

# QST

June 1983 \$2.50

devoted entirely to Amateur Radio



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

Field Day 1983 — 50th Anniversary



## the tempo S-15

...a no nonsense radio that provides more power, broader frequency range and simplicity of operation

The S-15 is the kind of hand held most people want. Simple, rugged, reliable, easy to use...it's the hand held for today and tomorrow. The S-15 offers a full 5 watts of power...power that extends your range and improves your talk power. The S-15 operates from 140 to 150 MHz (and 150 to 160 on export models). Compare that to the others. Its state-of-the-art integrated circuitry provides far more reliability and ease of maintenance than conventional circuitry...just one more indication of the kind of quality that goes into the S-15.

Consider all of these features before you decide on any hand held:

- 5 watt output (1 watt low power switchable)
- 10 MHz frequency coverage: 140-150 MHz (For export only: B version 150-160 MHz, C version 160-170 MHz)
- Electrically tuned stages. Receiving sensitivity and output power are constant over entire operating range.
- Three channel memory. (1 channel permits non-standard repeater offsets. 200 micro amp memory maintenance (standby)).
- A new "easy remove" battery pack
- One hour quick charge battery supplied (450 ma/HR)
- Plug for direct 13.8 volt operation

- Speaker/microphone connector
- BNC antenna connector and flex antenna
- Extremely small and light weight (only 17 ounces).
- Ample space for programmable encoder.
- Fully synthesized
- Extremely easy to operate
- Its low price includes a rubber antenna, standard charger, 450 ma/HR battery (quick charge type) and instruction manual.

OPTIONAL ACCESSORIES: 1 hour quick charger (ACH 15) • 16 button touch tone pad (S 15T) • DC cord • Solid state power amplifier (S-30 & S-80) • Holster (CC 15) • Speaker/mike (HM 15)

*Available soon!!*

The CS-15.. a new version of the S-15.. for commercial use.

- \* FCC type accepted
- \* Internally programmable
- \* Fully synthesized
- \* Full 5 watt output
- \* Ultra compact, portable
- \* 10 MHz receiver coverage

### TEMPO M-1

Superb quality VHF marine band hand held. Synthesized for world wide use... all marine channels & 4 weather channels. Ch 16 override. All offsets built in.

**TEMPO S-2** Use 220 MHz repeaters nationwide. Synthesized, field tested and dependable.

**TEMPO S-4** The first 440 MHz hand held and still a winner.

Available at  
your local Tempo  
dealer or from..



# Henry Radio

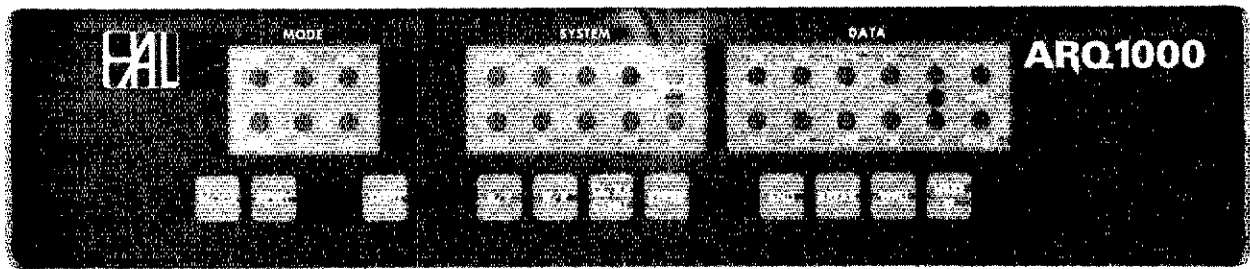
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Calif. residents please call collect on our regular numbers.

