180- 18-10- TN
KA4HKK 135- 15- 9- NC
N4VC 126- 14- 9- TN
WA4LDU 96- 12- 8- SC
WD4JFR 24- 6- 4- NC
AK4T 18- 9- 2- GA

5

WB5RUS 720- 45-16- STX
WA5VJB 660- 66-10- NTX
K5SW 629- 37-17- OK
N5BHZ 558- 31-18- NTX
WB5KTC 410- 41-10- NTX
K5WE 405- 27-15- OK
WB5VZL 372- 31-12- NTX
WD5FEH 364- 28-13- OK
K5YY 360- 24-15- AR
W5NZS 325- 25-13- OK
AIØX 264- 22-12- MS
W3XO/5 1- 1- 1- STX

6

K6GSS 1616-101-16- SCV
WD6CHL 583- 53-11- EB
N6ICV 360- 45- 8- EB
K6FV 266- 38- 7- SCV
K6PVS 231- 21-11- ORG
W6SJR 224- 32- 7- LAX
WA6OYS 200- 25- 8- SB
AI6I 138- 23- 6- SCV
WA6BYA 60- 12- 5- SCV
WA6LLY 42- 14- 3- SF
AA6Q 24- 8- 3- SB

7

WA6NHB 770- 77-10- WA
K7ND 420- 42-10- WA
N7BNJ 360- 45- 8- WA
WA1JXN 210- 15-14- MT
WB7DID 125- 25- 5- OR
WB7RSM 72- 12- 6- WY
N7BHC 66- 11- 6- UT
KCØP/7 9- 9- 1- AZ
WB7ATP 7- 7- 1- WA

8

WD8ISK 3220- 92-35- OH
WA8ZHE 2752- 86-32- OH
WA8BBR 2448- 72-34- OH
W8GOH 1218- 58-21- OH
WB8KAY 1176- 49-24- MI
WA8FTA/8 1134- 54-21- MI
WB8PAT 612- 36-17- OH
WB1OO 493- 29-17- MI
K8BCZ 448- 28-16- MI
N8AXA 341- 31-11- OH
KB1MN 252- 21-12- OH
K8CQA 198- 22- 9- OH
WD8OXK 180- 20- 9- OH

9

K9MRI 5216-119-44- IN
K9RO 3077- 96-32- IL
WB9MSV 1440- 60-24- IL
WB9WMM 1344- 48-28- IL
KB9NM 1232- 56-22- WI
K9RX 1197- 57-21- IL
K9AKS 1125- 45-25- IL
WD9HOZ 1060- 53-20- WI
W3EP/9 943- 41-23- IN
KA9HKL 455- 35-13- WI
N9CSA 377- 29-13- IL
WD9FSA 348- 29-12- IL
N9CJQ 264- 22-12- IL
WB9NTL 240- 24-10- IN
K9PW 176- 22- 8- IL
WB9SDA 144- 16- 9- WI

Ø

WBØSWD 1050- 42-25- IA
WAØVJF 722- 38-19- KS
WØVB 714- 42-17- MN
WAØLSH 450- 30-15- CO
NØCIH 377- 29-13- IA
WDØETA 324- 27-12- MN
NØAJH 336- 26-14- NE
WØRCU 230- 23-10- MN
WAØTKJ 210- 21-10- KS
NØLL 204- 17-12- KS
AKØP 154- 14-11- IA
KØTS 70- 14- 5- MN
KCØZC 16- 8- 2- MN
KAØCRO 1- 1- 1- MN

VE

VE3FGU 1334- 58-23- ON
VE3BFM 1254- 57-22- ON
VE2CUA 184- 23- 8- PQ
VE7ASI 114- 19- 6- BC

CHECKLOG

KA6JKQ

220 MHz

1

W1JR 507- 39-13 EMA
KA1BXB (K1GX, opr.)
418- 38-11- CT
W1GXT 250- 25-10- EMA
K1FWF 140- 20- 7- EMA
AA2Z/1 126- 18- 7- CT
W1XX 120- 24- 5- CT
AF1T 72- 12- 6- NH
K1DS 14- 7- 2- RI
AC1J 4- 4- 1- NH

2

W2EIF 490- 49-10- SNJ
K2BJG 360- 36-10- NNJ
WA2TTF 248- 31- 8- ENY
N2CEI 240- 30- 8- NNJ
WB2WIH 240- 30- 8- NNJ
WB2QOQ 114- 19- 6- NNJ
WA2FUZ 102- 17- 6- NLI
K2QR 4- 2- 2- WNY

3

WA2OMY/3 396- 36-11- EPA
WA3YON 297- 33- 9- EPA
W3IP 112- 16- 7- MDC
W3XO 50- 10- 5- MDC
W3CL 32- 16- 2- EPA
N3BHS 20- 10- 2- EPA

4

W3IY/4 240- 24-10- VA
KØRI/4 160- 20- 8- VA
WB4NMA 84- 12- 7- GA
KC4EG 45 9- 5- KY
K4CKS 35- 7- 5- GA
WA4QYK 30- 6- 5- TN
W4ODW 9- 3- 3- NFL

5

WA5VJB 63- 21- 3- NTX
K5SW 16- 4- 4- OK
W5NZS 4- 2- 2 OK

6

K6GSS/CM97 20- 10- 2- SCV
K6JKQ 16- 8- 2- SJV
K6FV 4 2 2 SCV
K6GSS/CM87 4- 4- 1- SCV

7

W7ZSL 6- 3- 2- WA
N7BHC 1- 1- 1- UT

8

N8BJN 176- 22- 8- OH
WD8ISK 136- 17- 8- OH
WB8PAT 117- 13- 9- OH
N8AXA 105- 15- 7- OH
W8IDU 40- 8- 5- MI

9

KB9NM 45- 9- 5- WI
WB9NTL 39- 13- 3- IN
K9XY 18- 6- 3- WI
K9RO 16- 4- 4- IL

Ø

WØVB 140- 14-10- MN
WØRCU 36- 9 4 MN
KLØP 7- 7- 1- MN
KCØZC 1- 1- 1- MN

VE

VE3BFM 77- 11- 7- ON

432 MHz

1

W1JR 742- 53-14- EMA
KA1BXB (K1GX, opr)
624- 52-12- CT
WA1JOF 310- 31-10- EMA
W1AW (AK4L, opr)
147- 21- 7- CT
K1KA 120- 24- 5- NH
KA1CZR 63- 21- 3- EMA
AJ1E 48- 16 3- EMA
AF1T 32- 8- 4- NH
AC1J 26- 13- 2- NH
N1BC 24- 12- 2- EMA
K8CH/1 12- 4- 3- CT
K1DS 6- 6- 1- RI

2

K2RIW 1596- 84-19- NLI
W2VC 676- 52-13- NNJ
K2BJG 546- 42-13- NNJ
W2EIF 539- 49-11- SNJ
N2CEI 384- 48- 8- NNJ
N2BMN 344- 43- 8- NNJ
WB2WIH 272- 34- 8- NNJ
KS2T 248- 31- 8- SNJ
WA2FUZ 240- 30- 8- NLI
N2BJ 174- 29- 6- ENY
K2CK 153- 17- 9- WNY
K2OVS 150- 25- 6- NLI
WA2ABN 60- 10- 6- WNY
WA2SZY 50- 10- 5- WNY
K2QR 28- 7- 4- WNY
WB2ELB 16- 4- 4- WNY

3

WB3ESS 1224- 68-18- EPA
W3IP 644- 46-14- MDC
WA3NUF 636- 53-12- EPA
N3CX 450- 45-10- EPA
WA2OMY 252- 36- 7- EPA
W3XO 243- 27- 9- MDC
KB3NQ 231- 33- 7- EPA
N3BHS 154- 22- 7- EPA
W3CL 84- 21- 4- EPA
WA3YON 55- 11- 5- EPA

4

W3IY/4 675- 45-15- VA
K4CAW 576- 32-18- NC
WD4MBK 70- 10- 7- GA
KC4EG 60- 12- 5- KY
N4ELQ 45- 15- 3- KY
AA4ZZ 16- 4- 4- NC
WA4QYK 2- 2- 1- TN
WA4LDU 1- 1- 1- SC

5

K5SW 200- 20-10- OK
WA5DBY 108- 18- 6- NTX
K5WE 70- 10- 7- OK
WBØNFY/5 64- 16- 4- STX
WA5VJB 36- 18- 2- NTX
W5NZS 6 3- 2- OK

6

N6ICV 92- 23- 4- EB
WD6CHL 88- 22- 4- EB
AI6I 63- 21- 3- SCV
K6PVS 63- 9- 7- ORG
K6GSS 38- 19- 2- SCV
K6FV 27- 9- 3- SCV
WA6LLY 4- 2- 2- SF

7

K7ND 96- 12- 8- WA
WA6NHB 72- 12- 6- WA
K7HSJ 36- 9- 4- OR
N7BHC 12- 4 3- UT

8

K8WW 836- 44-19- OH
WD8ISK 260- 26-10- OH
WB8KAY 12- 4- 3- MI
N8AXA 6- 6- 1- OH

9

WA9YLB 228- 19-12- IL
WB9NTL 44- 11- 4- IN
K9PW 1- 1- 1- IL
WB9SDA 1- 1- 1- WI

Ø

WØRCU 50- 10- 5- MN
WBØSWD 4- 2- 2- IA
KCØP 3- 3- 1- MN
WØVB 3- 3- 1- MN
W4ODW/Ø 1- 1- 1- NE

VE

VE3BSS 96- 12- 8- ON
VE3BFM 84- 12- 7- ON

1296 MHz

1

W1GAN 60- 12- 5- EMA
W1JR 40- 10- 4- EMA
K1ZZ 6- 3- 2- CT
WA1JOF 4- 2- 2- EMA
K1DS 2- 2- 1- RI
KA1BXB (K1GX,opr)
2- 2- 1- CT
AF1T 1- 1- 1- NH

2

KA2INY 114- 19- 6- SNJ
W2VC 102- 17- 6- NNJ
N2CEI 70- 14- 5- NNJ
W2EIF 40- 10- 4- SNJ
KK2D 33- 11- 3- NLI
WA2FUZ 12- 4- 3- NLI
K2BJG 8- 4- 2- NNJ
KA2JKC 1- 1- 1- SNJ

3

WA3JUF 147- 21- 7- EPA
WA3NUF 44- 11- 4- EPA
W3IP 4- 2- 2- MDC
WA3YON Ø- Ø- Ø- EPA

4

W3IY/4 20- 5- 4- VA
W4ODW 4- 2- 2- NFL
WD4MBK 4- 2- 2- GA
WA4QYK 2- 2- 1- TN

5

WA5VJB 8- 4- 2- NTX

6

WD6CHL 36- 12- 3- EB

7

WB7DID 4- 4- 1- OR
K7HSJ 3- 3- 1- OR

8

K8WW 112- 14- 8- OH
WB8BKC 72- 12- 6- MI
WA8TXT 66- 11- 6- OH
N8AXA Ø- Ø- Ø- OH

9

K9UIF 42- 7- 6- IN
WB9NTL 1- 1- 1- IN

Ø

WØOHU 1- 1- 1- MN
WØRCU 1- 1- 1- MN

VE

VE3BFM 2- 2- 1- ON

Contest Corral

A Roundup of Upcoming Operating Events

Conducted By Mark J. Wilson,* AA2Z

SEPTEMBER

1

RTTY Art Contest, Aug. *QST,* page 86.

3-4

Corona 10-Meter RTTY Contest, Aug. *QST,* page 86.

Four-Land QSO Party, Aug. *QST,* page 86.

LZ DX Contest, Aug. *QST,* page 86.

10-11

ARRL September VHF QSO Party, Aug. *QST,* page 85.

European DX Contest (WAEDC), phone, July *QST,* page 86.

IARS/CHC International Contest, cw, Aug. *QST,* page 86.

Late Summer QRP CW Activity Weekend, Aug. *QST,* page 86.

Howdy Days, sponsored by the Young Ladies Radio League, from 1800Z Sept. 10 until 1800Z Sept. 11. Only YL-to-YL QSOs count. All bands and modes; work a station once only. Exchange call signs and YES or NO indicating YLRL membership. Count 2 points per YLRL-member QSO, 1 point for nonmembers. No multiplier — score equals number of QSO points. Mail logs by Oct. 12 to Rose Ellen Bills, N2RE, 17 Craig Pl., Pennsville, NJ 08070.

12

W1AW Qualifying Run, 10-35 wpm, at 0200Z Sept. 13 (10 P.M. EDT Sept. 12). Transmitted simultaneously on 1.818 3.58 7.08 14.07 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 include your full name, call sign (if any) and complete mailing address. A large s.a.s.e. will help expedite your award/endorsement.

17-18

CAN-AM Contest, phone, Aug. *QST,* page 86.

IARS/CHC International Contest, phone, Aug. *QST,* page 86.

North American Sprint, cw, sponsored by the *National Contest Journal,* from 0100 to 0459Z Sept. 18 (phone contest 0100-0459Z Sept. 25). See Feb. *QST,* page 94, for complete rules.

Kansas State QSO Party, sponsored by the Boeing Employees' ARS of Wichita, from 0100 to 0700Z Sept. 17, 1300Z Sept. 17 to 0700Z Sept. 18 and 1300Z Sept. 18 to 0100Z Sept. 19. Work stations once per band and mode. Mobiles/portables may be worked again as they change county. All bands/modes except 10 MHz may be used. KS-to-KS QSOs allowed. Exchange serial number, signal report and QTH (county for KS stations; state, province or country for others). Suggested frequencies: cw — 60 kHz up from lower band edges; phone — 3.925 7.260 14.280 21.380 28.580; Novice — 3.725 7.125 21.150 28.160. KS stations count two points per phone QSO and three points per cw QSO; multiply by total number of states, VE provinces and countries worked. Others count two points per phone QSO and three points per cw QSO with KS stations; multiply by sum of different KS counties worked (max. 105). Non-KS stations may also count one additonal multiplier for each group of eight QSOs with the same KS county. Mail entry by Oct. 20 to Mike Thornton, WAØTAH, 1001 Munnell Ave., Wichita, KS 67213.

Scandinavian Activity Contest, cw, sponsored by the Suomen Radioamatooriliitto (Finland), from 1500Z Sept. 17 until 1800Z Sept. 18 (phone contest 1500Z Sept. 24 until 1800Z Sept. 25). Work LA/LB/LG/LJ, JW, JX, OF/OG/OH/OI, OHØ, OJØ, OX, OY, OZ, SJ/SK/SL/SM and TF stations on 3.5, 7, 14, 21 and 28 MHz only. Work stations once per band — no crossmode QSOs. Single op, all band; multiop, single transmitter; and multiop, multitransmitter categories. Multi-single stations may have only one transmitted signal at any given time and must remain on a band at least 10 minutes after a band change. Multi-multi stations are allowed only one transmitted signal per band. All transmitters and receivers must be located within a 500-meter radius. Exchange signal report and serial number starting with 001. Multi-multi stations start at 001 on each band. Non-EU stations count 1 point per Scandinavian QSO on 14, 21 and 28 MHz, and 3 points on 3.5 and 7 MHz. Multiply total QSO points by the number of different Scandinavian call areas worked per band (LA1 = LB1 = LJ1 and W1XX/OZ = OZØ, etc.) for final score. QSOs may be made only in these subbands: cw — 3.505-3.575, 7.005-7.040, 14.010-14.075, 21.010-21.120, 28.010-28.125; phone — 3.600-3.650 and 3.700-3.790, 7.050-7.100, 14.150-14.300, 21.200-21.350, 28.400-28.700. Mail entries for both modes by Oct. 30 to SAC Contest Committee, P.O. Box 306, SF-00101 Helsinki 10, Finland.

Washington State QSO Party, sponsored by the Boeing Employees' ARS, from 0100 to 0700Z Sept. 17, 1300Z Sept. 17 to 0700Z Sept. 18 and 1300Z Sept. 18 to 0100Z Sept. 19. All bands except 10 MHz, and all modes may be used. Work stations once per band and mode. Cw QSOs in cw subbands only. Work stations again as they change county. WA-to-WA QSOs allowed. Exchange serial number, signal report and QTH (county for WA stations; state, province or country for others). Suggested frequencies: cw — 1.805 3.560 7.060 14.060 21.060 28.160; phone — 3.925 7.260 14.280 21.380 28.580; Novice — 3.725 7.125 21.150 28.160. Count 2 points per phone QSO and 3 points per cw QSO. WA stations multiply by total states, provinces and countries worked. Others multiply by total WA counties worked. Non-WA stations also add one multiplier for each group of eight contacts with the same WA county. Mail logs by Oct. 19 to BEARS, c/o Willis D. Propst, K7RS, 18415 38th Ave., Seattle, WA 98188.

21

W1AW Qualifying Run, 10-35 wpm, at 2000Z (4 P.M. EDT) Aug. 21. See Sept. 12 listing for more details.

24-25

CAN-AM Contest, cw, Aug. *QST,* page 86.

North American Sprint, phone. See Sept. 17-18 listing.

Scandinavian Activity Contest, phone. See Sept. 17-18 listing.

Classic Radio Exchange, sponsored by the *Classic Radio Newsletter,* from 2000Z Sept. 25 until 0300Z Sept. 26. See January *QST,* page 92, for complete details.

Delta QSO Party, sponsored by the Delta Division of the ARRL, from 1800Z Sept. 24 until 2400Z Sept. 25, with a rest period from 0600 to 1200Z. Work AR-LA-MS-TN stations. Work stations once per band and mode. Portables/mobiles may be reworked as they change county. Exchange serial number, signal report and QTH (county and state for Delta stations; ARRL section or country for others). Suggested frequencies: cw — 65 kHz up from low end; phone — 3.990 7.290 14.290 21.390 28.590; Novice — 25 kHz up from low end. Count 1 point per QSO. Delta stations multiply by total ARRL sections worked (max. 74). Others multiply by total Delta counties worked (max. 316). Mail logs by Oct. 21 (include large s.a.s.e. for results) to Malcolm P. Keown, W5XX, 14 Lake Park Estates, Vicksburg, MS 39180.

Maine QSO Party, sponsored by the Portland Amateur Wireless Assn., from 2300Z Sept. 24 until 2359Z Sept. 25. Work stations once per band and mode. Exchange serial number, signal report and QTH (county for ME stations; state, province or country for others). Suggested frequencies: cw — 1.805 and 60 kHz up from low end; phone — 3.930 7.280 14.280 21.380 28.580; Novice — 20 kHz up from low end. Count 3 points per QSO. ME stations multiply by number of ME counties, states, provinces and countries worked. Others multiply by number of ME counties worked. Mail logs (include large s.a.s.e. for results) by Dec. 1 to PAWA, Box 1605, Portland, ME 04104.

OCTOBER

1-2

California QSO Party, sponsored by the Northern California Contest Club, from 1600Z Oct. 1 until 2159Z Oct. 2. Single ops may operate only 24 hours. Off-times must be at least 15 minutes long and noted in the log. Work stations once per band and mode. Cw QSOs in the cw subbands only. No repeater or MCW QSOs. CA stations may be reworked as they change county. Exchange serial number and QTH (county for CA stations; state, province or country for others). Suggested frequencies: cw — 1.805, and 60 kHz up from low end; phone — 3.895 7.230 14.280 21.365 28.560; Novice — 25 kHz up from low end. Try cw on the half hour and 160 meters at 0500Z. Count 2 points per phone QSO and 3 points per cw QSO. CA stations multiply by total number of states and VE call areas (max. 58) worked. Others multiply by total CA counties (max. 58) worked. Mail entry by Nov. 1 (include large s.a.s.e. for results) to Alan Brubaker, K6XO, 34456 Colville Pl., Fremont, CA 94536.

Oregon QSO Party, sponsored by the Hermiston ARC, from 1700Z Oct. 1 to 0800Z Oct. 2 and 1500Z Oct. 2 to 0000Z Oct. 3. Mixed-mode and cw-only categories. Suggested frequencies: cw — 60 kHz up from low end; phone — 3.929 7.260 14.300 21.370 28.600; Novice — 10 kHz up from low end. Work stations once per band and mode. Exchange signal report and QTH (county for OR stations; state, province or country for others). Count 1 point per QSO. OR stations multiply by total OR counties, states, provinces and countries worked. Others multiply by total OR counties (max. 36) worked. Mail logs to be received by Nov. 4 (include large s.a.s.e. for results) to Bob Franklin, KA7IXH, Rte. 3, Box 3783, Hermiston, OR 97838.

VK/ZL/Oceania Contest, phone, sponsored by the New Zealand Assn. of Radio Transmitters and the Wireless Institute of Australia, from 1000Z Oct. 1 until 1000Z Oct. 2 (cw contest 1000Z Oct. 8 until 1000Z Oct. 9). Single op and SWL classes. Work stations once per band. No crossband QSOs. Exchange signal report and serial number starting with 001. Count 2 points per VK/ZL QSO. Multiply by total VK/ZL call areas worked per band. Mail entries to be received by Jan. 31, 1984 to WIA Contest Manager VK3BGW, 1 Noorabil Ct., Greensborough, Victoria 3088, Australia.

4

West Coast Qualifying Run, 10-35 wpm, at 0400Z Oct. 5 (9 P.M. PDT Oct. 4). W6OWP prime, W6ZRJ alternate. Frequencies are approximately 3590/7090 kHz. See Sept. 12 listing for more details.

8-9

ARRL QSO Party, cw.

VK/ZL/Oceania Contest, cw. See Oct. 1-2 listing.

World-Wide SSTV Contest, sponsored by the German AR Teleprinter Group, from 0600Z Oct. 8 until 0600Z Oct. 9. A six-hour rest period must be taken at any time during the contest period. 3.5, 7, 14, 21 and 28 MHz only. Work stations once per band. Exchange call signs, signal report and serial number. GARTG members also send membership number. Count 1 point per 3.5, 7 or 14-MHz QSO; 2 points per 21-MHz QSO; and 5 points per 28-MHz QSO. Multipliers: countries as defined by the WAE and DXCC lists; W/K, VE/VO, JA, PY, VK call areas. Final score = QSO points × multipliers worked per band × continents worked per band. Add 50 bonus points per GARTG member worked. Mail logs to be received within 2 months to Wolfgang Puenjar, DL8VX, P.O. Box 90 11 30, D-2100 Hamburg 90, Fed. Rep. of Germany.

21/28 MHz Telephony Contest, sponsored by the Radio Society of Great Britain, from 0700-1900Z Oct.

*Assistant Communications Manager, ARRL

9. Single and multioperator categories. 21 and 28 MHz, phone only. Exchange signal report and serial number starting with 001. Work British Isle stations only (G, GD, GI, GJ, GM, GU, GW); contacts with GB stations do not count. Count 3 points per QSO. Multiply by the total number of different British Isle prefixes (G3, GW4, etc.) worked per band. Mail entries to be received by Dec. 1 to Mr. P. Miles, P.O. Box 73, Lichfield, Staffs, England.

11

W1AW Qualifying Run, 10-40 wpm, at 0200Z Oct. 12 (10 P.M. EDT Oct. 11). See Sept. 12 listing for more details.

15-16

ARRL Simulated Emergency Test

Maryland-District of Columbia QSO Party, sponsored by the Columbia ARA, from 1800Z Oct. 15 to 2100Z Oct. 16. Work stations once per band and mode. Mixed-mode, phone-only and cw-only categories. Exchange serial number, signal report and QTH (county for MD and DC stations; state, province or country for others). Suggested frequencies: cw — 60 kHz from low end; phone — 3.950 7.250 14.290 21.390 28.590; Novice — 20 kHz from low end. MDC stations multiply total QSOs by sum of MD counties, states, provinces and countries worked. Others multiply MDC QSO total by sum of MD counties and independent cities (max. 25) worked. Multiply score by 1.5 if running 200 W or less. Mail entry by Nov. 30 to Robert Nauman, WA3VUQ, 4017 Font Hill Dr., Ellicott City, MD 21043.

Worked All Y2 Contest, sponsored by RKDDR (East Germany), from 1500Z Oct. 15 until 1500Z Oct. 16. Phone and cw, single or multioperator. 80-10 meters. Do not use first 10 or last 25 kHz of each band. Exchange signal report and serial number. Y2-9 stations will send signal report and two-digit number representing "Kreiskenner." Count 3 points per Y QSO. Multiply by sum of different districts worked per band (max. 15 per band). Districts are indicated by last letter of call sign (letters A through O; P = D, X = F, R = L, S = M, T = N, U = A, G = W, V = H, Q = I, Y = J. Mail logs within 30 days to Y21TL. RKDDR, Hosemannstr. 14, DDR 1055 Berlin, German Democratic Rep.

21 MHz CW Contest, sponsored by the Radio Society of Great Britain, from 0700 to 0900Z Oct. 16. 21 MHz, cw only. Single op and single-op QRP (10-W input max) categories. Exchange signal report and serial number starting with 001. Work British Isle stations only (G, GD, GI, GJ, GM, GU, GW); contacts with GB stations do not count. Count 3 points per QSO. Multiply by total number of different British Isle prefixes worked. Mail entries to be received by Dec. 31 to D. S. Booty, 139 Petersfield Ave., Staines, Middx TW18 1DH, England.

Jamboree on the Air

22-23

ARRL QSO Party, phone.

AC-DC Contest

Fall QRP QSO Party

Pennsylvania QSO Party

YL Anniversary Party

29-30

ARRL International EME Competition, Part 1.

CQ World Wide DX Contest, phone.

30

W1AW Qualifying Run

NOVEMBER

5-6

ARRL November Sweepstakes, cw.

19-20

ARRL November Sweepstakes, phone.

Rules, Seventh ARRL International EME Competition

Because of the success last year's fall EME contest enjoyed, we will continue to hold these contests in October and November. This year's contest will be held the weekends of October 29-30 and November 26-27. Thanks to W1JR and WA1JXN for help in picking the dates to take advantage of good conditions while avoiding vhf conferences and European terrestrial vhf contests.

The rules are the same as for last fall. Official forms are available for an s.a.s.e. to ARRL Hq.

Rules

1) **Object:** Two-way communications via the earth-moon-earth path on any authorized amateur frequency above 50 MHz.

2) **Contest Period:** Two full weekends, Oct. 29-30 and Nov. 26-27, full 48-hour period UTC each weekend.

3) **Categories:**

A) Single Operator: One person performs all operating and logging functions, equipment adjustment and antenna alignment.

(1) *Multiband.*

(2) *Single-band:* Single-band entries on 50, 144, 220, 432 and 1296-and-up categories will be recognized in awards offered. Contacts may be made on any and all bands without jeopardizing single-band entry status. Such additional contacts are encouraged and should be reported. Also, see Rule 8, Awards.

B) Multioperator: Two or more persons participate; includes neighboring amateurs within one call area, but with EME facilities for different bands on different team members' premises, as long as no two are more than 50 km (30 miles) apart. Multioperator neighborhood groups cannot use the same call signs at each location; all calls will be listed in the results.

C) Commercial equipment: Stations using equipment that is not amateur (such as a dish antenna for lab equipment owned by an institution or government agency) will have their scores listed separately.

4) **Exchange:** For a valid contact to occur, each station must send and receive both call signs and a signal report in any mutually understood format, plus a complete acknowledgment of the calls and report. Partial or incomplete QSOs should be indicated in your log, but not for contest credit.

5) **Scoring:**

A) QSO Points: Count 100 points for each complete EME contact.

B) Multiplier: Each U.S. and Canadian call area, plus each DXCC country (not U.S./Canada) worked via EME on each band.

C) Final Score: Multiply QSO points by sum of multipliers worked on each band for your final score.

6) **Miscellaneous:**

A) Fixed or portable operation is permitted. Stations operating outside traditional call areas *must* indicate so, identifying the call area of the operating site.

B) Contacts may be on cw or ssb. Only one signal per band is permitted.

C) A transmitter, receiver or antenna used to contact one or more stations under one call sign may not be used subsequently under any other call sign during the contest, except for family stations where more than one call has been issued, and then only if the second call sign is used by a different operator.

D) There is no specified minimum terrestrial distance for contacts, but all communications must be copied over the moonbounce path, regardless of how strong (or weak) a nearby station's terrestrial signal may be.

7) **Reporting:** Entries must be postmarked no later than 30 days after the contest and must include complete log data. Your summary sheet should show a band-by-band breakdown of QSOs and multipliers, and include the final score. If possible, include details of your station setup and a photo.

8) **Awards:** Certificates will be issued to the top five stations worldwide in each of the entry categories: single-operator multiband; single-operator single band (separate awards for each band); and multioperator. Additional awards will be issued where significant achievement or competition is evidenced. In addition, each station that successfully completes at least one EME contact during the contest period will receive a certificate commemorating that achievement.

9) **Disqualification:** See January *QST*, page 85.

Section News

The ARRL Field Organization Forum

Coordinated By Jim Clary, WB9IHH

CANADIAN DIVISION

ALBERTA: SM, E. Roy Ellis, VE6XC — SM/SEC: VE6XC. ASM: VE6AMM. STM, DEC, NM (APSN & ATN): VE6ABC. NARC and CARA took care of communications for the 24-hour international relay race between Jasper and Banff, which consisted of 99 teams of racers. NARC FD rained (drowned) out this year. The annual Red Deer picnic was a success in spite of the dampness. VE6BFU became a Silent Key this month. He will be greatly missed by his many friends and family.

MANITOBA: SM, Peter Guenther, VE4PG — ASM: AJE. STM: RO. SEC: HK. OO: FK. Lots of mobiles on the road these days. Summer is taking its toll on all the nets. Field Day reports indicate more locations with less operators than last year. All in all everyone seems to be enjoying the outing. WRIN QNI 256, QTC 9, sess. 9. MEPN QNI 802, QTC 18, sess. 30. MMN QNI 480, QTC 32, sess. 30. MTN QNI 106, QTC 16, sess. 18. Traffic: VE4ACX 49, VE4TE 35, VE4AAD 25, VE4PG 12, VE4ADS 8, VE4CF 7, VE4NE 7, VE4BI 6, VE4FK 6, VE4AFO 5, VE4AGT 2.

ONTARIO: SM, Larry Thivierge, VE3GT — NMs: VE3AJN VE3BDM VE3CYR VE3FGU VE3GFN VE3HTL. Amateur Radio was well represented at the recent Rotary International Convention in Toronto with 13 countries registered. There was a ROAR (Rotarians of Amateur Radio) booth manned by Rotary amateurs and many ssb contacts were made throughout Canada and the U.S. ROAR has a membership of over 1200. VE3BJZ was the coordinator for the ROAR operation, and had a busload of 34 members over to a super banquet in Waterloo. VE3KK handled over 100 messages via the NTS for the event. At the Triennial Conference IARU Region 2 in Cali, Colombia, VE3CDM was elected Treasurer of the Executive Committee, following in the footsteps of VE3CJ and VE6AW. OVMRC members VE3s KLX KLK FHS CDS NJN NPG LAR and DF6OZ were active at the 2nd Annual Wendover Horse Trials for the Mentally Disturbed. New calls in the Section are VE3s OCF OCG OCH OCJ and OCK. VE3NKH has upgraded to Advanced. VE3NTI dropped by for an eyeball and expressed an interest in traffic work. New EC appts: VE3EFY, Kenora District; VE3JJB, Fort Frances; VE3TY, Peel-Dufferin-Halton. The entire VE3RPT system will be replaced ahead of schedule. There will be a "micro" in operation controlling VE3RPT later this year. Possibly the rack will be on display at the FM hospitality suite at the RSO Convention this month. VE3EFX is a new member of QCWA. The new executives of the Southern Ontario Repeater Team Inc. (SORT) are VE3s ACW KSX CFD ZK BTZ LST MGD GYQ. VE3SB celebrated 50 years as a licensed amateur. Traffic: VE3HTL 284, VE3GOL 182, VE3KK 180, VE3HGJ 155, VE3GT 133, VE3DPO 86, VE3BDM 74, VE3KCZ 62, VE3KXB 58, VE3FGU 51, VE3GFN 51, VE3AJN 36, VE3MPF 25, VE3WM 18, VE3EWD 15, VE3AWE 12, VE3WG 8, VE3WV 8, VE3KLX 7, VE3BAJ 4.

QUEBEC: SM, Harold Moreau, VE2BP — SEC: VE2DEA. STM: VE2EDO. NMs: VE2EDO VE2FSA. Thanks to all who participated in Field Day, and a special mention to L'UMS who had four stations in operation at Man and his World. Visitors had a good look at operators in action, and information was provided at a public information booth. En dix annees d'operation, le record du reseau "Les Joyeux Copains," est le suivant: nombre de stations 41650, dure: 3430 hrs. 42 minutes. Traffic 3774 et raccordement telephonique 1765. Felicitations a tous ces amateurs qui n'ont pas l'usage de leur yeux. Traffic: VE2ALE 314, VE2EDO 69, VE2BP 45, VE2EC 36, VE2EKC 28.

SASKATCHEWAN: SM, W. C. Munday, VE5WM — SEC: VE5RP. STM: VE5HG. TC: VE5GF. NMs: VE5BAF VE5EX VE5HG VE5OI. SK hams took part in Field Day and even the weatherman cooperated. Thirty eight members of MJARC and RARA toured the Badlands at Avonlea on June 4, followed by a tour of the Poplar River Power Plant at Coronach on June 25. Congrats to VE5EG for 62 years in Amateur Radio and the life membership bestowed on him by the MJARC. A thank you is extended to VE5AAD who steps down as QSL manager June 30. His successor will be VE5AE. Best wishes to VE5MC on his transfer to VE7-land. He will be missed on the SK nets with his popular Swap 'N Shop. A safe and happy summer vacation is extended to all. Traffic: VE5WM 16, VE5AAT 8, VE5UX 4.

ATLANTIC DIVISION

DELAWARE: SCM, Harold K. Low, WA3WIY — STM: W3DKX. SEC: W3PQ. PSHR: WA3WIY K3JL W3DKX. Congrats to WD3DOG, who in June attained 50 continuous years as an amateur under the same call. SARA furnished communications for the Old Fashioned 4th of July. Parents and children were united, also people and wallets. Those active K3PFW K3JL WA3VIT WA3ZBI WA3PWT KA3CDF WB3DUG WA3WIY. SARA upgrade KA3JYB to Advanced. Don't forget nominating petitions for SM must be at Hq by Sept. 9. Please attend Delmarva Hamfest Aug. 21. DTN: QNI 363, QTC 45 in 22 sessions. SEN QNI 46, QTC 1 in 5 sessions. KCARC QNI 29 in 4 sessions. DEPN (May) QNI 61, QTC 4 in 4 sessions. Traffic: W3QQ 105, WB3DUG 65, W3DKX 53, WA3WIY 46, K3JL 18, N3AXH 12, WA3PWT 9, W2AGR 6, K3ZXP 3, W3WD 2.

EASTERN PENNSYLVANIA: SM, Karl W. Pfeil, W3VA — ACC: KB3NE. SEC: WA3PZO. SGL: N3CJP. STM: KB3LF. DEC: AA3C K3QXC KB3LR KB3QW KB3UD N3BFL N3CJP W3EEK.

Net	Freq.	Time	QNI	QTC	Sess.
EPAEPTN	3917	6 P.M. Dy	469	179	30
EPA	3610	7/10 P.M. Dy	381	194	55
PTTN	3610	6:30 P.M. Dy	—	—	—
PFN	3958	5 P.M. Dy	186	217	30

Local and VHF nets reporting (QNI/QTC/sess.): D3ARES 121/11/4; D5ESN 47/4/4; D6ARES 46/4/5; Luz CARES 48/12/7; PWA ARES 64/3/4. OO report: W3KEK. OBS reports: K3EBZ KA3EJG KO3M W3CL W3VA. PSHR reports: KA3DLY KA3EJG KA3GJT KB3FW N3COY W3VA WB3FKP. BPL: K3NSN. Field Day messages received from: AF3T KJ3F K3IEC K3II KG3Q KI3S K3YTL N3AIW/MM W3ABR W3BN W3KGN W3KW W3OK W3PM W3UU WB3JOE WB3PLW. Sure was nice to hear so many EPA clubs and groups active in FD. New appointment: KB3LR to DEC for District 7. New officers Mt. Airy VHF RC (Pack Rats): WA2DPU, pres.; WB2VLA, v.p.; W0RSJ, cor. secy.; W3NSI, rec. secy.; K3GAS, treas. AF3Z new QTH, Mt. Gretna. KA3DLY now affiliated with Navy/Marine Corps MARS. WA3CKA now has his Vic20 on RTTY. W3HK recovering from a bout with a stubborn bug. N3BAY, EC Pike Co., reports ARES active in several public events. New gear: KA3GRS, a Ten-Tec Corsair; N3DAP, a FT690. Upgrades: N3CFE to A; N3DCR to Gen. WB3FVJ now KO3M. KA3LBG new Novice in Mt. Top. KA3LGV new Novice in Penn Argyl. KA3LDL KA3LDM KA3LDK KA3KZZ new Novices from Warminster ARC Spring classes. Welcome aboard. KB3LR, new DEC for District 7 which consists of Bradford, Lycoming, Sullivan and Tioga Cos., reports Williamsport City Emergency Disaster Drill went quite well. D7 hams interested in emergency work contact him. Congrats to Murgas ARC on being officially designated a Special Service Club. Traffic: K3NSN 2852, KA3DLY 167, WA3WQP 157, W3IPX 152, N3CD 116, KA3GJT 106, KB3FW 101, KE3U 88, W3DP 82, AA3B 68, W3VA 66, WB8KPE 64, N3COY 57, WA3EHD 57, KB3UD 57, W3AQN 45, WB3KUZ 39, W3TWV 37, WB3FKP 29, W3CL 18, KA3EJG 16, KA3IME 15, N3AIW 15, W3ADE 14, N3AKQ 12, KO3M 10, K3QXC 7, WA3CKA 6, W3FAF 6, N3CMC 2.

MARYLAND-DISTRICT OF COLUMBIA — SM, Karl R. Medrow, W3FA — STM: WB3GZU. SEC: WA3TAI. WA3DMF is zeroing in on VUCC. KJ3E maintains a sked with AG3L who is sailing to Bermuda. His big item is station improvement! KA3EWV and K3NNI make the MSN and MDD. MSN under NM KC3AV is attracting much interest at 1930 local time on 3717 kHz. W3CDQ enjoyed the QCWA get together with W3ABC and W4GF. W3ZNW is making points on 40 meters. KB3WL's travel time is here. WB3KJF says the days are too long — one end has got to go. Good OO reports from KA3R 20 and 15, and W3IK 10 meters. W3FZV has slim pickins with the PVRC reunion, but lots of FD contacts. KC3DW is generating some 40-meter interference he cannot find. WB3BFK opts for air condx radio shacks. W3LDD still chasing DX and catching some! KC3Y was Chief at the Ride-A-Bike with the AARC providing the commo support. Summer is the busy season for WB3GZU. KK3F is still planning the 80-meter dipole. W3OYY says too many net members are on vacation. FD messages received from: W3VPR KK3F KA3ARK W3DQI K3EF/3 K3CXB K3AA WA3NAN W3DOS and W3CWC/3. The wx good and fun for all. KJ3E made 74 PSHR points in April and I forgot to list him. Sorry about that. W3YVQ is the man to see for RACES liaison. Bulletins received from Chesapeake ARA, Chesapeake Bay RA, SMARC, AARC and FAR are much appreciated. With the nets: Sessions/traffic/QNI average, freq. times/local. MSN/KC3AV 29/52/5.6, 3717 kHz, 1930 daily. Slow speed CW, MEPN/WB3GZU 31/105/28, 3920 kHz, 1800 daily, 100% KC3DW, 3 or less W3DKX W3FA W3LDD and W3YVQ. WR PON/WB3BFK 21/56/22. MDC PON/W3OYY 5/6/15.3. PONs 3905 kHz 1700 except Sundays. WC 2-Mtr/KC3DW 4/0/18. Hagerstown Rpt 1900 Tuesdays. Traffic: WB3GZU 414, W3FA 232, KC3DW 181, KJ3E 169, KC3Y 113, W3YVQ 81, W3FZV 58, KC3AV 57, KK3F 43, KB3WL 37, WB3BFK 22, K3NNI 21, KA3EWV 20, WB3KJT 14, W3ZNW 13, W3LDD 10.

SOUTHERN NEW JERSEY: SM, Edward E. Wood, N2CER — STM: WA2HEB. SEC: K2NE. SGL: W2XQ. BM: WB2UVB. Did you know that there is a 2-meter rptr in Southern New Jersey dedicated to RTTY? This rptr is located at Waterford Works and is maintained by the South Jersey Teletype Users Group. It is a wide-area coverage rptr and covers nearly all of Southern Jersey. An electronic mailbox is in operation, and it facilitates the routing and handling of ROUTINE NTS and MARS traffic via a system known as Visual Information System for Traffic and Emergency Coordination (VISTEC). At present, narrow-shift (170 Hz) at 60 wpm BAUDOT is the normal format. At designated times, ASCII at other shifts and speeds is used. Packet radio is beginning to appear on the rptr and promises to be more and more prevalent. The rptr operates on 147.945/345 on a 24-hour basis. Those of you with 2-meter RTTY capability who are interested in VISTEC and SJTUG membership, contact W2HOB for details (*Callbook* address OK). Traffic: WB2UVB 258, WB2ZJF 202, WB2IQJ 130, N2CER 123, WA2CUW 84, WA2HEB 75, KC2PB 46, KY2T 28, WB2JCE 26, KM2E 23, KA2ANJ 16, KA2CQX 16, W2IU 7.

WESTERN NEW YORK: SM, William W. Thompson, W2MTA — SEC: W2BCH. STM: W2ZOJ. ACC: N2EH. BM: W2GLH. OO/RFI: W2AET. PIO: WA2PUU. SGL: KO2X. TC: K2QR. DEC: WA2AIV KA2BHR WB3CUF W2GJ(a), WB2NAO. APPTS: (EC) W2TFL Delaware, WA2SEF Hamilton. FIELD DAY messages: N2DM Elbridge, K2IQ Utica, KW2J Allegany Highlands, W2LZ Walton, KC2MI Oneonta, K2MP Band Dit Dahs, W2OFQ Rome, W2PE RAWNY, WA2QDV Orleans, K2QR Tioga, W2RCX GRAM, W2RUI Lockport, K2SA Goz's Gang, W2TKE Otsego, W2TQF Fulton, W2UXC Champlain Valley. OFFICERS: Boonville ARC WA2OFK W2VYI WD2ADX KA2FOR; Otsego Co. ARA WB2PEE WB2PEF KA2QDT; Tompkins Co. ARC KO2X KC2YC W2CFP.

Net	Freq.	Time/Day	QNI	QSP	QND
NARASEN	75/15	0930/Sn	83	1	4
NYS/1*	3677	1000/Dy	—	—	30
Mike Farad	3925	1300/M-S	182	48	26
THIN	3913	1600/Sn	13	—	3
NYPON*	3913	1700/Dy	477	303	30
NYSPTEN	3925	1800/Dy	536	77	30
ESS	3590	1800/Dy	308	38	28
OCTEN*	34/94	1830/Dy	449	100	30
Q Net	31/91	1830/Dy	376	15	30
STAR/E*	99/39	1830/Dy	28	5	14
WDN/E*	04/64	1830/Dy	524	101	30
Blue Line	93/33	1900/Dy	350	10	30
NYS/4*	3677	1900/Dy	385	222	30
JCARCN	10/70	2000/Dy	456	4	25
OARC Net	25/85	2000/Wed	71	3	5
VHF THIN	04/64	2000/Tue	40	—	4
WNYECN	3955	2000/3Sn	(ARES)		
BRVRN	055/655	2100/Dy	294	11	30
CNYTN*	90/30	2115/Dy	446	120	30
STAR/L*	325/925	2130/Dy	46	19	19
WDN/L*	04/64	2130/Dy	668	148	30
NYS/5*	3677	2200/Dy	364	358	30

*NTS. Lewis Co. ARES 26-5 63/03 Sun 1800; SLVARES 17-2 31/91 Sun 1930; Central District ARES 3rd Sun 2030 40/00. PSHR: W2AET KA2BHR N2BLX WA2FJJ WB2IDS WA2KOJ W2MTA WB2OWO KC2QQ WB2RBA KC2SW W2ZOJ. HAMFESTS: Seaway Valley Sept. 10; HAM-O-RAMA Sept. 10; Elmira Sept. 24; Syracuse Oct. 1. Bulletin Manager W2GLH recruiting OBS; let him hear from you! Affiliated Club Coordinator N2EH invites more clubs to become ARRL affiliated; write to him. EMERGENCY COORDINATORS still needed in Cattaraugus, Chautauqua, Clinton, Essex, Franklin, Fulton, Herkimer, Schoharie, Schuyler and Yates Cos. Contact W2BCH if you can help. Traffic: W2MTA 378, WA2FJJ 274, WB2OWO 262, WB2IDS 248, W2AET 214, WA2HSB 191, W2FR 155, VE2FMQ 141, WB2RBA 137, WB2QIX 123, KC2SW 93, W2ZOJ 92, WA2KOJ 87, KC2QQ 85, KG2D 68, KA2BHR 47, N2BLX 45, W2TZ 33, N2CSB 28, KA2QIK 27, WA2OEP 26, WA2RXO 23, WB2NAO 21, KA2DQA 20, KC2XD 17, AF2K 13, WB2PID 12, N2ABA 11, KA2DBD 10, K2VR 7.

WESTERN PENNSYLVANIA: SM, Otto L. Schuler, K3SMB — SEC: AB3Q. STM: AC3N. OO Coord: KN3B. ACC: N3EE. PIO: WB3CEW. SGL: W3OKN. TC: W3FE. BM: WN3VAW.

Net	QNI	QTC	Sess.	kHz	T/D	NM
WPACW	328	172	30	3585	7:00 P/D	WA3UNX
WPAPTN	465	144	30	3983	6:15 P/D	N3ADU
WPA2MTN	400	69	30	146.28/88	8:00 P/D	W3MML

No report from NWPA2MTN. I regret to announce two Silent Keys, N3MB and W3WBA (creator of the mini-quad). W3IYI celebrates fifty years as an amateur. Congrats. New calls KC3HR was KA3HDL. and N3DKO was KA3JCI. To Extra KC3CY. A ham family now has new General KA3LBQ. Novices KA3LBR & KA3LBS, father is K3ABG. The Ally Co. Comm. Coll. Novice class had a new Novice KA3KZE, 76 years young, who proves codeless license is a farce. The Radio Assn received a Cert. of Merit for their help in providing communications at the Summit Heights tornado. Field Day reports were received from Skyview Radio Soc., Foothills ARC, Mercer Co. RC, Two Rivers ARC, The Nittany ARC, Horseshoe ARC, North Hills ARC, Lawrence Co. ARA, Triple "A" ARC, Steel City ARC. If I missed your club please notify me. The site I was at had rig problems, and I know I did not receive all of my tfc. If you need a speaker at a club meeting, one of the appointees would be willing to be there. Please give whomever you would like to have plenty of notice and what you want. PSHR: AC3N WA3UNX N3CKQ N3ADU. Traffic: N3ADU 450, AC3N 167, N3CKQ 126, WA3UNX 121, KC3BB 92, K3CR 91, W3OKN 86, K3NPW 66, N3FM 57, KI3C 54, WA3QNT 53, K3SMB 53, W3RUL 50, W3IQD 34, KB3JO 33, W3MML 28, KA3HSV 23, W3NGO 20, K3HCT 19, W3KMZ 15, WN3VAW 14, KB3NV 12, W3KUN 10, K3TUA 8, KA3COX 7, K3LTV 7, K3VQV 4, W3LOD 3, KF3V 3, WB3HBE 2, N3KB 2, W3TTN 2. (May) WN3VAW 4. (Apr.) WN3VAW 6.

CENTRAL DIVISION

ILLINOIS: SM, David E. Lattan, WD9EBQ — SEC: W9QBH. STM: KB9X. OO/RFI: K9MX. BM: K9ZDN. PIO: WD9EED. SGL: W9KPT. ASM: K9ORP.

Net	Freq.	Time(Z) Days	QNI	QTC	Sess.
ILN	3690	0030/0400 Dy	513	273	60
IPN	3915	2230 Dy (x Sn)	729	116	30
NCPN	3915	1300 Dy	475	85	27
NCPN	7270	1815 Dy	173	42	24
ITN	3705	0100 Dy	200	67	30
IEN	3940	1500 Sn	108	3	4
IARES	3915	2230 1 + 3 Sn	14	0	1

IL was represented to D9RN 100% by stations K9EHP W9s NXG HOT HLX WB9s ODN NVN BXB WA9WGD KT9N. IL was represented 98% to 9RN by stations KB9X K9s AZS BVE CMO QEW SW MX N9TN W9s INZ NXG KD9K. D9RN was represented 100% to CAND. IL stations were W9s HOT NXG WB9s NVN ODN WGD. The Twin City ARC reports the following election results from the annual meeting in June: K9GWT, pres.; N9AVP, v.p.; K9CW, treas.; W9NYK, secy.; N9ALK, board. Congrats to ITN NM KA9NWO for her recent upgrade to Extra! You sure make the tough job of NM look easy! Rumor has it that the new guy, KT9O, is in reality none other than the former WD9BEX. I thought there was supposed to be an "X" in your new call?! N9ALK is spending most of what used to be his operating time working to see that the hams get a fair shake in the proposed Champaign Co. Tower Ordinance. IL SM WD9EBQ and SEC W9QBH were the guests of the Centralia Wireless Assn on the evening of June 10, and guests of the Southern Illinois ARS on the evening of June 11. At both meetings ARRL structure, the SSC program, ARES, NTS, and emergency operations were discussed. The following day June 12 EBQ and QBH caught up with KB9X as well as with NWO CMO AZS MX BEX and quite a number of others at the Egyptian RC hamfest in Granite City. Many good eyeball QSOs resulted at all three locations on what turned out to be a very productive (and busy) weekend. THANKS FOR HAVING US! ALL ECs AND ARES MEMBERS!! Mark your calendars now for the 2nd annual IL ARES Seminar which will be held on Saturday, October 22 at the Champaign Co. ESDA EOC. All ARES members should make a special effort to attend this event each year. Last year's program was extremely informative and contained information and discussions of vital interest to emergency prepared hams. Ask anyone that was there. The program will again be conducted by IL SEC W9QBH and hosted by Champaign Co. ESDA coordinator WA9YXZ. Plan to attend, and drop a card indicating your intent to: Bob Hajek, W9QBH, IL SEC, P.O. Box H, Riverside 60546. For many long established clubs an annual Field Day outing is nothing new. For a club who's never put together an FD effort, it can be SOMETHING ELSE! Congrats to the amateurs of the Herrin ARC (HARC) on the completion of their first annual Field Day operation and picnic. While HARC didn't operate the full contest period, they did have a good location (Her-

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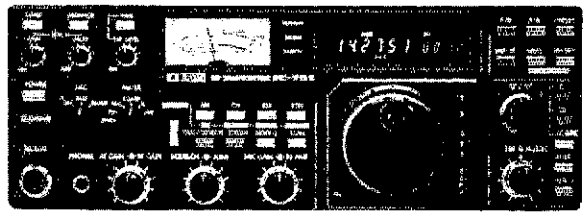

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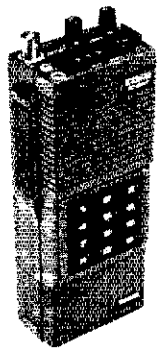

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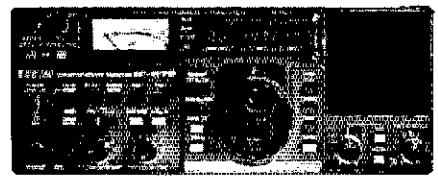

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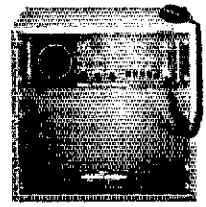

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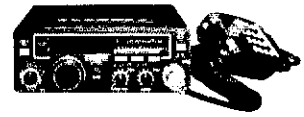

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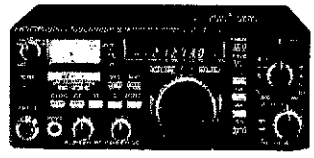

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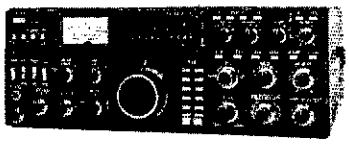

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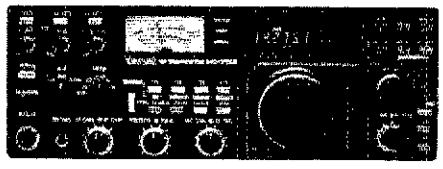

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rin City Park) and were mentioned in a Field Day article appearing in the *Southern Illinoisan*. Hopefully this years event has whetted the appetite of the Herrin hams, and we'll see them back at CQ FD next year! Traffic: K9ZDN 482, W9NXG 214, K9BVE 206, WB9UEA 193, W9JIJ 177, KB9X 161, W9HOT 158, K9CMO 155, KT9J 152, K9AZS 116, K9GMZ 72, W9OK 68, K9EHP 58, WB9WGD 56, W9TLU 43, W9HLX 41, WA9SHE 36, KD9K 34, KN9BAM 30, K9QEW 30, K9MX 28, W9KR 25, KA9NBH 22, W9QBH 19, W9LNQ 16, KB9KX 11, K9SW 10, WA9RUM 7, WD9EED 6, WD9CJB 4, K9ORP 1.

INDIANA: SM, Bruce Woodward, W9UMH — SEC: WB9ZQE. STM: W9JUJ. OO/RFI: KJ9G. SGL: WA9VQO. PIO: K9DIY. SDXC: N9MM. BM: KC9TA. SRC: N9WB. ACC: K9TUS. SCC: W9OBF. TC: WD9ADB. SHC: WA9FUD. NMs: ITN-W9QYY; QIN-KJ9J; ICN-KA9CZD; VHF-W9PMT; IWN-N9BHT.

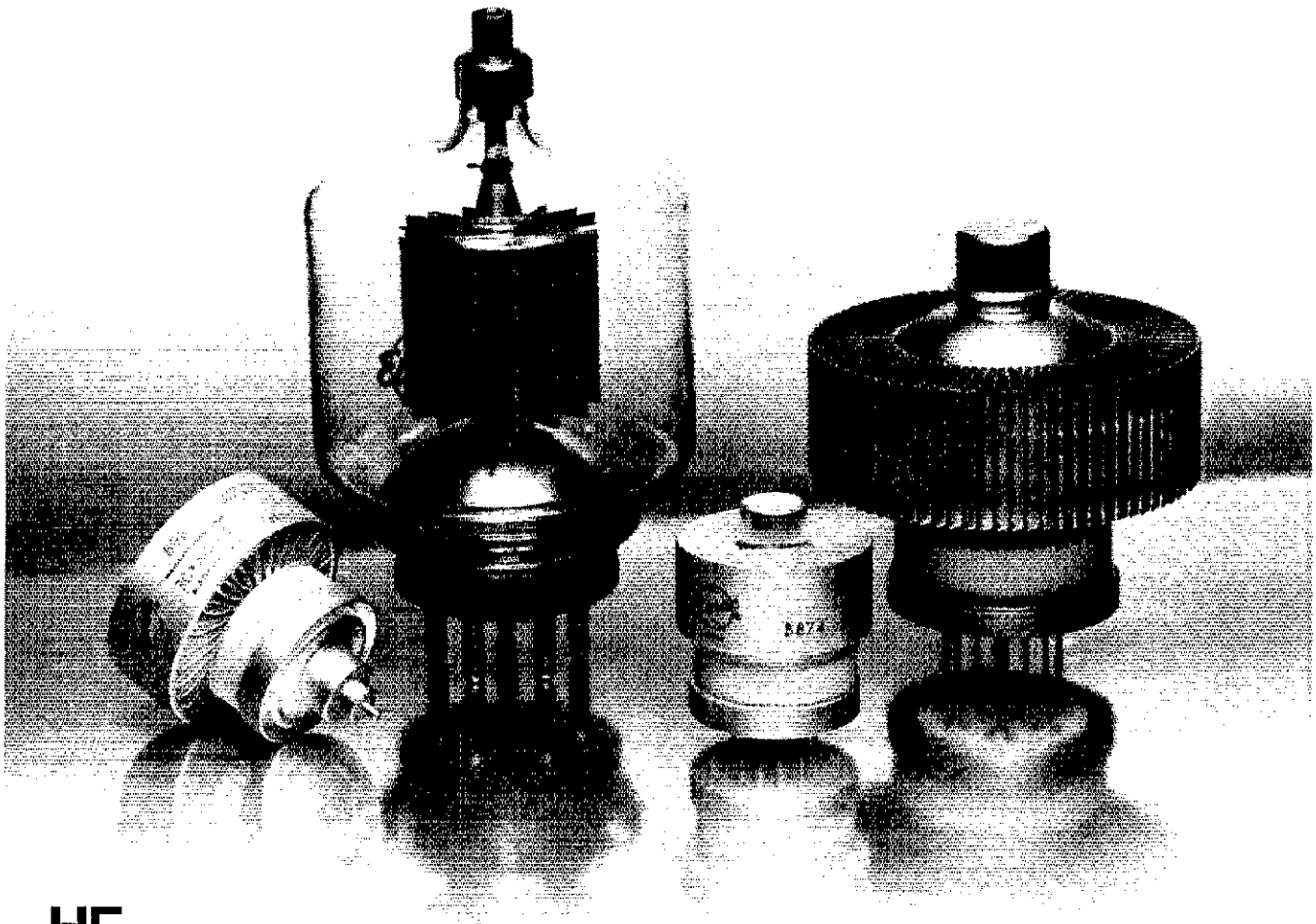
Net	Freq.	Time	QNI	QTC	QTR	Sess.
ITN	3910	1330/2130/2300	2330	306	2069	90
QIN	3656	1430/0100/0400	719	371	1939	89
ICN	3708	2315	---	---	---	---
IWN	3910	1310	2878	---	439	30

Hoosier VHF nets: QNI 6769, QTC 188, QTR 6984, bulletins 69 for 21 nets. D9RN 100% QTC 326 in 1114 min. IN stns W9JUJ W9URQ K9CGS KB9NR WB9MIK. 9RN 100% QNI 397, QTC 390, QTR 1057 in 60 sess. IN stns N9AEI W9EI N9HZ KJ9J W9JUJ WA9QCF W9QLW WB4RNT/9 WB9UYU K9WWJ W9XD. CAND D9RN 100% 814 messages in 30 sess. IN stns W9JUJ KB9NR K9CGS. Appts: STM W9JUJ; SHC WA9FUD; DEC for Vigo and surrounding counties W9MJI; EC for Morgan Co. W9ZSK; EC for Kosciusko Co. W9ENU; EC for Lake Co. KD9BE; ORS WB9DIX. Silent Keys: K9ILI Princeton, better known as the OM of K9ILK. Our deepest sympathy to her. Also W9HZ Indianapolis, W9NQB Muncie, (active on ITN), W5NPM Farmersburg member ITN, QIN, IWN and was ORS, OO & EC. One of our very finest old faithfuls is gone, K9FZX Columbia City was very active and well known throughout the state. 1983 NTS awards were presented to W9QYY, ITN Net Manager, and to KJ9J, QIN Net Manager, at the state convention. ARES award was presented to K9PQP, DEC for the Rush Co. Area. Certificates of Merit were presented to WB9ZQE W9JUJ K9TUS KC9TA KJ9G KA9FFO KM9B W9UEM K9KTH KA9IBU W9URQ WA9OKK K9IIB and KC9F. And now there are five(!) SSCs: FWRC, MAARC, IRCARC, Madison Co. (Anderson) ARC and Co. Hancock ARC. It is good to know that the Pike Co. ARC is considering becoming an SSC. I agree with W9UL that everyone should be an OO/RFI station, but I would like two officially from each county in the state. Calls please! Field Day was fun as usual. Was pleased with the Indiana activity; thanks. Traffic: W9JUJ 725, KJ9J 221, W9QYY 129, W9EI 113, WB9UYU 112, N9AEI 97, W9QLW 97, WA9QCF 71, KA9FFO 60, N9HZ 57, W9URQ 52, W9XD 46, W9UMH 45, W9WWJ 34, W9PMT 33, W9JZV 31, W9UEM 28, WB9ZQE 23, N9CQS 21, KK9D 20, WD9HII 18, KA9LAU 17, KB9HH 14, N9DHX 14, K9FVN 13, K9DIY 10, WD9DWD 10, KK9N 10, WA9OKK 10, W9ZGC 9, W9RTH 8, WB9AWI 7, W9BDP 7, WB9OZZ 7, WD9ART 6, W9DKP 5, WA9JNC 5, W9UPI 5, W9URS 4, WB9AJY 1, W9IOH 1, K9OUP 1. (May) K9ET 51, W9XD 5, K9DIY 3, W9IOH 2.

WISCONSIN: SM, Roy A. Pedersen, K9FHI — SEC: W9OAK. STM: K9UTQ. BWN 3984 1100Z QNI 1310, QTC 1434 WB9YPY. BEN 3985 1700Z QNI 607, QTC 176 WB9ESM. WSBN 3985 2230Z K9ANV. WNN 3723 2300Z QNI 102, QTC 19 KA9HPQ. WSSN 3645 2330Z QNI 192, QTC 55 KC9CJ. WIN-E 3662 0000Z QNI 283, QTC 120 W9YCV. WIN-L 3662 0300Z QNI 234, QTC 15 WA9YVC. NWTN .34/.94 2330Z QNI 484, QTC 36 N9BDL. Gr. Bay .72/.12 Thurs. 0145Z QNI 14, QTC 0 WB9NRK. WCWTN .31/.91 2330Z QNI 468, QTC 33 N9AUG. KA9AFB KA9OIF KA9OIG have Generals. N9CPV & WA9KCU have Advanced. KA9IRE & WB9MSM have Extra. W9YCV has 44 states confirmed and 3 continents on the satellites. On DXCC he has 146 confirmed. Stevens Point swapfest was well attended, only wx was cool. QCWA spring banquet had 144 present. Fifty-year certificates went to W9OVO W9OUT W9MUI W9BCV W9NZF W9OFL W9RF K9IWC & W9JM. Congrats. KA9POL new Novice Dodge Co. area. WB9POK is now KS9F. New Novice LaCrosse area KA9PRN. I received 18 messages from clubs throughout the state from FD sites. Looks like it was a good turnout. KA9IRE is now KW9H. BPL to KA9CPA. WD9ESZ is now KT9I. New Novice Ripon, KA9QDA. New Novices Ozaukee Co. area KA9PZG (XYL of KA9DDN), KA9PZH (XYL of WA9UJK). Traffic: KA9CPA 2442, WB9YPY 270, W9YCV 196, W9CXY 167, WA9WYS 143, K9FHI 140, KC9CJ 121, W9LDO 118, W9UCL 118, W9CBE 114, W9DND 114, W9IEM 112, K9SAO 103, WD9FRI 94, WB9ICH 85, K9AKG 62, N9CRO 53, KA9NOT 50, KA9HPQ 48, K9UTQ 48, AG9G 47, WB9ESM 46, W9SO 45, W9IHW 42, N9BCX 39, KA9IKR 38, WB9JSW 38, N9AUG 36, N9BGE 34, K9JPS 34, WA9ZTY 34, KC9MX 32, WB9NRK 30, W9FDY 29, KB9NG 28, WA9YVC 27, KA9AFB 26, N9ATP 26, N9DCF 24, KB9FM 23, KA9BHL 21, N9BDL 20, KA9GYD 14, KA9NKQ 14, KA9BHK 5, N9CP 5, KV9U 5. (May) KA9AFB 26.

DAKOTA DIVISION

MINNESOTA: SM, Helen Hayes, WBØHOX — SEC: KNØJ. STM: KDØCI. Hello again. June has come and gone already, and with it two of the biggest events of the summer. On the 4th was the amateur fair in St. Paul. I certainly enjoyed talking with many of you. To the ones I did not have an opportunity to see and chat with, I hope one day soon we can do so. The other event was Field Day. I hope everybody had as much fun as I did. I understand some of the contacts were most interesting. One in particular comes to mind that someone had on 40-meter CW. I wonder how many points you get for a contact with GOD! Seriously folks, the best thing to do in a thunderstorm is PULL THE PLUG. We have had our share of severe weather this season. I'm sure our ARES crews are there to render assistance when needed. WBØOLY has embarked on a journey from Winnepeg, Manitoba to Hudson Bay by canoe. He and partner on the trip expect to arrive at their goal sometime in September, after having left Winnepeg on June 13th. As of the 30th, they were at Norway House on the Nelson River. From there they will canoe to the source of the Echimamish River, portage from there to near the source of the Hayes River, and canoe on to the bay from there. They are operating amateur gear with the aid of a solar panel. My thanks to WBØLRK and WDØHDD who are keeping me informed on the progress of their harmonic on this trip. Welcome to new novice KAØQYF. Upgrade: Tech to General-WBØSRZ. Call sign changes: KAØPUB now NØESV; KAØFXA now KDØHB; WD9ESZ now KT9I; KAØNRU now KXØV. Congrats to each of you! Net news: In September, the Piconet Allday Watch will resume its 4th and 5th hours. Net mgr WØHZU is looking for some volunteers to act as net controls. If any of you are interested in giving it a try, contact him or morning captain



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WAØTFC or afternoon captain WBØYSQ. PAW is a good place to get started as an NCS, as well as to meet your friends and other fine people in our fraternity. I'm happy to see the great participation in the nets during the summer. I hope we can secure a few alternates for the evening phone net as standby NCS. Minnesota is at 100% representation on DTEN with several stations participating. My thanks to all of you. Finally, I hear thru the grapevine of a possible hamfest in International Falls during October. Listen on MSPN/E for the latest word.

Net	Freq.	Time	QNI	QTC	Sess.
MSN/1	3685	6:30 P	337	112	30
MSN/2	3685	10:00 P	254	51	30
MSSN	3710	7:00 P	88	10	26
MSPN/N	3945	12:05 P	593	163	30
MSPN/E	3929	5:30 P	934	206	30
MNAMWXNT	3929	6:15 P	382	230	21
PICONET	3925	Daily	2520	246	26

Traffic: WAØTFC 822, WAØHUF 530, KBØMB 517, KT9I 373, KAØEPY 175, WØHZU 173, W9DM 124, KDØCI 114, NØCLS 114, WBØHOX 114, KTØU 79, KAØARP 78, KAØJUX 71, KCØUJ 66, KØBDD 60, WØGRW 51, KTØR 42, WDØAHO 33, KØCSE 20, NØJP 18, WBØLRK 18, NØELB 13, KN9U 12, WDØBGS 11, KYØX 11, KØOGI 6, KAØODJ 4.

NORTH DAKOTA: SM, Dean R. Summers, KQØC — Congrats to NØEHL, new C.D. for Bowman Co. New rptr. in Beulah, tnx to NØEPX. N7EEE back in Dickinson for short vac. with XYL, Sharon and Harmonic. KAØKZX and NØEPS new editors of *BARK Noisesletter*. KAØNUA had BARK picnic at his QTH. KØGRM and KØGGL both Vic-20 owners. Fargo Code Club and BARK had nice Field Day. June DATA net controls were WØOSP NØAFP KBØCH KAØFSM and WDØGMD. Goose River Net 3 sess., 40 QNI, 2 QTC. DATA net 31 sess., 260 QNI, 17 QTC.

DATA	3.9965	Dy	2330Z	KAØFSM
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NDSN	7.145	Sat.	2200Z	KØØL

SOUTH DAKOTA: SM, Fredric Stephan, KCØOO — STM: WØKJZ. SEC: WØYMB. TC: KØAS. SGL: NØCDX. ACC: WBØPWA. Anyone able to outscore the Black Hills Group for the ARRL VHF QSO Party this month? Severe weather spotter training courses successful in Rapid City and Custer ARES Cos. Clubs busiest during Field Day this year were Mobridge ARC, Huron ARC, Hub City ARC and Sioux Falls ARC. Any others? NTS TEN and DTEN liaison stations were WØKJZ KØFRE KCØOO WBØSUM WBØKWX. Qualified traffic handlers always welcomed. SD Traffic Info net 75 QTC, 182 QNI; SD CW Net (SDN) 21 QTC, 83 QNI; SD Evening Emergency Net 45 QTC, 168 QNI; SD Sunday Emergency CW and Phone Nets 8 QTC, 75 QNI; Walworth Co. ARES Net 3 QTC, 12 QNI. PSHR: WØKJZ NØCFS NØEEH KCØOO. Traffic: KCØOO 131, NØCFS 110, WØKJZ 96, WØDVB 58, KAØHMI 42, KØFRE 34, WBØSUM 23, WBØLTV 15, NØEEH 13, WØYMB 11.

DELTA DIVISION

ARKANSAS: SM, Joel M. Harrison, WB5IGF — SEC: N5BPU. TC: W5FD. SGL: W5LCI. Welcome and congrats to AE5L on his appointment as Section Traffic Manager. He has been doing a fantastic job as interim STM for the past year. As I mentioned last month, a computer committee is in the making and should be together very soon. Their task will be to answer questions and help newcomers to computers. The group will be headed by our section Technical Coordinator W5FD. K5UR is in the process of erecting new towers and antennas at his new QTH. Contesters should start planning for the Sweepstakes contest coming up in November. Only 6 Field Day reports received. What happened to the rest? Still looking for an Affiliated Club Coordinator.

LOUISIANA: SM, John Meyer, N5JM — ASM: KC5SF. STM: W5GHP. SEC: WA4MUW. Farewell to summer and memories of Field Day and hamfests across the state and QRN on 75 and new faces taking the club reins for a new year. It seems that we had record numbers of new hams graduate from club-sponsored classes this year, and will probably see many more this fall despite the No-Code activists. Show the way to a prospective new ham by introducing him to the nearest club. What ever money you may have left over from the 1984 World's Fair in New Orleans you can spend at Amacom the '84 Delta Division Hamfest. These guys know how to put on a show . . . start saving now! Several League Leadership positions remain open to interested and qualified hams. Why not inquire to see how you can help others in the state? Welcome to new net mgr. N5BFV.

Net	Freq. (kHz)	Time	NM
LAN	3815	Dy 7 & 10 P.M.	N5BFV
LTN	3910	Dy 6:30 P.M.	N5ANH
LSN	3703	M-F 7:30 P.M.	WD5CWK
LRN	3587.5	Sn 6:30 P.M.	W5GHP
LEN	3910	M 8 P.M.	WA4MUW
CCTN	146.01/61	M-F 6:45 P.M.	GNOARC

Traffic: W5GHP 218, KA5HDT 105, K5TL 98, W5VMY 83, WD5JFY 42, N5ANH 31, WA5TQA 28, WB5LBR 21, N5BFV 10, W5TVW 9.

MISSISSIPPI: SM, Tom Hammack, W5WLF — SEC: N5DDV. PIO for Mississippi is ND5M. Keep him informed of info of public interest. New OBS is W5SGL. EC appts.: K5MK for Mississippi Baptist Disaster Relief; WD5IKD for Rankin Co. and US Weather Service at Thompson Field; NF5Q for City of Clinton (Hinds Co.); W5TXK for City of Jackson (Hinds Co.). DEC for District "G" (Issaquena, Sharkey, Warren & Claiborne Cos.) is K5VXV. Net manager for CAEN is NF5Q and for MSN is KD5TY. Tnx for helping. Central Gulf Coast Hurricane Net will have WB5ILY as net manager in August. Good number of clubs & individual stations in Field Day. Reports from Jackson, Gulfcoast, Mississippi State Univ., New Albany, Pearl River, Laurel & Tupelo. AE5H still pumping out the bulletins. Tnx to all for the hard work. Traffic: N5AMK 215, K5OAF 179, KT5Z 75, N5EZQ 39, N5OAG 14, N5XA 6.

TENNESSEE: SM, John C. Brown, NO4Q — ACC: WA4GLS. SGL: W4WHN. SEC: K4TKG. STM: K4YOL. TC: W4HHK. Now is the time to begin to think about the upcoming election for Section Manager, Delta Division Director and Vice Director. Fellows and gals, please take the time and small, small amount of effort and cast your vote for the candidate of your choice. Remember that if you do not vote, you really don't have any choice in the operations of the section and division and, most of all, the ARRL. All you gotta do is make some small marks on the ballot, place it in an envelope and stick a stamp on, then drop in the mail back to Headquarters. The band activity being an indicator would say that many clubs and groups had a fine 1983 Field Day. Not many groups wanted the extra points for sending a message to the SM or SEC. The tally only indicated nine in all. This is an appropriate time to list the section-wide nets for your participation:

Now electronics technicians can get into VCR Servicing quickly and easily

Learn professional VCR servicing at home or in your shop with exclusive videotaped demonstrations

Today, there are more than 10 million VCRs in use, with people standing in line to have them serviced. You can bring this profitable business into your shop with NRI professional training in VCR servicing. This top-level training supports the industry's claim that the best technicians today are those who service VCRs.

Integrated Three-Way Self-Teaching Program

In one integrated program, NRI gives you a study guide, 9 instructional units, 2 hours of video training tapes accompanied by a 32-page workbook that pulls it all together. At home or in your shop, you'll cover all the basic concepts of video recording, mechanical and electronic systems analyses, and the latest troubleshooting techniques. Your workbook and instructional units also contain an abundance of diagrams, data, and supplementary material that makes them valuable additions to your servicing library.

The "How-To" Videotape

Your NRI Action Videocassette uses every modern communications technique to make learning fast and easy. You'll enjoy expert lectures and see animation and video graphics that make every point crystal-clear. You'll follow the camera eye into the heart of the VCR as step-by-step servicing techniques are shown. Both electronic and mechanical troubleshooting are covered . . . including everything from complete replacement and adjustment of the recording heads to diagnosing microprocessor control faults.

Plus Training On All The New Video Systems

Although your course concentrates on VCRs covering Beta, VHS, and ¾" U-Matic commercial VCRs, NRI also brings you up to speed in other key areas. You'll get training in capacitance and optical video disc players, projection TV, and video cameras. All are included to make you the complete video technician. There's even an optional final examination for NRI's VCR Professional Certificate.

Covers Beta *and* VHS systems with actual instruction on videotape.

The Best Professional Training

This exclusive self-study course has been developed by the professionals at NRI. NRI has trained more television technicians than any other electronics school! In fact, NRI has consistently led the way in developing troubleshooting techniques for servicing virtually every piece of home entertainment equipment as it appears in the marketplace.

Satisfaction Guaranteed . . . 15-Day No-Risk Examination

Send today for the new NRI Self-Study Course in VCR Servicing for Professionals. Examine it for 15 full days, look over the lessons, sample the videotape. If you're not fully satisfied that this is the kind of training you and your people need to get into the profitable VCR servicing business, return it for a prompt and full refund, including postage. Act now, and start adding new business to your business.

Special Introductory Offer

This complete VCR training course with two hour videotape is being offered for a limited time only, on orders received from this ad, at our low introductory price of $179.95. Save $20 by acting now!

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YES! Get me started in profitable VCR servicing. Rush me my NRI self-study course in VCR Servicing for Professionals. I understand I may return it for a full refund within 15 days if not completely satisfied.

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Education Center
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Washington, DC 20016

PLEASE SPECIFY TAPE FORMAT DESIRED ☐ VHS ☐ BETA

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Enclosed is my ☐ check ☐ money order for $179.95 (D.C. residents add 6% tax) Make check payable to NRI

Charge to ☐ VISA ☐ MasterCard _____
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Software Available for Six Computers

The versatility of the personal computer gives you a whole new world with the Kantronics Interface™ and Hamsoft™ or Hamtext™. The Interface™ connects to any of six popular computers with Hamsoft™ or Hamtext™ giving you the ability to send and receive CW/RTTY/ASCII. An active filter and ten segment LED bargraph make tuning fast and easy. All programs, except Apple, are on program boards that plug directly into the computer.

Hamtext™, our new program, is available for the VIC-20 and Commodore 64, with all the features of Hamsoft™ plus the ability to save received information to disc or tape, variable buffer sizes, VIC printer compatibility, and much more. Our combination of hardware and software gives you the system you want, with computer versatility, at a reasonable price.

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ASCII send/receive 110, 300 Baud

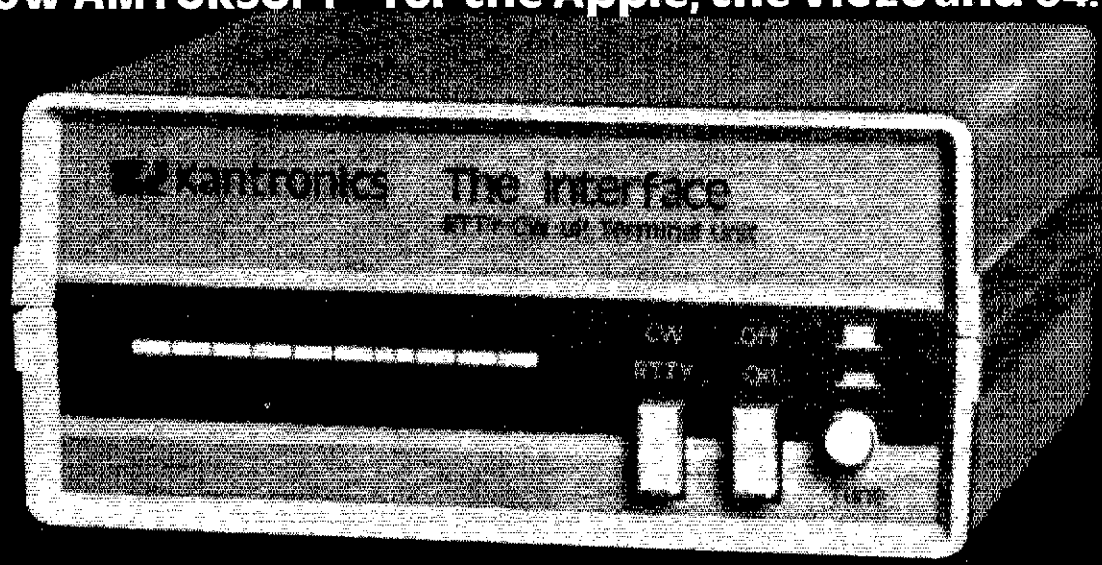
Hamsoft™ Prices

Apple Diskette	$29.00
Atari Board	$49.95
VIC-20 Board	$49.95
TRS-80C Board	$59.95
TI-99 Board	$99.95

Hamtext™ Prices

VIC-20 Board	$99.95
Commodore 64 Board	$99.95

Now AMTORSOFT™ for the Apple, the VIC20 and 64.



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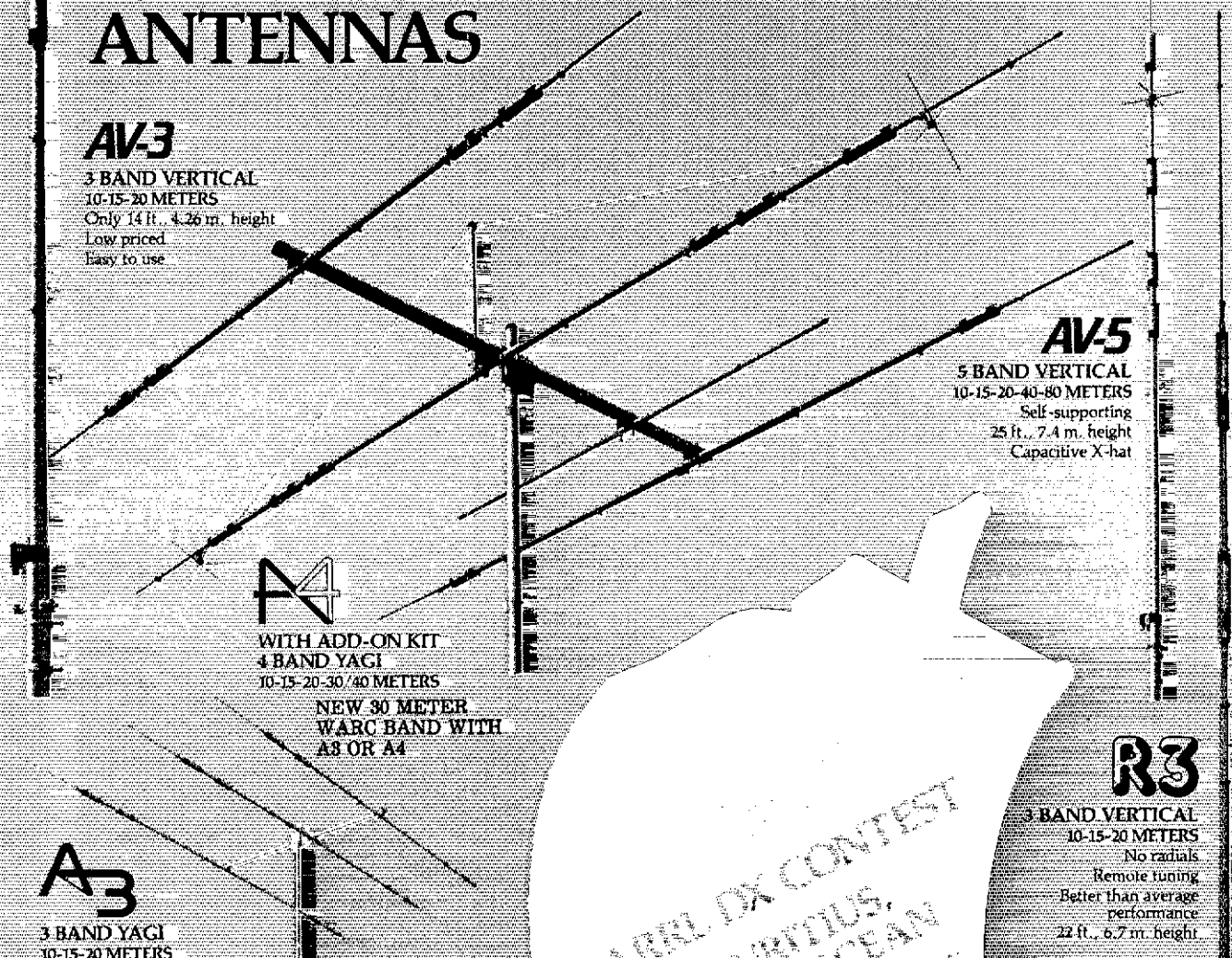

AV-3

3 BAND VERTICAL
10-15-20 METERS
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Low priced
Easy to use

AV-5

5 BAND VERTICAL
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Self-supporting
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A4

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10-15-20-30/40 METERS

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A3

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R3

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Better than average performance
22 ft., 6.7 m. height

THE CHOICE, A FAVORITE FOR DX-PEDITIONS

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. 1¼ 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., 9.7m., weight 37 lbs., 16.8 kg., turn radius 18 ft., 5.48 m., mast dia. 1¼" to 2 in., 3.18 to 5.08 cm., material 6063-T832 seamless aluminum.

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CLIFFORD
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30RM 30A ps w/meters 119 m
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32S-1 Transmitter 189 mf
32S-3 Transmitter 329 mc
30L-1 Linear 499 v
312B-4 Station control 189 mf
KWM-2 Xcvr (round) 499 v
312B-5 PTO console 299 v
516F-2* AC supply 149 mfcv
*Not sold separately
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MLA-2500 Linear $589 f
Clipperton L Linear 469 mc
HF-ACS 10A 12v ps 39 m
W-2 Wattmeter 69 v
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R-4A Ham Rcvr 149 v
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*Sold with Rcvrs only
FS-4 Synthesizer 149 m
R-7 SW Receiver 869 mfce
R-7A SW Receiver 1099 e
T-4X Transmitter 149 c
T-4XB Transmitter 225 m
T-4XC Transmitter 275 mf
TR-4 Xcvr 225 mwfc
TR-4C Xcvr 275 mfc
TR-4CW Xcvr 349 mfce
TR-4CW/blanker 399 w
AC-3* AC supply 59 mf
AC-4* AC supply 89 all
*Not sold separately
DC-4 DC supply 69 wf
TR-7 Xcvr 750 m
TR-7/300/500 Hz 799 m
TR-7/NB/1.8/aux 849 v
TR-7/NB/500 Hz filter 825 w
TR-7/fan/NB/500/1.8 889 v
TR-7A Xcvr 999 e
TR-7A/fan/1.8 KHz filter 1049 v
PS-7 Power supply 199 mfve
PS-75 Power supply 99 m
MS-7 Speaker 29 m
MN-75 Tuner 149 m
RV-7 Remote VFO 119 mwve
C-4 Station console 199 f
7077 Desk microphone 29 v
TR-33C 2m FM portable 89 m
AA-10 10w 2m amplifier 29 m
UV-3 3-band FM Xcvr 659 e
UMK-3 Remote trunk kit 39 e
ETO
76PA Linear amp 1399 m
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ST-6000 Demod/keyer $399 m
ST-5000/low Demod 159 m
RVD-1002 Video conv 149 m
DS-3000KSR Term vers 2 499 m
DS-3000KSR Term vers 3 599 m
DS-2000KSR Terminal 269 m
RKB-1 RTTY keyboard 79 m
HEATH
SB-201 Linear amp $299 m
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PS-1220B 20A ps/2m amp $169 w
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FSK-1000 Demodulator $369 f
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IC-701 Xcvr w/ps $569 me
IC-701 Xcvr only 469 mc
IC-701PS AC ps 89 wc
IC-720 Xcvr 649 m
IC-720A Xcvr 699 mf
PS-20 Power supply 159 mf
PS-740 Internal ps 119 m
IC-2KL Linear amp 999 f
IC-551D/FM 80w 6m Xcvr 529 m
IC-25A/red 2m FM Xcvr 229 v
IC-211 2m Xcvr 369 we
IC-251A 2m Xcvr 459 me
IC-215/BC-20 2m port 109 m
IC-202S 2m SSB port 189 m
IC-3PA AC supply/spkr 35 f
IC-3PE AC supply/spkr 35 f
KDK
FM-2030 2m FM Xcvr $199 mc
KLM
PA2-25B 25w 2m amp $ 49 f
KENWOOD
R-599A Ham Rcvr $199 w
R-599D Ham Rcvr 229 e
T-599D Transmitter 299 e
TS-120 Xcvr 399 w
TS-130V 25w PEP Xcvr 429 m
PS-30 20A power supply 99 m
DFC-230 (new close-out) 169.95 all
VFO-120 Remote VFO 119 m
TS-180S/DFC Xcvr 549 m
TS-180S/DFC/CW filter 589 f
TS-520 Xcvr 449 f
TS-520/CW filter 479 c
TS-520S Xcvr 469 mf
TS-520SE Xcvr 449 e
DG-5 Digital disp 99 cv
SP-230 Speaker 49 w
TS-820/DG-1 Dig Xcvr 549 wv
TS-830S Xcvr 699 w
VFO-240 Remote VFO 119 w
AT-230 Ant tuner 139 m
BS-5 Pan kit (520/S) 49 w
BS-8 Pan kit (820/S) 49 w
SM-220/BS-8 Scope 319 m
R-820 Ham receiver 589 mv
R-1000 SW Receiver 299 mw
TV-502 2m transverter 169 we
MC-50 Desk mic 29 mc
IR-7730 2m FM Xcvr 219 f
TR-7800 2m FM Xcvr 219 v
TR-9000 2m Xcvr 299 m
TR-9130/TTP 2m Xcvr 369 m
KPS-7 6A power supply 59 f
KPS-7A 6A power supply 55 f
KPS-12 10A ps 69 m
KPS-21 16A ps 89 f
TR-2400 2m FM HT 199 m
MCM (Daiwa)
CNA-2002 Ant tuner $329 m
MACROTRONICS
TA-650 Interface/Apple $199 m
T-2 Terminall/Apple II 299 m
T-3 Terminall/TRS-80/3 299 m
MICROLOG
AVR-2 Demodulator $199 mv
ACI-1 Terminal 579 mv
MIRAGE
B-23 2/30w 2m amp $ 59 w
NPC
IR-16 10A power supply $ 59 mf
104R 4A power supply 25 m
NYE VIKING
MB-I-02 Ant tuner $129 w
MB-IV-01 Ant tuner 259 m
SSK-1K Keyer/paddle 59 m
046-001 Phone patch 35 m
PALOMAR
PT-2500A Tuner $189 w
PANASONIC
RF-2600 SW receiver $119 e
RF-6300 SW receiver 299 we
TR-9300 9" B & W monitor 109 v
RCA
TC-1501/16 Camera $139 m
TC-11109 B & W monitor 109 m
ROBOT
80 Camera $ 99 w
SONY
ICF-2001 SW receiver $149 f
SWAN/CUBIC
Astro 150 Xcvr $469 m
PSU-5 AC supply 79 m
102BX Xcvr 499 e
PSU-6 AC supply 119 e
PSU-6A AC supply 119 m
PS-1215 AC supply 19 m
117XC AC ps/spkr 99 m
Mark II Linear 569 m
TEMPO
Tempo One Xcvr $249 m
AC/One AC supply 89 m
VF/One Remote VFO 89 m
2020 Xcvr 399 w
TEN-TEC
505 Argonaut Xcvr $199 m
210 AC supply 19 v
580 Delta Xcvr 449 mfv
580/NB/250 Hz filter 499 m
580/NB/500 Hz filter 499 m
Omni A ser B/NB/500 Hz 429 m
546 Omni D series B 469 mv
546C Omni D series C 629 me
243 Remote VFO 119 e
252G AC power supply 79 m
280 Power supply 99 m
255 Deluxe supply 129 e
234 Speech processor 69 me
247 Ant tuner 49 w
229 Ant tuner 179 f
216 Microphone 12 m
USI
PI-2 12" grn monitor $109 m
YAESU
FR-101S Ham Rcvr $249 m
FR-101DIG Ham Rcvr 289 m
FR-101DIG/CW/AM filts 329 m
FL-101 Transmitter 289 m
FT-101ZD Dig Xcvr 549 m
FT-101ZD Mk II Xcvr 579 m
FV-101Z Remote VFO 99 mf
SP-101 Speaker 19 w
SP-101B Speaker 19 m
FT-301S DIG 40w Xcvr 289 m
FT-301AD Xcvr 399 m
FP-301 AC supply 99 m
FV-301 Remote VFO 89 m
FT-901DM Xcvr 649 mv
FT-901DM/CW filter 669 v
SP-901 Speaker 25 m
FT-107M/DMS/CW/int ps 659 m
FT-107M/DMS/WARC 749 w
FP-107E External ps 99 w
FTV-107 Xvtr w/2m mod 199 m
6m module for Xvtr 69 m
FT-707 Xcvr 469 m
FTV-707 Xvtr w/2m 189 w
FT-ONE Xcvr 1299 m
FRG-7 SW Rcvr 189 m
FRG-7000 SW receiver 269 wf
FRG-7700/MU Rcvr/mem 429 f
FRT-7700 Ant tuner 35 wf
FT-221R 2m Xcvr 329 f
FT-480R 2m Xcvr 329 fe
FT-720RVH 2m FM Xcvr 189 m
FT-720RVH/Rp/pl/cable 239 f

7-22-83

(1) This list was prepared from an inventory taken on the date shown. The letters after the prices indicate in which store the equipment was located at that time. The quantities vary. In some cases there are several of an item, others, only one. Due to the lead and distribution time of this publication, some of the items may have already been sold by the time you see this ad. However, due to the number of trades we are involved in each day, some items are in stock that are not listed. (2) We reserve the right to sell certain power supplies and accessories only with matching transmitters or transceivers, depending on our stock situation. (3) Sometimes used gear is serviced after we receive your order. Please allow for a few days delay in shipping your order. (4) No trades on used gear. (5) Used gear policies do not apply to New Equipment special, Closeouts, etc.