# AMTOR RTTY

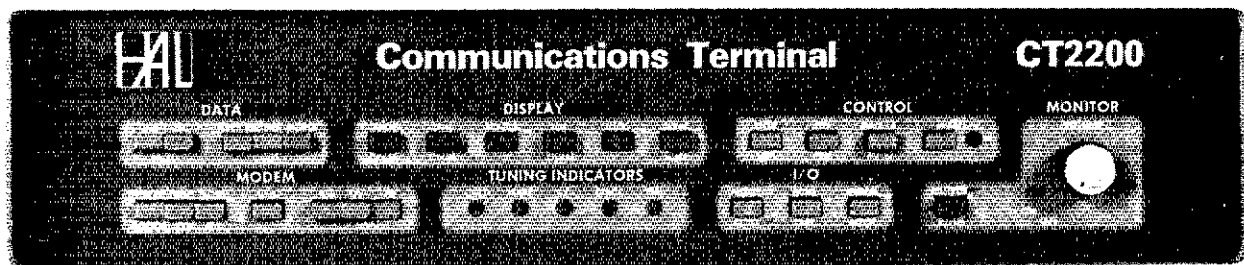


HAL is proud to announce the ARQ1000 code converter. This terminal not only supports the AMTOR amateur codes, but meets ALL of the commercial requirements of CCIR Recommendation 476-2. The ARQ1000 can be used with present and previous generation HAL RTTY products. In fact, any Baudot or ASCII full duplex 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



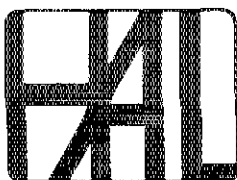
By popular request—the new CT2200. Our slogan is "When Our Customers Talk, We Listen"—and we have been listening. The CT2200 includes these often requested features:

- 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
- 3¾" × 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 "20 2" 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**

# 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.

**Features.** All of the above features plus 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 fluorescent 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.** FM unit, 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, FL44A  
CW: FL52A, FL53A  
AM: FL33



# ICOM

## The World System

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David Sumner, K1ZZ  
Editor

**Staff**  
E. Laird Campbell, W1CUT  
Managing Editor

Joel P. Kleinman, N1BKE  
Assistant Managing Editor  
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Features Editor

Doug DeMaw, W1FB  
Senior Technical Editor

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Associate Technical Editor

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Stan Horzepa, WA1LDU, Harry MacLean, VE3GRD,  
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Richard L. Baldwin, W1RU, John Huntoon, W1RW  
Contributing Editors


Brooke Craven  
Production Supervisor

Sue Fagan  
Technical Illustrations

Lee Aurick, W1SE  
Advertising Manager

John H. Nelson, W1GNC, Circulation Manager;  
Marion E. Bayrer, Deputy Circulation Manager;  
Lorraine Belliveau, Asst. Circulation Manager — QST

**Offices**  
225 Main St., Newington, CT 06111 USA  
Telephone: 203-866-1541  
Telex: 643958 AMRAD NEWI

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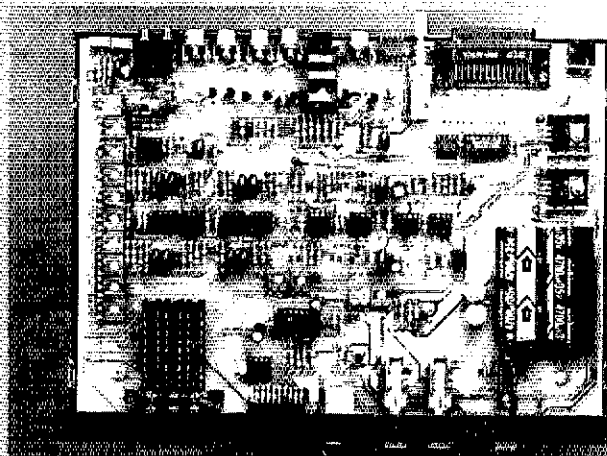
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# CHAMPAGNE RTTY/CW on a Beer Budget



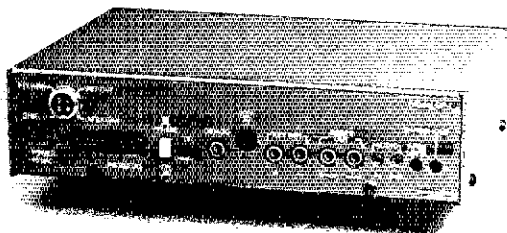
## CP-1 Computer Patch™ Interface

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.