USED AES SHOP TEST EQUIPMENT

HEWLETT-PACKARD
606A .05-65MHz sig gen 895
608E .10-480MHz sig gen 1895
8640B .5-1024Mhz sig gen w/options 001/002/003 5895
11710 10Khz-11Mhz down converter; 8640B 895
SINGER-GERTSCH
FM-10CS w/RFM-10A, FIM-3 & ODM-1 4995
OAM-1 AM mod for FM-10C 395

NEW EQUIPMENT Closeouts & Specials

AEA
HTM Mic. for ICOM HTs 9.95
ALLIANCE
HD-73 Dual speed rotor 99.95
BUTTERNUT
HF6V 6-band vertical ant 119.95
DRAKE
Theta 7000E comm. term. 599.95
Theta 7000E w/9" monitor 699.95
L-75 Linear w/tube 699.95
EIMAC
3-500Z tubes each 99.95
HAL
CWR-6850 term/crt/kbd 789.95
HYGAIN
207 2m 5/8 trunk mt ant 9.95
ICOM
IC-720A 9 band xcvr 899.95
IC-290A 2m multimode 389.95
IC-402 432 portable SSB 299.95
IC-502A 6m portable SSB 314.95
IC-251A 2m multimode *549.95
*+ $50 Factory Rebate
KDK
FM-2030 2m FM xcvr/TTP 269.95
KLM
KT-34A 20-15-10m beam 299.95
Power Amplifiers
15-40BL 2m 5-15 in/40 out 89.95
4-80BL 2m 1-4 in/80w out 169.95
15-80BL 2m 5-15 in/80 out 119.95
4-40CL 450 1-4 in 40w out 199.95
KENWOOD
DK-520 DG-5/520 adaptor 5.00
AT-180 Antenna tuner 149.95
SP-180 Spkr w/audio filt 49.95
VFO-180 Ext. VFO; TS-180 99.95
DF-180 Dig. freq. control 99.95
AM-599 AM filter for R-599 24.95
VFO-700S VFO; TS-700S/E 59.95
MB-1A Mobile mt; TR-2200 4.95
RM-76 Microprocessor cont 69.95
ST-1 Desk chgr for TR-2400 79.95
BH-1 Belt hook for TR-2400 4.95
LH-1 Leather case; 2400 37.95
TR-7600 2m FM xcvr 229.95
RO-9 Sys base, TR-9000 32.95
TS-600 6m multi-mode 569.95

DFC-230 20 Hz step Digital Frequency Controller for TS-120S, 130S/SE, 530S, 830S - **Closeout $169.95**

Last Chance on ROBOT 800 SUPER TERMINALS at 1/2 Price! Closeout $447.50

REGENCY
Prog scanner 189.95
IRAM
Automatic SWR/wattmeter 69.95
VALOR
1/4 wave mag mt antenna 14.95
YAESU
FV-101Z 101ZD/902 VFO 129.95
FV-101DM 101ZD scan VFO 199.95
FV-901DM ZD/902 VFO 249.95
SP-107P 107M Spkr/patch 45.00
SP-901P ZD/902 spkr/ptch 59.95
FT-627RA 6m FM xcvr 299.95
FT-680R 6m multimode 389.95
FT-720RU 10w 440 FM 299.95
FT-404R/TTP 440 FM HT 189.95

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Contact AES Today for your Quote

Sorry we do not take in trade Hand-Helds, FM amplifiers or kit Wired equipment

Location	Local Phone	Nationwide	In-State
m = Milwaukee, WI 53216; 4828 W. Fond du Lac Ave	(414) 442-4200	1-800-558-0411	1-800-242-5195
w = Wickliffe, OH 44092; 28940 Euclid Ave	(216) 585-7388	1-800-321-3594	1-800-362-0290
f = Orlando, FL 32803; 621 Commonwealth Ave	(305) 894-3238	1-800-327-1917	1-800-432-9424
c = Clearwater, FL 33575; 1898 Drew Street	(813) 461-4267		
v = Las Vegas, NV 89106; 1072 N. Rancho Drive	(702) 647-3114	1-800-634-6227	
e = Chicago, IL Erickson Communications (Associate)	(312) 631-5181		

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Connect your computer to the air!

The "AIRWAVES" that is, thru the Microlog AIR-1, a single board terminal unit AND operating program that needs no external power supply or dangling extras to put your VIC-20 computer on CW & RTTY. And what a program! The famous Microlog CW decoding algorithms, superior computer enhanced RTTY detection, all the features that have made Microlog terminals the standard by which others are compared. Convenient plug-in jacks make connection to your radio a snap. On screen tuning indicator and audio reference tone make it easy to use. The simple, one board design makes it inexpensive. And Microlog know-how makes it best!

There's nothing left out with the AIR-1. Your VIC-20, America's most popular computer, can team-up with Microlog, America's most successful HAM terminal, to give you an unbeatable price and performance combination for RTTY & CW. If you've been waiting for the right system at the right price, or you've been disappointed with previous operating programs, your time is now. At $199, the complete AIR-1 is your answer. Join the silent revolution in RTTY/CW and put your VIC-20 ON-THE-AIR! See it at your local dealer or give us a call at Microlog Corporation, 18713 Mooney Drive, Gaithersburg, Maryland. TEL (301) 258 8400. TELEX 908153.

Note: VIC-20 is a trademark of Commodore Electronics, Ltd.

MICROLOG

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TN CW Net	3635	Dy	0100 (All UTC)
TN Slo CW Net	3702(7102)	Dy	0000
TN RTTY Net	3625	Dy	0130
TN EMP Net	3980	M-F	1140
TN MP Net	3980	M-F	1245 (Ssn & Hol 1400)
TN Eve P Net	3980	M-S	0030
Mid TN Ten M Net	28.8	T & F	0200
TN EC Net	3980	Wed	0130

There are many 2-meter nets and one six meter net that you can join and extend your talents and friendly association. Try it and see, you might just like it. You never know till you try it. Section traffic for the period is: low frequency — sessions 97, QNI 3674, QTC 221; VHF — sessions 94, QNI 2288, QTC 518; CW — sessions 62, QNI 370, QTC 129; RTTY — sessions 28, QNI 80, QTC 0. CW Honor Roll for month: TSN — W4DDK NG4J K4UJZ K9IMI/4 W4ZJY. No net reports from 9,12,15,19 & 22. W4DDK has been appointed NM for the TN CW Net. Traffic: NG4J 181, W4ZJY 134, K4WWQ 83, W4DDK 70, WD4GYT 51, NM4W 23, NQ4Y 23, W4PFP 22, K4UMW 13, KA4BSG 11, WA4HKU 10, KE4LS 10, WD4SIG 8, W4TYV 8, W4PSN 6, NN4S 6.

GREAT LAKES DIVISION

KENTUCKY: SM, Ann Sloan, KA4GFU — Northern KY Emergency Net 7:30 P.M. Tue 147.86/26. N4EZE now KF4YP; KB4DHG is N4IVQ; KB4GBE is new Novice in O'boro. Welcome to CW nets AB4Y NW4A and WK4D, but more CW ops needed. New OBS are K4DMU KC4WN K4YZU. District ARES reports are needed by SEC — WA4JAV. O'boro Swapfest Oct. 29.

Net	QNI	QTC
KRN	480	27
MKPN	925	115
KTN	846	114
KYN	187	83
KSN	211	74
KNTN	296	84
KYPON	62	6
CARN	132	14
PAEWT	223	16
SEKEN	28	1
TSTMN	453	58
WTEN	64	9
BARES	89	11
3ARES	47	10
4ARES	68	4
5ARES	95	14
7ARES	29	0
11ARES	61	5

Traffic: WA4JTE 134, WD4IYI 111, KA4MZY 99, WA4YPQ 91, KA4SAA 90, WD4BSC 84, KA4GFU 83, K4MHL 82, KB4OZ 76, KA4BCM 68, KC4WN 67, N4GD 59, KA4SKV 37, WA4JAV 24, KA4YIV 24, KZ4G 22, WD4RWU 20, WA4EBN 19, KA4MTX 18, W4WQV 18, WA4AVV 17, WB4NHO 16, KD4TY 14, WA4AGH 11, WD4CJO 10, WD4IYH 10, WD4CQF 9, K4HOE 9, WB4AUN 8, W4PKX 8, N4HZT 7, WA4NOG 7. KA4MAP 6, WA4SWF 6, KA4MBF 4.

MICHIGAN: SM, James R. Seeley, WB8MTD — ASM: WA8DHB. SEC: WA8EFK. STM: WD8RHU. OO/RFI Coord.: K8JH. ACC: K8SB. PIO: WA8PII. SGL: N8CNY. TC: WB8BGY. BM: KZ8V. Join the MI ARES net, Sn, 3932, 1730, and the Traffic Workshop, Sn, 3953, 1600 (times local). 3932 is MI HF emer. freq. Silent Key, with deep regret: KA8HON. New appts: ORS, WD8OUO; EC (Charlevoix Co.), N8CVP. Again this year, a high level of FD activity for MI hams as observed on the air and from the numerous messages received. I have to keep reminding folks that FD is, among other things, a public service activity, and an emergency preparedness exercise, and as such counts 5 points in PSHR category 9. And for those who never have tried it, FD is a heck of a lot of fun! Beginning Mon., Sept. 12, there will be a new weekly net on the MI HF scene: The MI ARRL Information Net, 1945 hrs. local, 3953 kHz. I will serve as moderator, and as many of your section officials as can make it will be there. It will be on-the-air forum, open to all. The main thrust will be ARRL news and info, and as such will include the concept of last spring's short-lived bulletin net, but with a broader base. ANY serious question on any aspect of Amateur Radio will be considered and answers attempted; any legitimate topic will be discussed. This, by the way, is not a new idea with me — it's borrowed from a successful, on-going activity in AL section conducted by their SCM W4IBU. Join in, please. Your leadership people need your input on current affairs as much as you need the news we will have for you. Congrats to MI's first Special Service Club, the Monroe Co. Amateur Communications Assn. It was a bit of a struggle, but they stuck with it and made it. Special thanks to ACC K8SB for his patience in unscrambling the paperwork. Jackson's Cascades ARS deserves honorable mention for their season's public service work. At this writing (early July) they have, since Mar. 29, hosted a "no-code" meeting, held two fox hunts, worked a regatta, a parade, three charity runs and a bike-a-thon, a hospital move on the same day as FD, a balloon race, and a special event station at the MI Space Center's 6th anniversary celebration, and caused a minor NTS overload from the latter event. Now *that's* an active club! With the FCC's removal of 3rd party logging requirements I hope to see many rptr groups which in the past might have been unwilling to allow traffic operations on their machines actively pursuing this useful and rewarding public service activity. This would be especially welcome in the larger metropolitan areas. SGL N8CNY is available to put on programs for club meetings: "The Law and Amateur Radio," (my guess at his title) and related items surely would make for an interesting and informative meeting. He can be contacted almost any evening on MITN or GLETN. His home phone is 571-484-1665. BPL: AF8V.

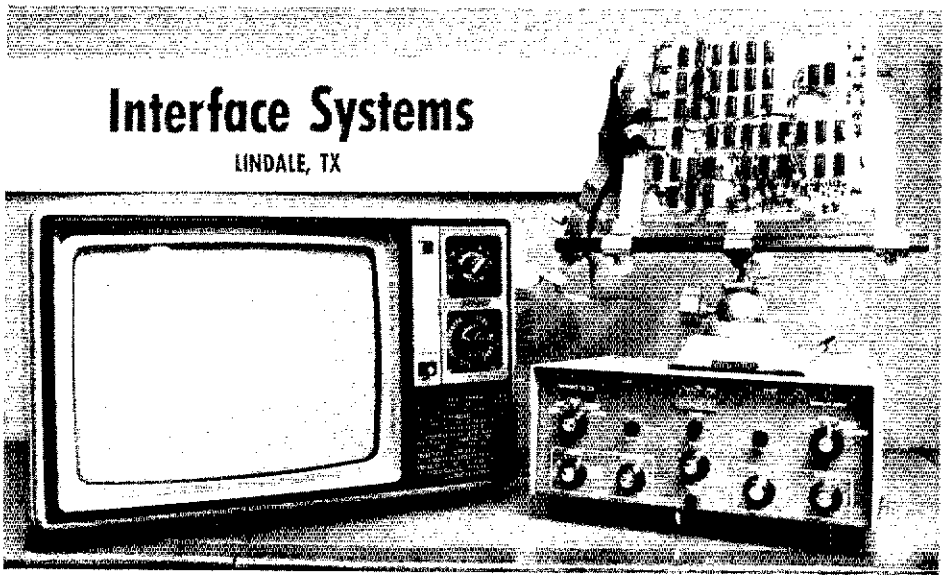
OHIO: SM, Allan L. Severson, AB8P — SEC: K8AN. STM: K8OZ. ACC: K8US. PIO & SGL: N8CVK. TC: KB8MU.

Net	QNI	QTC	Sess.	Time (local)	Freq.
BN	437	252	60	6:45/10 P.M.	3.577
BNR	236	94	30	6:00 P.M.	3.605
BSSN	344	223	59	9:45 A/7:15 P.M.	3.927
ONN	—	—	—	6:30 P.M.	3.708
OSN	281	100	30	6:10 P.M.	3.577
OSSBN	2003	706	90	10:30 A.M., 4:15 & 6:45P.M.	3.9725
OSSN	133	61	30	6:45 A.M.	3.577
06MN	—	—	—	9:00 P.M.	50.160

Good to see so many of you during Field Day weekend. I managed to get to 16 sites, but had to pass up dozens of others. Makes one realize how large this Section is, and how fast the weekend goes. I saw some amazingly innovative emergency power and antenna set-ups, ate some gourmet-quality food (and some my dogs would refuse — but I'm not going to say which is which), and generally

Don't Get Stuck With Low Resolution & Only One Memory

This Is The Unit That Can Be Upgraded



COLOR CONVERSION FOR ROBOT 400*

Interface System's new 12 memory conversion offers picture perfect high resolution color. This new system is the 3064-C Series. Its twelve 64K RAMs, video input multiplexing and timing circuits provide excellent results in both receiving and transmitting. Four modes of operation are available at the operator's fingertips. Its compatability with existing on-the-air transmissions is outstanding. It provides more memory storage capability than any other unit currently available to SSTVers.

Modes of Operation

1. 8.5 sec. frame sequential
2. 17 sec. high resolution frame sequential
3. 128 line sequential (25.5 sec.) single frame transmission
4. 256 line sequential (51 sec.) single frame transmission

Storage Capability

1. 12 B/W pictures (128 x 128) world standard format now in use
2. 6 high resolution B/W pictures (128 x 256)
3. 4 full color pictures (128 x 128) 4,096 hues of color
4. 2 high resolution full color pictures (128 x 256) 4,096 hues of color

Total Capability

1. Used with B/W camera and RGB filters
2. Instantly snatch color pictures using color camera
3. Instantly snatch a commercial or public color television picture
4. Single snatch capability from a VCR composite or RF outputs
5. Interface any computer (B/W or color) using the I/O port
6. Displays, transmits and receives 4 x 3 or 1 x 1 aspect ratio in any mode. 4 x 3 aspect ratio is full screen.
7. Compatible with systems now in use worldwide
8. Overlays graphics (snatch & receive modes) over any picture in memory

Any future modifications will be sent to you free of charge providing order is received on or before September 30, 1983.

BASIC SYSTEM NECESSARY TO GET ON COLOR

You may purchase either High Resolution or Standard Resolution, which you may later upgrade.

Standard Resolution

3000-C Conversion. This system contains twelve 16K memory chips. This board is completely assembled, aligned and tested. Kit includes all installation parts and instructions. Kit $485

High Resolution

3064-C Conversion. This is the 3000-C system upgraded for high resolution. It contains twelve 64K memory chips. Kit includes all installation parts and instructions. Kit $560

Television Interface

ISTV-3. This system is installed in your television set. It provides interfacing to the first video amp and the red, green and blue guns of the television set. It also provides red, green and blue video outputs from the TV set providing correct color separation. This modification makes an ideal monitor for both standard and high resolution color video. Kit $134

Additional Modification Available

1. Single frame (line sequential) and color bar generator $65
2. Full screen (4 x 3 aspect ratio) $134
3. First sync modification and graphic overlay N/C
4. CIM 4000. This is a computer interface module for any computer with an I/O port. Video is transferred from the memories of the ROBOT 400* to the memories of the computer. All types of image processing and graphic overlays are possible (software not included) $120

The following TV sets can be used with this system:

Gold Star 13", model #CR407
K-Mart 13", model #KMC 1311G
And Others

All modifications can be installed by **Interface Systems.** For further information or to place an order, call (214) 882-9908.

INTERFACE SYSTEMS

Route 4, Box 634K, Lindale, TX 75771

WE REVOLUTIONIZED COLOR SLOW SCAN TV

*Robot 400 is trademark of Robot Research, Inc.

had a wonderful time. As I've said again and again, "Amateurs are marvelous folks." This is may last opportunity to plug this year's Great Lakes Convention/Cleveland Hamfest. Interesting forums already set in place, good banquet, and at last word, as speaker, journalistic television's grand and great lady, 90-year-old Dorothy Fuldheim, who is always entertaining and informative. It'll be an affair you shouldn't miss. Club election: Massillon ARC: W8AU, pres.; WB8KLC, v.p.; N8ATZ, secy./treas. And welcome new affiliated club Portage ARC, really off and running. Upgrades (busy month): To Extra: N8CDC KA8HOE KA8RZJ N8AXX W8CLA KB8ZR WB8QXN (now NC8Q), KD8GE and NA8W. Congrats all!

Local Nets	QNI	QTC	Sess.
BARF	58	30	15
BRTN	206	142	30
COARES	151	13	4
Medina Co.	287	54	30
NEON	155	26	29
NCTW	32	46	16
RARA	70	3	5
TSRAC	1307	75	42
VWCEN	21	3	3

Traffic: WD8MIO 626, K8NCV 511, W8PMJ 420, WD8KFN 306, AB8P 196, KF8J 190, W8SKP 189, N8DSU 176, N8EES 173, W8QZK 172, KD8IC 157, K8YUW 152, K8JDI 143, WB8DMF 134, KA8IAF 113, W8EK 106, KA8GJV 83, K8TVG 83, K3RC 72, WA8GMT 66, WD8KBW 61, K8AN 52, WD8RGP 52, KA8MEB 49, WD8NEC 49, WD8IKC 48, WA8SSI 45, WB8JGW 41, WB8UBR 41, W8BHL 38, WD8AYH 37, N8EBC 35, KA8GGZ 34, WA8HED 34, KA8CGF 32, KV8Q 32, W8CXM 31, N8EHR 30, WA8QYJ 25, K8DL 23, WB8YTD 23, W8ZM 22, N8CGM 20, K8CKY 19, K8EM 19, WB8KQJ 18, WB8SIQ 18, KA8DJZ 17, W8FUP 17, WD8RGS 16, KA8DJZ 15, WB8MRL 15, N8AEH 14, N8CW 14, WB8NHV 13, WD8RZG 12, KA8ICB 11, WD9HDZ 9, KA8GMF 8, WA8ZID 8, WD8EKI 7, WD8DOS 6, W8LZE 6, WB8NTR 6, N8AJU 4, N8CJS 4, W8RG 4, WB8SRC 4, W8OQL 3. (May) KA8DJZ 15, WB8NTR 5, W8RG 5.

HUDSON DIVISION

EASTERN NEW YORK: SM, Paul S. Vydareny, WB2VUK — STM: WA2SPL. SEC: KB2KW. ACC & SC: N2BFG. BM: WB2EAG. Very little club news this month. PEARL announced new officers: N2CPX, pres.; WB2EAG, v.p.; WB2PDV, secy.; N2CSX, treas.; K2AV WB2HOL, directors. Rec'd FD msgs from following: Albany Co. RACES/ARES, WECA, Overlook Mtn ARC, Adirondack ARC, Magillas Gorillas, Schenectady ARC, Poughkeepsie ARC. Net reports: AESN-sess. 4, stns 62, QTC 3; EPN-sess. 30, QNI 162, QTC 165/145; SDN-sess. 30, QNI 265, QTC 82/68; NYPON-sess. 30, QNI 477, QTC 336/303; NYS-sess. 60, QNI 749, QTC 688/580, CDN-sess. 30, QNI 592, QTC 128. Net reports (May): NYS-sess. 62, QNI 902, QTC 662/594. CDN-sess. 31, QNI 659, QTC 100. There will be a few changes and some additions to ENY staff with the next report. I am still looking for volunteers for the staff positions still open. Help! WA2KCL reports two upgrades to General, KA4VZN KA2KWY. W2WSS reports in ESS bulletin Silent Keys K2MIP W2RUT WB2TDN. Congrats to KA2KVZ for new call NA2N. PSHR (May): WB2EAG WB2OHR WB2ZCM. PSHR: K2ZM WB2VUK WB2ZCM KC2TF WB2OHR K2ZVI KA2MBP WA2YBM. Traffic: WA2SPL 225, KC2TF 149, K2ZM 122, AG2X 107, WB2ZCM 95, WB2VUK 82, KA2MBP 71, WA2YBM 71, K2ZVI 64, WA2JQL 42, WB2OHR 23, N2AWI 22, WA2JBO 20, AA2Y 17, WB2SON 15, WA2CJY 9, N2BFG 7. (May) WB2EAG 171, WB2ZCM 82, WA2CJY 46, WB2OHR 41, N2AWI 24.

NEW YORK CITY-LONG ISLAND: SM, John H. Smale, K2IZ — SEC: WA2KKJ. STM: K2GCE. ACC: WB2IAP. OO/RFI: WA2PMW. TC: W2JUP.

NLI CW*	3630	1900/2200	W2LWB
NLIPN*	3928	1815	KS2G
NCVHF	6.145/745	1930 M-F	K2MT
SCVHF	4.77/5.37	2030 M-F	WA2ARC
BAVHF	6.07/67	2000 M-F	N2BQD
ESS	3590	1800	W2WSS
NYS	3677	1900/2200	N2APB
NYS	7077	1000 M-S	WB2EAG

*Denotes section net; all times are local; please try and help out by checking in whenever possible. Plan now to attend the ARRL National Convention July 20-22 at the New York Statler. LIMARC will hold their fall hamfest Sept. 18, with the rain date the following weekend. Radio Central will hold their indoor Hamfest on Nov. 27. KA2EJD WB2PRO N2DYN and K2TNN provided comm. for the Franklin Square Lion's Club 12 Km Walk for Juvenile Diabetes. Officers for the Wantagh ARC are: KB2HK, pres.; WD2AFA, v.p.; KA2ES, treas.; KW2Y, corr. secy.; KI2M, rec. secy. Metroplex took an active part in the June 2nd Honeywell tele-conference net and they are taking part in the Sept. 1st net. New members in Radio Central ARC are KA2MUH and K2KSK. N2CRW has purchased a new QTH down in Fla. Radio Central will also have a special event station at the old RCA site using some of the old antennas that are still on site, the date will be Oct. 8th and 9th. New members of Grumman ARC are father and son W2BLH and WA2SUH. It would be appreciated if all clubs that publish newsletters or bulletins would mail a copy to WB2IAP, the Affiliated Club Coordinator. The address is Woody Gerstner, WB2IAP, 42 Mohawk Ave., East Atlantic Beach 11561. Welcome to new Novice KA2RQM, brother of WB2IDP, W2GZD is now NCS on Thurs. for the NLIPN. KS2G back after 2 weeks in Maine. W2GKZ operated at W1YR for Field Day. If you hold an OO appointment, you must contact WA2PMW and let him know of your activities. The address is Lou Marchese, WA2PMW, 23-26 125th St., College Point 11356. Traffic: N2AKZ 414, WA2ARC 366, K2MT 87, W2DBQ 72, W2GKZ 30, K2IZ 24, KS2G 16, WB2BNA 12.

NORTHERN NEW JERSEY: SM, Robert Neukomm, KB2WI — SEC: WB2VUF. STM: W2XD. BM: N2BOP. ROC: W2CC. SGL: W2KB. PIO: WB2NQV. TC: AD7I. ACCs: KK2U KY2S.

Net	Mgr.	Freq.	Time	Sess.	QNI	QSP
NJM	N2XJ	7063	1000 Dy	30	151	60
NJPN	W2CC	3950	1800 Dy 0900 Sn	34	408	145
NJSN	WB2IQJ	3735	1830 Dy	30	201	96
NJN/E	AG2R	3895	1900 Dy	30	—	—
TCETN	KA2GSX	147.255	1930 Dy	30	161	52
OBTTN	KY2D	147.12	2000 Dy	30	316	81
NJN/L	AG2R	3695	2200 Dy	30	—	—
NJVN	KA2HNQ	49/49	2230 Dy	30	—	—
NJRTTY	W2PSU	147.51	Autostart			

UPLINK NEWS NUMBER 201-735-8550. WA2ARP is interested in any ham wanting to participate in the NJ area of the National Weather Net to call him at either 627-0501, 596-2124 or 661-5062. You can also get him mornings on the Split Rock rptr 385/985. Metroplex has celebrated 5 years, and their newsletter reports KY2Q upgraded to extra. They report you can hear "Westlink" of the very latest news on legislative updates, operating events, DX news — just call 212-224-1555 and it can also be heard at ran-

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AMTOR NOW OFFICIALLY APPROVED IN U.S.A.

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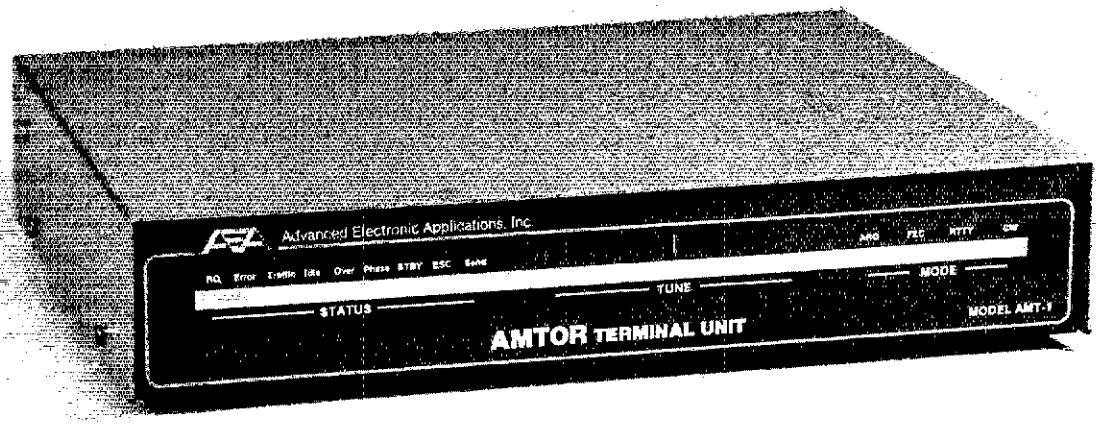
The Definitive AMTOR Terminal Unit



$499.95 Introductory Price

AMTOR is the system of error correcting RTTY which has been rapidly overtaking conventional RTTY in Europe, just as its marine equivalent, SITOR, has been taking over in ship to shore communications.

It was originated by Peter Martinez, G3PLX (see June 1981 QST, p. 25). He first interpreted the international marine CCIR 476-1 specification for amateur use. Virtually all of the 400+ stations presently on AMTOR world wide are using software/hardware designs originated by Peter. The AMT-1 is a proven product which represents his latest and most highly refined design. It represents the culmination of over three years of development and on the air testing, and sets the standard against which all future AMTOR implementations will be judged.

Not only does it incorporate the latest AMTOR specification, but it gives superlative performance on normal RTTY, ASCII and CW (transmit only). As well as some fairly incredible real time microprocessor software, the AMT-1 boasts a four pole active receive filter, a discriminator type demodulator, a crystal controlled transmit tone generator, and a 16 LED frequency analyzer type tuning indicator, which is very easy to use.

Driven from a 12 volt supply, the AMT-1 connects to the speaker, microphone and PTT lines of an HF transceiver and to the RS-232 serial interface of a personal computer or ASCII terminal. All mode control is via ESCAPE and CONTROL codes from the keyboard (or computer program).

It used to be that C.W. was the ultimate mode for "getting through" when QRM and fading were at their worst. That's no longer true — AMTOR will get through with perfect error-free copy when all other conventional transmission modes become useless.

So join the swing to AMTOR now and the large number of satisfied AMT-1 users already on the air outside of the U.S.A. Choose the definitive product. You'll wonder why anyone uses normal RTTY! Send for details. Better yet, see your favorite AEA dealer.

See the AMT-1 and hear Peter Martinez speak at the Dayton Hamfest (Booth #64)

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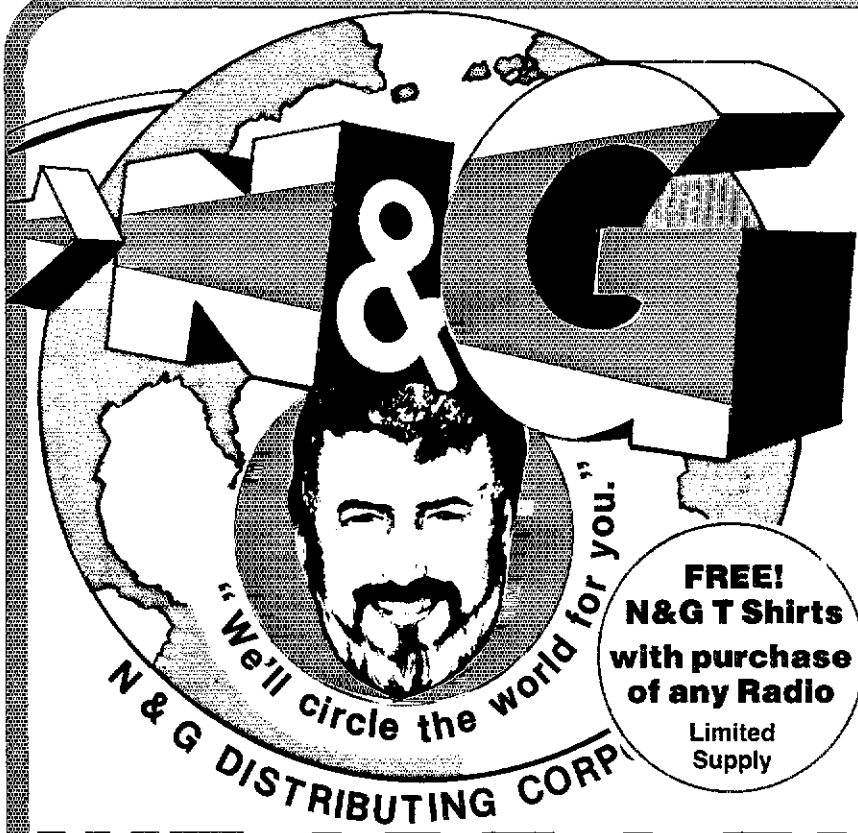

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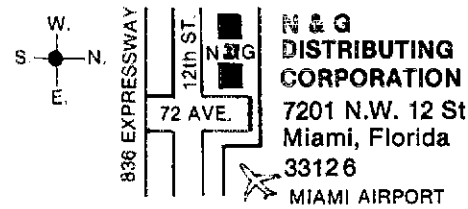

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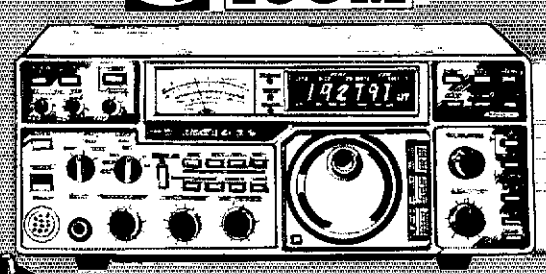

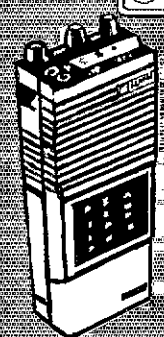

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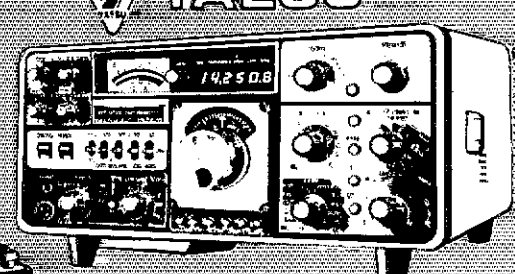

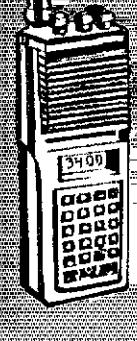

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- 2 meter digital scanning tranceiver

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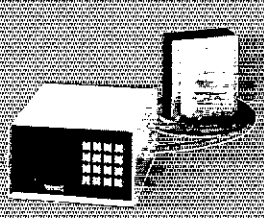
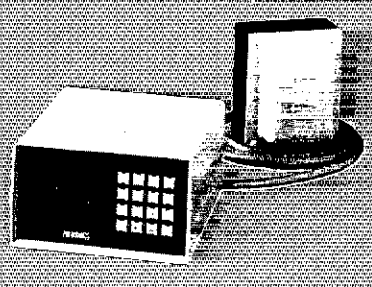
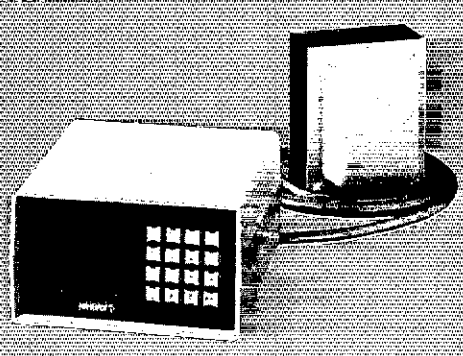


GOOD



BETTER



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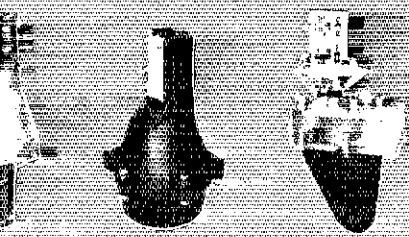

Package #2 PSE-1/PSE-5

Package #3 PSE-2/PSE-4

Package Special

Package Special

Package Special

PRO-SEARCH
Reaching The World

dom times on 145.45. Please advise your SM of all Amateur Radio courses being held, where and when. Let's make a concerted effort to get those Novices on the air by instituting "Elmer" programs in your clubs. Trust that you all enjoyed the NJ QSO Party. Remember to send in your logs to the Englewood ARA. WB2IQJ indicates that the NJSN has plenty of instructors and is looking for new students. Check in on 3735 at 6:30 P.M. any evening. This column prepared by W2CC. Traffic: W2RQ 240, N2XJ 155, K2VX 139, W2XD 89, KA2GSX 77, N2DPN 72, KY2P 71, W5DTR 52, WB2QMP 46, W2ZEP 43, WB2GHN 40, WB2KLF 36, KC2YG 27, W2UH 25, W2CC 19, N2EBA 16, WA2FZJ 12, W2RRX 10.

MIDWEST DIVISION

IOWA: SM, Bob McCaffrey, KØCY — SEC: WA4VWV. STM: KAØX. ACC: WBØQAM. BM: KØIR. TC: KØDAS. PIO: KBØZP. SGL: AKØQ. Many reports of Field Day activities, and it looks like some very good scores. Congrats to WDØFWB as new ORS; he has been active as TEN NCS/Rep. Thanks to all the ARES groups who have participated in recent SKYWARN activities; your help has been invaluable. New newsletter from Muscatine; nice job. ICN still needs your support; let your new people in the area know about this FB training net. Thanks to all of those groups that have participated in the RAGBRAI message relay, a very successful project for the second year. A little disappointed with the section special event station, but kudos to KBØZP for his work in organizing the project. Kudos to Cass Co. for helping with the M-S bikathon, and the Jefferson hams, namely W4JL, for the Bell Festival Event station, which will become an annual event. DSM with a "super" hamfest; Cedar Rapids is next; see you there.

Net	Freq.	UTC	Dys	QNI	QTC	Sess.
TLCN	3560	2330-0300	Dy	255	170	60
ISSB	3970	1730-2300	M-S	1774	158	52
ICN	3713	0000	TTHS	51	25	12
ITEN	3970	2130	Sn	45	5	4

Traffic: WAØAUX 306, KØGP 149, WDØFWB 115, KØCY 114, WØYLS 112, WØSS 111, W4JL 95, KQØI 51, KAØJQG 44, WBØJGF 42, WØBW 41, WDØHND 38, KAØADF 36, WBØAVW 24, KCØSC 20, KØEVC 11, KEØY 9, WA9GBG 9, KØZQ 3. (May) WDØHND 18.

KANSAS: SM, Robert M. Summers, KØBXF — SEC: WØKL. STM: WØOYH. NMs: WBØZEN WØMYM KAØCUF. Despite the weather, activity on the nets seems to be holding up; reports for the month of June are as follows: net QNI/QTC, NM — KSBN 1139/172, KAØCUF; KPN 324/35, KAØCUF/WØFRC, KWN 796/559; KMWN 654/551, WAØLBB; CSTN 1707/135, WAØOMB; QKS 229/75, WBØZEN; QKS-SS 42/11, WØMYM. Interest in the PSHR appears to be dropping off. Why not take a look at what it takes to qualify and report? Another FIELD DAY is over, and the following stations were heard from via message: KFØX KØNL KØWA WDØENU AEØA NØBMX WØTQ WØHT WØRCZ WØQW WØMI WØERH NØCWR WDØCBU WØLB. If your club station sent a message to the SM and it was not included in the above, perhaps a follow-up might find the reason why it failed to reach destination. Traffic: WØFRC 294, WBØZEN 148, WØFIR 102, WØHI 101, WØOYH 71, WØFDJ 59, KSØU 48, KØBXF 44, WØAM 40, WØCHJ 40, KØJFC 25, WØQMT 23, WØPB 17, KAØE 6, WØNYG 4.

MISSOURI: SM, Ben Smith, KØPCK — Congrats to the Central Missouri RA for being the first club in Missouri recognized as a Special Service Club. Missouri Governor Christopher Bond proclaimed June 20-26 as "Amateur Radio Week" in Missouri. MO SEC WBØKUW presented a program at the Advanced Emergency Management Workshop in Jefferson City June 7-9. The workshop was conducted by the State Emergency Management Agency, and was attended by several amateurs from MO. KAØDFN, net manager of the Int'l Handicapped Net, was recently appointed to the President's Committee on Employment of the Handicapped. He has also received an official invitation to join the Missouri Governor's Committee on Employment of the Handicapped. The Central Missouri RA, the Mid-MO ARC and the Callaway Amateur League provided communications for the U.S. Pony Club Cross Country Trials. Members assisting were WBØTEG NØBLB WBØRHK KAØCFY WØNUB WBØUEY and KCØSF. Attendance at the hamfests in Missouri have been good so far this year, but there are several hamfests left. If you have not gone to a hamfest yet, make plans to do so. It takes a lot of work, time and money to put on a hamfest. Let's support the clubs and groups holding hamfests with our attendance. Field appointments for the past month are WBØMTX and WBØHOP to ORS. At this time WBØKUW has seven DEC appointments in the state. His goal is to have DEC appointments for all parts of the section by the end of 1983. I am sure he would like to hear from anyone interested in working in the DEC and EC programs.

Net	Freq.	Time/Dy	QNI	QTC	Mgr.
NEMOE	144.53/5.13	1930 MWF	72	9	WBØMTX
ACE	3712	1800 MWF	36	8	WBØMTX
HBN	7280	1200 M-S	425	24	KØDSQ
MEOW	3963	1715 Dy	357	47	KØDSQ
CMEN	147.16/76	2100 W	101	6	KØPCK
MON/MON2	3585	1900/2145 Dy	363	138	KØSI
MOSSB	3963	1800 Dy	555	90	KT5Y
STAN	146.31/91	2000 Tue	288	4	NØBKH
IFAN	147.84/24	1930 M	40	2	WØKNF

Traffic: KCØAS 714, AIØO 166, KØSI 129, KØPCK 124, WØBMA 101, WBØCPR 60, WA8MAZ 53, KUØG 50, WBØUID 49, WAØYJX 42, KØSDO 40, K2ONP 39, KT5Y 33, NØBLB 28, WBØSSB 24, WBØMTX 22, WØNUB 21, NØBKH 21, KØCW 18, WAØKUH 17, WBØHOP 14, KYØU 12, NØSS 6, NØCEE 5.

NEBRASKA: SM, Reynolds Davis, KØGND — SEC: Jim Sanford, NØAIH, 9718 Jaynes St., Omaha 68134. STM: Shirley Rice, KAØBCB, 510 E. 16th St., Scottsbluff 69361. Hard to believe that summer is over! Hope you plan for a safe and relaxing Labor Day weekend. If you are driving, drive carefully and try some HF mobile. Let's start thinking about a bigger-than-ever 1984 Nebraska QSO party! Need your ideas on dates, rules, etc. Pass them on to either me or KØJFN. In the last one, WAØJCE working with WAØRKQ ran away with the SSB honors while KBØAG chalked up the high CW total. A couple of new appointments since last time: ORS-WAØSCP; NM-WBØQPP. Thank you both for helping. Tune in the section bulletin for club doings and other gossip. 1715Z Saturdays at 7085 kHz RTTY and repeated during the NE 40 Phone Net at 1800Z near 7282 kHz also Saturdays. Traffic: KØDKM 192, WBØTED 91, WØKK 59, NØDGM 44, WØSGA 42, WØHOP 29, KAØBCB 30, KØGND 27, KØIXY 27, WØZNI 19, KAØBWM 14, WAØDXY 13, WBØGWR 12, KAØCLI 9, WAØPCC 8, WBØGMQ 7, WAØBOK 6, KØSFA 5, KAØFXS 4, WØNIK 4, WAØBIE 2, WDØBOX 2, KØRRK 2, WØWZR 2, WØRAM 1.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Pete Kemp, KA1KD — STM: K1EIC. SEC: K1WGO. OO/RFI: KA1ML. BM: WA1DWE. TC: W1HAD. ACC: N1AZF. SGL: K1AH. PIO: WB1AIU.

Net	Freq.	Local Time	QTC	QNI	NM
CN	3640	1900/2200	243	341	K1EIR
CPN	3985	1800/1000 Sn	83	217	KA1BHT
NVTN	28/88	2130	---	---	WB1ELA
WCN	78/18	2030	80	341	WB1GXZ
RTN	13/73	2100	31	251	K1UQE

Welcome on board to KA1BHT new NM of CPN and to K1UQE new NM of RTN. Field Day reports received from: W1QI K1DW WA2RYB W1HER W1WP K1MIJ WB1COO W1FHP W1BCG KB1ES. It is with regret that I inform the section that K1EUW has become a Silent Key. His con-

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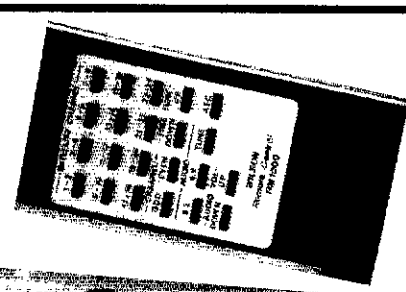
with infrared Remote Controller



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- AFC
- Automatic antenna switching
- Built-in modulator
- Digital channel display
- Fine tuning
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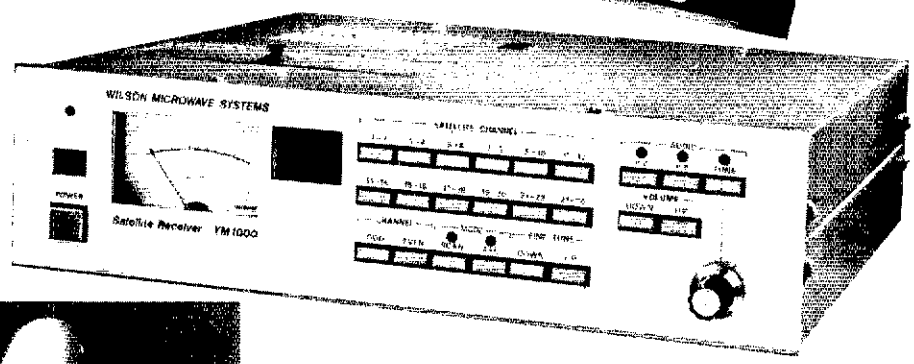

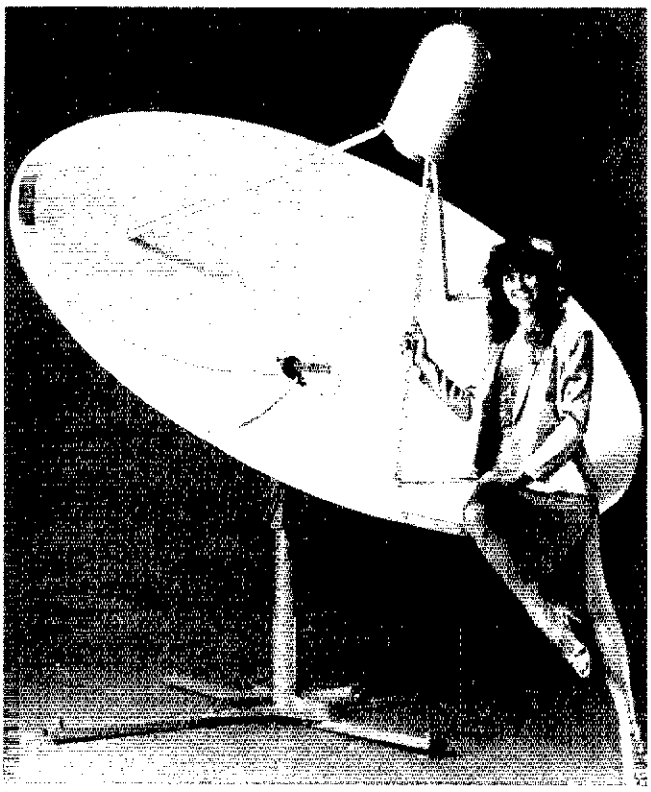

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MD-9 Specifications

ANTENNA

Diameter	8'8"
Construction	12 panels, 18 ga. steel
Finish	Tan, industrial grade
Weight	180 pounds
Wind-operational	50 mph steady load
Survival	100 mph steady load
Temperature range	-60 to +125°
Frequency	3.7 to 4.2 GHz
VSWR	1.1 to 1
Gain	38.5 dB
F/D Ratio	.385
1/2 power beamwidth	1.8°

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Weight	70 pounds
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Azimuth Sweep	91°
Elevation	66°

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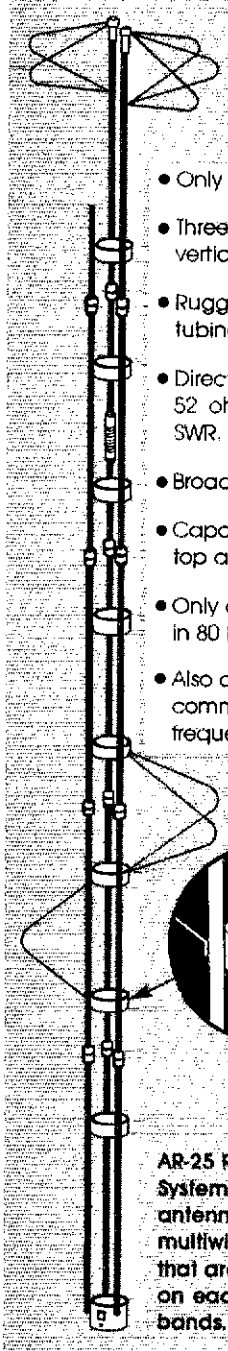

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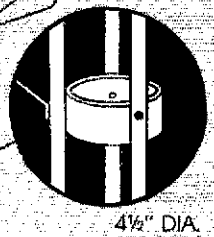

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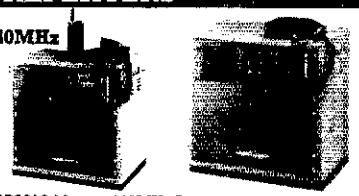

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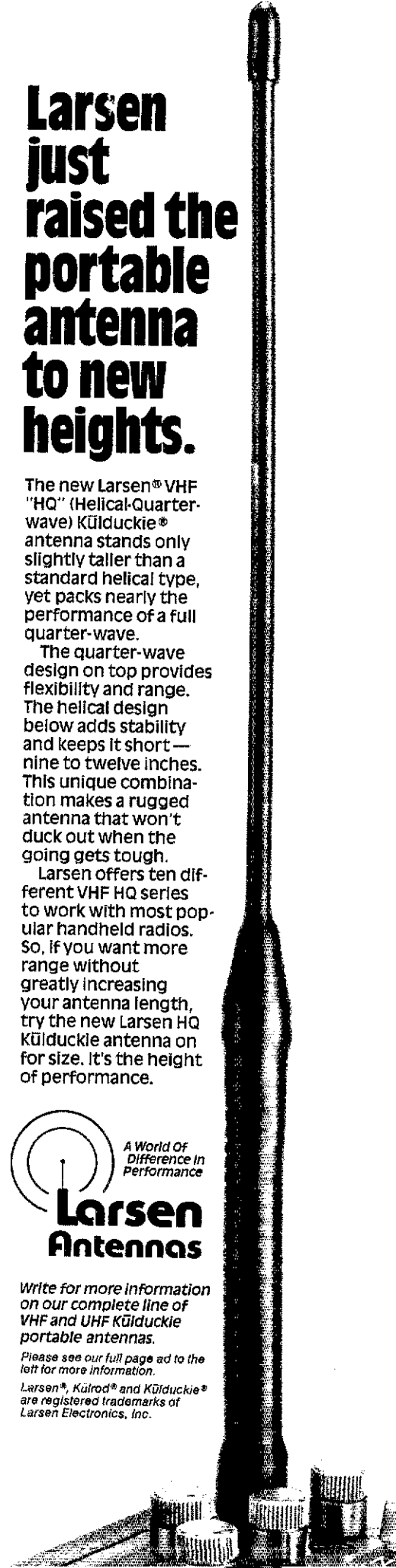

tributions to NTS and his friendly demeanor coupled with dedication to Amateur Radio will be missed. Look for GNARC's special events station WA1RXA during Norwalk's Oyster Festival Sept. 9-11. A BIG TNX to all of our section's clubs and individuals who actively participated in helping to get the vote out in the recent FCC No-Code controversy. Congrats to N1BOW & YL on their first harmonic and to Jefferson Middle School (Meriden) on their 15 new Novices. CARA Flea Market, Danbury, Sept. 18, talk in on 147.12. New OBS: KB1I. Upgrades: Section OO WA1LYS to Extra, and N1THD and KA1GIY to General. WA1DCR has received a Certificate of Merit for his many years of Navy MARS service. Valley ARC provided communications for an ITT and Griffin Hospital simulated disaster exercise. A new 3rd party agreement is now in effect with Swaziland, 3D6. ECARA's new newsletter, the *Sign Post*, has a fresh look, complete with computer generated text. New Tri-City ARC officers: WA2RYV, pres.; KA1BB, v.p.; KA1FSP, treas.; KA1DFI, r/secy.; N1AMD, c/secy. What is your club doing to promote Amateur Radio education? With September upon us, schools and adult education programs are gearing up. Why not put in a plug for the world's greatest hobby? Traffic: WB1GZX 383, W1EFW 326, WB9IHH 186, WB2PJU 153, K1EIR 150, K1UQE 63, KA1XG 61, KA1EGE 50, W1XX 35, KA1BHT 32, K1AQE 29, W1BDN 27, KA1GWE 24, K3ZJJ 23, W1YOL 21, WB1ESJ 18, W1CUH 8, W1QV 8.

EASTERN MASSACHUSETTS: SM, Rick Beebe K1PAD — STM: KA1GBS. SEC: W1IAY. ASM: K9HI. ACC: K1AZE. OO/RFI & BM: WA4STO. TC: KA1IU.

Net	Freq.	Time (loc)/Dy	QNI	QTC
EMRI	3.658	1900/2200 Dy	400	391
EMRIPN	3.959	1730/Dy	257	167
EM2MN	23/63	2000/Dy	439	141
NEEPN	3.945	0830/Sn	56	8
HHTN	04/64	2230/Dy	669	313
EMRISS	3.715	2030/Dy	130	29
CI2MN	045/645	1930/Dy	200	55

At the top of the column you will notice that we have a new Section Traffic Manager, namely KA1GBS. Our previous STM, WA1TBY, has stepped down because of his new job that conflicts with the evening system. I want to thank him publicly for dedicated years of service that he has put in. He has personally introduced many to the fun of traffic handling. It is fitting that one of those that he has helped along is KA1GBS, our new STM. She is a constant BPLer, and has certainly paid her dues in NTS. N1BGW will replace KA1GBS as EMRIPN Net Manager. Well, Field Day is over for another year, and from the sound of the bands it was another great success in the EM section. I attempted to reply to all clubs who sent radiograms. Does anyone know N1CC's address? W1ALP's widow has remarried (To W4ULR) and moved to FLA. The address is Mrs. Winifred MacDonald, 409 Penman Rd., Neptune Beach, FL 32233. Tnx W1CTR. WA1OEZ coordinated an emergency drill in CD Area 2 in conjunction with a mock nuclear accident at the Plymouth power station. Recent arrival to our section, KD2S is the project manager for PACSAT which will be a fancy satellite with storage and recall via Packet Radio. The Packet Radio interest group has organized into a club called the New England Packet Radio Assn. (NEPRA). By the time this hits print there will be a number of STNS on in this interesting new mode. Listen on 145.01 for something that sounds like crickets. Suggestion for affiliated clubs. The first duty of your new secretary when elected should be to send his or her name and address to Hq so that mail, especially the annual reaffiliation form, goes to the right place. More then once has a club been put on the inactive status simply because the form sent from Hq went to the wrong person. I suggest writing this duty into your bylaws. Traffic: KA1EFO/MM 1648, KA1GBS 533, KO1O 326, W1AF 220, N1AJJ 207, N1BGW 180, WA1TBY 140, N1BHH 139, KA1EPO 113, KA1MI 91, AK1J 78, WB8TDA 72, WA1DXT 64, N1BYS 57, K1BA 52, KA1BBU 50, KA1DJV 46, WB3FOC 40, K1CB 38, W1CE 36, KA1AMR 32, KA1EXJ 32, KI1I 32, N1CRJ 28, WA1FNM 25, K1BZD 18, W1QLL 10, KA1R 8, K1LCQ 8, W1XA 4, W1ZHC 2. (May) WA4STO 89, K1GN 50.

MAINE: SM, Cliff Laverty, W1RWG — SEC: KL7IJG/1. STM: AK1W. ACC: KA1EIW. OO/RFI: W1KX. SGL: K1NIT. PIO: KA1TJ. TC: K1YFY. BM: W1JTH. K1YFY, in recognition work in previous yrs, was appointed chairman of the 100-unit City of Augusta July 4th parade. He was assisted by KA1FKS asst chmn, W1TGY W1JTH WA1JZP registration, W1BYK judges stnd, KA1FMK police liaison, W1MFJ W4SME K1BEA K1NIT W1CUW div leaders. W1HTG KR1E K1NBG N1CMZ W1SIN line assts. On the *State of Maine*, Maine Maritime training ship, KA1EFO handled over 800 pieces of tfc with commendations going to Maine net ops W1LDF AK1W AC1G N5YX/1 on the shore end.

Net	Sess.	Checkins	Traffic	Mgr.
PTN	58	548	409	AC1G/N1BJW
SGN	26	871	309	K1GUP
CMEN	8	173	47	W1WCI
MPSN	4	44	45	KL7IJG
AEN	4	46	1	WA1YNZ

PSHR: AK1W KA1AVU N1BJW WA1YNZ KL7IJG KA1TJ KA1GCW. Traffic: AK1W 799, WB1BYR 155, N1BLZ 154, W1ISO 131, KA1AVU 125, W1KX 108, KA1TJ 96, N1BJW 92, W1RWG 90, KA1GCW 71, W1BMX 62, K1NIT 61, N1BME 56, KL7IJG 44, WA1YNZ 44, K1UMZ 42, W4SME 40, W1JTH 33, W1GCB 30, KB1AQ 14, W1AHM 13, KA1FTL 8, K1PV 5, KA1ENL 4.

NEW HAMPSHIRE: SM, Robert C. Mitchell, W1NH — SEC: AK1E. STM: W1TN. NMs: N1NH KI1M W1VTP, WB1GKV now KI1D. Seen on Hyways & Byways: KA1DBY KA1HLL K1ARA W1AZD N1NH. K1PQV now in AF MARS. KK1E now ORS. WA3BZM looking for Rockingham Co. gang on ARES net on 146.85 Thursdays at 2330Z. Top NHN checkin W1VTP. Winner of NH QSO Party AF1T. New rptr New Hampton, KA1BUC, 147.30+. KA1FQZ now General. W1GS now on 220. Nice to hear the NH rptr ops giving information to visitors with courtesy. Traffic: N1NH 209, KK1E 184, W1TN 178, KI1M 162, W1GUX 116, N1CPX 76, AK1E 62, WB1CFP 55, KA1BJ 44, W1MHX 39, W1ALE 37, W1CUE 35, W1VTP 29, W1YR 21, K8UXO 18, N1AKS 15, WA3BZM 14, WA1YZN 12, N1ZHN 8, K1OIQ 8, W1OKW 6, W1FYR 5, K1PQV 5, N1ALM 4, N1BSM 2.

VERMONT: SM, Reed Garfield, WB1ABQ — STM: N1ARI. BM: AE1T. PIO: W1RNA. Congrats to new DEC in Southeastern Vt. area, K1IK, in West Dover. At this writing, all Vt. rptrs are sounding fine. Glad to have 'em up and running.

VTN	30/86/39
GMN	26/333/33
Carrier	26/475/30
RFD	4/53/16
VSBN	30/473/160
VFMN	30/537/71
VPN	4/64/5
CVFMN	4/22/0

Traffic: N1ARI 126, AE1T 108, K1BQB 99, N1COB 93,

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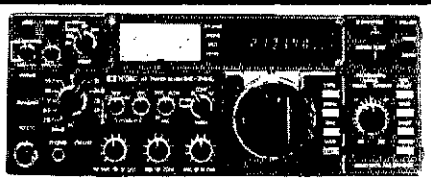

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EX-241 Marker unit	20.00	
EX-242 FM unit	39.00	
EX-243 Electronic keyer unit	50.00	
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FL-54 270 Hz CW filter (1st IF)	47.50	
FL-52/A 500 Hz CW filter (2nd IF)	96.50	89.95
FL-53/A 250 Hz CW filter (2nd IF)	96.50	89.95
FL-44/A SSB filter (2nd IF)	159.00	129.95
MB-12 Mobile mount	19.50	
HM-10 Mobile scan microphone	39.50	
IC-730 8-band 200w PEP Xcvr w/mic	$829.00	599.95
FL-30 SSB filter (passband tuning)	59.50	
FL-44/A SSB filter (2nd IF)	159.00	129.95
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EX-195 Marker unit	39.00	
EX-202 LDA interface; 730/2KL/AH-1	27.50	
EX-203 150 Hz CW audio filter	39.00	
EX-205 Transverter switching unit	29.00	
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MB-5 Mobile mount	19.50	
IC-720A 9-band Xcvr/.1-30 MHz Rcvr	$1349.00	899.95
FL-32 500 Hz CW filter	59.50	
FL-34 6.2 KHz AM filter	49.50	
MB-5 Mobile mount	19.50	
IC-7072 transceive interface, R-70	112.50	
IC-751 9-band xcvr/.1-30 MHz Rcvr	$1399.00	1259
PS-35 Internal power supply	160.00	144.95
PS-15 External 20A power supply	149.00	134.95
FL-52A 500 Hz CW filter	96.50	89.95
FL-53A 250 Hz CW filter	96.50	89.95
FL-33 AM filter	TBA	
HM-12 Hand microphone	TBA	
SM-6 Desk microphone	39.00	
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Accessories: 720/730/740	Regular	SALE
PS-15 External 20A power supply	$149.00	134.95
EX-144 Adaptor; CF-1/PS-15	6.50	
CF-1 Cooling fan for PS-15	45.00	
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CC-1 Adaptor; HF radio to PS-20	10.00	
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IC-25H as above, but 45 watts	389.00	349.95
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IC-490A 10w 430-440 SSB/FM/CW Xcvr	649.00	579.95
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IC-505 3/10w 6m port SSB/CW Xcvr	449.00	399.95
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IC-20L 2m amp, 10w PEP or FM	98.00	89.95
IC-30L 432 amp, 10w PEP/FM	105.00	94.95
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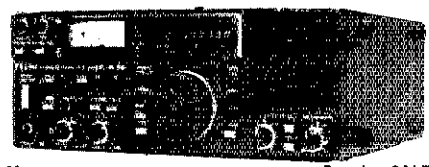
RP-1210 10w 1.2 GHz repeater	999.00	899.95
Cabinet for RP-1210 or RP-3010	249.00	



Shortwave receiver	Regular	SALE
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BP-3 Extra std. 250ma 8.4v 1.5w battery	29.50
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BC-20 Nicads & DC-DC charger for portables	57.50
BU-1 Memory back-up; 25A/290A/490A	38.50
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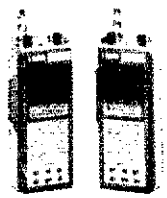

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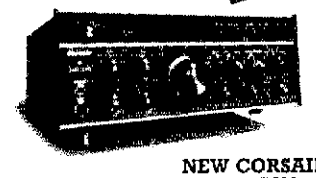

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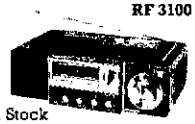

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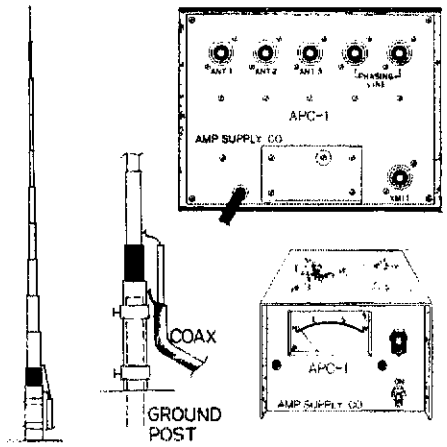
This is a super linear for all purposes, the LA-1000 excelled during the Hurd Island DX pedition with over 30,000 contacts. The rugged design lends itself to continual use during contests and users are even running it on RTTY at 500 watts input.

LA-1000A **$399.50***



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The AEX-1 is a 33' self-supporting vertical full 1/4 wave on 40 meters (or any band). It is constructed of adjustable seamless aluminum, and will handle 4 KW.

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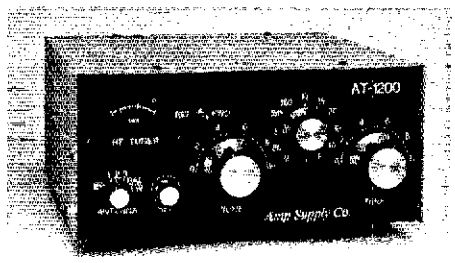

AT-1200

The AT-1200 antenna tuner is the perfect companion for the LA-1000A or any amplifer running up to 1200 watts input. It covers 1.8 to 30 MHz, has an antenna selector switch for 3 coax positions and 1 long wire or balanced feedline, and a built in SWR bridge and meter.

AT-1200 ..... **$169.50***

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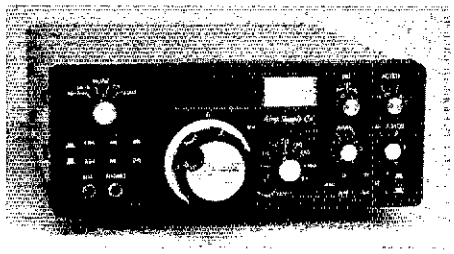
The NVR antenna is an excellent all band 102 foot dipole. It comes completely assembled and will handle 2KW PEP. This antenna was originally developed in Great Britain and has enjoyed worldwide acceptance for years. It consists of 102 feet of copper antenna wire, 31 feet of 300 ohm transmission line, 70 feet of RG-8X coax, 2 end insulators, 1 center insulator 1 PL-259 and sleeve connector.

NVR Antenna **$50.00***

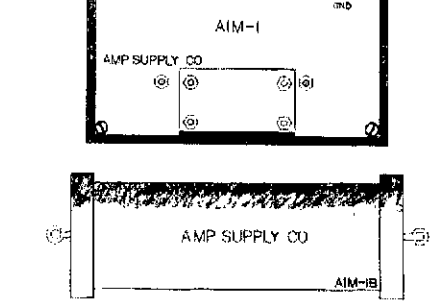


ASR-1

The Amp Supply ASR-1 is an 80-10 meter solid state transceiver, great for mobile, portable or fixed station operation. It is finished in an attractive gray-on-gray color scheme and matches the Amp Supply product line.

- PTO w/digital display readout
- Receiver sensitivity 0.3uV
- RIT ± 3KHz
- Notch filter 200 Hz - 3.5 KHz
- QSK full break in CW
- Two level power 10 watts & 100 watts PEP input
- 4"H × 9"W × 12"D
- CW, SSB, SSTV, RTTY 100% duty

ASR-1 ..... **$599.50***



AIM-1™

Major Antenna break through!

The Aim-1 is an antenna impedance matching network for random, long wire or loop antennas. It provides continuous coverage from 500 KHz - 30 MHz, is completely *automatic*, no knobs to turn or coils to tap. Installation is simple; hook on wire antenna, ground, coax cable to station and balancing module at opposite end of wire. The antenna is ready for transmission from 1.8 - 30 MHz at up to 3KW PEP.

- SWR max 2:1, 1.5:1 average
- wire lengths should be 1/2 wave on lowest frequency for maximum efficiency.
- inverted V, inverted L, rombic, random wire or loop antennas
- weatherproof
- 2 year warranty

AIM-1 ..... **$119.50***
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The RJX-810 is a solid state transceiver covering 10-160 meters and manufactured by Panasonic. If you are looking for the ultimate radio, you'll want and need every feature offered on this competitively priced transceiver.

- 4 memories
- Auto-Scan
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WB1ABQ 38, W1KRV 32, W1KJG 2.

WESTERN MASSACHUSETTS: SM, William J. Hall, W1JP — PIO: WA1MJE. ACC: W1YI. SEC: WB1HIH. STM: W1UD. Field Day, the last big activity for the season, has come and gone. I received reports from the UMass ARA W1PUO/1, NoBARC K1FFK/1, the Harvard (MA) RC W1XH/1, and the HCRA W1NY/1, all expressing enthusiasm and a spirit promoted by excellent weather. Your SM just returned from the second annual 4th of July sail in to Block Is. Rafted together were KA1T W1JP WB1ABF and KA1BLV who found each other in the fog. On Sunday, contact was made with N1AGV/AM, who, while flying overhead spotted the ARRL flags flying off the spreaders. More news from the active group at UMass. During May, W1PUO participated in 89 of the 110 sessions of section-level NTS nets and had a traffic total of 129. Sharing the load were WB1FCD KF1R WB1FSV KR4N and WB1EOA. With regret I must report the passing of W1MND W1DOC and K1MZW, who became Silent Keys. On a happier note, KA1CPG upgraded to General, and WMEN NM KA1CDC is now KR1R. PSHR: WB1HIH W1PUO KA1T K1JHC. Traffic: W1PUO 208, KA1T 166, W1UD 162, WB1HIH 149, W1KK 81, W1TM 66, K1JHC 44, W1ZPB 27, W1JP 25, W1XH/1 25, K1PUG 23, KR1R 21, WB1FSW 19, WB1HKN 9, KA1EKQ 5.

NORTHWESTERN DIVISION

ALASKA: SM, Will Darsey, AL7AC — All Alaska clubs participating in Field Day activities reported excellent band conditions and good participation. Now is a good time to review any weaknesses in our emergency operations and make corrections as necessary before winter. There has been a noticeable decrease in traffic for the past two months. This may be because of bad band conditions or vacations and it should pick up again by September. KL7NP, manager of the Alaska QSL Bureau for over seven years, gets a long overdue "Atta-Boy." He and Dot, his XYL, have been providing us with a service unequalled even in the "lower 48" states. Dot, who says, "I just don't think I'd make a good ham, but would like to contribute," works as much as he does in the processing of all Alaska bureau cards. During the peak of the sun spot cycle, they were processing and mailing over 4,000 QSL cards each month. During the summer they're off in their camper personally delivering cards to Fairbanks, Kenai, Homer, Palmer, Tok, and even to the panhandle areas of Juneau, Ketchikan and Haines. Space does not permit a detailed account of all their other contributions to Amateur Radio, but they are many. The Amateurs of Alaska tip our hats to them and say "many thanks." Traffic: KL7LA 58, KL7VY 44.

IDAHO: SM, Dennis Hall, KK7X — Amateur Radio Saves Lives! May 28th was the Coeur d'Alene Marathon. Sixteen members of KARS and NIRA participated in communications. The temperature reached 80° the day of the race. Members were on the scene when one runner dropped from heat related injuries. Through amateur communications an ambulance was dispatched and on the scene in less than 5 minutes. Dr. Jim Arthurs, the marathon doctor, said, "Had it not been for the excellent communications the runner could have died on the course. I am very impressed with the Radio Operators." This is the fourth year communications have been provided for this event. I had a nice trip to California for the NVOAD conference and visiting clubs in S. Idaho. Also met with the head of disaster services for the State of Idaho. The state expresses the interest and need for emergency communication capabilities within the state. Let's all work on uniting our efforts within the state. 73, KK7X.

Net	Freq.	Time	Sess.	QNI	QTC
ICD	3990	7:10 A.M. M-F	22	692	18
IMN	3635	8 P.M. M-F	22	101	171
FARM	3935	6 P.M. Dy	—	—	—

Traffic: W7GHT 258, W7JMH 47, K7TM 17.

MONTANA: SM, Les Belyea, N7AIK — SEC: W7LR. STM: KF7R. OO/RFI: K6TU. ACC: WB7TWG. PIO: WA7GQO. SGL: W7JMX. TC: K0PP. BM: KB7SE. Congrats goes to the Yellowstone ARC for achieving SSC (special service club), the first group in Montana to do this. If you think your club can qualify for SSC, contact WB7TWG for the proper forms. The FCC will be in Billings Sept. 27-29 to administer exams; good luck. The Capital City ARC was enjoying a BBQ prior to their FD activities when the 4-year-old daughter of KA7PUI walked away from the group. A massive search was conducted for 8 days with no results. Many hams from Helena, Bozeman, Great Falls and Butte provided communications. Look for a detailed report on this in the Public Service section in a future issue of *QST*. Sorry to report that W7NEG is a Silent Key. PSHR: WB7WVD WA7GQO.

Net	Sess.	QNI	QTC	Mgr.
IMN	22	171	101	K7RX
MTN	22	749	64	KB7SE

Traffic: WB7WVD 48, WA7GQO 30, N7AIK 29, KD7EG 8.

OREGON: SM, William Shrader, W7OMU — STM: W7VSE. SEC: N7CPA. PIO: KC7YN. SGL: KA7KSK. ACC: WB7WTD. RFI: AK7T. OO: N7SC. Please keep your eyes and ears open for any new state or local ordinances that affect Amateur Radio. Get info, newspaper clippings, etc., to Section Manager and/or State Government Liaison. They sneak up on us from time to time. UPGRADES: KA7PSU (Novice); N7FGW KA7PVL KA7NVC (Tech); KA7AGH KA7PWJ (Gen); KA7MTY N7LYG KA7CTP N7OOB KD7IH (Adv.); N7AEH N7ACO WB7VBQ (Extra). Wedding bells in May for KA7MLW. Congrats to all! The Baker ARC is getting up STEAM for new activities. Ask them what that's all about. Steam Train Mobile Special. Josephine-Jackson Co. Swap Meet (Jo-Jac for short) was a real success in its second year. The "Northwest Amateur Radio Council" was formally started at Seaside in June. Elected officials were: KA7AHF (PARC), chmn.; WA6LKA (ORRC), v. chmn.; WA7TEG (RVARC), secy.; K7UUH (TERAC), treas. The council will coordinate club activities within its territory. Clubs reporting Field Day activity were: OTVARC, McMinnville ARC, Tektronix ARC, Central OR ARC, Salem ARC, Rogue Valley ARC, UMpqua Valley ARC, Emerald ARC, Hoodview ARC, Silverton ARC. Traffic: V7VSE 569, WA7LGN 239, KA7ELI 106, AL7W 81, KI7Y 75, KA7AID 42, W7LNE 20, N7BGW 15, W7DAN 8.

WASHINGTON: SM, Joe Winter, WA7RWK — SEC: K7SH. STM: W7GB. ACC: K7RS. TC: K7UU. BM: KD7G. PIO/SGL: W7CKZ. OO/RFI Coord.: KB7WC.

Net	Freq.	Time(Z)	QNI	QTC	Sess.
WSN	3590	0145/0445	437	171	60
WARTS	3970	0100	2681	217	30
NTN	3987	1900	790	47	30
NWSSB	3945	0130	652	39	30
EWTN	146.64	0030/0430	70	80	46
PSTS	145.33	0030/0530	138	82	59
SCARES	147.18	0230 Wed.	19	4	4

Wash. State Amateur Radio Week is set for Sept. 12th thru 18th. Wash. State QSO Party is Sept. 16th-18th (PST) spon-

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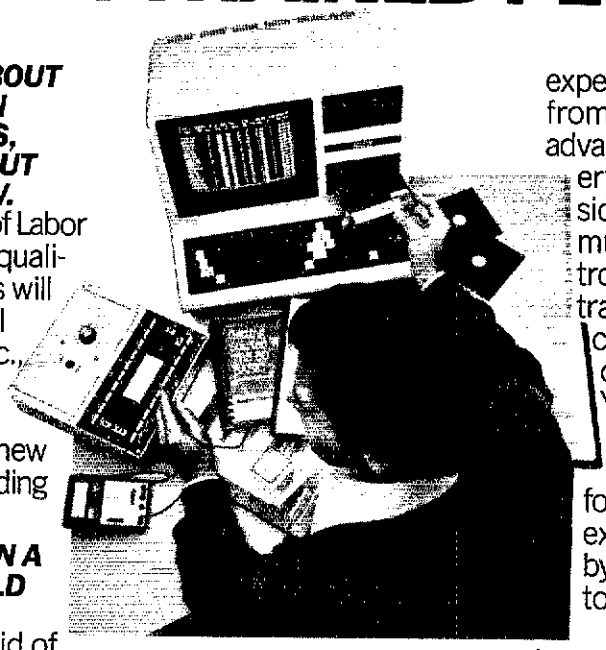

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sored by Boeing Emp. ARS. K7RS has rules and logs. Affiliated Club Coord. K7RS has contacted all aff. clubs by letter acquainting them with the Special Service Club program and offering his assistance. Discuss the possibility of your club becoming a SSC. OO/RFI Coord. KB7WC is recruiting Official Observers and hams to assist in handling RFI problems. Bulletin Mgr. KD7G is looking for more bulletin stns in all parts of the section. State Gov't. Liaison W7CKZ is contacting various gov't. offices acquainting them with the activities of ham radio. STM W7GB and SEC K7SH have asked to be replaced after their two-year terms end on Sept. 30th. I have worked with them for many years and have appreciated their abilities and dedication. I'm sure they will remain active on the local scene. Many thanks to you both for a job well done. Plan on attending the Walla Walla H.F. Sept. 24-25. ECs should be planning for the SET exercise in Oct. Appointment changes: N7AGW is now the new EC for King Co. replacing K7GZO who resigned after serving six yrs. Congrats and a big thanks to both. W6IIH is now DEC for Dist. 4 replacing KG7S. Again, congrats and a big thanks to you both. KA7CSP and his fine committee are to be congratulated for producing a successful NW '83 Convention. I enjoyed it and heard many nice comments about it. W4KFC, K1ET and W3AZD attended from Hq. presenting forums and seminars. Speaker Roy Neal, K6DUE, gave an exciting & inspiring talk on the historic event taking place in Sept., "THE HAM IN SPACE." Many excellent seminars and talks were presented by others. WA7LNC was presented with a NOAA Public Service Award for organizing and managing the Amateur Radio Weather Spotter System (similar to Skywarn) in NE Wash. Congrats. W7BFI rcvd the HAM of the YEAR Award from the Spokane AR Council for 1983. Congrats. Traffic: WB7OGA 944, WB7WOW 631, N7FKA 612, W7DZX 573, N7DNG 188, W7LG 178, KS7I 174, W7HNA 143, K7GXZ 131, N7ANE 128, W7GB 77, N7DDP 67, K7CTP 57, KR7F 48, WA7BDD 47, W7IEU 43, W7APS 27, KA7AJT 18, N7AFZ 13, KD7G 11, KA7INX 9, W7ERH 2. (May) WA7JEB 56.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG — ASMs: W6ZM N6DHN VE2AQV/W6. SEC: W6LKE. STM: NI6A. The HARC's *The Chewed Rag* will soon have a new editor. After 3 years on a "temporary" basis, N6APQ had to step down owing to new job committments. His excellent job will be a hard act to follow! EBARC's W6CUS club station provided communications from Salvation Army Hq. in SF to Coalinga after the earthquake, but their old receiver let them down. So they're collecting for a new state-of-the-art rig to install in its place. LARK has elections soon, and they are adding a greeting committee, publicity/PR committee, and a custodian/historian. MDARC has 246 members. New calls for some of their members are KA6HLY to N6EBQ and N6EWG to N6GWG. Alameda Co. RACES operated from the county rptr site using W6RGG. Traffic was received from almost every section club which was active in FD, and there were many! Traffic: K6APW 168, W6VOM 108, K6AGD 101, WB6DOB 37, NI6A 10.

NEVADA: SM, Leonard M. Norman, W7PBV — Boulder City radio amateurs are interested in hearing from all radio amateurs who worked on the Hoover Dam project. Six companies — City of Los Angeles Dept. of Water and Power, Southern California Edison Company or Government for preparation of the 50th Anniversary celebration of Hoover Dam. Please send QSL card with date of service to POB 945, Boulder City 89005 for additional information. W7TA KB7BT and KG7Q each report good FD activity. If you are interested in a station appointment, let me know.

PACIFIC: SM, Army Curtis, AH6P — Aloha and hafa adai to all of the Pacific. Please welcome KH8AB, our new EC for American Samoa. Field Day has come and gone once again with many fine efforts shown. KH6LG blasted from Kauai as always, with KH6ND and KH6CP from Oahu, KH6CC from Hilo, and KH6RS AH6BK KH6NO and WH6C from Maui. Amateur Radio Week proclamations were obtained from the Governor and the Mayors of Hawaii and Kauai. Some great PR work was done, and Amateur Radio was demonstrated to many visitors. Mahalo to all who participated. Congrats to WH6AVA for winning first place in the Novice Roundup for the section. FB! Traffic: KH6B 254, KH6S 45, KH6JJP 31, KH6H 19, KH6CCL 6, W6ORS 2.

SACRAMENTO VALLEY: SM, Norman Wilson, N6JV — SEC: N6AUB. STM: KE6NO. ASM: KI6T. I am especially pleased to announce that N6AUB, Ron Menet, P.O. Box 244, Cedar Ridge 95445, is the new Section Manager effective Oct. 1. It has been a special 10 years for me and I am sure he will find working with all of you as much fun as I found it. Please send him copies of all your club newsletters and personal notes. He will need all the help he can get. Congrats to KY6A on her new Extra class call and KB6ATA on his Novice. Once again, N6EPG and WA6ZUD made Public Service Honor Roll. Traffic: N6EPG 5, N6JV 2, K6IS 1.

SAN FRANCISCO: SM, Bob Smith, NA6T — SEC: N6BLN. STM: K6TP. Field Day was a BIG success in the section. No less than 7 club stations were operating during the weekend — Happy 50th FD. City of Novato will present MARC with 50th Year of Service Award at their birthday party. SFRC FD was on S.S. Jeremiah O'Brien. A rousing success, only two problems: vertical tri-banders & "BIP's rig blowing fuses." SCRA is in between rptrs. Old but good NOW, bigger and better LATER. SCRA will possibly be the FIRST "Special Service Club" in the Section. If any other club is interested in participating in this League program, see NA6T for information. SPACE: Don't forget OSCAR 10 and W5LFL. Get ready for both — new horizons in Amateur Radio. The Mobileers are still active on the North Coast — see WAGONMASTER WA6ACX for details. Traffic: W6IPL 314, W6NL 267, W6RNL 106, K6TWJ 101, K6TP 90, WB6RTE 23, W6GGR 6.

SAN JOAQUIN VALLEY: SM, Charles McConnell, W6DPD — SEC: WA6YAB. STM: N6AWH. A/SMs: W6TRP K6YK. New officers of the Fresno ARC are: WA6UOR, pres.; AJ6X, v.p.; KA6JKS, secy.; WA6LDJ, treas. Officers of the Sierra ARC are: WA6IMN, pres.; W6SIY, 1st v.p.; WA6FZX, 2nd v.p.; WA6ARA, secy.; ND6Q, treas. WB6RFH WB6IVZ and W6FRH are Silent Keys. WA6DCV is Extra. KA6WCP is General. KB6AFC KB6AFE and KB6AFF are Novices. K6AYL and WA6QWP are ARRL Life Members. WB6EHH has a computer. WB6YAR has a TR2500. N6HWO has a Swan 500C. The Southern SJV Swapfest will be Sept. 17 at the Bakersfield Police Pistol Range. Traffic: N6AWH 109, WA6YAB 25, W6DPD 16, WD6FHS 11, W6SX 6, WA6JDB 5.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Ian C. Black, WD4CNR — Net Time Freq. QNI QTC Mgr.

CMN	1245Z	3.927	452	173	W4EAT
CSN	2200Z	7.114	145	35	NJ4L
JFK	2230Z	3.923	652	87	WB4WII
THEN	2330Z	3.923	508	46	WD4LRG
CEN	2245Z	3.893	540	262	WB4MJH
CN E/L	2300/0200Z	3.574	488	218	K4WJR

June operations on the nets slowed considerably as the usual summertime conditions plagued the bands. Vacations took their toll of liaison spots: Sure good to see volunteers picking up the slack in almost every case; commitments to higher echelon nets were maintained on schedule. Those two problems will exist for another two months or so providing a challenge to all of us. Seriously ill and still in the hospital as of this writing, W8JUP was feeling better at last report. Best of luck; we're all pulling for you. We were deeply saddened this month to learn that K4VHQ had become a Silent Key. He was active on the NC nets and "round tables" for many years and was a bona fide personality there. Those fruity tones announcing, "this is K4VHQ," would introduce a ragchew session that became a must on many a hams' nitely schedule in our section. As his illness began to keep him off the air, it became obvious that we shared him with others as his friends from other states would call in asking for the latest on him. Although we are poorer for his passing, we are indeed richer for having known him. Traffic: WD4CNQ 172, K4NLK 170, WD4CNR 155, W4EAT 139, WA4OBR 138, WD4LRG 130, AB4S 110, KU4W 91, WB4WII 74, WB4N 73, WA4FKY 57, W4GRO 42, NT4K 42, K4DDY 38, K4IWW 38, WA4SRD 33, WA4YTO 33, WD4LOO 25, WD4CEB 23, KB4CUI 20, WB4CYN 17, KZ4A 15, WB4HRR 13, WD4HTE 12, N4UE 11, KA4KJI 9, KA4ATK 8, W4TWD 4. (Apr.) WB4WII 120.

SOUTH CAROLINA: SM, Jimmy Walker, WD4HLZ — K4WJR started as NM of CN as of July 1. Do your local CD officials know about the capabilities of Amateur Radio? During Exercise 83, taking place in and around Spartanburg June 11, WA4EZU N4FGT WD4RJQ K4LNQ and KA4ONN provided primary communications for CD when county radios became overloaded resulting from actual emergencies during the drill period. I don't think you can respond to an emergency any faster than these amateurs did. For all of you trying to get CD officials to recognize the value of Amateur Radio, PLEASE STAY VISIBLE. Sometime in the future they will need a service that only you can provide through Amateur Radio. Judging from messages I received concerning Field Day activities, SC amateurs were out in force during the two-day event. Traffic: K4ZN 198, W4ANK 151, W4FMZ 78, W4NTO 57, WB4UDK 43, K4WJR 40, K4FRX 34, KA4AUR 30, W4PAB 20, WD4NMF 19, K4ZB 18, WD4FJP 16, KA4LRM 16, WA4MIY 14, WO1KT 12, K4LYU 8, W4DRF 4.

VIRGINIA: SM, Phil Sager, WB4FDT — STM: WD4ALY. SEC: WB4UHC. Chief OO: W4HU. Chief OBS: K3RZR. SGL: W4THV. Public Information Officer-vacant; need a volunteer!

Va Traffic Net	7260	1 P.M.	WD4FTK
Va Sideband Net	3947	6 P.M.	NN4I
Va Slow Net	3680	6:30 P.M.	K4VWK
Va CW Net	3680	7/10 P.M.	K4JST/W3ATQ
Va Phone Net	3947	7 P.M.	
Va Late Net	3947	10:15 P.M.	KA4IUM

The doldrums of summer are upon us and the traffic nets are reporting reduced activity. Your SM only received six Field Day messages this year, down from 10 last year. Sterling Park ARC celebrates its 20th anniversary Sept. 10 by handling public service communications for a parade AND conducting a special "Field Day" type operation awarding special certificates and QSLs to stations worked. N4DR vacationing in Israel. WB4FDT now has second harmonic, a girl born June 21. Old Va Hams Club (Manassas) made 1500 contacts, mostly on CW, during Field Day. I'm happy to report that the *Virginia Ham* will soon be edited by members of the K4KDJ gang down at VPI&SU in Blacksburg. N4HAI was featured in his school's yearbook with a photo of him at his station. The Vienna Wireless Society had an Amateur Radio display and message booth at the Town of Vienna July 4th celebration. Traffic: W3ATQ 332, WA4CCK 319, AA4AT 313, WB4PNY 280, K4JST 264, K4KDJ 187, WD4FTK 177, WD4ALY 171, KR4V 171, WA4LJI 147, W3BBN 141, WB2RBA 137, WD4OCW 135, N4YQ 110, W4UQ 106, KA3DTE 103, KA4IUM 93, WB4FLT 90, N4HAK 83, K4JM 80, KB4OG 71, NN4I 66, WB4UHC 66, W4JLS 38, NF4T 38, K4VWK 37, NT4S 33, KC4HN 31, KB4WT 31, KA4JXZ 30, KB4PW 26, WB4DQZ 25, W4HIR 20, WA4TVS 19, W3BBQ 14, W4LXB 12, W4NFA 11, W4ZYT 11, K4AET 10, WB4KIT 10, WB2OMZ 10, WA1VRL 10, K4MLC 8, W4PVA 8, N3RC 7, W4TZC 5, WA4EQW 4, WB4MAE 4, KI4W 4, N4FNT 3, N4BJX 2, K4DHB 2, W4KX 2, N4LE 2, NW4O 2, W4DM 1, WB4ODZ 1, W4YE 1.

WEST VIRGINIA: SM, Karl S. Thompson, K8KT — SEC: K8QEW. STM: KD8G. ACC: WA8CTO. TC: K8CG. SGL: K8BS. Rptr. Coord.: WD4KHL. K8BS was named outstanding Amateur of the Year for 1983; congrats. WVDXA was FD winner for 1982. WB8VAZ was WV QSO Party winner for '83. Net appreciation plaques were awarded to KA8OGF and WA3NUI. Certificates of Merit were presented to KA8QAU KC8CR WA8GYU and KZ8Q. Nat'l MARAC conv. in Chas. was a big success. Congrats to WB8SNO and committee.

Net	Time	Freq.	Sess.	QTC	QNI	NM
WVN	7:00	3567	27	37	161	W8LYV
WVFN	6:00	3900	28	81	388	N8AJC
WVMD	11:45	7235	29	54	502	W8FZP
Hillbilly	1600Z	14290	4	4	85	KC8YU
KFC 2M	8:30M	87/47	4	2	69	WD8RHL

Traffic: KZ8Q 123, WA8KCJ 48, K8KT 42, W8FZP 30, N8AJC 25, KD8G 22, W8HZA 15, K8QEW 11, KC8CR 9.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Bill Shetfield, KQ0J — SEC: KQ0W. STM: WD0AIT. OO/RFI: K0DJ. ACC: WB0DUV. PIO: WD0HNQ. SGL: WB0FOB. TC: KO0P. BM: W0MDT. An amateur is a multitude of many things: DXer, rag chewer, traffic handler & public servant. Fortunately for us in Colo. many amateurs are all of the above, as this summer in the Rockies has been eventful to say the least. Sure we DXed, contested, Field Dayed; but more importantly we helped one heck of a lot of folks. Many hours were spent on the sports festival, flood waters, brush fires, and the always never reported public service deeds. Be proud that you are an amateur. This month name droppers for extra effort & performance are: N0BQP K0DJ WA0HJZ. Barctest/83 Boulder ARC is Sept. 25th. This is always a well organized fun event. Be sure to attend. It's at the Boulder Nat'l Guard Armory. The Quarter Century Wireless Assn. (QCWA) will hold their 1983 national convention in Denver this year, Sept. 30th & Oct. 1st. Contact Sol, W0WSK 303-755-3171. He promises many activities, tours & lots of prizes. Welcome and help our visiting hams. 73, KQ0J.

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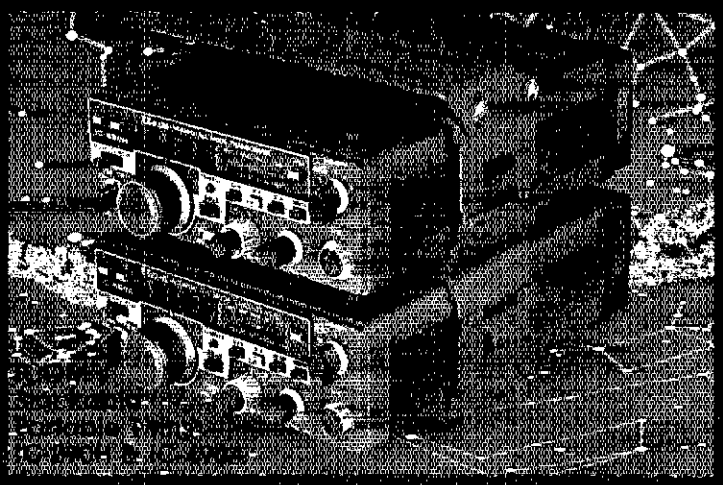

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Thirty-two tunable memories keep the IC-471A ready to go on frequency and to monitor the beacon frequencies. A good noise blanker plus all-mode squelch make listening a real pleasure. 10Hz variable speed tuning, which automatically shifts to 100Hz when needed, and a low-noise PLL that locks to 10Hz makes the frequency resolution of the ICOM Twins second to none. For MODE B use, the IC-471A features a 10W SSB transmitter with variable power control.

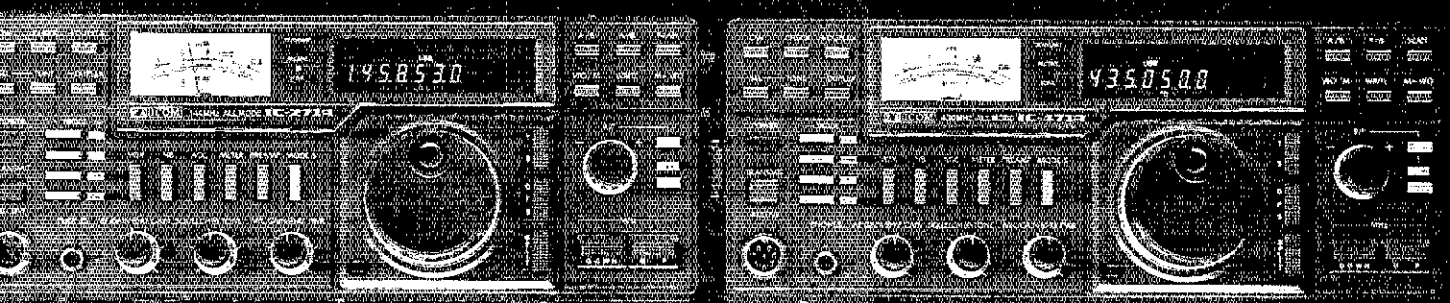
The same basic features of the IC-471A apply to the IC-271A and an optional internal pre-amplifier with front panel switch is available. The IC-271A transmitter features 25W of transmitter power.