# HAMTRONICS

4033 Brownsville Road  
Trevose, Pennsylvania 19047  
(215) 357-1400

# AEA

Brings you the  
Breakthrough!

# Ringo Ranger II

## Simply the best

The best combination of gain, bandwidth and low angle radiation for simplex or repeater operation.

**Quick easy assembly and installation**

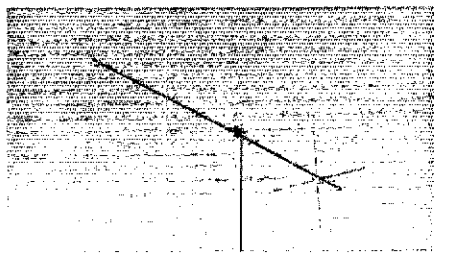
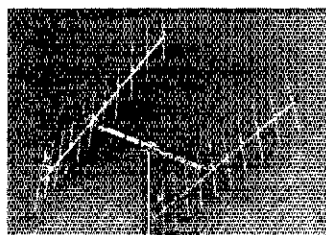
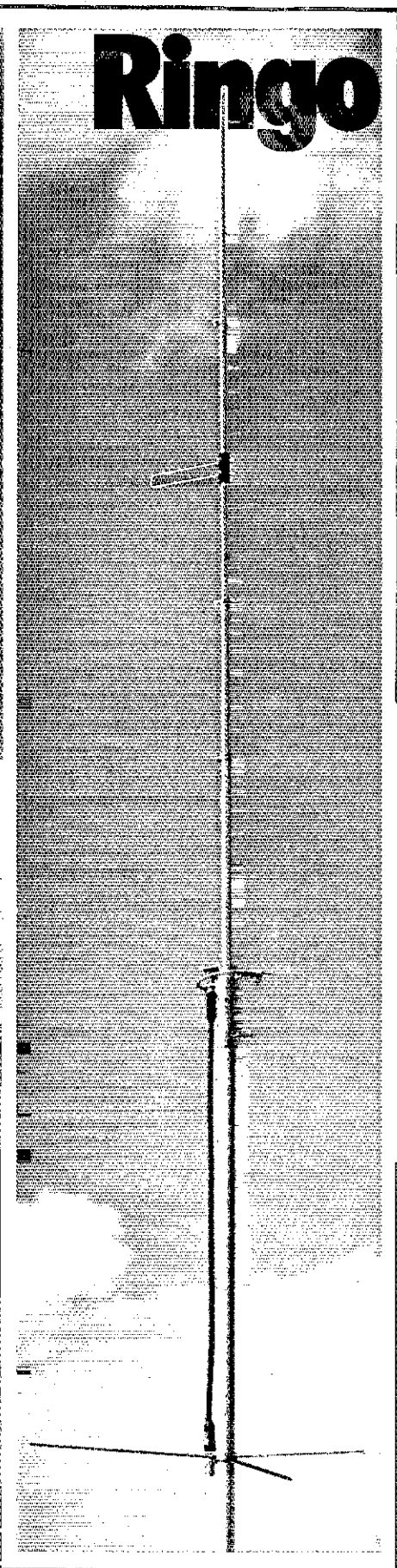
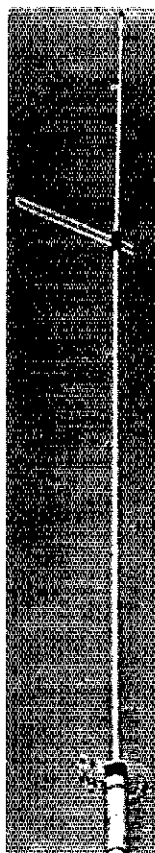
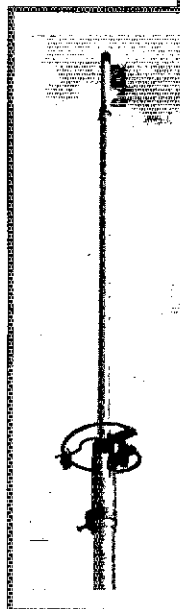
**Mount anywhere with compact dimensions and neat appearance**

**Proven performance and durability in all environments**

**Complete FM band coverage**

**One year warranty**

Cushcraft antennas created the FM antenna revolution by making the best performance and value available to every ham. We continue to set the pace with a broad line of antennas for every FM application. Tune across the band and you will find the overwhelming majority of hams using one, two, or more Cushcraft antennas. The reason is very simply that they are the best. Now is the time for you to enjoy the value of a Cushcraft antenna. See your nearby dealer today.