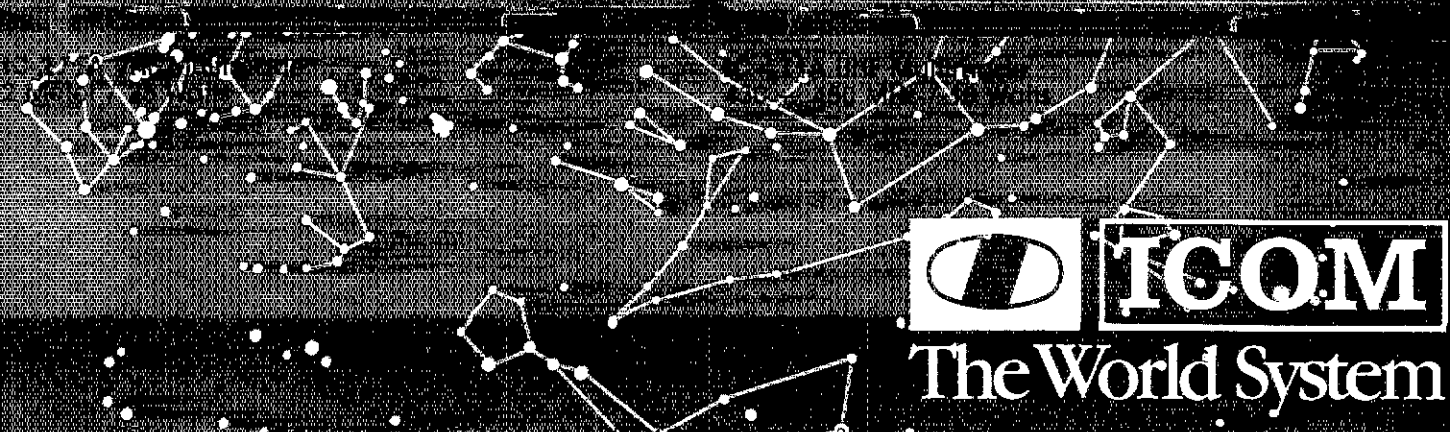
The IC-471A and the IC-271A both have options for computer interfacing. The ICOM BUS is brought out through an optional interface to the back of the radio. From this point, it may be routed to the ICOM computer interface terminal, mounted in a matching box, that will convert the ICOM BUS to RS232C standard. Allowing computer control of both transceiver units, this capability, plus the antenna-tracking programs available for Oscar 10, will make the IC-271A and 471A Twins the ultimate for computer control of your satellite operations.

IC-290H/IC-490A Twins

ICOM's IC-290H and IC-490A mount together as a stackable, mountable pair that offers versatility, portability and satellite capability in an incredibly small size. These units are easily hung from your ham shack bench, taken on portable operations or used mobile.

Each features multiple tuning rates, memories, FM/SSB/CW, programmable scan and priority function, and an all-mode squelch. The IC-290H has a 25W transmitter; the IC-490A, 10W. Both of these transceivers are high quality designs by ICOM and offer all the flexibility needed for satellite operations.





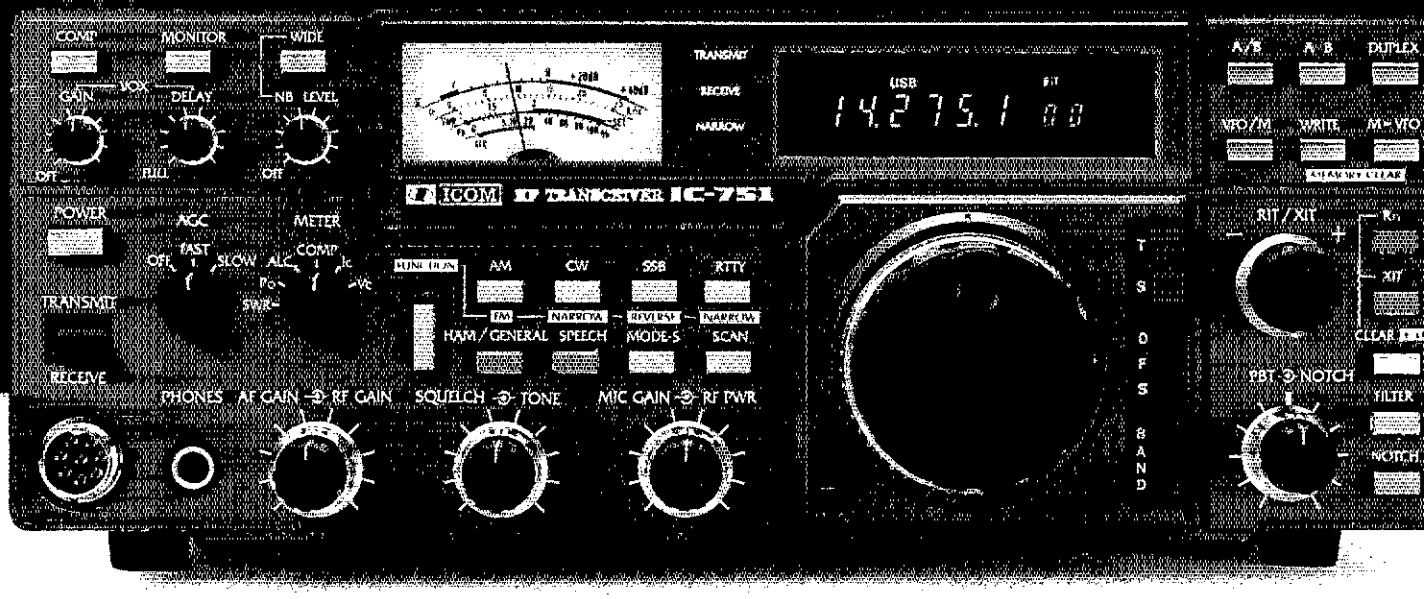
ICOM

The World System

ICOM IC-751

The New Standard of Comparison

NEW Competition Grade Transceiver!



ICOM is proud to announce the most advanced amateur transceiver in communications history. Based on ICOM's proven high technology and wide dynamic range HF receiver designs, the IC-751 is a competition grade ham receiver, a 100KHz to 30 MHz continuous tuning general coverage receiver, and a full featured all mode solid state ham band transmitter, that covers all the new WARC bands. And with the optional internal AC power supply, it becomes one compact, portable/field day package.

Receiver. Utilizing an ICOM developed J-FET DBM, the IC-751 has a 105dB dynamic range. The 70.4515MHz first IF virtually eliminates spurious responses, and a high gain 9.0115MHz second IF, with ICOM's PBT selectivity. A deep IF notch filter, adjustable AGC and noise blanker (can be adjusted to eliminate the woodpecker), audio tone control, plus RIT with separate readout provides easy-to-adjust, clear reception even in the presence of strong QRM or high noise levels. A low noise receiver preamp provides exceptional reception sensitivity as required.

Transmitter. The transmitter features high reliability 2SC2097 transistors in a low IMD (-32dB @ 100W), full 100% duty cycle (internal cooling fan standard), 12 volt DC design. Quiet relay selection of transmitter LPF's, transmit audio tone control, monitor circuit (to monitor your own CW or SSB signal), XIT, and a high performance speech processor enhance the IC-751 transmitter's operation. For the CW operator, semi break-in or full QSK is provided for smooth, fast break-in keying.

Dual VFO. Dual VFO's controlled by a large tuning knob provide easy access to split frequencies used in DX operation. Normal tuning rate is in 10Hz increments and increasing the speed of rotation of the main tuning knob shifts the tuning to 100Hz increments automatically. Pushing the tuning speed button gives 1KHz tuning. Digital outputs are available for computer control of the transceiver frequency and functions, and for a synthesized voice frequency readout.

32 Memories. Thirty two tunable memories are provided to store mode, VFO, and frequency, and the CPU is backed by an internal lithium memory backup battery to maintain the memories for up to seven years. Scanning of frequencies, memories and bands are possible from the unit, or from the HM 12 scanning microphone. In the Mode-S mode, only those memories with a particular mode are scanned, others are bypassed. Data may be transferred between VFO's, from VFO to memories, or from memories to VFO.

Standard Features. All of the above features plus FM unit, high shape factor FL44A, 455 Khz SSB filter, full function metering, SSB and FM squelch, convenient large controls, FM option, a large selection of plug-in filters, and a new high visibility multi-color flourescent display that shows frequency in white, and other functions in white or red, make the IC-751 your best choice for a superior grade HF base transceiver.

Options. External frequency controller, external PS-15 power supply, internal power supply, high stability reference crystal (less than 100Hz, -10 C to +60 C) HM12 hand mic, desk mic, filter options: SSB: FL30
CWN: FL52A, FL53A
AM: FL33

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The World System

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"Overall, the ICOM IC-R70 outperforms any other model we have tested in the under-$1,000 category."

—World Radio TV Handbook 1983

With the IC-R70, ICOM continues its tradition of superior quality, high performance receiver design. Statements, such as the one above, are coming from shortwave listeners and equipment reviewers around the world.

What can a shortwave receiver do for you? The IC-R70 brings the news, music, and political opinions of other nations into your home or office. Enjoy music from the Near East, western Europe, South America; hear political opinion from Russia, Viet Nam, China; news from the BBC, Canada, Israel, Japan. Most countries broadcast in English as well as their national languages.

The IC-R70 is an easy-to-use comercial grade shortwave receiver, with features found only on the best receivers. The R70 out-performs receivers costing more than twice as much. And...

At a price well below $1,000, the ICOM R70 is the best performance value in a shortwave receiver today. See it at your authorized ICOM dealer, or contact ICOM for more information.

ICOM IC-R70
World Communications Receiver

ICOM World Clock
Rotate globe to display time of illuminated location

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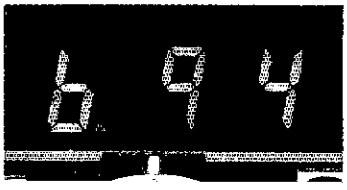
ICOM IC-25A/H

More Features and Power Per Square Inch!

The smallest 2 meter FM mobile on the market is now even easier to read and use with a green LED readout and a compact touchtone™/scanning microphone and gives you the option of 25 or 45 watts.



New Green LED. Easier to read in bright sunlight, and not glaring at night, the IC-25A(H)'s new readout provides good visibility under all conditions.

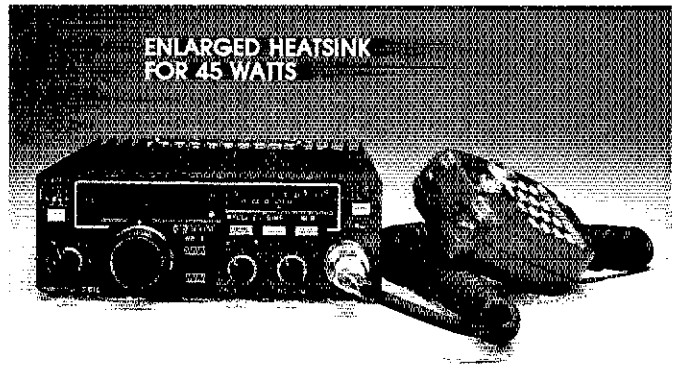
5 Memories. Instant access to most used frequencies. VFO A information is transferred to the selected memory by pushing the write button.

Priority Channel. Any memory channel may be monitored for activity on a sample basis, every 5 seconds, without disruption of a QSO conducted on a VFO frequency.

New HM14 Microphone. Smaller and lighter . . . the HM14 microphone provides a 16 button touchtone™ pad as well as up and down scan buttons adding easy frequency control of the radio and additional tones for repeater control.

NOR/REV Capability. Use of this button in the duplex mode allows one touch monitoring of the repeater input frequency. If simplex operation is possible you will know instantly.

Scanning. Pushing the S/S button initiates the scan circuitry. With the mode switch in a memory position the unit will scan all 5 memories plus the 2 VFO frequencies. With the mode switch in a VFO position, the unit will scan the entire band or the portion of the band defined by memories 1 and 2. Full band scan or program band scan is selected from the front panel and internally switched scanning choices of adjustable delay period after a carrier is received then resume scan, or resume on carrier drop, are standard.



The New 45 Watt IC-25H. Only slightly longer than its companion IC-25A, the IC-25H packs a powerful 45 watt punch. This 45 watts of power eliminates the need for an external power amplifier in fringe areas and gives a savings of space and wiring.

The IC-25H has all of the standard features of the IC-25A that have made it the most popular 2 meter mobile ever, plus the new green LED readout, new HM14 microphone and extra power. These new features make the IC-25H the best 2 meter mobile value on the market.

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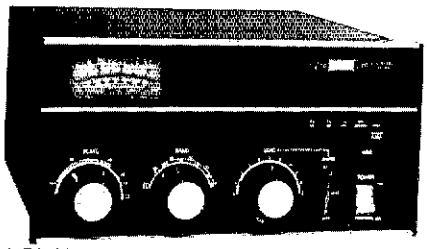
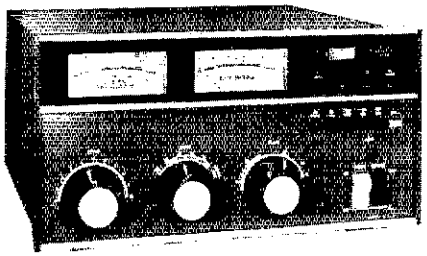
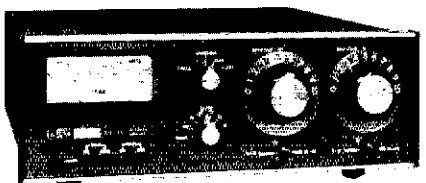
DRAKE Linears
New Low Prices!



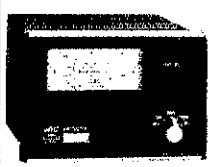
L-75 160-15m Linear; 1200w PEP, SSB, 1000w CW, AM, RTTY & SSTV. (1) 3-500Z, tuned input; 60w drive SSB, 50w CW, AM, RTTY & SSTV. Built-in power supply; 2-speed fan; bypass switch. 13¾"w × 6¼"h × 14¼"d, 42 lbs. **With tube;** (Regular $854.95)..... **Sale $699.95**



L-7 160-15m; 2000 watts PEP, SSB & AM, 1000 watts CW, RTTY, SSTV - all modes full rated input, continuous duty cycle. (2) 3-500Z's, tuned input; 100w PEP drive SSB, 75w CW, AM, RTTY & SSTV. Desk top rf unit & separate power supply. Built-in RF wattmeter, adj. AGC, 2-speed fan; bypass switch. Size: (amp) 13¾"w × 6¾"h × 14¼"d, 27 lbs; (supply) 6¾"w × 7⅜"h × 11"d, 42 lbs. **With tubes;** (Regular $1400)..... **Sale $1129**



MN-2700 Matching Network. 1.8-30 Mhz; 1000w or 2000w PEP. Tunes antennas fed with coaxial cable, balanced line (w/B-1000 balun), or random wire. 13" × 4½"h × 8½"d, 10 lbs. (Reg. $349).. **Sale $309.95**



DRAKE Wattmeter
WH-7 Directional, in-line type for 1.8-30 Mhz. Scales: 0-20, 0-200, 0-2000 watts & VSWR. Accuracy: 5%/reading. Coupler removable for remote metering. 5⅛"h × 6¾"w × 7½"d, 3 lbs.
Reg. $129 - **Sale $79.95**

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MIRAGE VHF/UHF Power Amplifiers

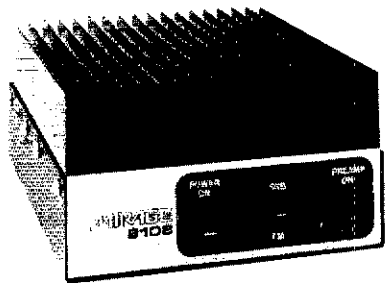
5-year Warranty

B23 2m 30w Amplifier for low power HT's, etc. All-mode, 100mw-5w drive; 2w in-30w out. 4"w × 2¼"h × 4¾"d, 1¼ lbs. 13.6vdc/5A (Reg. $89.95) **Sale $79.95**

C22 As above, but for 220MHz All-mode, 500mw-5w drive; 2w in-20w out. (Regular $89.95) ... **Sale $79.95**

D24 Same as B23 except for 440 MHz. All mode, 2w in/40w out. (Regular $199.95) ..... **Sale $179.95**

D24N As above, but with low-loss Type-N coaxial connectors (Regular $208.95)..... **Sale $187.95**



B108 2m 80w amplifier with built-in 10db gain/2.5db NF Receive Preamp. All mode, 500mw-15w drive; 10w in/80w out. Int./ext. relay keying. 5⅛"w × 3"h × 8"d, 3 lbs. 13.6vdc/12A. (Reg. $179.95)..... **Sale $159.95**

B1016 Same features as B108, except rated 160w. 500mw-15w drive; 10w in-160w out. 5½"w × 3"h × 12"d, 5 lbs. 13.6vdc/20-25A. (Reg. $279.95)..... **Sale $249.95**

B3016 Same as B1016 but 15-45w drive; 30w in-160w out. 13.6vdc/20-25A. (Reg. $239.95) **Sale $199.95**

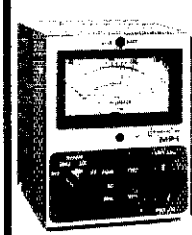
C106 Same as B108, except 60w for 220 MHz. All-mode, 10w in-60w out. (Reg. $199.95)... **Sale $179.95**

C1012 Same features as C106, except rated 10w in 120w out; 2w in - 45w out. 5½"w × 3"h × 12"d, 5 lbs. 13.6vdc/20-25A. (Regular $289.95)..... **Sale $259.95**

D1010 100w 430-450 Mhz UHF Amplifier. All-mode, 300mw-15w drive; 10w in-100w out. 5½"w × 3"h × 12"d, 5 lbs. 13.8vdc/20 A. (Regular $319.95) **Sale $289.95**

Model D1010N (with Type N connectors) ... **add $9.00**

RC1 Amplifier remote control w/18' cable. Duplicates all switches. 1¾" × 3¾" × 2½" **$24.95**



MIRAGE Wattmeters
MP1 for 1.8-30 Mhz. Peak/Average. 25, 200 & 2000w fwd & rev power scales & VSWR scale. 1-2w VSWR sensitivity. Remote coupler, requires 9v batt. or ext. AC adaptor. 5¼"h × 4½"w × 5¾"d, 3 lbs.
Reg. $119.95 - **Sale $99.95**

MP2 VHF Wattmeter. Same as MP-1, except 50-200 MHz; 50, 500 & 1500w scales & VSWR.
Reg. $119.95 - **Sale $99.95**

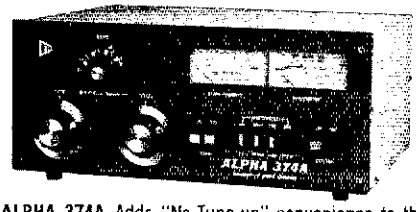
ETO Alpha Linears

ALPHA 76A Manually tuned, covers 160-15m, 1.8-2.0, 3-22 MHz & WARC bands. 2.5 KW PEP SSB input, 1 KW average, CCS - No Time Limit. (2) 8874's - 60w CW, 110w PEP SSB drive. 1.5KVA transformer, forced air cooling. 7½"h × 17"w × 14¾"d, 65 lbs ..... **Sale Price $1449**

76A with Lightweight Hipersil® xfmr ..... **$100** *extra*

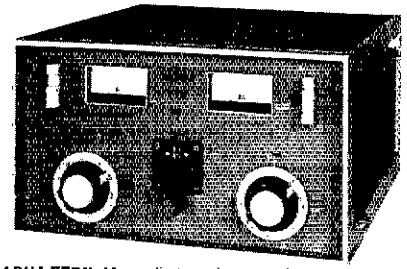
ALPHA 76PA Identical to 76A except uses (3) 8874 tubes. For extended FSK/SSTV.. **Sale Price $1749**

ALPHA 76CA Same as **76PA**, but uses 2.4KVA Hipersil® extra-duty transformer ..... **Sale Price $1949**



ALPHA 374A Adds "No-Tune-up" convenience to the basic 76A chassis. Provides instant bandswitching on the popular amateur bands & full coverage manual tuning on 1.8-2.0 & 3-22 MHz ranges ..... **Sale Price $1869**

ALPHA 78 Combines the best features of all other ALPHA amplifiers. (3) 8874's, QSK, 2.4KVA Hipersil® transformer and "No Tune-up" convenience on 160-15m. 7½"h × 17"w × 14¾"d, 65 lbs ..... **Sale Price $2499**



ALPHA 77DX Manually tuned, covers 160-15m, 1.8-2.0, 3-22 Mhz & WARC bands. DC plate input: 3 KW PEP or continuous carrier - No Time Limit. Single 8877 requires 100 watts drive for 2 KW input nominal. Vacuum relay QSK-T/R system, air cooled, 120/240v encapsulated 4+ KVA Hypersil® transformer, vacuum variable. 11"h × 19½"w × 22"d, 103 lbs; Air Frt ... **Sale Price $3895**

77DX *Drop shipped from factory*..... **3795**

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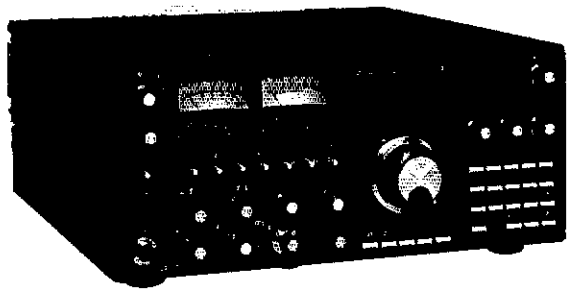
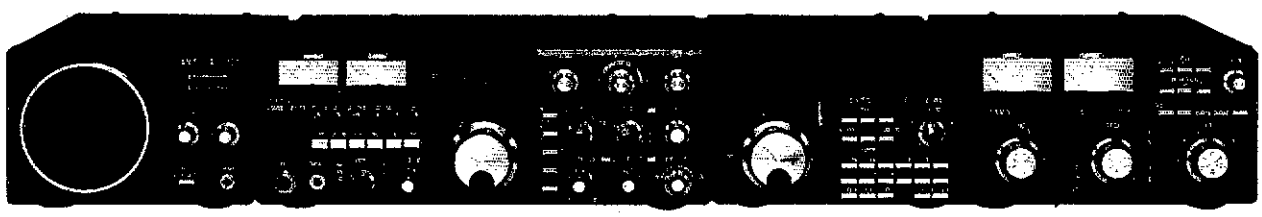


FT-ONE

THE TOP OF THE LINE HF ALL MODE GENERAL COVERAGE TRANSCEIVER WITH COMMERCIAL-GRADE CONSTRUCTION, COMPETITION-GRADE DESIGN WITH UNEQUALLED RECEIVER FILTER PERFORMANCE.
TX: 100W 1.8–29.99 MHz
RX: 150 kHz–29.99 MHz

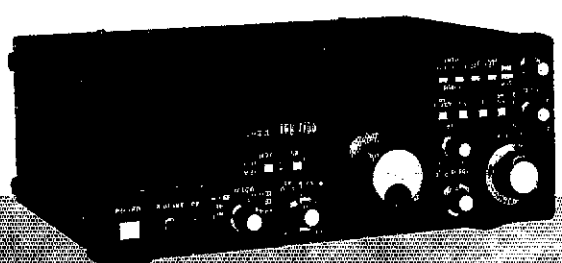
FT-980 CAT

NEW HF ALL MODE TRANSCEIVER WITH GENERAL COVERAGE RECEIVER, 8-BIT MICROPROCESSOR CONTROL, AND INTRODUCING YAESU'S NEW COMPUTER-AIDED TRANSCEIVER SYSTEM FOR COMPLETE EXTERNAL COMPUTER CONTROL.
TX: 100W 9 bands
RX: 150 kHz–29.99 MHz



FT-102 LINE

Designed for wide dynamic range and clean transmitter output—to give you that extra competitive edge. Three 6146B's give power to spare, while the ultra-modern features give you total operating flexibility and control.



Simple, reliable and thrifty, the all solid-state rig that gives you everything you need for no-frills mobile HF, or base station with the optional FP-700 Power Supply. 100W: 9 bands, SSB and CW, w/FM optional

All mode synthesized general coverage receiver—perfect for serious shortwave listening. Options include 12-channel Memory Unit, VHF Converters, Antenna Tuner and an Active Antenna.

Specifications subject to change without notice or obligation.

CIRCLE 146 ON READER SERVICE CARD

VHF FAMILIES

FT-208R/708R

Feature-packed FM Handhelds that have proven their superior performance. Microprocessor control assures convenient operation while incorporating every worthwhile feature the serious operator needs.

FT-208R 2.5W/1W RF: 143.5–148.5 MHz

FT-708R 1W/200mW RF: 440–450 MHz

10 memories w/lithium backup
Full scanning features

FT-230R/730R

Compact FM mobiles engineered for reliability and convenience. The perfect balance of current drain and power output for all mobile needs. Built to withstand years of punishing mobile use.

FT-230R 25W RF: 143.5–148.5 MHz
FT-730R 10W RF: 440–450 MHz

FT-290R/690R/790R

All mode portables with full microprocessor control and all of the features needed for serious SSB, CW and FM field operation when powered by eight optional "C" cells. Options also available for mobile and base operation.

FT-690R 2.5/1W RF: 50–54 MHz
FT-290R 2.5W/1W RF: 143.5–148.5 MHz
FT-790R 1W/200 mW RF: 430–440 MHz

FT-480R/680R/780R

All mode base/mobiles with power and performance in all SSB, CW and FM applications. Optional matching FP-80A AC Power Supply makes the perfect base station.

FT-680R 10W RF: 50–54 MHz
FT-480R 10W RF: 143.5–148.5 MHz
FT-780R 10W RF: 430–440 MHz

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• **CONTINUOUS FREQUENCY COVERAGE**—1.5 to 30 MHz full-receive coverage. The optional AUX7 expands traditional Amateur band coverage to include 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). • **CONTINUOUS DUTY RATED**—Full power 250 watt input operation on SSB and CW (same on SSTV and RTTY with optional FA7 fan). • **FULL PASSBAND TUNING (PBT)** enhances use of high rejection 8-pole crystal filters. • **BUILT-IN FEATURES**—NB7 noise blanker, 2.3 kHz SSB and 500 Hz CW crystal filters plus provisions for two additional filters. • **MODULAR CONSTRUCTION**—Plug in G-10 glass epoxy printed circuit boards. • **STATE-OF-THE-ART DESIGN** combining solid-state PA, up-conversion, high-level double balanced 1st mixer and frequency synthesis provides a no tune-up, broadband, high dynamic range transceiver. • **ACCESSORIES**—A full line of compatible accessories, including the new RV75 digital synthesized VFO, is available from your Drake dealer. • Manufactured in U.S.A.

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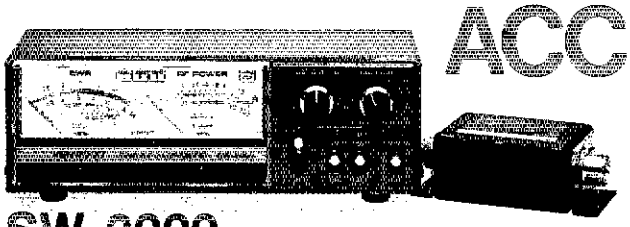
ACCESSORIES



SW-2000

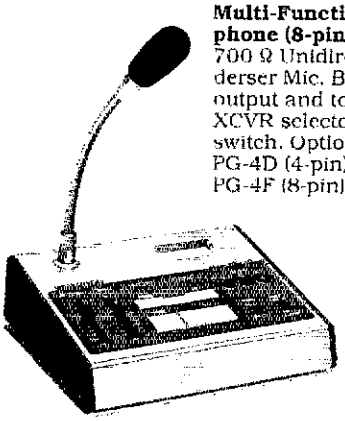
160~6-m 2 KW SWR/PEP-POWER Meter

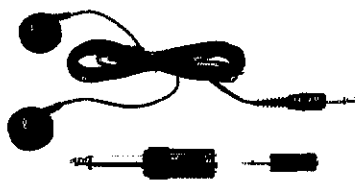
Up to 3 separate directional couplers may be connected. (One SWC-3 is supplied.) Optional couplers: SWC-2 (2-m/70-cm, 200 W) & SWC-3 (160~6-m, 2 KW).

MC-85

Multi-Function Desk Top Microphone (8-pin)

700 Ω Unidirectional Electret Conderser Mic. Built-in mic-amp with output and tone control, meter, XCVR selector and UP/DOWN switch. Optional mic cables: PG-4D (4-pin), PG-4E (6-pin) & PG-4F (8-pin).

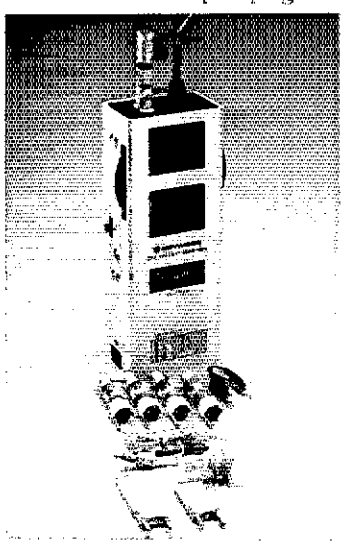




HS-7

Micro Headphones (16 Ω)

Ultra light weight and portable ear-fitting headphones supplied with two audio adaptor plugs.



DM-81

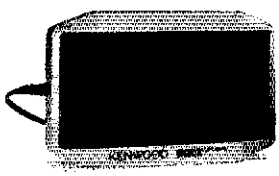
700 kHz-250 MHz Dip Meter

All solid-state and built-in battery.

MC-80

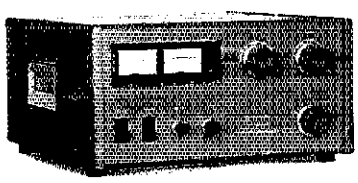
Desk Top UP/DOWN Microphone (8-pin)

700 Ω Unidirectional Electret Conderser Mic. with "FLEX" type boom. Built-in mic-amp and UP/DOWN switch. Optional mic plug adaptors: MJ-84 (8p-4p) & MJ-86 (8p-6p).



SP-50

High Quality External Mobile Speaker



TL-922A

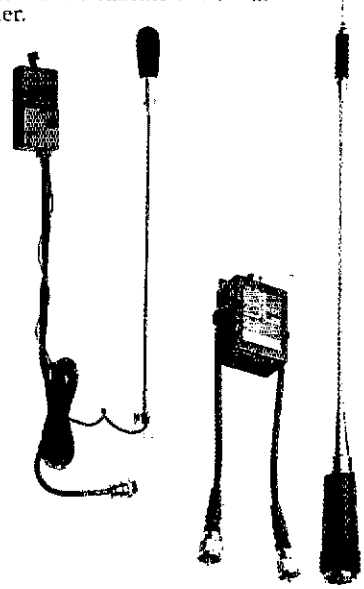
160~15-m 2 KW PEP/1 KW DC Input Linear Amplifier

Pair of EIMAC 3-500Z tubes and excellent IMD characteristics. Perfect safety protection with blower turn-off delay circuit.

MC-55 (8P/6P)

Mobile Microphone (8-pin or 6-pin)

700 Ω Electret Conderser Mic. with flexible boom, and separate STAND-BY box built-in UP/DOWN switch and 5 minute Time-Out-Timer.



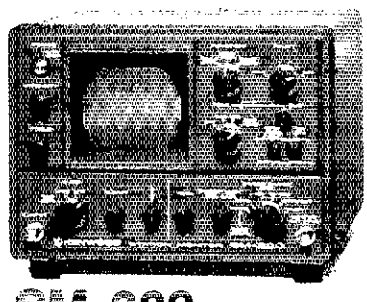
MA-4000

2-m/70-cm Dual-Band Mobile Antenna

5/8λ 3 dB gain for 2-m and stacked 5/8 λ 5.5 dB gain for 70-cm. Duplexer is supplied.

PC-1A

Phone Patch (FCC Part 68 registered)



SM-220

Station Monitor/High-Performance Oscilloscope

Pan-display capability with optional BS-8 (for TS-830S/820S/180S) or BS-5 (for TS-520 series). Transmitted waveforms and/or receiving signal waveform monitor. Built-in 2 tone generator.

SW-100A/B

A: 160-m~2-m. B: 2-m ~70-cm. 150 W SWR/POWER/VOLT Mete

Compact design with separate coupler, ideal for mobile use. Built-in 0-20 V volt meter.

MICROPHONES:

- **MC-60A** Deluxe desk top micro phone with UP/DOWN switch, (8-pin) Pre-amplifier, 500/900 Ω
- **MC-60N4** Deluxe desk top microphone (pre-amp. not included). (4-pin) 50 k/500 Ω
- **MC-50** Desk top microphone, 50 k/500 Ω (4-pin)
- **MC-48** 16-key autopatch UP/DOWN microphone. (8-pin)
- **MC-46** 16-key autopatch UP/DOWN microphone. (6-pin)
- **MC-42S** Hand microphone with UP/DOWN switch. (8-pin)
- **MC-35S** Noise-cancelling hand microphone, 50 k Ω (4-pin)
- **MC-30S** Noise-cancelling hand microphone, 500 Ω (4-pin)

MICROPHONE CABLES:

- **PG-4A/4B/4C** For MC-60A/60N4. PG-4A(4-pin)/4B(6-pin)/4C(8-pin)
- **PG-4D/4E/4F** For MC-85. PG-4D (4-pin)/4E(6-pin)/4F(8-pin)

MICROPHONE PLUG ADAPTORS:

- **MJ-48** (4-pin mic to 8-pin XCVR)
- **MJ-84** (8-pin to 4-pin)
- **MJ-86** (8-pin to 6-pin)

HEADPHONES:

- **HS-6** Lightweight headphones
- **HS-5** Deluxe headphones
- **HS-4** Standard headphones

GENERAL PURPOSE AC POWER SUPPLIES:

- **KPS-7A** 13.8 VDC, 7.5A intermittent
- **KPS-12** 13.8 VDC, 12A intermittent
- **KPS-21** 13.8 VDC, 21A intermittent

ANTENNAS:

- **RA-3** 2 m 3/8 λ Telescoping antenna with BNC connector
- **RA-5** 2-m 1/4 λ/70-cm 5/8 λ Telescoping dual-band antenna with BNC connector

Other accessories:

- **RD-20** Dummy load, 50 Ω, DC-500 MHz, 50 W intermittent
- **SP-40** Compact external mobile speaker
- **AL-2** Lightning & static protector, 50 Ω 1 KW output
- **PG-3A** DC line noise filter for mobile

SERVICE MANUALS:

- Available for most transceivers, receivers, and major accessories

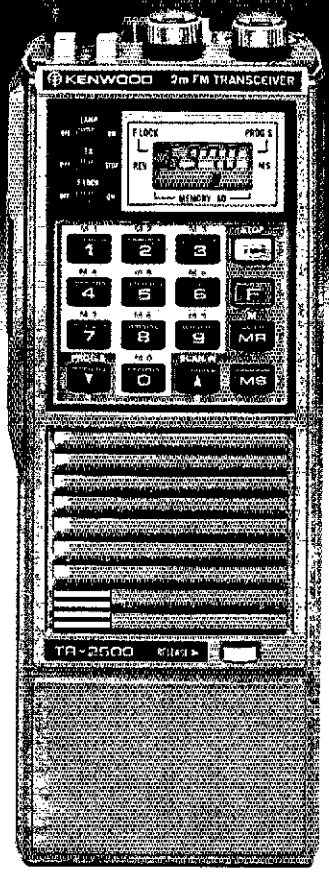
NOTE: Prices and specifications of all Trio-Kenwood products are subject to change without prior notice or obligation.

KENWOOD

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

TR-2500

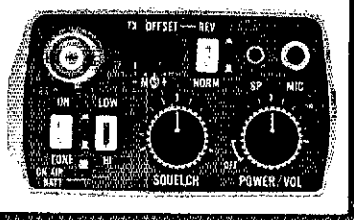
...ger, smaller price!



The TR-2500 is a compact 2 meter FM handheld transceiver with every conceivable operating feature.

TR-2500 FEATURES:

- Weighs 540 g, (1.2 lbs), 66 (2-5/8) W x 168 (6-5/8) H x 40 (1-5/8) D, mm (inches).
- LCD digital frequency readout.
- Ten memories includes "MO" for non-standard split repeaters.
- Lithium battery memory back-up, built-in, (est. 5 year life).
- Memory scan.
- Programmable automatic band scan, and upper/lower scan limits; 5-kHz steps or larger.
- Repeater reverse operation.
- 2.5 W or 300 mW RF output. (HI/LOW power switch).
- Built-in tunable (with variable resistor) sub-tone encoder.
- Built-in 16-key autopatch encoder.
- Slide-lock battery pack.
- Keyboard frequency selection.
- Covers 143.900 to 148.995 MHz.



- Rapid charger/supply for operation while charging.
- Battery status indicator.
- Complete with flexible antenna, 400 mAH Ni-Cd battery, and AC charger.

Optional accessories:

- ST-2 Base station power supply/charger (approx. 1 hr.)
- MS-1 13.8 VDC mobile stand/charger/power supply.
- VB-2530 2-M 25 W RF power amps., (TR-2500 only).
- TU-1 Programmable CTCSS encoder (TR-2500 only).
- TU-35B Programmable CTCSS encoder (mounts inside TR-3500 only).
- PB-25H Heavy duty 490 mAH Ni-Cd battery pack.
- DC-25 13.8 VDC adapter.
- BT-1 Battery case for AA manganese/alkaline cells.
- SMC-25 Speaker microphone.
- LH-2 Deluxe leather case.

TR-3500

70 CM FM Handheld

- Covers 440-449.995 MHz in 5-kHz steps.
- Hi-1.5 W, Low-300 mW.
- TX OFFSET switch, ±5 kHz to ±9.995 MHz programmable.
- Auto/manual squelch control.
- Tone switch for opt. TU-35B
- Other outstanding features similar to TR-2500.

- BH-2A Belt hook.
- RA-3 2 m 3/8 λ telescoping antenna (for TR-2500).
- WS-1 Wrist strap.
- EP-1 Earphone.

TR-7950/7930

Big LCD, Big 45 W, Big 21 memories, Compact.

Outstanding features providing maximum ease of operation include a large, easy-to-read LCD display, 21 multi-function memories, a choice of 45 watts (TR-7950) or 25 watts (TR-7930), and the use of microprocessor technology throughout.

TR-7950/TR-7930 FEATURES:

- New, large, easy-to-read LCD digital display. Easy to read in direct sunlight or dark (back-lighted). Displays TX/RX frequencies, memory channel, repeater offset, sub-tone number, scan, and memory scan lock-out.
- 21 new multi-function memory channels. Stores frequency, repeater offset, and optional sub-tone channels. Memory pairs for non-standard splits. "A" and "B" set band scan limits. Lighted memory selector knob. Audible "beep" indicates channel 1 position.
- Lithium battery memory back-up. (Est. 5 yr. life.)
- 45 watts or 25 watts output. HI/LOW power switch for reduction to 5 watts.
- Automatic offset. Pre-programmed for simplex or ±600 kHz offset, in accordance with the 2 meter band plan. "OS" key for manual change in offset.
- Programmable priority alert. May be programmed in any memory.
- Programmable memory scan lock-out. Skips selected memory channels during scan.
- Programmable band scan width.
- Center stop circuit for band scan, with indicator.
- Scan resume selectable. Selectable automatic time resume-scan, or carrier operated resume-scan.
- Scan start/stop from up/down microphone.
- Programmable three sub-tone channels with optional TU-79 unit (encoder).
- Built-in 16-key autopatch encoder, with monitor (Audible tones).
- Front panel keyboard control.
- Covers 142.000-148.995 MHz in 5-kHz steps.
- Repeater reverse switch. (Locking)
- "Beeper" amplified through speaker.
- Compact lightweight design.

Optional accessories:

- TU-79 three frequency tone unit.
- KPS-12 fixed-station power supply for TR-7950.
- KPS-7A fixed-station power supply for TR-7930.
- SP-40 compact mobile speaker.

KENWOOD

TRIO-KENWOOD COMMUNICATIONS

1111 West Walnut, Compton, California 90220

Nets: CWN: 30 sess., QTC 111, QNI 148, QNF 611. HNN: 30 sess. QTC, for. 124, int. 274, QNI, 1494. QNF 1525. Traffic: NØBQP 2219, WAØVTU 232, NØCXI 229, WDØAIT 216, KBØZ 128, WØHXB 124, WØLAE 117, KØDJ 116, KAØNLI 76, WBØNHA 72, WØNFW 38, WØGW 8. (May) WØHXB 213. (Apr.) WØHXB 130. (Mar.) WØHXB 189.

NEW MEXICO: SM, Joe T. Knight, W5PDY — DEC: KB5XD. STM: KV5U. NMs: WA5UNO KB5LJ W5VFQ. Southwest Net (SWN) meets daily on 7.083 at 1930 local and handled 193 msgs with 216 stations in. New Mexico Roadrunner Net (NMRRN) meets daily on 3939 at 0100 UTC and handled 88 msgs with 985 stations in. New Mexico Breakfast Club meets daily on 3939 at 0830 local and handled 92 msgs with 979 checkins. Yucca 2-Mtr Net 78/18 & 93/33 handled 6 msgs with 533 checkins. Caravan Club 2-Mtr Net 66/06 handled 5 msgs with 97 checkins. Sorry to report the passing of W5USS. W5QNT surprised us with a visit while returning from a visit to Russia. W5VFQ W5NUI W5KOK W5OGG & K5DI spending part of the summer away. Traffic: W5UH 345, W5JOV 175, ND5T 167, W5DAD 162, W5ENI 54, WA5MIY 10.

UTAH: SM, Ron Todd, K3FR — STM: W7OCX. SEC: NA7G. BM: WA7MEL. OO/RFI: KD7FL. ACC: KB7XO. PIO: K7RJ. Greetings, I'm honored to be serving as your SM. Check my phone and adr on p. 8. My work phone is 801-582-7430 (days). Special thanks to W7PBV for his help in transition. Greatest appreciation to all who provided disaster or PS support. FD msgs. rcvd from WA7JOF WA7MXZ and NA7G. Help, we still need TC and SGL. I'm computerizing section records. Please be patient on appointment endorsements. UARC meeting 10/6 will be computer fair. OARC had 9 ops at Golden Spike 5/9-10. WA7ARK/R (34/94) now WA7YTE/Rpt with new rig in SLC area. New format coming next month. Traffic: K7HLR 186, WA7KHE 158, WA7MEL 96, NA7G 45, K7CKF 16, W7PBV 16, W7OCX 11, KO7H 5. (May) N7BQE 2.

WYOMING: SM, Dick Wunder, WA7WFC — SEC: W7TVK. STM: WØOGH. BM: KD7AN. TC & OO/RFI Coord.: KC7QY. PIO & ACC: KC7QJ. Field Day was very active within our section despite the weather. Some of the clubs participating in this year's activities include SHY-WY ARC, Casper Outlaws, Sweetwater ARC, High Plains ARC and Cedar Mtn ARC. KC7QY reports that six meters has been very active, and has many new states in his log. The heavy spring run off and rains caused high water problems and many amateurs pitched in to provide communications. WAØPFJ reports the Wyoming Jackalope Net held 24 sessions with 229 QNI & 0 QTC. Traffic: W7HLA 4, KC7QY 1.

SOUTHEASTERN DIVISION

ALABAMA: SCM, H. H. Wheeler, W4IBU — ASCMs: WA4RNP KA4WVU. STM: WA4PIZ. SEC: N4DMA. One serious accident occurred during Field Day. A tower fell while WD4CPF was attempting to repair a rotor. Accidents don't happen; they are caused. In this case it was improper guying. Next year have a safety committee appointed to insure that all is shipshape!!! Please send information to me on the election of new officers and any change in the mailing address of your club so that I may get the newsletter into the right hands. The election of the Division Director and the Alabama Section Manager is in the offing. If you are a conscientious member of the ARRL, then you will cast your vote. The Shelby Co. ARC was the first to apply for the SSC program. If your club qualifies, why not now? The B'ham and Mobile clubs are to be congratulated on fifty years of continuous service to Amateur Radio. Does your club exchange newsletters with other clubs around the section? It might be a source of new ideas & innovation. ARRL membership referral program is underway. Build up your club's library by signing up new members. See July issue of *QST*. CAND reports DRN5 represented 100% by W4CKS & N4FQD. DRN5 reports Alabama represented 93% by WB4IXA N4FQD KC4GS WA4JDH W4IBU W4CKS WA4WQW NW4XM W4WJF & K4RSB. Traffic: WA4JDH 559, N4FQD 109, W4CKS 85, WA4LXP 55, WB4IXA 43, NW4X 34, WA4HRV 19, KA4IJT 15, K4AOZ 8, W4DGH 8, WB4TVY 6, WA4PIZ 4.

GEORGIA: SM, Eddy Kosobucki, K4JNL — STM: W4WXA. SEC: WB4HXE. ASEC: K4SWJ. ACC: WA4ABY. SGL: W4BTZ. PIO: WA4PNY. TC: K4UDR. OO/RFI: K4VHC. NWS: WA4PZD. Red Cross: NC4E. Congrats once again to the Atlanta RC & area hams for the FB job with the annual Peachtree Road Race. If u missed the Ga SSB Assn picnic at Madison, u missed the best ever. All the folks had a ball. Tnx go to the assn officers & to the host WB4ZVX. Three hamfests are on tap for Sept. Warner Robins on the 10th & 11th, Augusta on the 18th & Gainesville on the 25th. Support is what keeps the clubs going. All ARRL affiliated clubs should have received info on the new Special Service Club qualifications. If u have not, contact WA4ABY or me and we'll get you a set. At ur next meeting talk abt it & see if ur club can qualify. There are many advantages in being a SSC. Tnx to all in the section who took time to respond to their federal officials in regard to the "NO CODE LICENSE." As issues come up it is our duty to respond to them, be it on a local, state or national level. Let's let them know that we are a united group. Our vy capable SGL W4BTZ is contacting legislators in regard to the Georgia license plates. Sure would be nice if we could have "Amateur Radio" on them. Sometime during the month of Oct. I will start the "Georgia ARRL Information Net." I planned on it earlier in the year but summertime brings erratic propagation on 75 so we'll do it during the fall & winter. Day & time will be announced on the nets & in the next column. This will give all an opportunity to give recommendations, gripes & general info pertaining to the League & ham radio in general. The Central Ga ARC received an outstanding commendation for their FB efforts with the Special Olympics held there recently. Enjoy the rest of the nice wx & cu at one of the upcoming hamfests.

NORTHERN FLORIDA: SM, Billy Williams, N4UF — STM: WF4X. SEC: W4UEA. ACC: N4ADI. PIO: WA4PUP. BM: W4GUJ. Lots of Field Day activity this year despite erratic bands. W4WWW active from Ocala area with 11 rigs. W4IZ (NOFARS) operated from FJC North Campus in Jax. Tnx to WB2CPV there was excellent TV news coverage on two stations in Jax this year. BARS operated from Jax Bch and AK4L (LMARS) did well from Sanford. WESVARS and OARC also active. The Santa Rosa ARA did well from Milton. Great to see all this activity. FD in Fla. is very competitive with championship trophies awarded by *Florida Skip* magazine to the top 1A and multi-xmtr finishers. NOFARS W4IZ won last year. This year's winners will receive their trophies at the Miami Hamfest in February. New officers for the Orlando ARC are: KA4WMX, pres.; KD4NT, v.p.; KF4JV, secy.; W4UFY, treas. Board members are WE4C KY4F WD4ORO & N4FPA. WO4M (ex-KF4EU) has moved to KL7 to accept a new job. He served as OO, ORS, OBS here. Orange Co. Emergency Net meets each Wed. at 1915 local on the 16/76 rptr. W4DTV is busy with

it has features never before available in one handheld, it's made in the USA and it's priced right!

COMPARE TENNESSEE TECHNOLOGY WITH THE OTHERS...

Do their handhelds have memory lockout?
Exclusive memory lockout on the TEN-TEC 2591 allows scanner to temporarily bypass channels for quick lockout of busy frequencies yet retain them in memory for normal operation on demand.

Do theirs store transmit offset?
The 10 memories of the 2591 allow stored offset for easiest operation. And memory channel 0 accepts any non-standard offset.

Do theirs offer selectable SKIP or HOLD?
When scanning with the 2591, choose HOLD to stop and stay on a busy frequency. Choose SKIP to stop for several seconds and continue.

Do theirs offer modifiable Band Scan without complete reprogramming?
With the 2591 you can scan any section of the band with user defined upper and lower limits in steps of 5, 10, 15, 25, or 30 kHz. Change step size, upper and lower limits independently. Manual Scan also, up or down, in 5 kHz steps.

Do theirs have Quick-Release NI-CAD Battery Pack?
The 2591 battery pack slides off easily, yet is secure in use, has a heavy duty 450 mAH rating at 8.4v, and the 2591 has capacitive memory retention to permit pack changing without reprogramming.

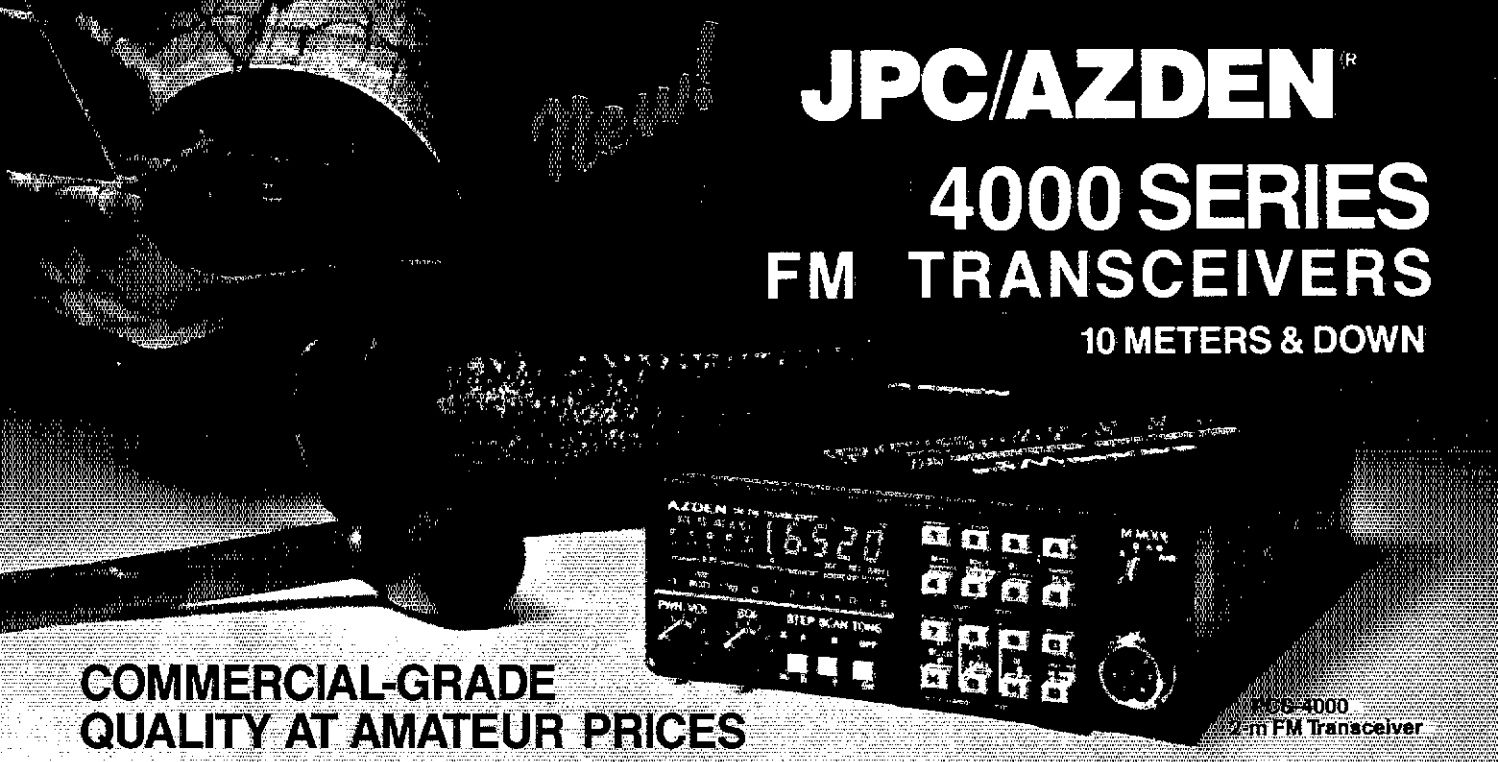
THE TEN-TEC 2591 HAS ALL THE RIGHT FEATURES...

• **Memory Scanner scans only programmed channels** and has user selectable HOLD or SKIP • **Selectable 2.5 Watts or 300 Milliwatts power,** top panel switched • **Extended Frequency Coverage—143.5 to 148.995 MHz.** Covers full Amateur Band plus some CAP and MARS frequencies. • **4-Digit LCD Readout with Switchable Back Light** —large, easy-to-read digits, selectable for frequency or memory channel number. • **Key-Pad Frequency and Function Control** —16 key dual tone encoder • **Dual Function LED**—shows battery status and transmit mode. • **Electret Microphone** plus separate speaker for superior audio. • **Compact, Lightweight, Complete**—easy to handle and rugged. Standard equipment includes flexible antenna with BNC connector, AC charger, belt clip, connectors for mike and speaker. Options include: adaptor pack for +12 VDC mobile operation, speaker/mike, 25 watt power amplifier, leather case, desk charger, subaudible tone module, and spare NI-CAD pack.

DESIGNED AND MANUFACTURED IN TENNESSEE and it carries the famous TEN-TEC 1 year warranty. See your dealer for the best in 2 meter FM—the TEN-TEC 2591. Or write for information to TEN-TEC, Inc., Sevierville, TN 37862.

JPC/AZDEN®

4000 SERIES
FM TRANSCEIVERS
10 METERS & DOWN

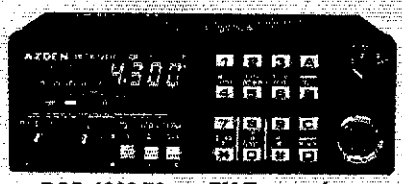


PCS-4000
2-m FM Transceiver

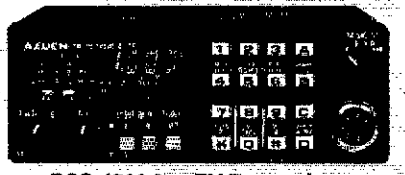
COMMERCIAL-GRADE QUALITY AT AMATEUR PRICES

EXCLUSIVE 1 YEAR LIMITED WARRANTY! *COMPARE!*

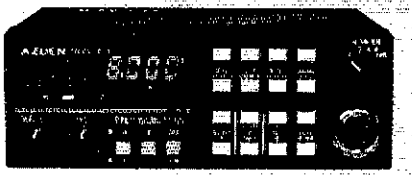
THE 4000 SERIES



PCS-4300 70-cm FM Transceiver



PCS-4500 6-m FM Transceiver



PCS-4800 10-m FM Transceiver

COMING SOON
PCS-4200 1¼-m FM Transceiver

PCS-300
2m Handheld
FM Transceiver
142-149.995 MHz

- **WIDE FREQUENCY COVERAGE:** PCS-4000 covers 142.000-149.995 MHz in selectable steps of 5 or 10 kHz. PCS-4200 covers 220.000-224.995 MHz in selectable steps of 5 or 20 kHz. PCS-4300 covers 440.000-449.995 MHz in selectable steps of 5 or 25 kHz. PCS-4500 covers 50.000-53.995 MHz in selectable steps of 5 or 10 kHz. PCS-4800 covers 28.000-29.990 MHz in selectable steps of 10 or 20 kHz.
- **CAP/MARS BUILT IN:** PCS-4000 includes coverage of CAP and MARS frequencies.
- **TINY SIZE:** Only 2"H × 5.5"W × 6.8"D. COMPARE!
- **MICROCOMPUTER CONTROL:** At the forefront of technology!
- **UP TO 8 NONSTANDARD SPLITS:** Ultimate versatility. COMPARE!
- **16-CHANNEL MEMORY IN TWO 8-CHANNEL BANKS:** Retains frequency and standard simplex or plus/minus offsets. Standard offsets are 600 kHz for PCS-4000, 1.6 MHz for PCS-4200, 5 MHz for PCS-4300, 1 MHz for PCS-4500, and 100 KHz for PCS-4800.
- **DUAL MEMORY SCAN:** Scan memory banks either separately or together. COMPARE!
- **TWO RANGES OF PROGRAMMABLE BAND SCANNING:** Limits are quickly reset. Scan the two segments either separately or together. COMPARE!
- **FREE AND VACANT SCAN MODES:** Free scanning stops 5 seconds on a busy channel; auto-resume can be overridden if desired. Vacant scanning stops on unoccupied frequencies.
- **DISCRIMINATOR SCAN CENTERING (AZDEN EXCLUSIVE PATENT):** Always stops on frequency.
- **TWO PRIORITY MEMORIES:** Either may be instantly recalled at any time. COMPARE!
- **NICAD MEMORY BACKUP:** Never lose the programmed channels!
- **FREQUENCY REVERSE:** The touch of a single button inverts the transmit and receive frequencies, no matter what the offset.
- **ILLUMINATED KEYBOARD WITH ACQUISITION TONE:** Unparalleled ease of operation.
- **BRIGHT GREEN LED FREQUENCY DISPLAY:** Easily visible, even in direct sunlight.
- **DIGITAL S/RF METER:** Shows incoming signal strength and relative power output.
- **BUSY-CHANNEL AND TRANSMIT INDICATORS:** Bright LEDs show when a channel is busy and when you are transmitting.
- **FULL 16-KEY TOUCHTONE® PAD:** Keyboard functions as autopatch when transmitting (except in PCS-4800).
- **PL TONE:** Optional PL tone unit allows access to private-line repeaters. Deviation and tone frequency are fully adjustable.
- **TRUE FM:** Not phase modulation. Unsurpassed intelligibility and audio fidelity.
- **HIGH/LOW POWER OUTPUT:** 25 or 5 watts selectable in PCS-4000; 10 or 1 watt selectable in PCS-4200, PCS-4300, PCS-4500, and PCS-4800. Transmitter power is fully adjustable.
- **SUPERIOR RECEIVER:** Sensitivity is 0.2 uV or better for 20-dB quieting. Circuits are designed and manufactured to rigorous specifications for exceptional performance, second to none. COMPARE!
- **REMOTE-CONTROL MICROPHONE:** Memory A-1 call, up/down manual scan, and memory address functions may be performed without touching the front panel! COMPARE!
- **OTHER FEATURES:** Dynamic microphone, rugged built-in speaker, mobile mounting bracket, remote speaker jack, and all cords, plugs, fuses, and hardware are included.
- **ACCESSORIES:** CS-7R 7-amp ac power supply, CS-4.5R 4.5-amp ac power supply, CS-AS remote speaker, and Communications Specialists SS-32 PL tone module.
- **ONE YEAR LIMITED WARRANTY!**

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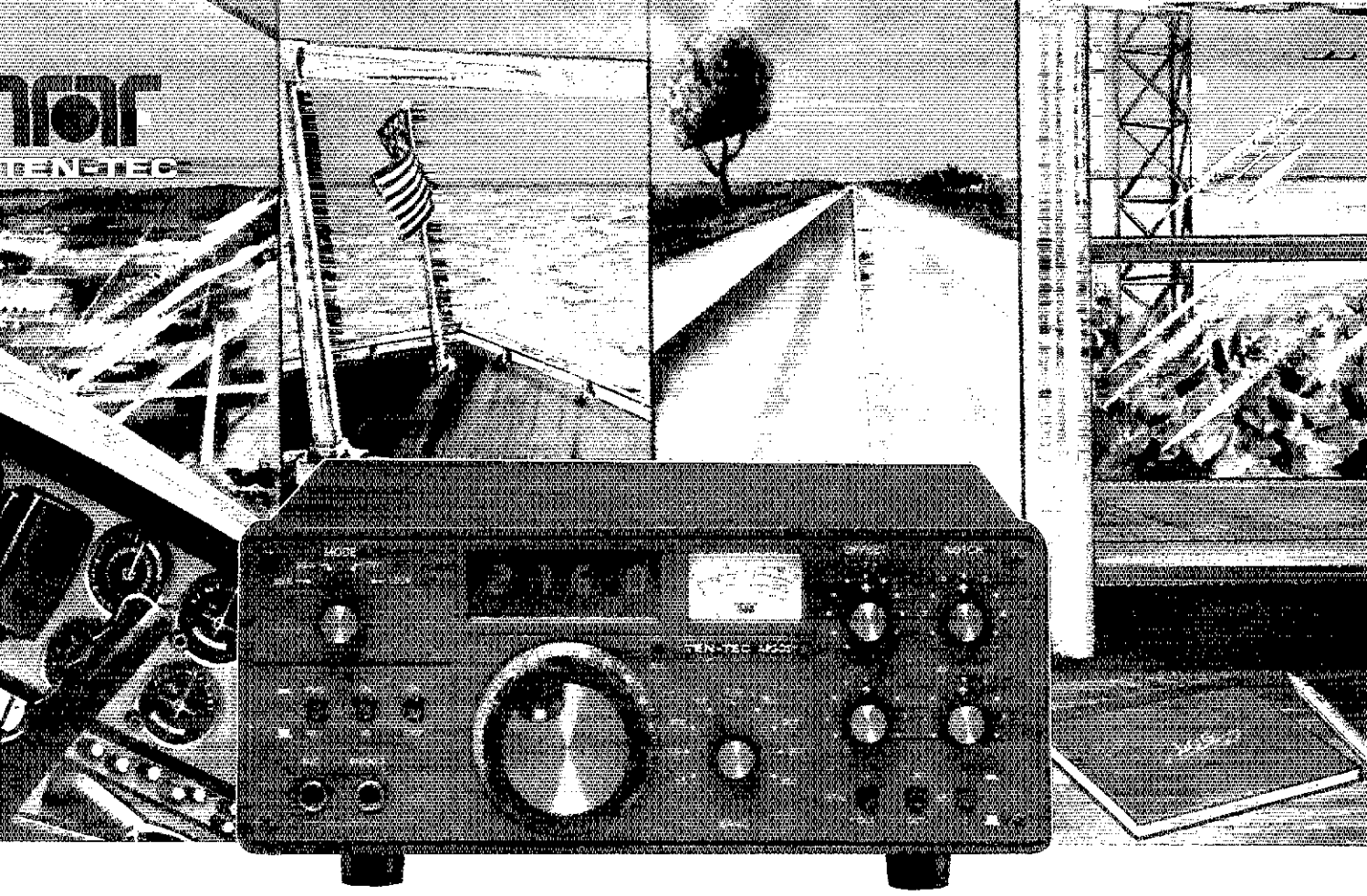

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licensing classes. Regular CGARC meetings begin again in Sept. Summer meetings of that club are "informal." N4BRJ had a feature story in Daytona newspaper. KB4T reports the Daytona 75/15 machine has had a new computer controller installed which should be operational by the time you read this. Jax RANGE rptr group celebrated its 10th anniversary with a dinner at the Busch Brewery. WA4RGO and several Jax hams provided comm. for the 4th of July celebration which included the unveiling of the name for Jax new professional football team in the USFL. Over 50,000 people attended and all went smoothly. KF4IG is head of BARS TVI/RFI committee. W2KGI is BARS education chairman and will arrange classes to start this fall. The new NM of the Northern Florida Phone Net is WF4Y of Milton, who is very active as an OO and ORS as well. Thanks to KF4GZ the outgoing NM for his fine job during the one-year term. Also congrats to KF4HA who has been NM of the Tropical Phone Traffic Net for the past year. The new TPTN NM is KF4YE. WA4QXT finishes his one year term as NM of QFNS after doing a fine job. Traffic: WF4X 626, N4PL 490, WA4QXT 267, WA4EYU 215, WD4HBP 143, KB4LB 109, WB4TZR 83, KD4KK 60, WD4IIO 68, W4GUJ 58, NY4E 47, WD4ORO 38, WD4RIQ 36, N4AOI 30, KD4QZ 29, WB4YQP 29, KC4FL 27, WB4ADL 26, KB9LT 26, NF4Q 24, W4DTV 22, WD4RJI 17, WA4STZ 17, KB4T 17, N4UF 14, NQ4P 12, NS4C 11, KA4ETX 10, W3IDQ 10, KA4RBY 10, WB4AWG 9, N4FMJ 7, W4LUW 7, KF4GY 6, KA4RMH 6, N4HGD 5.

SOUTHERN FLORIDA: SM, Richard D. Hill, WA4PFK — SEC: W4SS. STM: K4ZK. ACC: AA4WJ. BM: WA4EIC. TC: KI4T. The number of station activity reports continues to decrease, down to 66 this month. Hopefully they will pick back up when the summer draws to a close. Congrats to KA4AMC and KF4YE, the new managers of QFNS and TPTN, respectively. Also special thanks to KF4YE who has published another update listing traffic handlers, both alphabetically by call as well as by QTH. KF4YE is ex-WB4CDQ. Congrats also to WB4GHU who is the QFN mgr from Northern Florida. N2WX has been appointed an Official Observer, and also reports that the K4GCC rptr had a temporary permit to re-broadcast Challenger/Mission Control exchanges for the recent STS-7 flight. Broward Co. held an SET in early June. Field Day was a big success again this year. The following groups sent the SM formal messages: The South Florida Hamsters, Clearwater ARS, KA4EGP/Naples ARES, Tampa ARC, Sarasota ARA, West Palm Beach ARC, Dade RC, Ft. Myers ARC, Hollywood ARC, N4APE, Hardee Co. ARES, KY0T/Ft Myers, Broward ARC, Platinum Coast ARS and the Brandon ARS. KE4O reported he had fun operating at the Gulf Coast RC station during Field Day. W4LLA handled 44 maritime mobile phone patches. W4JM reports area hams are monitoring 14245 and 7243 for area hams who are away on vacation. He also said he is enjoying the 14150-175 subband. WA4EIC reported total bulletin traffic was 66. OBS reporting were AA4BN K4IEK and WA4EIC. I would sure appreciate monthly reports to WA4EIC from the OBS stations. The same for the ECs to W4SS. The net managers never seem to miss sending their reports to K4ZKI W4SS W4PHL and WD4BCC spoke at the APCO state convention relative to emergency communication and were very well received. 73 de WA4PFK. Traffic: W3CUL 3082, W3VR 706, WD4COL 373, WA4PFK 346, K4ZK 258, K4SCL 244, W4NFK 236, KA4GUS 153, WB4WYG 150, K4JLL 120, K4IA 118, NC4H 109, KY4U 108, W4YCL 107, KE4O 92, WD4CHO 90, K4EUK 81, WD4AWN 68, KA4AMC 58, WD9AEP 51, WA4LKY 46, KA4ASZ 43, W4ESH 43, W4DVO 40, KA4FZI 40, N4KB 40, K4JI 38, KF4RL 34, K5IHH 34, WA4EIC 32, KA4BBA 27, WK4F 27, N2WX 27, WB4GCK 26, WD4KBW 25, AA4BN 25, W3TLV 23, W4MPV 22, KA4NXF 21, W4LLA 18, K7LCA 15, WB2OUK 12, K4FQU 10, WB4AID 9, W1DLP 9, KA9AKY 8, KA4GDU 8, WD4PPA 8, W4WYR 6, KB4KB 5, K4KKP 5, N4BXU 4, WB4GJH 4, W4PKP 4, KY0T 4, WA1VOB 4, K4VSN 3, KF4JA 1, W4MFD 1, K4OVC 1.

WEST INDIES: SM, Gregorio Nieves, KP4EW — Field Day activity was very active in the West Indies. Several groups operated in this area, among them: the Puerto Rico ARC, KP4ID, 2A Class with operators KP4FV NP4FW NP4E WP4CRS (Novice operator); Radio Club de Telegrafistas de Adjuntas (APRC) KP4FI, 1A Class with Operators KP4FI KP4TM NP4C; The Virgin Islands RC KV4IE operated near Charlote Amalie with 8 operators. Another group operated with call KP4FIX, 2A class with operators KP4FIX KP4EMX KP4ER KP4EQG KP4DDP KP4AOC NP4EK. Best wishes and good luck to all of you. The following amateurs upgraded to Extra Class during this month: NP4BN KP4AYI KP4FV KP4FIX and NP4BN. Congrats. New QNI for West Indies Net KP4ABK KP4DJ and NP4EY. WP4BCV reports the following totals for WINC: QNI 557, QTC 35, 26 sessions. PSHR: NP4D. Traffic: NP4D 94, KP4DJ 33.

SOUTHWESTERN DIVISION

ARIZONA: SM, Erich J. Holzer, N7EH — STM: W7EP. NMs: WA7FDN WA7KOE. DECs: W5KMF N7CVT N6HJ KB7XN W7KAX WB7ORP. The month of June brought the Arizona summer sun to the section. The month ends on the fading CQs from Field Day. I received FD messages from 8 clubs/groups this year. W7KAX reports that ARES/RACES members were activated as a result of flooding in Mohave Co. owing to the flooding along the Colorado River. This activation is expected to last for some time as more water is released into the river. ARA reports that the following participated in the Diabetes Bike-A-Thon Bake In April: W7IXA WB7BLF KD7DR N7AFM N7DOM KA7BPC KC7OE K7LKL WB7BYK K7REA K7QPN K7TPY KB7FE KA7DRV WA7FBG KA7DTT WB7QPQ W7LEJ. ARA also helped with comm. for the American Cancer Soc. Great AZ Bike Ride. Those participating were: KA7DTS N7AFM KA7FQO WA7FSG N7AIY AJ7C KA7DRV KA7DTT W7KOY N7DAX W7DVC. By the time you get to read, this Ft. Tuthill will be history. Hope to have seen you there. PSHR: W5KMF. ATEN: QNI 1015, QTC 152. Cactus Net: QNI 772, QTC 101. Traffic: W7AMM 144, K6LL 114, KB7FE 104, W7EP 92, K7UXB 75, W5KMF 40, WA7KQE 32, KA7JNU 23, K7NMQ 20, N7EH 15, W7LBW 12, K7POF 6, N7CQY 5, WA7NXL 5, WA7YUL 5. (May) WA7NXL 2.

LOS ANGELES: SM, Stan Broki, N2YQ — STM: W6INH. SEC: N6UK. As you know in January, the ARRL Field Organization underwent a complete change. I unfortunately still have some top positions to fill, e.g. Technical Coordinator; OO/RFI Coordinator, Public Info Officer; and State Government Liaison. Under the new organization STM W6INH is responsible for all traffic matters. He is sending in monthly reports and will be writing up to 20 lines in the monthly column in *QST* devoted to traffic matters. N6UK has done a good job getting the emergency ARES organization going. On June 22 at my home the top ARES appointees met in response to the Los Angeles City agreement. N6ZH was unanimously given the responsibility of acting in our behalf in all matters concerning emergency preparedness for the City of Los Angeles. He wanted a section-wide calling frequency in case of a major disaster in LA. 147.81/21 was chosen. In case of a major disaster

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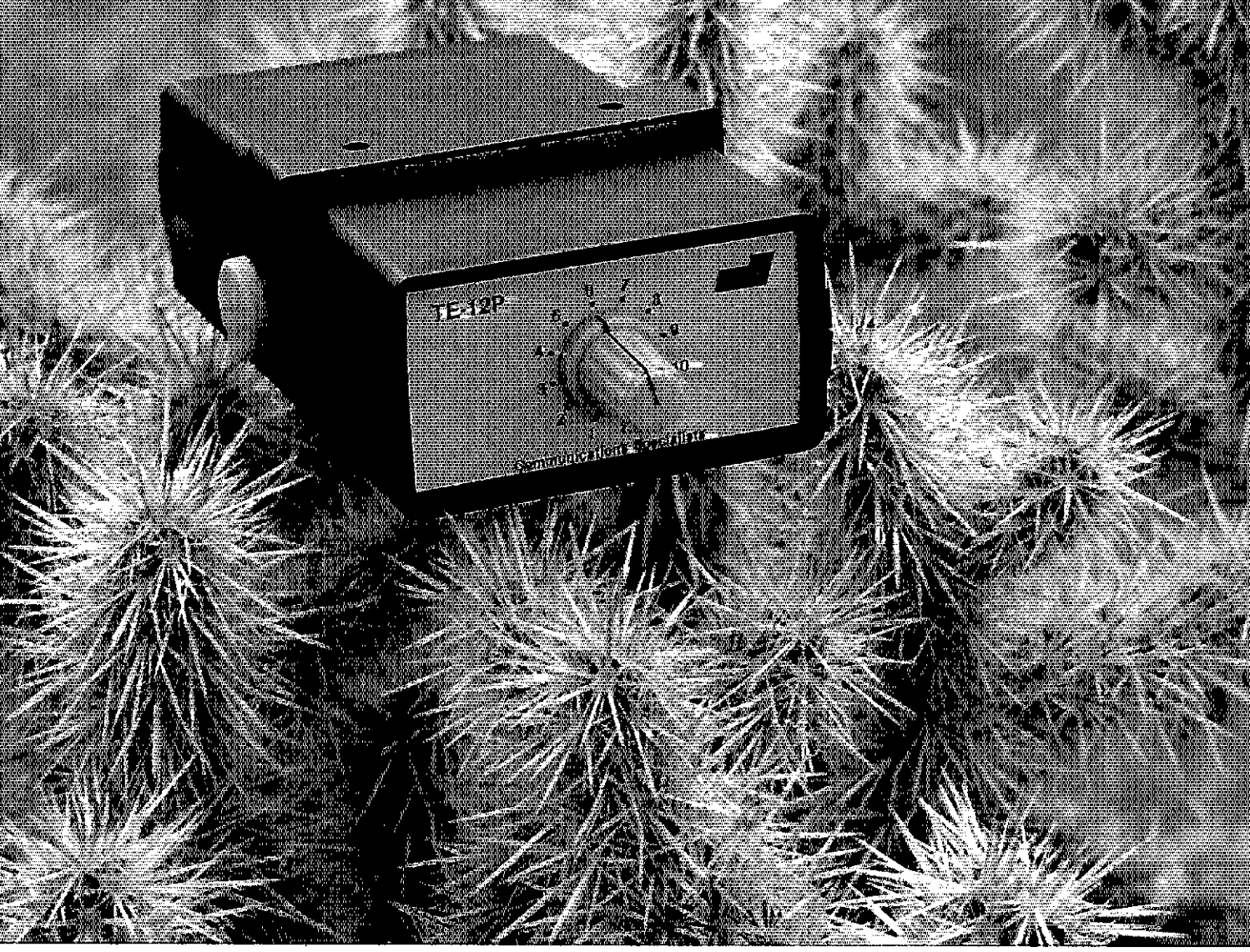

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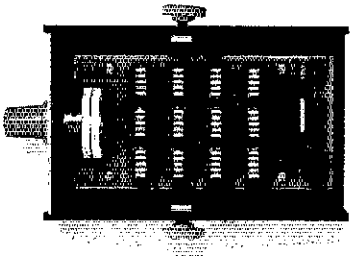

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77.0 XB	94.8 ZA	114.8 2A	141.3 4A	173.8 6A	
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this frequency should be monitored. N6ZH also will be the main focus in all matters concerning the City of Los Angeles and ARES. ACC NF6D is doing a fine job, but is still in need of bulletins from the clubs. Although it is fine that the clubs send me their bulletins, it is NF6D's job to give me the information for the monthly QST column, so please send your club bulletin to Ron Fish, NF6D, PO Box 6371, Woodland Hills 91365. I have been appearing monthly at the TRW Swap Meet and will continue to do so. I have most of the ARRL supplies and books. Additionally, I now have an answer phone at home, so that if you need something during the month leave a message and I will try and have it. You should be able to leave a message any time day or night. W6GC is the Olympic Committee Coordinator. He needs volunteers shortly for the 1984 Olympics in LA. Needed will be Village Station Manager. I received only three reports this year for Field Day from W6VLO W6JW and W6MPH. OO reports: KD6NL 1, WB6CFZ 4, K6KA 100. Traffic: K6VYK 394, W6INH 196, AD0A 64, KT6D 53, N6GZP 49, W6NKE 26, K6CL 17, N6DZQ 12.

ORANGE: SM, Sandi Heyn, WA6WZN — SEC: W6UBQ. STM: WA6QCA. ACC: KA6NLY. PIO: NS6W. OO/RFI: N6PE. SGL: N6HIQ. TC: AA6DD. BM: W6DXL. DECs (counties): WB6JBI (Orange), W6LKN (Riverside), K6GGS (San Bernardino), WB6YZY (Inyo). Once again ham booth at OC Fair sponsored by OC Council ARC was awarded 1st place; thanks to N8AIW N6CIO WB6NOA and many others. Founding officers of two new OC clubs — Ladies ARA (LARA): KA6WAH/VE7DLW, pres.; KA8TYO, v.p.; WB6SKE, treas.; N6FBT, r. secy.; KA6TJJ, c. secy.; Buena Park ARC: KA6PRO, pres.; N6CAC, v.p.; W6EA, treas.; KA6QWZ, secy.; KA6IYM, PR. Morengo Basin ARC held successful swapmeet at Yucca Valley Drive-In, and members supported Blue Grass Festival. Hosp. Disaster Group EC WA6OPS appointed NB6N as asst. EC. St. Jude's Hosp. & Rehab. ARC held successful "Round-up Pancake Breakfast" with featured guest W8AQ. N6HIQ Fountain Valley Emergency Services Coordinator is organizing city ARES/RACES group. For latest T-hunting info, send K6BMG SASE. NI6W appointed OC area coordinator by So. Calif. Contest Club pres. NE6I. Owing to business KA6HNY resigned as vice chairman of OC Council. WA6WZN was elected to fill the position. WA6WZO was designated central freq. coordinator (assisted by N6BVU) for 1984 Summer Olympics by LAACARC Amateur Radio Support Committee, headed by K6ZT; OC Olympic support will be the responsibility of WB6JBI, asst. by WB6GGT. San Bernardino VIP RACES/ARES treated to picnic at CDF Hq. WB6EIG again given traffic award at Mission Trails Net round-up; MTN (3927 kHz 7 P.M. daily) elected K6UGS, pres.; N6ESU, v.p.; K6QMD, secy.; KA6BTU, treas. Desert Waves ARC (Blythe) FD was cut short by flooding. OBS W6BAM continues sked Sun., Mon., Wed., Fri., 8:30 P.M. on 7075 kHz. If interested in chess, write K2VJ. Chess and Amateur Radio International (CARI). New private rptr N6GWD/R on 145.25(−) in Desert Hot Springs. WB6JPI new trustee of 146.4/147.435 in La Habra Hills (MWRA). K8TC/R formally K6VG at Lone Pine off air. Open rptr W6IWY/R 147.06(+) at Bishop added PL 18. OSCAR info on 144.144 MHz USB 7:30 A.M. and P.M., as well as Tues. net 8 P.M. 3850 kHz. I hope to see all of you at the SW ARRL Division Convention Sept. 2-4 at the Marriott in Anaheim. PSHR: W8NTN N6GIW WB6QBZ WA6QCA W6CPB.

Net	Freq.	Time	QNI/QTC	NM
SCN/1(20+)	3598 kHz	7 P.M.	375/308	K6XI
SCN/2(13−)	3598 kHz	8:15	171/120	K6XI
SCN/V(FM)	146.645(−)	9 P.M.	525/346	WA6QCA
RTTY/V1	145.12(−)	10 A.M.	425/160	KA6HJK
RTTY/V2	146.70(−)	10 A.M. (above)		KA6HJK

Traffic: WA6QCA 275, N6GIW 260, WB6EIG 188, WB6QBZ 180, W6NTN 144, KA6HJK 127, N6GQT 104, AI6E 86, K6GGS 69, K6XI 65, W6CPB 44, W6RE 41, W6ZKC 32, W6TKV 4.

SAN DIEGO: SM, Arthur R. Smith, W6INI — PIO: WA6CUP. ACC: WA6COE. BM: WA6HJJ. STM: N6GW. SEC: W6INI. Clubs desiring info on SSC Program may contact Affil. Club Coord, WA6COE, 464-1744. A 15 min. videotape entitled "At Any Moment . . . Amateur Radio and Disaster Preparedness" is available to clubs thru WA6CUP via the Coronado Police Dept, 435-3123. It's excellent for acquainting public safety agencies with emergency capabilities of Amateur Radio. The North County Tfc Net met 29 times, handled 146 msgs, according to NM WB6HMY. Net meets daily at 2000 hours on Palomar ARC rptr (146.13/73) and provides training for beginners in message handling. Give it a try! Field Day msgs recd from: Chollas Hts Pole Climbing Soc, Convair ARC, Escondido ARS, No Shores ARC, Palomar ARC, ARC of El Cajon, Poway ARS, South Bay/Coronado Clubs. Upgrades: N6GZI, WA6OLI to Adv; N6INN to Extra. Four booths at Del Mar Fair were manned by hams: Calif. Dept. of Forestry, SD (city) Office of Emerg. Mgmt., SD State Univ., SD Co. Humane Society. Traffic: K16A 581, KM6I 199, K6HAP 158, W6HUJ 105, KB8AI 104, N6AT 61, N6GW 10, WA6IIK 8.

SANTA BARBARA: SM, Robert N. Dyruff, W6POU — Amateurs serving FEMA Region IX in disasters in CA, AZ, NV, Pacific Isles. Coalinga quake comms. rpt available to all agency heads to apply lessons learned — Send 37¢ s.a.s.e. to W6POU — see pg. 8 for address. KA6BPG handled point relay comms for Heart/Caan marathon run. Simi Settlers' K3HZP/R undergoing burn-in tests with N6AYV & W6AFF. W6IOJ given QST cover plaque for OSCAR 435 MHz conv. design. WA6MHA develops Apple RTTY software. WD6EBY runs Vic 20 battery portable. WD6ETK now up on 300 baud in SBAR. Listen on 170.07 kHz for W6HDO/W6WYO "WEE CUESTA" call from Cuesta College, SLO experimental stn. Also runs 1/4-wave 160m vert. and 2000 ft Beverage, 16 ft dish on moonbounce; copying OSCAR 10 beacon on 145.812. Also listen for WB6EER San Simeon as "ZZ" on 179.5 kHz. WB6WCW designing Butterworth filter for 300 baud TTY. N6HY Paso Robles es WB6UNH Carpinteria QRP award winners with 21.6 and 19.25 × 10^6 miles/watt per WORLDRADIO. Field Day stns which sent ARRL msg were: Cambria, Estero, Paso Robles, Satellite, SBARC, Simi Settlers. W6POE gives regular news on SMRA WA6ZTT 28/88 rptr Tu 1900, Wed 0900, Thur 1800 PT. RN6 ops meet daily 3655 kHz at 1945/2130 PT. They incl. N6FTQ W6IXU W6JTA KE6LO N6WP K6YD. Newsletter by K6UYK. W6INH signals 50th traffic year! Hope to CU at SW DIV. Convention in Anaheim 9/2-4.

WEST GULF DIVISION

NORTHERN TEXAS: SM, Phil Clements, K5PC — ASM/ACC: WA5QFD. SEC: W5GPO. STM: W5VMP. PIO: N5FDL. OO/RFI: WB5JBP. TC: WB5IIR. SGL: W5UXP. BM: W5QXK. PIAs: K5HGL N5DRZ KD5FL WA5GNT. NMs: K5UPN WD5JYI AE5I. There you have it, folks, our Leadership Officials for the section! A finer group of dedicated experts in their fields could not be asked for! The massive

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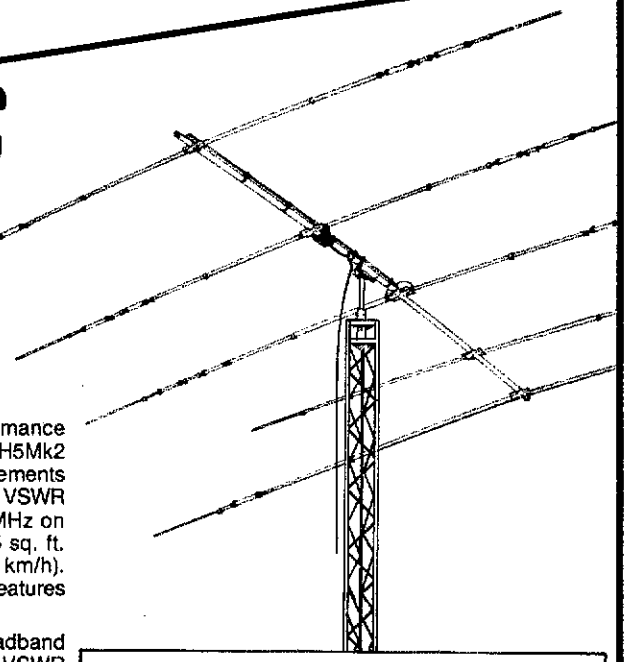
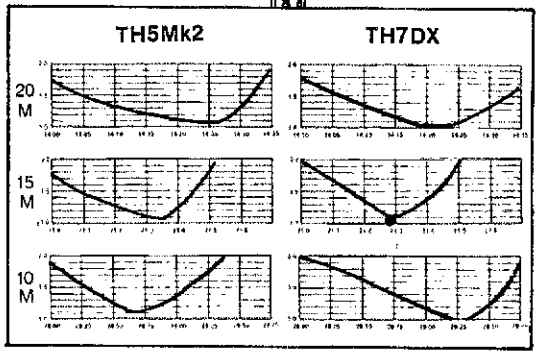


TH5Mk2 Now you can enjoy outstanding broadband antenna performance in a size to fit most city lots. With 5 elements on a 19 ft. (5.8 m) boom, the TH5Mk2 has 4 active elements on each band. Hy-Q traps and monoband parasitic elements achieve gain and front-to-back ratio comparable with stacked monobanders. VSWR is less than 2:1 over the 20 and 15 meterbands, and from 28.0 to 29.4 MHz on 10 meters. The TH5Mk2 weighs only 57 lbs. (25.8 kg). And with just 7.5 sq. ft. (.68 sq. m) surface area, wind-loading is 190 lbs. at 80 mph (86 kg-129 km/h). In addition, the TH5Mk2 offers the same solid construction and outstanding features as the TH7DX. See common features below.

TH7DX The new standard of comparison for high performance broadband tribanders. Using a dual driven 7 element system, the TH7DX maintains a VSWR of less than 2:1 on all bands including ALL of 10 meters. This computer aided design uses a unique combination of Hy-Q traps and inner-laced parasitic monoband elements. The result is gain and front-to-back numbers that add a whole new dimension to your station capability. Even with this amazing performance, the TH7DX boom is only 24 ft. (7.3 m) and the entire array is no bigger than the famous TH6DXX. Weight of the TH7DX is 75 lbs. (34 kg) with surface area of 9.4 sq. ft. (.87 sq. m) and wind-loading of 240 lbs. at 80 mph (108.9 kg-129 km/h).



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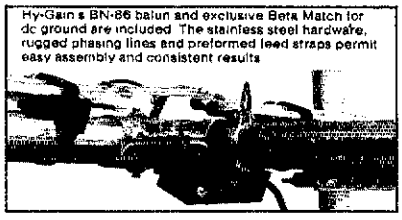
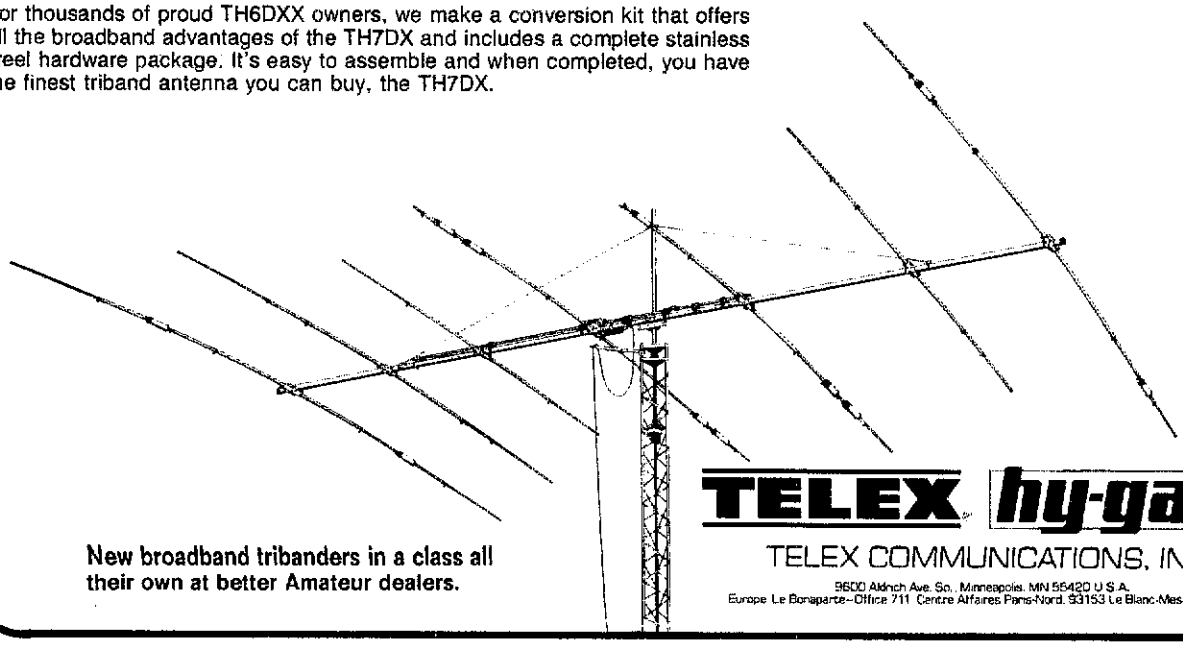
- Twist and slip proof, die-formed heavy-gauge aluminum element-to-boom brackets.
- Packaged in two boxes suitable for UPS shipment.



CONVERT YOUR TH6DXX

For thousands of proud TH6DXX owners, we make a conversion kit that offers all the broadband advantages of the TH7DX and includes a complete stainless steel hardware package. It's easy to assemble and when completed, you have the finest triband antenna you can buy, the TH7DX.



New broadband tribanders in a class all their own at better Amateur dealers.

TELEX hy-gain

TELEX COMMUNICATIONS, INC.

9600 Aldrich Ave. So., Minneapolis, MN 55420 U.S.A.
Europe: Le Bonaparte—Office 711 Centre Affaires Paris-Nord, 93153 Le Blanc-Mesnil, France

changes in the field organization this year took some doing, but is beginning to get into a more responsive way to serve League members in our section. $.75 of your dues money goes to expenses for these fine volunteers, and stays right here at home, at the "grass roots" level. We are witnessing a great transfer of benefits and services within the League back to the local level, as it should be. We have a very talented paid staff of workers and a fine building and station in Newington, but as Pogo would say, "We have met the League, and he is us!!" Please plan to get active in your chosen area of interest. Appointments are open in all areas; just let me know where you would like to work. My address is on the bottom of page 8 of all your QST's. Much help will be needed in the near future when the licensing and enforcement chores are thrust upon us. Field Day was mammoth! Reports from AG5F W5TI W5FC KW5A KD5RO K5QJ I W5NGU W5NW KM5Y W5CR N5OX KV5K W5QX K5QHD WB5RDD and N5HD. Many upgrades this summer; congrats to all! The Dallas ARC has increased its membership by 70+ this summer! Can anyone top this? PSHR: KA5AZK WA5QFD WB5NRN KC5NN N5BT KD5FR N5FDL. Hope to see you all on the hamfest circuit this summer/fall. Let me know the dates of your planned activities and I will try to make as many as possible. The Texas CW Net has moved to 3697 kHz (0000Z and 0300Z daily). Our Section Emergency freqs. are now: 7290 (day) 3961 (night) and 3697 (CW). These are calling and starting freqs. for all H.F. emergency operations in our Section. New EC for Hamilton Co. is WA5BHF. Thanks, Bo! DEC's K5UPN and N9AJP doing super job of recruiting in their districts. Traffic: KA5AZK 172, N5BT 145, KD5FR 90, WA5QFD 82, WB5OXE 67, KC5NN 64, W5PBN 40, WB4HML 37, W9OYL 34, WB5NRN 32, K5PC 23, AE5I 21, W5CUE 14, N5FDL 5, KB5UL 4, AJ5F 2.

OKLAHOMA: SM, Art Roberts, W1GOM — SEC: W5ZTN. STM: KV5X. TC: W5QMJ. BM: W5AS. SGL: W5NZS. My apologies to the OK section for the lack of a column last month and the short column this month. Family affairs and moving have managed to take all my time. I was honored to award the Tulsa ARC their certificate for 50 years of affiliation with the ARRL. Are there any other clubs that might qualify? I hope everyone enjoyed their summer vacation.

SOUTHERN TEXAS: SM, Arthur R. Ross, W5KR — ASM/TM: N5TC. SEC: WA5RVT. BPL: WB5YDD, WD5DRB sent newsy postcard from B-VARC: Club held public service demonstration for Mothers' Day at an area mall in April; sponsoring new emergency repeater for local hospital (officers are WB5MXX WA5ACF N5DQR); Ft. Bend ARES coordinating with city officials of Missouri City, Stafford and Sugarland (HF and VHF stations being set up in city police stations to be ready for emergency; KA5OCW upgraded to General in June, and N5HF married in July (congrats all around!); B-VARC annual picnic a July affair. K5LTS working on travel trailer for summer use: W5MPX put up new 2-meter beam. ACC KA5KRI spoke to the Matagorda Co. ARC at their May meeting; the club held a successful drill for emergency readiness at Wagner General Hospital with WB5ZRA K5OJV K5IMF and WB8FVB showing how things are done. ORS AC5K worked 309 QSOs in the WPX CW contest using 5W on TenTec Argosy (birthday present from his better half). TSN mgr WD5JYI of Irving sure keeps that net active. DRN5 mgr WB5YDD reports STX represented 100% in June by N5DFO N5CRU W5KLV W5CTZ N5AMH WB5FQU WB5EPA N5EFG K5WOB KA5KRI KD5KQ K5OWK and WB5YDD. OBS W5KLV gave 111 readings on 8 nets in June. CAND mgr. W5KLV reports that STX represented 100% by KA5RRI WB5YDD W5URN KD5KQ W5KLV N5EFG N5DFO and N5AMH. N5FVO upgraded to Advanced. N5FVP has Brownsville emergency communications well established; stations at Sheriff's office, both hospitals and National Weather Service office. Traffic: WB5YDD 528, W5CTZ 382, W5KLV 327, N5EFG 133, KA5KRI 100, W5TFB 91, N5TC 84, N5DFO 78, KV5W 74, K5OWK 72, ND5C 53, W5BGE 52, WD5GKH 42, W5KR 38, WB5EPA 28, KD5GM 28, WB5FQU 27, K5HZR 21, WB5MMI 18, AK5M 11, WA5RVT 9. (May) KD5RE 21.

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" × 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*. If the 20th falls on a Sunday, the Ham-ad deadline is the previous Friday.

(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 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 characters of their products and services. Individual advertisers are not subject to scrutiny.

Clubs/Hamfests

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.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't., police etc. invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

CERTIFICATE FOR proven two-way radio contacts with amateurs in all ten USA areas. Award suitable for framing and proven achievments added upon request. S.A.S.E. brings TAD data sheet. W6LS, 2814 Empire, Burbank, CA 91504.

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 Pryer 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 VWOA, Ed. F. Pleuler, Jr., Secretary, 46 Murdock Street, Fords, NJ 08863.

JOIN the Old Timers Club, an international non-profit organization. If you operated a radio station, commercial, amateur or Armed Forces 40 or more years ago, and have an Amateur license at present you are eligible. Join the real pioneers of ham radio. Write O.O.T.C. Box AA, Mamaroneck, NY 10543 for details.

MUSEUM now open for radio historians and collectors. Free admission. Old time amateur (W2AN) and commercial station exhibits, 1925 replica store and telegraph displays. 15,000 items. Write A.W.A. for details: Bruce Kelley, W2ICE, Holcomb, N.Y. 14469.

YAESU Owners — join your International Fox-Tango Club — now ending its eleventh year. Calendar year dues still only $8 US, $9 Canada, $12 airmail elsewhere. Don't miss out — get top-rated FT Newsletters packed with modifications monthly, catalog of past modifications, free advertisements, technical consultation, FT Net (Saturdays, 1700Z, 14.325MHz), more. 1982 or 1983 sets $8 each; both $15. Send dues to FT Club, Box 15944, W. Palm Beach, FL 33416.

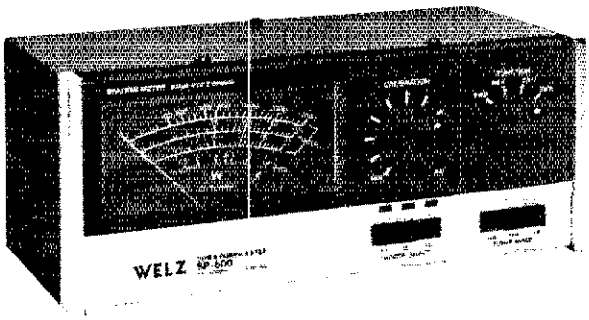
ATTEND "The Big Event of the Summer Hamfest Season!". The Original Forty-Sixth Annual 1983 Cincinnati Hamfest, Sunday September 18, 1983 at Stricker's Grove on State Route 128, one mile west of Venice (Ross), Ohio. Exhibits, Awards, Food and Refreshments available. Flea Market (radio related products only), Music, Talks, Hidden Transmitter Hunt and Sensational Air Show. Admission and Registration $5. For information - Lillian Abbott, K8CKI, 317 Greenwell Road, Cincinnati, Ohio 45238.

ILLINOIS: Sept. 17 & 18, The Peoria Area Amateur Radio Club presents Peoria Superfest '83 at Exposition Gardens, W. Northmoor Rd., Peoria, IL. Tickets $3 advance $4 gate. Gate opens 6:00 AM, commercial building 9:00 AM. Talk-in 146.16/76 call W9UVI. Latest Amateur & computer product displays, huge free flea market, Free Ladies Bus to Northwoods Mall on Sunday. Full camping facilities. Sat. night Informal get together at Heritage House Smorgasboard, 8209 N. Mt. Hawley Rd. For tickets and info SASE to Superfest '83, 5808 N. Andover Ct, Peoria, IL 61615.

CHESS PLAYERS! Join Chess-Amateur Radio International. CARI, Box 682, Cologne, NJ 08213.

WELZ

SP-600



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SP-600 Select 1 of 3 sensors by soft touch switch. Three wide bandwidth sensors cover 1.6-500MHz. **$159.00**
RS-1: 1.6-60MHz 0-2kW RS-2: 1.6-150MHz 0-200W RS-3: 130-500MHz 0-200W

SP-200 Two position antenna switch and indicators. Three power ranges to 1kW, 1.8-160MHz. **$107.00**

SP-400 Three band sensors (2m, 220, 450MHz), 10 percent accuracy, 0-150W CW, LED power range indicators. **$109.00**

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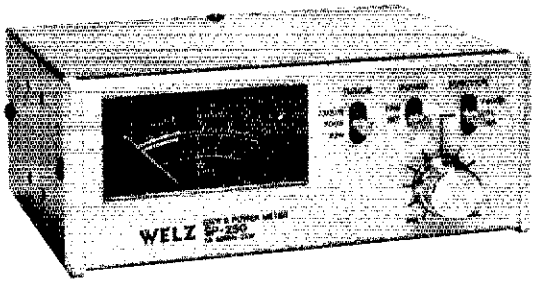
SP-250



SWR & POWER METERS

SP-250 Low-profile, economy 2kW wattmeter. 1.6-60MHz bandwidth. 3W SWR sensitivity. Three ranges. A Best Buy! **$75.00**

SP-15M 1.8-150MHz, 200 watt, low-profile wattmeter. VSWR, FWD PWR, REF PWR, 1.5W SWR sensitivity. Great for mobile HF. **$60.00**

SP-45M VHF-UHF to 100 watts. 3W sensitivity for SWR, 10 percent accuracy. All metal shielded construction. **$85.00**

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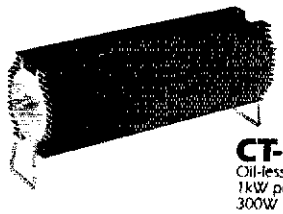
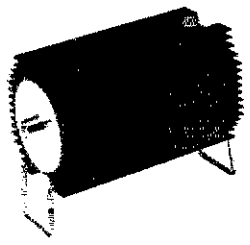
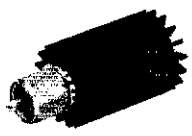
DUMMY LOADS



CT-300
Oil-less aircooled,
1kW peak for 3 min.,
300W avg. DC-250MHz
$68.00



CT-150
Oil-less aircooled,
400W peak for 3 min.,
150W avg. DC-250MHz
$46.00



CT-15A
50W peak, 15W avg.
50-239 screw-on dummy
DC-500MHz, VSWR<1:1.2
$12.00

CT-15N
50W peak, 15W avg.,
Type N Dummy Load.
DC-500MHz, VSWR<1:1.1
$21.00

SURGE SUPPRESSOR

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Contains replaceable,
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voltage protector.
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DC-500MHz, 350V breakdown.
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Two-way coaxial switch,
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DC-900MHz, 1kW power.
$54.00

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TP-05X
BNC connector,
5W talkie checker,
Field calibratable,
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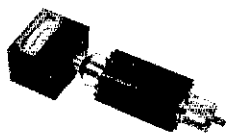
1W center. 50-500MHz.
$21.00

TP-25A
25 watt version of
TP-05X for mobile use.
Larger Dummy Load.
50-500MHz
$40.00



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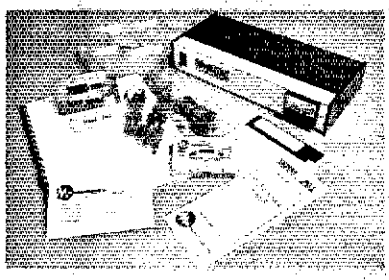


TERMINALL is a hardware and software system that converts your personal computer into a state of the art communications terminal. Terminall features simple connections to your computer and radio plus sophisticated and reliable software.

Simplicity

TERMINALL was designed from the outset to be easy to connect to your radio and easy to use. Plug into your receiver headphone jack and copy Morse Code or radioteletype (RTTY). Plug into your CW key jack and send Morse Code. Attach a microphone connector and send Baudot or ASCII RTTY using audio tones (AFSK). That's all there is to hooking it up.

The software is loaded into your computer from disk or cassette. Enter your callsign and the time and you will start receiving immediately. No settings or adjustments are necessary to receive Morse Code, it's fully automatic and it works! You may type your message while receiving or transmitting.

You will be on the air, receiving and transmitting in any mode, in minutes. As we said, TERMINALL is simple.

More for your money.

■ TERMINALL has the RTTY terminal unit - demod and AFSK - built in. This results in a lower total cost.

■ **Fantastic Morse reception.** Six stage active filter demodulator copies the weak ones. Auto adaptive Morse algorithm copies the sloppy ones. Received code speed displayed on status line.

■ **Outstanding documentation.** Professionally written, 90 page user manual contains step-by-step instructions.

■ **Built in, separate, multi-stage, active filter RTTY and CW demodulators.** No phase lock loops. RTTY demodulator has 170 and either 425 or 850 Hz shift- keyboard selectable - and uses either the panel meter or scope outputs for easy tuning. Copy the weak ones. Copy the noisy ones. Copy the fading ones.

■ **Built in crystal controlled AFSK.** Rock stable for even the most demanding VHF or HF applications. A must on many VHF RTTY repeaters.

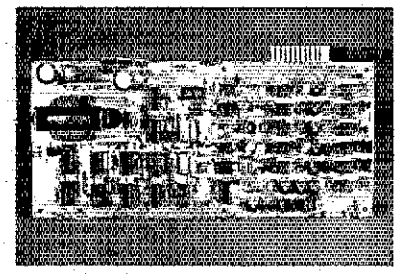
■ **Built in 110 or 220** volt AC power supply.

■ **Built in parallel printer driver software.** Simply attach a parallel ASCII printer (e.g. the EPSON MX-80) to your printer port to obtain hardcopy in all modes.

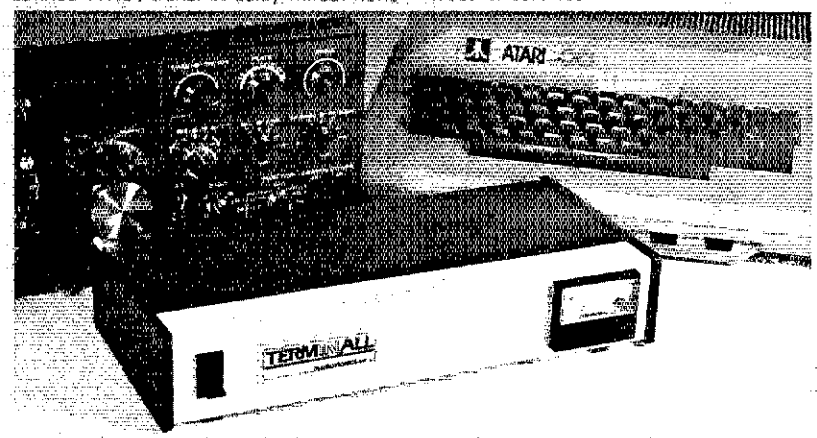
■ **Multi level displays** - allows examining and editing of historical text.

■ **Word wrapping,** word mode editing, diddle, ignore carriage returns, user programmable end of line sequence, adjustable carriage width, multiple user-defined WRU, transmit delay (fixed, none or auto adaptive), break mode and more!

NO COMPROMISE HARDWARE.



■ **The all-in-one TERMINALL design** makes it great for use on HF or VHF, Ham, Commercial, SWL or MARS! SWL's: TERMINALL may be jumpered for either 425 or 850 Hz reception to copy news and weather services.



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System Requirements

TERMINALL T1 Communications terminal for the TRS-80 Model I. Requires a Model I TRS-80, 16K RAM and Level II BASIC. Includes software on cassette and disk, assembled and tested hardware and an extensive instruction manual. **$499.**

TERMINALL T3 Communications terminal for the TRS 80 Model III. Requires a Model III TRS 80, 16K RAM and Model III BASIC. Includes software on cassette and disk, assembled and tested hardware and an extensive instruction manual. **$499.**

TERMINALL T2 Communications terminal for the APPLE II. Requires an APPLE II or APPLE II Plus with 48K RAM and disk. Software is provided on disk in DOS 3.2 format. Use MUFFIN utility to convert to DOS 3.3 format. Includes software on disk, assembled and tested hardware and an extensive instruction manual. **$499.**

Add $4.00 shipping U.P.S. reg. delivery. CA residents add 6% sales tax.

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The communications terminal that does it all!

NEW JERSEY Computer & Electronic Fleamarket - 5th Yar - Oct. 15-16, Meadowlands Hilton Hotel, Route 3, Secaucus. Sellers $15, Buyers $5, 10,000 persons expected! Covered all-weather parking lot! Opens 7:30 AM for Sellers and 9:00 AM for buyers. 201-297-2526 for information.

HAMFAIR'83 will be sponsored by LIMARC, the Long Island Mobile Amateur Radio Club, on Sunday, Sept. 18, 1983 at the Islip Speedway, Islip Ave, Islip, NY just off the Southern State Parkway Exit 43. Sellers spaces are $5 per space. General admission and helpers are $3. Open for buying from 0800 to 1600. For additonal information contact Al Flappin WA2FBQ, 3743 Windsor Drive, Bethpage, NY 11714 or call 516-796-2965.

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DON'T buy QSL cards until you see my free samples — or draw your own design. I specialize in custom cards. Send black and white sketch: will give quote. Little Print Shop, Box 9848, Austin, TX 78766.

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FREE samples — stamp appreciated. Conner, 522 Notre Dame Ave., Chattanooga, TN 37412.

QSLs & rubber stamps. Top quality. QSL samples and stamp information 50c. Ebbert Graphics D-3, Box 70, Westerville, OH 43081.

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QSLs — KØAAB collection, railroad employees and railfan's specials, front report styles. State your sample wants. 37¢ self addressed business size envelope required. Marv WØMGI, 2095 Prosperity Ave., St. Paul, MN 55109.

QSLs Samples 30c (stamps OK) Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, MA 02151.

INTRODUCING: Beautiful natural full color photo QSL cards, made from your color negative or slide. From $260. for 3,000 cards minimum. Free samples, stamps appreciated. K2RPZ, Box 412, Dept. NC, Rocky Point, NY 11778 516-744-6260.

QSLS. Quality and fast service for 23 years. Include call for free decal. Samples 50¢. Ray, K7HLR, Box 331, Clearfield, UT 84015.

SPACE SHUTTLE cards done in 3-D design. Samples 25¢. 3-D QSL Co. P.O. Box D, Bondsville, MA 01009.

QSLs by W6BA "customized" $19.75 per 1000. Star Route 2, Box 241, 29 Palms, CA 92277.

NEW KID on block — for QSL free samples write Kings Grove Press, Box 9, Ellerslie, MD 21529. Also custom printing and SWL's. Stamp appreciated.

RUBBER Stamps custom made to your satisfaction. Free literature. J. Glass, WB6ZTI, 14316 Cerecita Drive, East Whittier, CA 90604.

CLUB Call pins: 3 lines 1-1/4 x 3-1/4 $1.55 each. Call, first name and club, colors: blue black or red with white letters. Catalog — Arnold Linzner, WA2ZHA, 2041 Lidnen, Ridgewood, NY 11385.

STAMP brings QSL catalog of new designs and samples, from $7 up. 22 years custom printing. WA6SOK, 4056 Acacia, Riverside, CA 92503.

QSL's by W4TG: Prices from $16 per 1000. Send SASE to PO Box F, Gray, GA 31032.

COLORFUL QSL's - woodgrains and dayglows - samples 50¢. Specialty Printing, Box 361, Duquesne, PA 15110.

BE SURPRISED - get a variety of cards - 100 for $8 or 200 for $13. Samples $1 refundable. All three colors, fast service, satisfaction guaranteed. Constantine, 1219 Ellington, Myrtle Beach, SC 29577.

QSLs, Catalog 50¢ N & S Print, 2523 West Orangewood Avenue, Phoenix, AZ 85021.

FINEST custom QSLs, large cut catalog and samples $1 refundable on first order. Ritz Print Shop P.O. Box 45018, Westlake, OH 44145.

PICTURE QSL cards of your shack etc. from your photograph of black ink art work. 500 $21, 1000 $29.50. Send stamp for illustrated literature. Generous sample pack $1; half pound of samples $2. Custom printed cards, send specifications for estimate. Raum's, 4154 Fifth Street, Philadelphia, PA 19140. Phone 1-215-228-5460.

BUSINESS Card QSL — LSASE, Sample. KØOJW, 814 Riderwood, Dept. QST, Hazelwood, MO 63042.

RUBBER STAMPS - Nametags - Signs - Fast Service - S.A.S.E. for info. KB7AS 1230 West Main, Bozeman, MT 59715.

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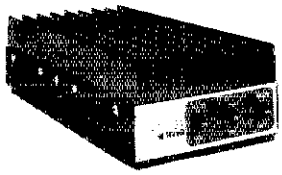
B1016 2 Meter Dual Purpose $249
H.T. 1-2W In - 35-90W Out
or Transceiver 10W In - 160W Out



Model	Band	Pre-amp	Input	Output	DC Pwr	Sale Price
B23	2M	No	2W	30W	5A	$ 79
B108	2M	Yes	10W	80W	10A	$159
B1016	2M	Yes	10W	160W	20A	$249
B3016	2M	Yes	30W	160W	17A	$199
C22	220	No	2W	20W	5A	$ 79
C106	220	Yes	10W	60W	10A	$179
C1012	220	Yes	10W	120W	20A	$259
D24	440	No	2W	40W	8A	$179
D1010N	440	No	10W	100W	20A	$289

RC-1 Remote Control for Mirage Amplifiers $24
MP-1 and MP-2 Peak-Reading Wattmeter $99

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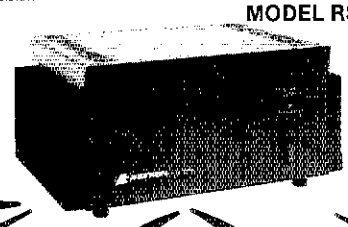
Model	Cont. Amps	ICS Amps	Price
RS4A	3	4	$ 39
RS7A	5	7	49
RS12A	9	12	69
RS20A	16	20	89
RS20M	16	20	109
RS35A	25	35	135
RS35M	25	35	149
RS50A	37	50	199
RS50M	37	50	229

MODEL RS-50A



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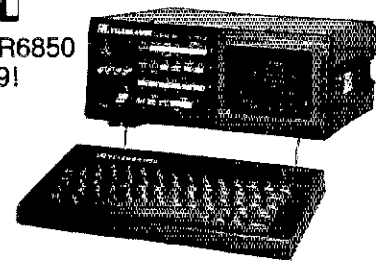
$849!



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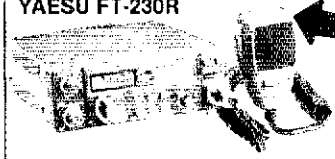
ARQ1000 Amtor Error Correcting Terminal	649
KG-12 12" High Resolution Monitor	169

YAESU FT-230R



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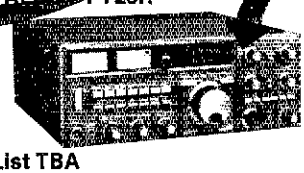

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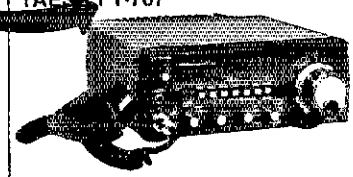

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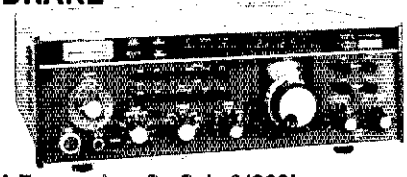

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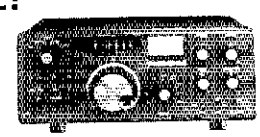

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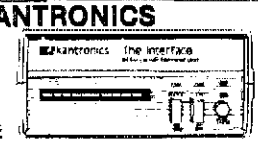

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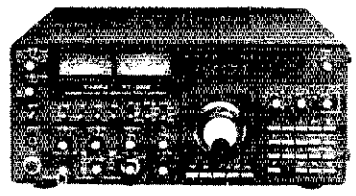

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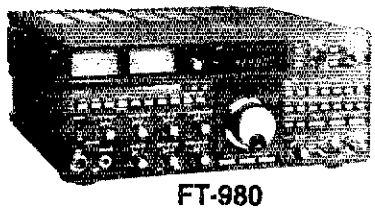

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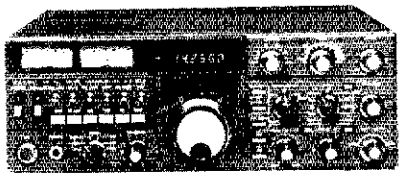

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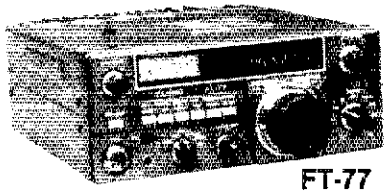

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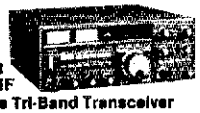

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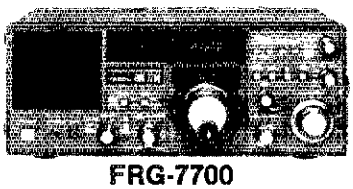

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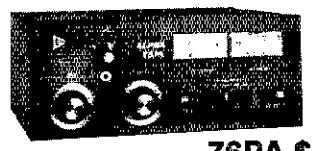

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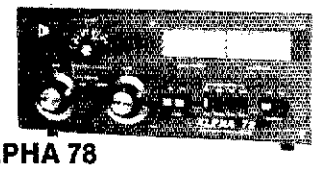

ALPHA 78

ALPHA 374A

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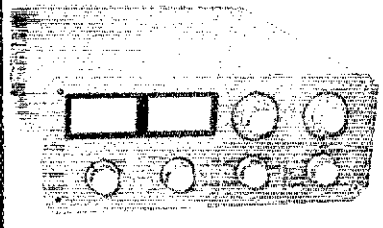

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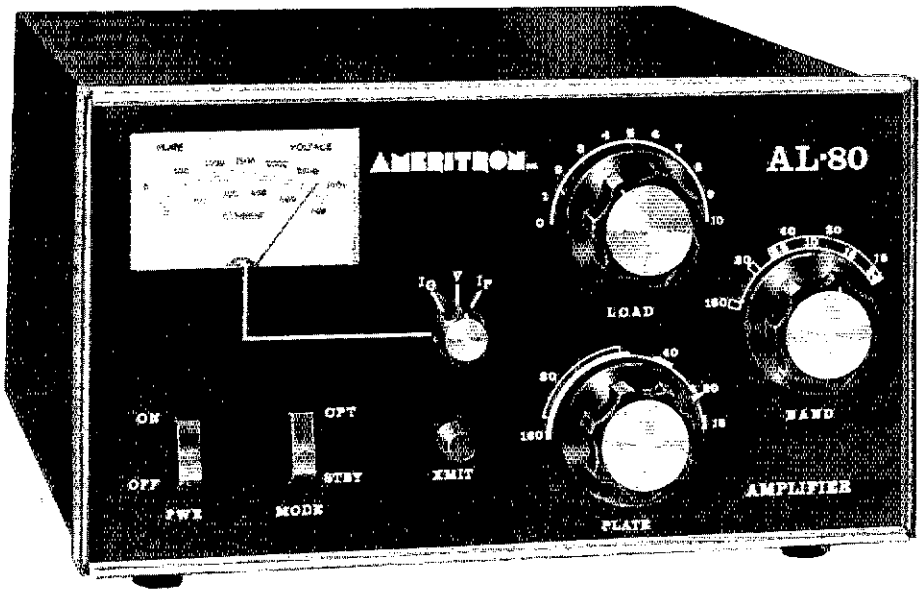

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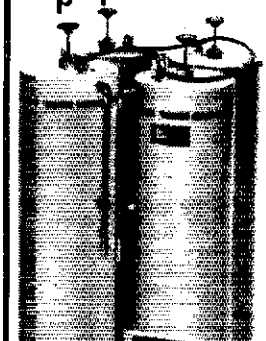

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TRANSCEIVE with your scanner! 2m-70cm. Low cost add-on! Free info, SASE to W6GVC Apt. "O", 720 County Center Drive, Visalia, CA 93277.

QUADS *db QUADS* 2, 3 & 4 elements, complete kits, fibreglass spreaders, components, wire. 3 First Class stamps for complete brochure. db² Enterprises, Box 24, Pine Valley, NY 14872.

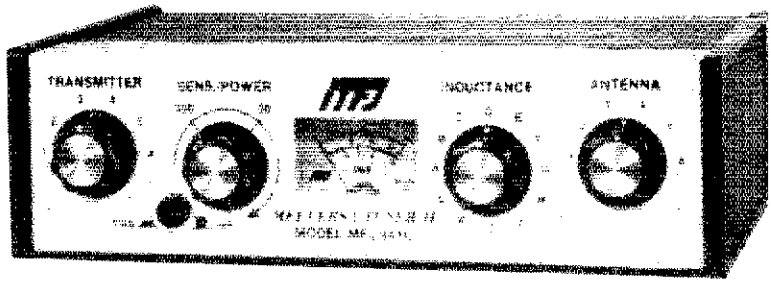
NEW solar electric panels, batteries, components. Send for information. Non-profit. Specs Inc., Box 155 Montrose CA 91020.

MORTTY is an astounding Heath H8/H89/Z89 communications program — RTTY, telephone, ASCII or Baudot at any speed. Morse ID, split screen, type ahead, key-string detect, autoanswer, adaptability, many options $100. MORTTY, 3707 Blanche, Cleveland, OH 44118.

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.

$89.95 (+ $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.

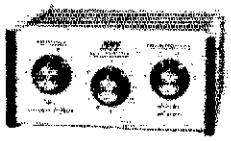
Built-in 4:1 balun for balanced lines. 1000V capacitor spacing.

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

$49.95 (+ $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

$139.95 (+ $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

$229.95 (+ $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.

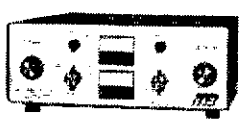
6 position antenna switch handles 2 coax lines (direct or through tuner), wire and balanced lines.

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

$329.95 (+ $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.

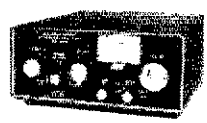
18 position dual inductor, ceramic switch.

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

$329.95 (+ $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.

Built-in lighted 2% meter reads SWR plus forward/reflected power. 2 ranges (200 & 2000W).

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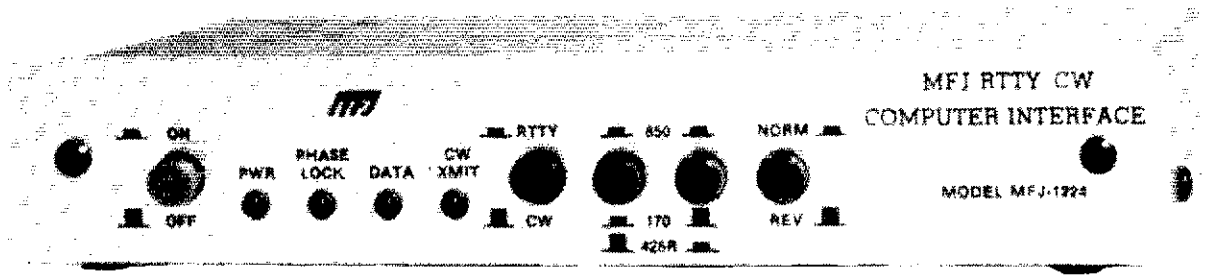
MFJ RTTY / ASCII / CW COMPUTER INTERFACE

Lets you send and receive computerized RTTY/ASCII/CW. Copies all shifts and all speeds. Copies on both mark and space. Sharp 8 Pole active filter for 170 Hz shift and CW. Plugs between your rig and VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64 or most other personal computers. Uses Kantronics software and most other RTTY/CW software.



- *Copies on both mark and space tones.*
- *Plugs between rig and VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64 and most other personal computers.*
- *Uses Kantronics software and most other RTTY/CW software.*

$99.95

MFJ-1224

This new MFJ-1224 RTTY/ASCII/CW Computer Interface lets you use your personal computer as a computerized full featured RTTY/ASCII/CW station for sending and receiving.

It plugs between your rig and your VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64, and most other personal computers.

It uses the Kantronics software which features split screen display, 1024 character type ahead buffer, 10 message ports (255 characters each), status display, CW-ID from keyboard, Centronic type printer compatibility, CW send/receive 5-99 WPM, RTTY send/receive 60, 67, 75, 100 WPM, ASCII send/receive 110, 300 baud plus more.

You can also use most other RTTY/CW software with nearly any personal computer.

A 2 LED tuning indicator system makes tuning fast, easy and positive. You can distinguish between RTTY/CW without even hearing it.

Once tuned in, the interface allows you to copy any shift (170, 425, 850 Hz and all shifts between and beyond) and any speed (5 to 100 WPM on RTTY/CW and up to 300 baud on ASCII).

Copies on both mark and space, not mark only or space only. If either the mark or space is lost the MFJ-1224 maintains copy on the remaining tone. This greatly improves copy under adverse conditions.

A sharp 8 pole active filter for 170 Hz shift and CW allows good copy under crowded, fading and weak signal conditions. Uses FET input op-amps.

An automatic noise limiter helps suppress static crashes for better copy.

A Normal/Reverse switch eliminates retuning while stepping thru various RTTY speeds and shifts.

The demodulator will even maintain copy on a slightly drifting signal.

A +250 VDC loop output is available to drive your RTTY machine. Has convenient speaker output jack.

Phase continuous AFSK transmitter tones are generated by a clean, stable Exar 2206 function generator. Standard space tones of 2125 Hz and mark tones of 2295 and 2975 Hz are generated. A set of microphone lines is provided for AFSK out, AFSK ground, PTT out and PTT ground.

FSK keying is provided for transceivers with FSK.

High voltage grid block and direct outputs are provided for CW keying of your transmitter. A CW transmit LED provides visual indication of CW transmission. There is also an external hand key or electronic keyer input jack.

In addition to the Kantronics compatible socket, an exclusive general purpose socket allows interfacing to nearly any personal computer with most appropriate software. The following TTL compatible lines are available: RTTY demod out, CW demod out, CW-ID input, +5 VDC, ground. All signal lines are buffered and can be inverted using an internal DIP switch.

For example, you can use Galfo software with Apple computers, or RAK software with VIC-20's. Some computers with some software may require some external components.

DC voltages are IC regulated to provide stable AFSK tones and RTTY/ASCII/CW reception.

Aluminum cabinet. Brushed aluminum front panel. 8x1¼x6 inches. Uses 12-15 VDC or 110 VAC with optional adapter, MFJ-1312, $9.95.

RTTY/ASCII/CW Receive Only SWL Computer Interface

$69.95

MFJ-1225

Use your personal computer to receive commercial, military and amateur RTTY/ASCII/CW traffic.

The MFJ-1225 automatically copies all shifts (850, 425, 170 Hz shift and all others) and all speeds.

It plugs between your receiver and VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64 and most other personal computers.

It uses Kantronics software which features CW receive 5-99 WPM, RTTY receive 60,67,75,100 WPM, and ASCII receive 110, 300 baud, plus more.

An automatic noise limiter helps suppress static crashes for better copy, while a simple 2 LED tuning indicator system makes tuning fast, easy and positive.

In addition to the Kantronics compatible socket, a general purpose socket provides RTTY out, RTTY inverted out, CW out, CW inverted out, ground and +5VDC for interfacing to nearly any personal computer with most appropriate software.

Audio in, speaker out jacks. 4½x1¼x4¼ in. 12-15 VDC or 110 VAC with adapter, MFJ-1312, $9.95.

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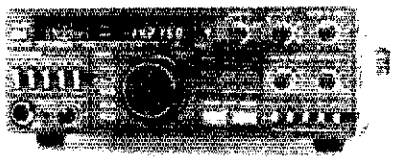

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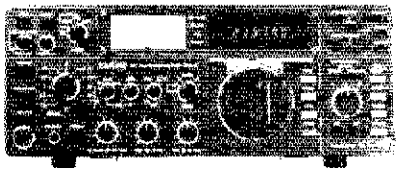

- 1.8 to 30 MHZ
- Super Receiver
- 200 Watts
- Selectable IF / PBT Tuning

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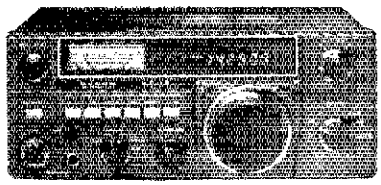

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- 3.5 to 30 MHZ
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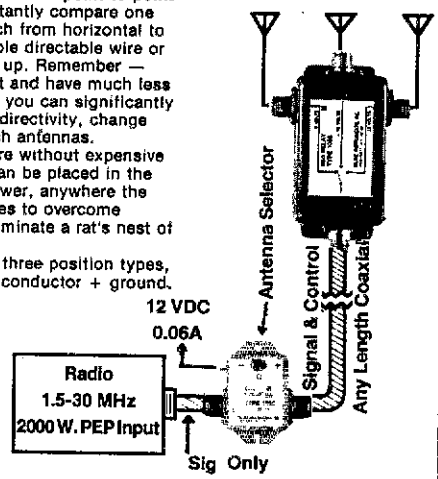

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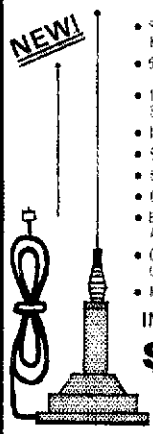

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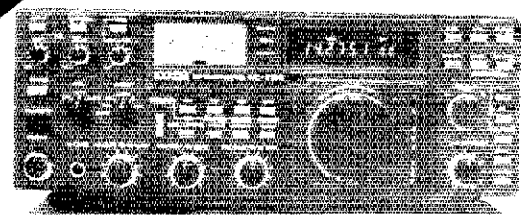

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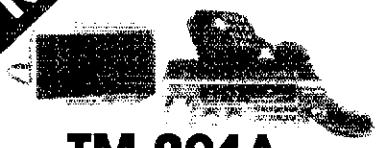

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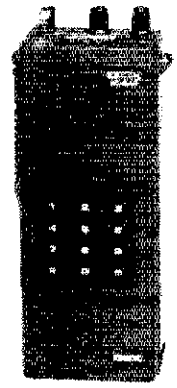

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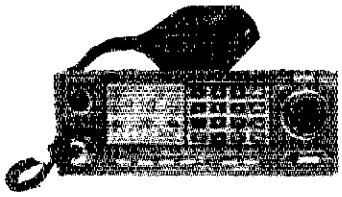

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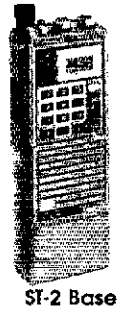

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UPS Brown Paid on TR 2500 Accessories

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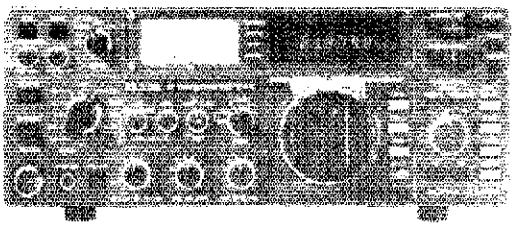

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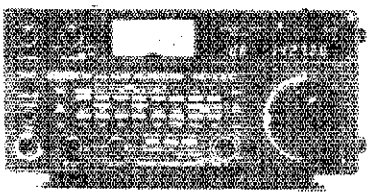

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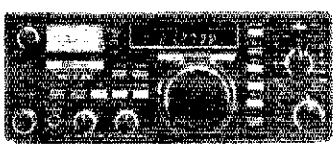

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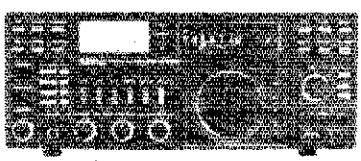

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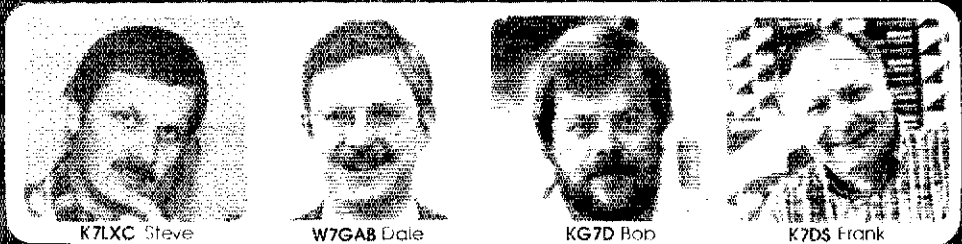

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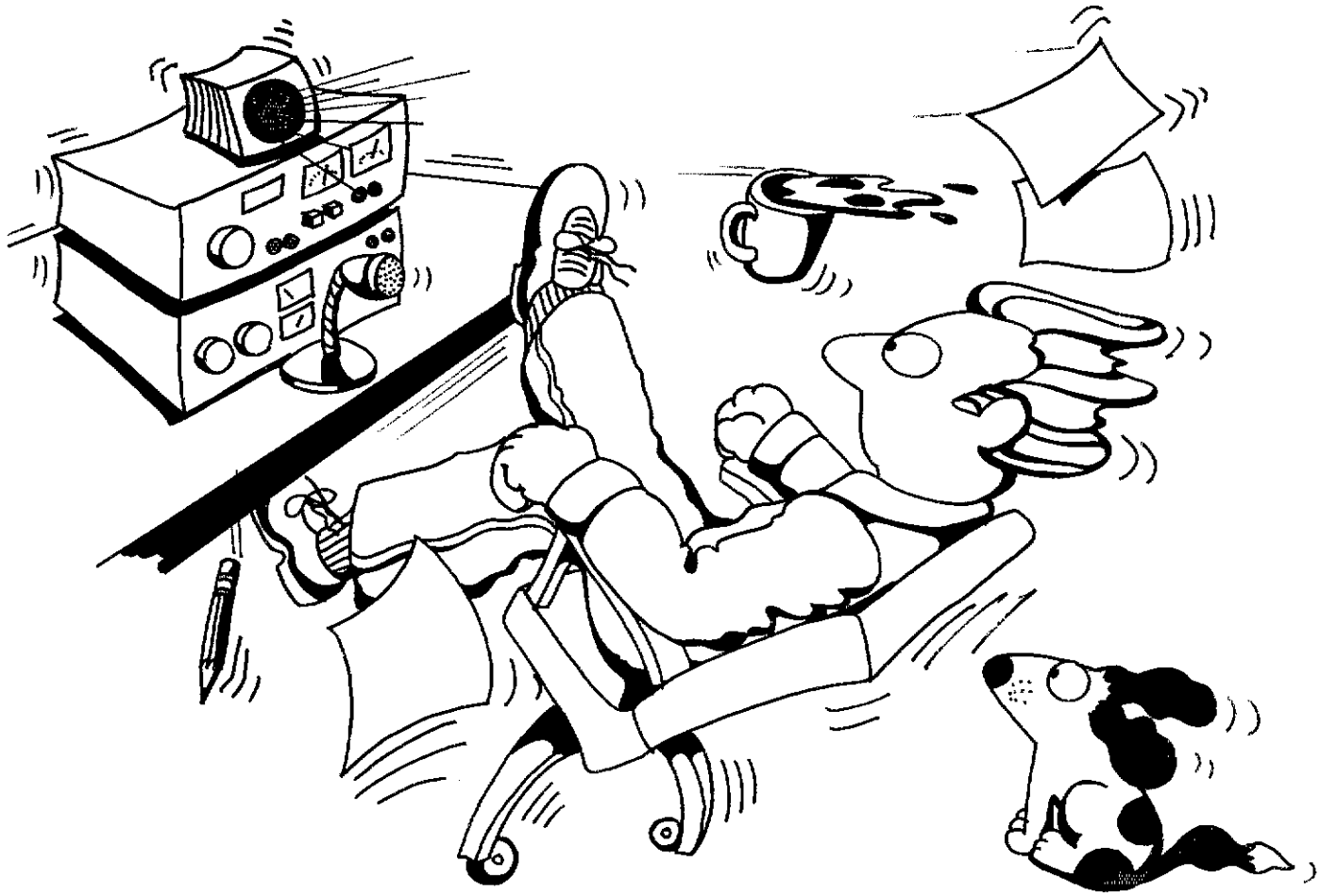

Ever notice how many of the really **dominating** signals you hear originate from ALPHAs? You know that a great amplifier alone doesn't guarantee a standout signal. Still, it obviously must be a big step in the right direction.

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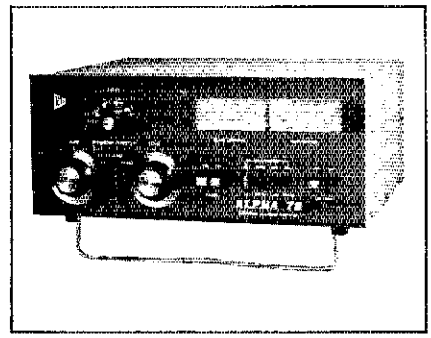

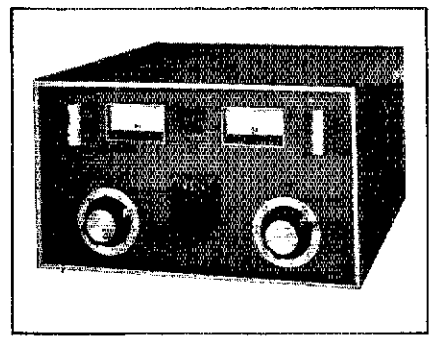

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WANTED: tower sections, Heights Mfg Co., standard alum. self-supt., 30" base legs, 30" tapered section, 26" straigh section; or what have you? Manny Block, WØPIG, 70 Orme Ct., St. Paul, MN 55116.

ALPHA 78 160-10 $2100. Robot 400 $425 w/demod. Palmer - KE9R - Chicago Area. 1-312-799-5135.

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COLLINS, excellent condition, one owner, manuels: 75S-3B, 32S-3, 516F-2, 312B-4, 30L-1. Package $2,100. Dallas Fontenot, W5HCF, 2016 Prienwood Drive, Lake Charles, LA 70605 318-478-1233.

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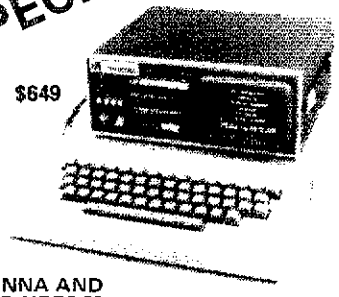

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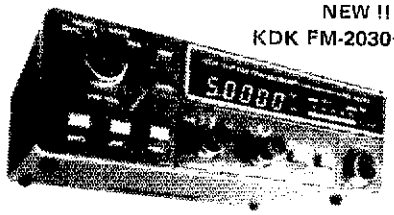

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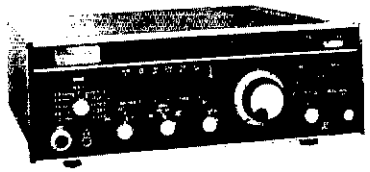

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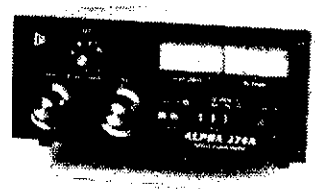

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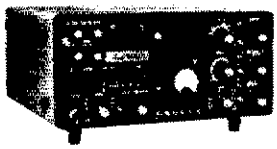

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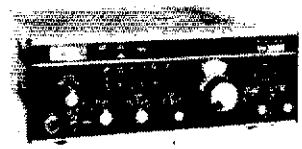

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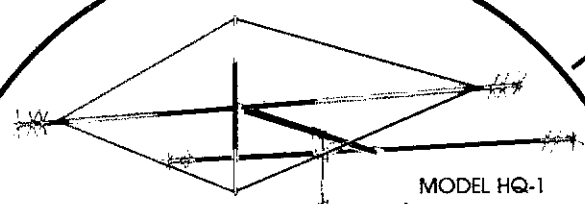

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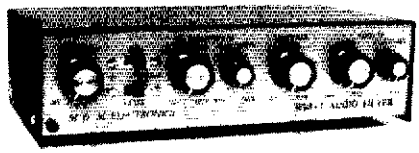

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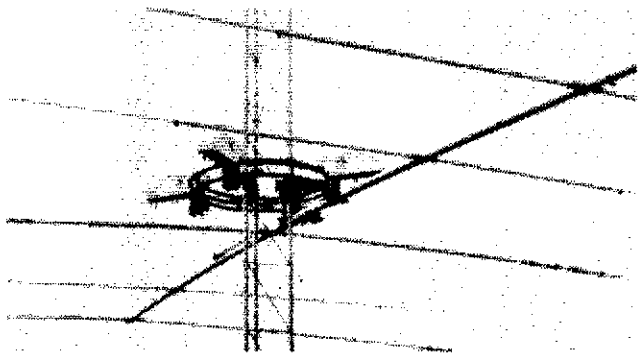

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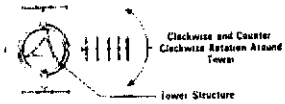

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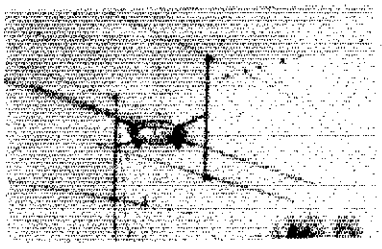

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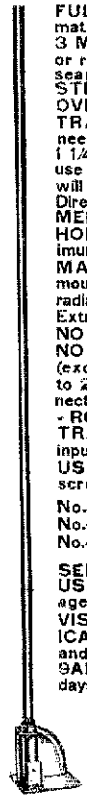

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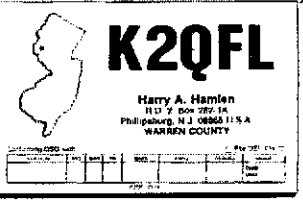

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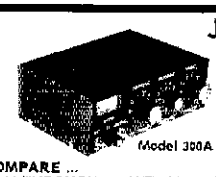

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TS-820 (digital) with 500kc CW filter and MagiCom Processor - mint- $575. R820 (digital) ham and general coverage with 500kc 1stIF and 250kc 2ndIF CW filters. Mint $650. Both with interconnecting cables $1100. K5KR 504-837-1485.

DRAKE TR-7, NB, four filters, FA-7; PS-7, FA-7; SP-75; MS-7; 7077; R-7, NB, four filters; MS-7; TR-7 service manual; TR-7/R-7 service kit; 1548 R-7/TR-7 cable interface. Original factory boxes and manuals, like new condition, no modifications, no service work has been required. $1,695. W4TYC, Russ, 703-297-5263.

FOR SALE: HW-101, AC and DC supply, CW filter. Mic, $365. Hallicrafters HA-2 and HA-6 VHF transverters, PS, low noise preamps, complete transceive station for 6 and 2, $260. Heath SA-2040 80-10 ant. tuner, $125. Ten-Tec Argonaut 515, xtal calibrator, audio filter, mic, $365. Heath HW-2036 2M FM, with TT mic, $150. W1OU 203-693-0620 after 6 PM eastern time.

WANTED: A Swan MB-80 or Swan MB-40 monobander. KD5RQ. Claude Matchette, 534 Lindsay Ave. Fort Sill, OK 73503.

KENWOOD 830, VFO-230, mint, will ship in original boxes, both $950. J. E. Rehler, Box 371, Corpus Christi, TX 78403. 512-884-1961. 512-993-8368.

KENWOOD 2400 2M package, leather case, spkr mike SMC-24, base stand ST-1, mike MC-30S DC quick charger BC-5 manuals $300 DGM-MVD-1000 video display with RTTY/ASCII pcb connects to any TV set factory updated 2-page display $260 Hal WN1TKD 617-533-8904.

BIRD Model 43 wattmeter with 100H and 1000H elements; never used; $225. Keith Furgalus, 216-333-7882.

COMPLETE 2 mtr. set-up, Kenwood TS-700A, Kenwood 2200A, HyGain handi-talki model 3806, includes crystals for most S.E. Mass rptrs. Also 9 ele. beam and 5/8 wave mag mount antennas. $600 pkg. WB1FWS 617-834-7813.

TS130S-mobile bracket-SSB filter - mic - 20 Amp supply. Mint condition $500. Hustler and 10/15/20/80 mtr coils J.S.R. Tuner $100. Mike, KE4IM 919-471-6971 evenings.

MUST SELL: Eldico 10 to 80 mtrs with special (MARS) mode. Xmtr-T-102 rcvr R-104 control unit M-135 (phone patch) power supply P-109 Rel type S-119 Amateur special SSB communication system. Xlant condition with manual $300 will ship. Ernie Hawran 2909 West Hazelwood St., Phoenix, AZ 85017. 602-249-3118.

160 METER Dipole 110' long, coax-fed $42.50. W1JC Tom Evans 113 Stratton Brook, Simsbury, CT 06070.

SELL-MBA-RO reader, $189.50; Vibroplex Lightning Bug, $25 WA6IRN, Sherman, 2550 Elizabeth Blvd, Twin Falls, ID 83301 208-734-0915.

REMOTE aircraft engines. 2 new K&B 61 with mufflers. Trade for IC2A or offer. KA7ADE 208-237-6230.

SELL: Drake T4X, R4A, MS4, AC4 All $325. HW7 $30, Alda 200W mobile 20-80 mtr xcvr $150. 607-522-4884 after 7 P.M. 315-456-4594 before 5 P.M. H. LaPierre, Prattsburg, NY 14873.

KENWOOD VFO180 new $75 VFO-120 $125 Collins mobile mount $15 Collins speaker for 75A4 w/light $60 Collins 75S3B receiver wing $295 312B4 console wing $145 Keyer Hatol homebrew works $8 Icom IC211 all modes 2M $375 Icom IC245 all mode 2M $285 Heath SB400 transmitter w/xtals $150 Drake CCI console cabinet new $35 QST 1925-1930 $5 each. Good selection of early ARRL Handbooks Inquire. Sprite 3" square fans special $6ea John Kakstys, 18 Hillcrest Terr., Linden, NJ 07036 201-486-6917.

MOD.28 Teletype machine fully equipped mint $185. W2NGN 201-933-4683.

SELL: SWAN 400 xcvr. 420VFO, 117V. A.C.P.S. spkr.&mic., also Kenwood R-1000 rec. A.A. Treadwell, 200 Rothwell Dr., Lutherville, MD 21093 301-828-5568.

SELL: Yaesu FL-2100B $345, Collins 75S-3B $355, SB-630 $55, bound QST's 1929/1930 make offer. Roderick, Box 1463, Little Rock, AR 72203. Phone 501-988-2527.

SELLING OUT. Motorola, General Electric, Collins, Hammarlund, Hewlett-Packard, Heath, Marconi, Tektronix, Lampkin, Dumont, Shure, Phelps-Dodge, McMurdo Silver, General Radio. Equipment and parts. SASE for list. Will ship. K6CS, 1012 Woodglen Drive, Roseville, CA 95678.

KENWOOD 520SE, extremely low hours. Absolutely flawless, $425. Lynn Ritchie, KU7S, 1970 Orchard Drive, S.L.C., UT 84106 801-277-4406.

SELL: R4B Drake receiver excellent condition operating and appearance prepaid in original carton with 10 MHz crystal $249 W5SHC Claude Sweger Box 1842 Ft. Stockton, TX 79735.

RYCOM R1307A/GR VLF miniature tube receiver excellent $200. HP1217A transisterized scope excellent $350. Fluke 873A differential ac/dc FM excellent $400. Racal RA6217E general coverage transisterized receiver. Works but needs work $250. K6AVF, 1047 Sherri St., Ridgecrest, CA 93555.

FOR SALE: 2kW linear (Dentron), 160-10 meters, 4×572B's, mint, $370. W2GTE 716-624-4692.

QUALITY STAINLESS hex-"U" bolts, screws-nuts-washers-more! Lists 25¢ or long S.A.S.E.! Walt, W8BLR, 29716 Briarbank, Southfield, Mich. 48034.

SELLING SB-102, p/s, manual CW filter. $300. 75S-3, $300 K7LQI. 206-383-5054.

SOFTWARE! We have software for Amateur Radio. We also have general software for other purposes. Send for free price list. Also we offer a software catalog fo the Apple II+ and Apple IIe with descriptions of software. Send $4 for catalog. Mail to RCIS Inc., 2701-C West 15th Street, Plano, TX 75075.

SELL: VIKING I, VFO, $65; Viking II, VFO, $65; CE20A, VFO $65; FT-101E, carton, $450; SP101B, $25; 75A-4, no. 5567, vernier, .5, .8, 2.1, 3.1, speaker, $575; 75A-3, .8, 3.1, $125; HR2B, $75; unused AR2B, $95; HR05, ac, 6Vdc, 8 coils, racks, $175; 1968 International 2.5 ton communications truck, air conditioned, furniture, insulated 100-foot pneumatic mast, trailer, 2500 watt generator, compressor, winch, etc. $4500; HQ-150, $135; 180 foot b.c. tower, guys, $1000; Clipperton-L, clean, 10m, $450; Hallicrafters SR-160, 80, 40, 20m, ac, dc, mike, $150 want Signal One, Eimac 1000T, Telrex 40m. FOB K8CCV 216-427-2303, 6-9PM weeknights.

DRAKE 2C, 2NT, Hallicrafters HA5 VFO, clean, $285 Dan, WA1GGN 203-934-7011.

ROBOT 400. New in original carton with cables, manual: $295. R.f. modulator: $10 with purchase. Want: RCA 77DX microphone, 1950-1960 equipment. Phone Sunday through Thursday. K2BBK 716-288-3604.

APPLE II Software, 5BDXCC, 5BWAS, Dupesheet, 10-10 etc. Machine language programs $10 each postpaid. Info SASE. K4HAV, 306 Frances, Sylvester, GA 31791.

KLMKT34XA, elements, excellent condition. All hardware. Manual. **Except Boom & Boom-To-Mast Plate**. $90 plus UPS. K8DYX 12840 New Buffao Rd., North Lima, OH 44452 216-549-3893 evenings.

NEW TR-7850 2m 40w, up/dn mic, TTP, mobile bracket, hardware, manual, warrentee, original carton; Cushcraft 2m Halo base antenna; Hy-gain 5/8 mobile antenna. $290. Tom Redmon, KC4NX, 212-582-6210 day, 201-322-5180 evening.

TET ANTENNAS are back at Sultronics Amateur Radio! Call or write for our new catalog of TET Antennas, HB9CV dual-drive Tribanders, New 40-meter Mono-bander, VHF, Rotors and more. Also Larsen Antennas, Daiwa meters and amplifiers, Coax-Seal, Icom, Kenwood, and Yaesu. We look forward to hearing from you! Contact Dan WD8IDZ or Nina N8ANU at Sultronics Amateur Radio, 15 Sexton Drive, Xenia, OH 45385. Call 513-376-2700.

SELL GALAXY GT-550A transceiver w/AC400. SC550A. RV550A and XO550 $400 or BO. Swan MKII linear (6mtrs) $250 or BO. Eldico S119 Radio Set (3-30Mcs) $250 or BO. FOB Atlanta K4SKP 404-434-3295.

WANTED: Alpha amplifier, Collins round emblem. K5UR, 501-988-2527.

TEN-TEC, Century 21, C.W. transceiver (with manual), 10/15/20/40/80 meters, Automatic disconnect, good condition, $250. Call Lynne (KA2RAW) call after 5 P.M. 201-947-0700.

NCG DISCOUNTS: 10/160m HF $849 w/CW filter $919. 15m mobile $239. 15m whip $25. MC/VISA. SASE for info. Drake's 17808 2nd South, Seattle, WA 98148. 206-244-1729.

SELLING COLLECTION QST's in binders from 1925, CQ's-73's HR's, other magazine: Loose QST 1922 to 1977 books, antique keys, mics, etc. Send large SASE for list. L. Pezzulo, 15 Amyrillis Dr., Windsor, CT 06095.

ROSS $$$ New Bargains: MFJ-1224 $89.90, 941C $89.95, 313 $33.95, 250 $29.95 Robot RB-800 $439.90, Icom IC-751 $1,254.65, IC-451A $729.90, IC-551D $569.90, IC-471 $799.90. Every day is Icom day at Ross's. Kenwood TS-430S $779.90, TS-930S $1349.90, TW-4000A $539.90, TM-201A $329.90, Yaesu FT-708 $259.90, FT-726R $709.90, FT-One $2,149. Complete Kenwood, Yaesu, Icom, Drake, etc. Used Kenwood TS-130S $499.90, TS-120S $449.90, TS-520 $429.90. Mention this ad to receive these bargain prices. Send SASE & call letters for list of used equipment and current specials. All prices cash, FOB Preston. Closed Monday at 2:00 Ross Distributing Company, 78 South State, Preston, ID 83263 208-852-0830.

HANDIE-TALKIE-Wilson Mark-4, 4 & 2 watts output, in perfectly new condition, used less than 30 hours. Included: Factory-installed touch-tone pad, wall charger, leather case, operating and service manual, installed freqs.-146.52 MHz. trans & recv.//146.055 trans. & 146.655 recv.//$275 or reasonable offer Write to Joseph Kardos, WA1VRQ, Schine Hall University of Bridgeport, 520 University Ave. Bridgeport, CT 06602.

HW-8, mint $120. KA7PMQ. 602-892-8334.

SIGNAL/One CX7A with "B" power supply, very late model, mint condx with three CW filters and RIT mod super $585 Amplifier builders send SASE for parts list goodies. W6RW 213-654-3714.

ROBOT 800 RTTY terminal. Low tone version. New in box, never used. $400. Jeff Poll, NA5S, 9206 Canter Drive, Dallas, TX 75231 Phone 214-349-6432 nights and weekends.

WANTED: Heathkit HW-7 or HW-8 in good condition. KA5OAT, 713-797-6480.

SEND quarter and SASE for telegraph catalog. Dr. Hess W6CK.

SELL: 75S3-B, 32S3, 516F2, 312B4 (R/E) $1250. BTI LK-2000-HD $995. 75S3-B, 32S3-B, 516F2, 312B4 (w/e) $995. 312B5 $350. 312A1 $65. W1FBG 603-964-6658.

KENWOOD TR-8300 440 MHz FM w/touchtone $250. Wilson Mark-II 2mtr FM w/touchtone extras $140, Midland 13-509 220MHz FM $110, Hitachi Videotape recorder $100, Pioneer lazer disk player $400, N9IF 2114 Harley Drive, Madison, WI 53711 608-271-0568.

HEATH SB-104A for sale with CW filter, Heath power supply and microphone, manuals and Palomar preselector with T/R relay, all in good working order, for $395. Will ship UPS. Jim McGloin, KB9O, 919 State St., Apt. 2, Lemont, IL 60439. 312-257-6180.

CUSHCRAFT Skywalker beam sale 40-2CD $265; 20-4CD $235; 15-4CD $110; 10-4CD $97; Barker & Williamson Coax Switches #595 $28; #593 $24; 4 Band Trapped Dipole AT-80 $45. Low prices our specialty Ham-Tenna, P.O. Box 4414, Utica, NY 13504.

GALAXY GT-550 xceiver, RV-550, SC550 (power supply and speaker, Galaxy 300 ohm Filter, calibrator 250-25KH with manual. $375 prepaid - Joseph Veltri, 249 Kingwood St., Morgantown, WV 26505.

TOUCHTONE Receiver: Telaris 7640 hybrid includes audio amps, AGC, bandpass filters, detector and output logic in one DIP package. $20 for pretested part includes spec sheets, postage. WA6UIX, 1390 Katella St., Laguna Beach, CA 92651.

VIC-20 and C-64 free CW receive program listing and information on PROKEY CW transmit program, newly improved and now only $13.95!! VIDEOTITLIST to create video pictures for ATV/SSTV and VCRs $20. MINIMUF PLUS propagation program $6. SASE please, prompt courteous service. Jim Grubbs, P.O. Box 3042 Springfield, IL 62708.

SALE - Instructograph with 14 tapes AC Model with phones, $65. Hammarlund HQ-150 excellent condition, $75. QST in ARRL binders years 1954 to 1969. Make offer. W3JCN 301-565-0507.

ARMY MARS is looking for new members in CT, RI and MA. If you would like more information, send your name, call sign, license class and address to Peter O'Dell, KB1N, 7 Brian Rd., South Windsor, CT 06074.

MICROPHONES: Best prices - new and used Amateur, professional, commercial mics. Microphone Specialists, Box 1372, Burnsville, Minn. 55337.

SPY RADIO. RR-2/GRC-109. 3-24 MHz, 25 watts, rcvr, xmtr, ps. excellent condition. $100. Also have RS-6. Want other clandestine radio gear. Gary, W8MFL 219-233-8631.

YAESU FT-101, CW filter, fan, new finals, $399 Joe, KCØZE, 612-252-7719.

Jobs for Hams

JOBS FOR ENGINEERS! R.S. James Associates, a small, highly specialized recruiting firm dedicated *only* to targeted placements, is seeking *experienced college graduate* RF/telecommunications engineers for design/development of circuitry/equipment functioning from HF through microwave. Our primary clients are in Eastern PA and Southern NJ, with a few sunbelt locations available. Generous relocation policies are possible in some cases. No fees, contracts, or other obligations are involved. For further information please contact Stu, K3UEI at 215-584-0775 9-4:30 M-F Eastern or submit resume including salary requirements and location preference to R.S. James Associates, 4240 Township Line Road, Harleysville, PA 19438.

YOUNG Bachelor of Science (Electr. Engineering) looking for job from November. Trainee permit obtainable. Write to HB9BKQ, Passwangstrasse 26, 4153 Reinach, SWITZERLAND.

Chasing Awards?
See Page 153

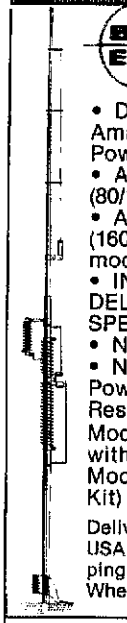
ADVERTISING DEPARTMENT STAFF

Lee Aurick, W1SE, Advertising Manager
Sandy Gerli, AC1Y, Assistant Adv. Mgr.
Danielle Huot, Advertising Assistant

203-667-2494 is a direct line, and will be answered only by Advertising Department personnel

Index of Advertisers

ANTENNA/TOWER SALE!

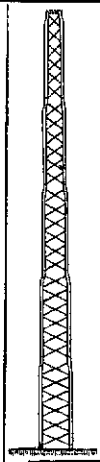


BUTTERNUT ELECTRONICS CO.

- Designed to operate on all Amateur Bands at "FULL" Legal Power Input.
- Automatic Band Switching (80/10 meters).
- Automatic Band Switching (160/10 meters) with optional model TBR-160 HD.
- IN STOCK for IMMEDIATE DELIVERY & LOOK at very SPECIAL PRICES . . .
- New Model HF6V $129.00
- New Model TBR-160HD (High Power 160 meter Base Resonator) $49.00.

Model RMK-11 (roof mount kit with multiband radial kit $39.00. Model STR-2 (Stub Tuned Radial Kit) $20.00.

Delivery Anywhere In The Continental USA At No Additional Cost. (Free Shipping On Butternut Accessories Also When Purchased With Antenna.)



UNARCO-ROHN Self Supporting Towers — On Sale!

Freight Prepaid

These rugged beauties are being offered at Big Discounts and - we are shipping them freight prepaid! Look over the specifications and pick the unit most suited for your needs, then - Call us to place your order with Mastercard/Visa or write and include your check for quick shipment - Freight Prepaid!

And — Save even more — Include antenna and rotor of your choice with the order and we will ship them along freight prepaid also! How's that for good old fashioned savings?

Tower Model	Tower Ht.	Load Rating	Ship Weight	Tower Base	Tower Price	Base Price	Total Price
HBX40	40 ft	10 sq ft	164	BXB6	289	24	313
HBX48	48 ft	10 sq ft	303	BXB7	369	26	395
HBX56	56 ft	10 sq ft	385	BXB8	449	30	479
HDBX40	40 ft	18 sq ft	281	BXB7	339	26	365
HDBX48	48 ft	18 sq ft	363	BXB8	429	30	459

Tri-Ex®

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

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

Check these features:

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

Model	Height	Load	Sale Price
W-36	36 ft.	9 sq. ft., 50 mph	$549
W-51	51 ft.	9 sq. ft., 50 mph	$799
LM-354	54 ft.	16 sq. ft., 60 mph	$1499
LM-470D (Motorized)	70 ft.	16 sq. ft., 60 mph	$2999

Masts—Thrust Bearings—Other Accessories Available at Sale Prices—Call!

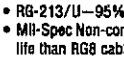
RG-213U

$.29/ft $279/1000 ft Up to 400 ft via UPS

- RG-213/U—95% Bare Copper Shield
- Mil-Spec Non-contaminating Jacket for longer life than RG8 cables.
- Our RG-213/U uses virgin materials.
- Guaranteed Highest Quality!

RG-8X

$.19/ft $179/1000 ft

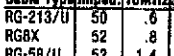


- RG8X—95% Bare Copper Shield
- Low Loss Foam Dielectric
- Non-contaminating Vinyl Jacket

Coaxial Cable Loss Characteristics (DB/100 ft)

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

HARDLINE/HELIAX™



Lowest Loss for VHF/UHF!

½" Alum. w/poly Jacket . . . . . $.79/ft
½" LDF4-50 Andrew Heliax™ $1.49/ft
⅞" LDF5-50 Andrew Heliax™ $3.99/ft
select connectors below.

HARDLINE & HELIAX™ CONNECTORS

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

AMPHENOL CONNECTORS

Silver PL259 . . . . $1.25 Nickle PL259 . . . . $.90
UG21B N Male . . $2.95 UG23D N Female . $2.95

ANTENNA WIRE & ACCESSORIES

12 Ga. Copperweld . $.12/ft 14 Ga. Copperweld . $.10/ft
14 Ga. Stranded . . $.10/ft 18 Ga. Copperweld ¼mi $30
450 Ohm H.D. Line . $.16/ft H.D. End Insulators . $2/ea
Van Gorden 1:1 Balun $11
Van Gorden Center Insulator $6

HUSTLER

4BTV 40-10 mtr Vert . $79 5BTV 80-10 mtr Vert . $99
G6-144B 2-mtr Base . $79 G7-144 2-mtr Base . $109

Mobile Resonators	10m	15m	20m	40m	75m
400W Standard	$10	$10	$12	$15	$19
2KW Super	$14	$15	$19	$24	$33

Bumper Mounts - Springs - Folding Masts in Stock!

CUSHCRAFT

A3 3-el Tribander	$219	A4 4-el Tribander	$289
R3 20/15/10mtr Vert	$279	A743/A744 40mtr Kit	$75
103CD	$95	15-3CD	$115
20-3	$199	40-2CD	$289
A50-5	$79	A147-4	$29
214B	$79	3219	$95
228FB	$219	424B	$79
147	$63	144-20T	$75
14TMB	$29	AMS-147	$29
10-4CD	$109	15-4CD	$125
20-4CD	$279	AV5	$89
A50-6	$99	A147-11	$49
214FB	$79	220B	$95
416TB	$59	617B	$199
144-10T	$52	432-20T	$49
ARX2B	$39	PD-2	$25

Many other Cushcraft models in Stock—CALL!

HY-GAIN

The ALL NEW Broadband 3-el Triband Beam Explorer-14, In Stock—$289

30/40-mtr. Add-On-Kit . . . . . Call for price
V2S 2-mtr Base Vertical $39
TH5MK2S Broad Band 5-el Triband Beam $319
TH7DXS 7-el Triband Beam $379
TH3JRS 3-el Triband Beam $159
TH2MK3S 2-el Triband Beam $139
HY-QUAD 2-el Triband Quad $279
402BAS 2-el 40-mtr Beam $199
205BAS 5-el 20-mtr Beam $299
155BAS 5-el 15-mtr Beam $179
105BAS 5-el 10-mtr Beam $119
204BAS 4-el 20-mtr Beam $229
203BAS 3-el 20-mtr Beam $139
153BAS 3-el 15-mtr Beam $79
103BAS 3-el 10-mtr Beam $59
DB1015BAS 3-el 10/15 mtr Beam $159
64BS 4-el 6-mtr Beam $55
66BS 6-el 6-mtr Beam $109
18HTS 80-10 mtr Hy-Tower Vertical $339
LC-160 160-mtr Coil Kit for 18HTS $39
214 14-el 2-mtr Beam $35
2BDQ 80/40 mtr Trap Dipole $49
5BDQ 80-10 mtr Trap Dipole $99
BN86 80-10 mtr KW Balun W/Coax Seal $19

MOSLEY

CL-33 3-el Triband Beam $229
TA-33 3-el Triband Beam $199
TA-33JR 3-el Triband Beam $149
S-402 2-el 40-mtr Beam $279

HYGAIN/TELEX CRANKUPS

ON SALE! FREIGHT PAID! SPECIAL PRICES! SAVE$$!

Model	Height Up	Down	Wind Load	List	Sale
HG-37SS	37.0 ft	20.5 ft	9.0 sq ft	$777	$669
HG-52SS	52.0 ft	20.5 ft	9.0 sq ft	$1095	$949
HG-54HD	54.0 ft	21.0 ft	16 sq ft	$1818	$1499
HG-70HD	70.0 ft	23.0 ft	16 sq ft	$2850	$2399
HG-33MT2	33.0 ft	11.5 ft	8.5 sq ft	$898	$779

ALPHA DELTA COMMUNICATIONS

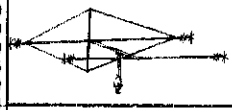
Transi-Trap™ Surge Protectors—In Stock Now!

Model LT 200W UHF Type . . $19
Model HT 2KW UHF Type . . $29
Model LT/N 200W N Type . . $39
Model HT/N 2KW N Type . . $44
Model R-T 200W Deluxe . . . $29
Model HV 2KW Deluxe $32

KLM

KT34A 4-el Broad Band Triband Beam $309
KT34XA 6-el Broad Band Triband Beam $469
3.8-1 80-mtr Rotatable Dipole $429
7.2-1 40-mtr Rotatable Dipole $159
7.2-2 2-el 40-mtr Beam $289
7.2-3 3-el 40-mtr Beam $439
7.2-4A 4-el 40-mtr Beam $599
6el-20mtr Big Stick Monoband Beam $599
6el-15mtr Big Stick Monoband Beam $389
6el-10mtr Big Stick Monoband Beam $229
10-30-7LP Log Periodic Broad Band Beam $599
144-148-13LBA 13-el 2-mtr Beam $79
143-150-14C 14-el 2-mtr Satellite Antenna $79
420-470-18C 435 MHz Satellite Antenna $59
432-16LB 432 MHz Long Boom Antenna $59

MINI-PRODUCTS HQ-1 only $139!



Wing Span - 11 ft
Boom - 54 in. long
Wind Area - 1.5 sq ft
1200W P.E.P. Input
6-10-15-20 mtrs

ROTORS & CABLES

Alliance HD73 (10.7 sq ft rating) $99
Alliance U100 (for small beams & elevation) $49
Telex HAM 4 (15 sq ft rating) $199
Telex Tailtwister (20 sq ft rating) $249
Telex HDR300 Heavy Duty (25 sq ft rating) $439
Kenpro KR-500 Heavy duty elevation rotor . . $189.00

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

UNR-ROHN GUYED TOWERS

10 ft Sections 20G $32.50 25G $43.50 45G $95.50

Foldover Towers

Model	Height	Ant Load*	Price
FK2548	48 ft	15.4 sq ft	$789
FK2558	58 ft	13.3 sq ft	$879
FK2568	68 ft	11.7 sq ft	$959
FK4544	44 ft	34.8 sq ft	$1099
FK4554	54 ft	29.1 sq ft	$1219
FK4564	64 ft	28.4 sq ft	$1329
25G Foldover Double Guy Kit			$199
45G Foldover Double Guy Kit			$229

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

All Foldover Towers Shipped Freight Pre-Paid!
Foldover prices 10% higher west of Rockies.
All Rohn 25G & 45G Accessories in stock - Call!

TOWER/GUY HARDWARE

3/16" EHS Guywire (3990 lb rating) . . . . . $.12/ft
1/4" EHS Guywire (6000 lb rating) . . . . . $.15/ft
5/32" 7 × 7 Aircraft Cable (2700 lb rating) . . . . . $.12/ft
3/16" CCM Cable Clamp (3/16" or 5/32" Cable) . . . $.35
1/4" CCM Cable Clamp (1/4" Cable) . . . . . $.45
1/4" TH Thimble (fits all sizes) . . . . . $.30
3/8EE (3/8" Eye & Eye Turnbuckle) $5.95
3/8" EJ (3/8" Eye & Jaw Turnbuckle) $6.95
1/2" EE (1/2" Eye & Eye Turnbuckle) $8.95
1/2" EJ (1/2" Eye & Jaw Turnbuckle) $9.95
3/16" Preformed Guy Grip $1.79
1/4" Preformed Guy Grip $1.99
6" Diam - 4 ft Long Earth Screw Anchor $12.95
500D Guy Insulator (5/32" or 3/16" Cable) . . . . . $.95
502 Guy Insulator (1/4" Cable) $1.95
5/8" Diam - 8 ft Copper Clad Ground Rod $11

PHILLYSTRAN GUY CABLE

HPTG2100 Guy Cable (2100 lb rating) . . . . . $.29/ft
HPTG4000 Guy Cable (4000 lb rating) . . . . . $.43/ft
HPTG6700 Guy Cable (6700 lb rating) . . . . . $.69/ft
9901LD Cable End (for 2100/4000 cable) $4.95
9902LD Cable End (for 6700 cable) $6.95
Socketfast Potting Compound (does 6-8 ends) $8.95

GALVANIZED STEEL MASTS

Heavy Duty Steel Masts 2 in OD - Galvanized Finish

Length	5 FT	10 FT	15 FT	20 FT
.12 in Wall	$25	$39	$59	$79
.18 in Wall	$39	$69	$99	$109
.25 in Wall	$69	$129	$189	$249

SOUTH RIVER ROOF TRIPODS

HDT-3 3 ft Tripod . . . $19 HDT-5 5 ft Tripod . . . $29
HDT-10 10 ft Tripod . . $49 HDT-15 15 ft Tripod . . $69

Heavy Duty Tripods include mtg hdw-UPS Shippable

TEXAS TOWERS

DIV. OF TEXAS RF DISTRIBUTORS INC.

MasterCard VISA

1108 Summit Ave., Suite 4 / Plano, Texas 75074

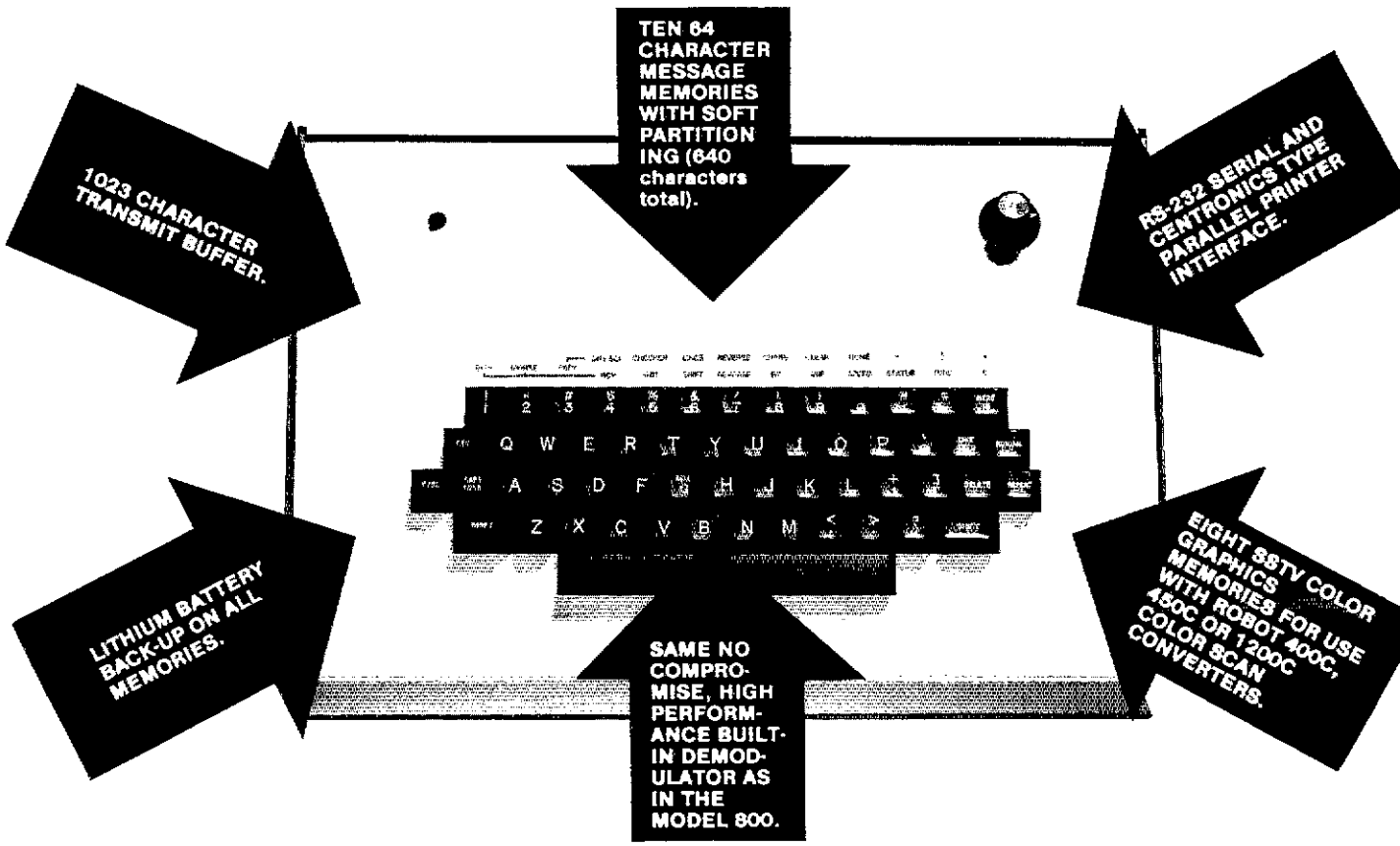
ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Mon.-Fri.: 8:30 a.m. - 5:30 p.m. Sat. 9 a.m. - 1 p.m.

TELEPHONE: (214) 422-7306

CIRCLE 10 ON READER SERVICE CARD

THE NEW ROBOT MODEL 800C SUPER TERMINAL!



The new Model 800C offers the same fine quality construction, high performance, and outstanding features as the popular Model 800, plus the many new operating features shown above. It is a complete specialty mode communications terminal offering unmatched ease of operation. The 800C is designed expressly for amateur radio and nothing else! By focusing our attention on this simple concept we are able to provide a product that works better, costs less and is easier to operate than systems that try to do "everything" and do nothing very well.

OUTSTANDING BUILT-IN DEMODULATOR

The Model 800C has the same high quality demodulator acclaimed by thousands of users of the Robot Model 800 in daily use world wide, with its ability to copy those weak signals that you usually give up on. The demodulator employs separate active two-tone discriminator filters for optimum demodulation of RTTY signals. It is available with the IARU standard "low tone" frequencies or "high tones" for use on VHF-FM.

BAUDOT/ASCII OPERATION

Split screen display. Autostart. Programmable WRU and SELCAL. On-screen status line and tuning indicator. Programmable narrow shift CW ID.

MORSE CODE OPERATION

Autotrack on receive. Side tone oscillator. Morse code traine On-screen speed indication.

SSTV OPERATION

Full color SSTV graphics capability when used with Robot's new color scan converters plus stand alone black and white SSTV graphics transmission. Eight color graphics memories available for CQ, QTH and special messages.*

ATTENTION ROBOT MODEL 800 OWNERS: All of the "new" features found in the Model 800C are available by adding the Model 800C Update Kit to your unit. All necessary parts and hardware are included for an easy single evening installation.

For complete information on all the Robot 800C's features wri for literature or visit your Robot dealer.

*The Model 800C does not receive SSTV pictures. A scan converter is necessary for this.

ROBOT

ROBOT RESEARCH, INC.
7591 Convoy Court • San Diego, CA 92111 • (619) 279-9430

World Leaders in SSTV, Phone Line TV and Image Processing Systems.

MEET THE NEW YAESU FT-102

The FT-102 is factory equipped for operation on all present and proposed Amateur HF bands. An extra AUX band position is available for special applications. Equipped for SSB, CW, and AM (RX), the FT-102 may be activated on FM and AM (TX) via the optional AM/FM-102 Module.

The all-new receiver front end utilizes a low-distortion RF preamplifier that may be by-passed via a front panel switch when not needed. Maximum receiver performance is yours with this impressive lineup of standard features: IF Notch Filter, Audio Peak Filter, Variable IF Bandwidth Control, IF Shift, Variable Pulse Width Noise Blanker, Independent SSB and CW Audio Channels with Optimized Audio Bandwidth, and Front Panel Audio Tone Control. Wide/Narrow filter selection is independent of the Mode switch.

The celebrated transmitter section is powered by three 6146B final tubes, for more consistent power output and very low distortion. An RF Speech Processor, Mic Amp Audio Tone Control, VOX, and an IF Monitor round out the transmitter lineup.

Futuristic panel design and careful human engineering are the hallmarks of the FT-102. Convenient pop-out controls below the meters may be retracted when not in use, thus avoiding inadvertant mistuning. Abundant relay contacts, rear panel phono jacks for PTT, microphone/patch input, and other essential interface connections make the FT-102 extremely simple to incorporate into your station.

SPECIFICATIONS

TRANSMITTER

Power Input: (1.8-25 MHz) (28-29.9 MHz)

SSB, CW	240W DC	160W DC
AM	80W DC	80W DC
FM		160W DC

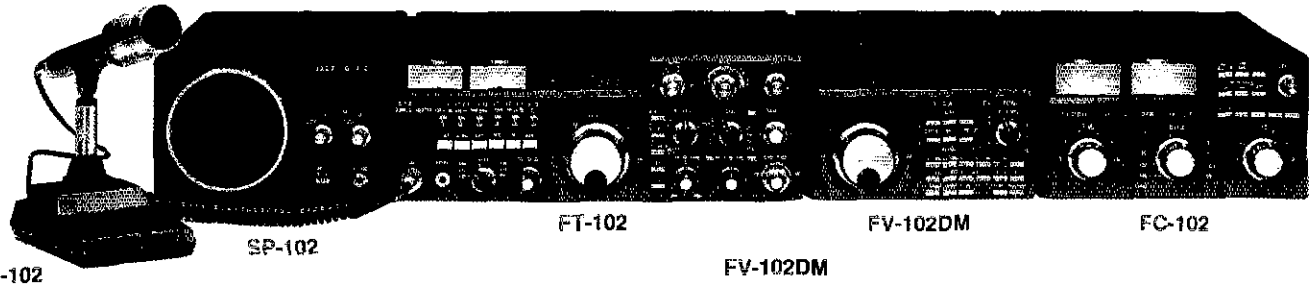
RECEIVER

Image Rejection:
Better than 70dB from 1.8-21.5 MHz
Better than 50dB from 24.5-29.9 MHz

IF rejection:
Better than 70 dB

Selectivity (−6 dB/ −60 dB):
SSB, CW, AM; 2.7/4.8 kHz (with no optional filters)
Width adjusts continuously from 2.7 kHz to 500 Hz (−6 dB)

Spurious Radiation: Better than −40 dB



SP-102

The SP-102 External Speaker/Audio Filter features a large, high-fidelity speaker with selectable low- and high-cut audio filters. The front panel A-B switch allows selection of two receiver inputs for maximum versatility. Also available is the SP-102P Speaker/Patch.

See your Authorized Yaesu Dealer today for a hands-on demonstration of the rig that everybody's talking about. It's the FT-102, The Transceiver of Champions!

Price And Specifications Subject To Change Without Notice or Obligation

1082

FV-102DM

The FV-102DM Synthesized External VFO tunes in 10 Hz steps. Keyboard entry of frequencies, UP/DOWN scanning, and 12 memories make the FV-102DM a "must" for serious DX or contest work.

FC-102

The FC-102 Antenna Coupler is capable of handling 1.2KW of transmitter power, with an in-line wattmeter, separate SWR meter, and A-B input/output selection expanding your station's capability. The optional FAS-1-4R allows remote selection of up to four antennas via one coaxial cable connected to the FC-102.

YAESU **ELECTRONICS CORPORATION** 6851 Walthall Way, Paramount, CA 90723 (213) 633-4007
CINCINNATI SERVICE CENTER 9070 Gold Park Drive, Hamilton, OH 45011 (513) 874-3100

Digital DX-terity...

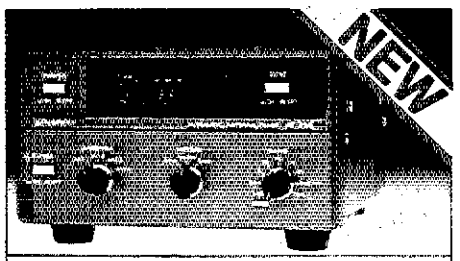
General coverage, Superior dynamic range, 2 VFO's, 8 memories, Scan, Notch...COMPACT!

TS-430S

The TS-430S combines the ultimate in compact styling with advanced circuit design and performance. An all solid-state SSB, CW, and AM transceiver, with FM optional, covering the 160-10 meter Amateur bands, it also incorporates a 150 kHz-30 MHz general coverage receiver having a superior dynamic range, dual digital VFO's, 8 memories, memory scan, programmable band scan, IF shift, notch filter, all-mode squelch, and built-in speech processor.

TS-430S FEATURES:

- **160-10 meter operation, with general coverage receiver**
  With 160-10 meter Amateur band coverage, including WARC 30, 17, and 12 meter bands, it also features a 150 kHz-30 MHz general coverage receiver. Innovative UP-conversion digital PLL circuit, for superior frequency stability and accuracy. UP/DOWN band switches for Amateur bands or 1-MHz steps across entire 150 kHz-30 MHz range. Two digital VFO's continuously tuneable from band to band. Band information output on rear panel.
- **USB, LSB, CW, AM, with optional FM**
  Operates on USB, LSB, CW, and AM, with optional FM, internally installed. AGC time constant automatically selected by mode.
- **Compact, lightweight design**
  Measures only 10-5/8 (270) W x 3-3/4 (96) H x 10-7/8 (275) D, inches (mm), weighs only 14.3 lbs. (6.5 kg.).
- **Superior receiver dynamic range**
  Use of 2SK125 junction-type FET's in the Dyna-Mix high sensitivity, balanced, direct mixer circuit provides superior dynamic range.
- **10-Hz step dual digital VFO's**
  10-Hz step dual digital VFO's operate independently, include band and mode information. Different band and mode cross operation possible. Dial torque adjustable. STEP switch for tuning in 10-Hz or 100-Hz steps. A=B switch quickly shifts "B" VFO to the same frequency and mode as "A" VFO, or vice-versa. VFO LOCK switch provided. RIT control tunes VFO or memory. UP/DOWN manual scan possible using optional microphone.
- **Eight memories store frequency, mode, and band data**
  Memories store frequency, mode, and band data. Eighth memory stores receive and transmit frequencies independently. M.CH switch for operation of memory as independent VFO, or fixed frequency.
- **Lithium battery memory back-up**
  Estimated five-year life...
- **Memory scan**
  Scans memories in which data is stored.
- **Programmable automatic band scan**
  Scans programmed band width. Scan speed adjustable. HOLD switch interrupts band or memory scan.
- **IF shift circuit for minimum QRM.**
  IF passband may be moved to place interferring signals outside the passband, for best interference rejection.
- **Tuneable notch filter built-in**
  Deep, sharp, tuneable, audio notch filter.
- **Narrow-wide filter selection**
  NAR-WIDE switch for IF filter selection on SSB, CW, or AM, when optional filters are installed. (2.4 kHz IF filter built-in.)
- **Speech processor built-in**
  Improves intelligibility, increases average "talk-power."
- **Fluorescent tube digital display**
  Indicates frequency to 100 Hz (10 Hz modifiable).
- **All solid-state technology**
  Input rated 250 W PEP on SSB, 200 W DC on CW, 120 W on FM (optional), 60 W on AM. Built-in cooling fan, multi-circuit final protection. Operates on 12 VDC, or 120/220/240 VAC with optional PS-430 AC power supply.
- **All-mode squelch circuit, built-in**
- **Noise blanker, built-in**
- **RF attenuator (20 dB)**
- **Vox circuit, plus semi break-in with side-tone**



Optional AT-250 Automatic Antenna Tuner
Designed to match the TS-430S in size, color, and appearance. Functionally compatible with any HF transceiver of 200 watts PEP or lower. (Requires manual bandswitching.)
• Covers 160-10 meter incl. WARC
• ABC Automatic Band Changing System (when used with TS-430S) • SWR/Power meter • 4 antenna terminals • Built-in AC Power Supply.

Other optional accessories:

- PS-430 compact AC power supply.
- PS-30 or KPS-21 AC power supplies.
- SP-430 external speaker.
- MB-430 mobile mounting bracket.
- AT-130 compact antenna tuner, 80-10 m incl. WARC.
- FM-430 FM unit.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filters.
- YK-88SN (1.8 kHz) narrow SSB filter.
- YK-88A (6 kHz) AM filter.
- MC-42S UP/DOWN hand microphone.
- MC-60A deluxe desk microphone, UP/DOWN switch.
- MC-80 UP/DOWN desk microphone.

More information on the TS-430S is available from all authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.

KENWOOD

pacesetter in amateur radio

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