### RINGO RANGER II

ARX-2B	134-164 MHz
ARX-220B	220-225 MHz
ARX-450B	435-450 MHz

### RINGO RANGER

ARX-2	134-164 MHz
-------	-------------

### RINGO

AR-6	50-54 MHz
AR-2	135-175 MHz
AR-10	28-29.7 MHz
AR-220	220-225 MHz
AR-450	440-460 MHz

### MOBILE ANTENNAS

AMS-147	144-148 MHz	Magnetic Mount
ATS-147	144-148 MHz	Trunk Lip Mount
AMS-220	220-225 MHz	Magnetic Mount
ATS-220	220-225 MHz	Trunk Lip Mount

### YAGIS

A147-4	145.5-148 MHz	4 Element
A147-11	145.5-148 MHz	11 Element
A147-22	145.5-148 MHz	22 Element
214-FB	145.5-148 MHz	14 Element
A220-7	220-225 MHz	7 Element
A449-6	440-450 MHz	6 Element
A449-11	440-450 MHz	11 Element

### CROSS YAGI

FOR CW/SSB and FM

A147-20T	144-146 MHz Horizontal
	145.5-148 MHz Vertical



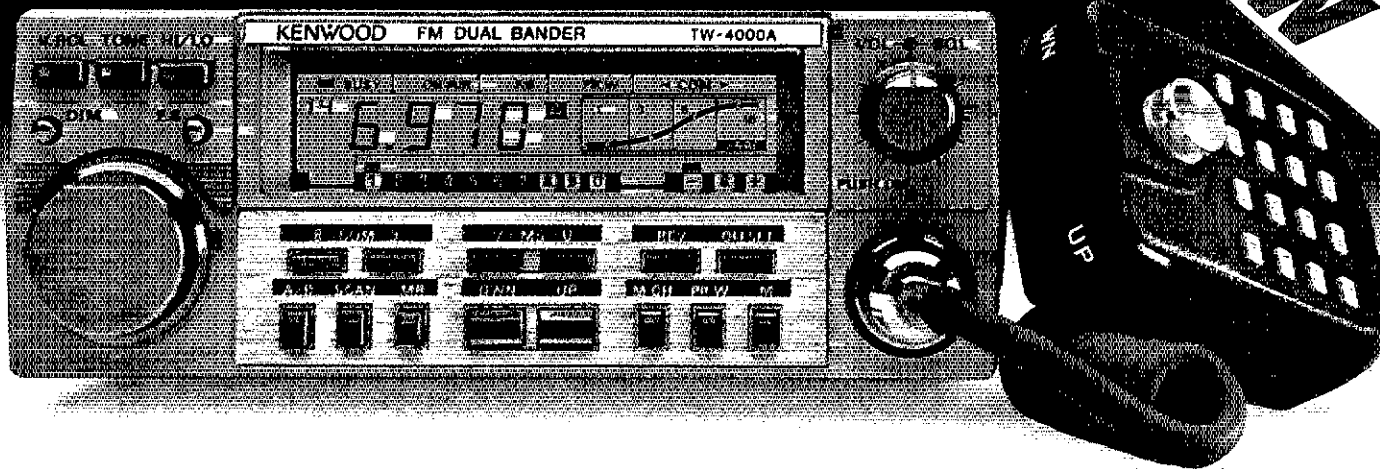
**cushcraft**  
CORPORATION

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



# FM "Dual-Bander"

**NEW**



**2 m & 70 cm in single compact package, LCD, 25 W, optional voice synthesizer.**

## TW-4000A

**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**  
A green, multi-function back-lighted LCD display for better visibility. Indicates frequency, memory channel, repeater offset, "S" or "RF" level, VFO A/B, scan, busy, and "ON AIR" Dimmer switch.
- **25 Watts RF Power on 2 m/70 cm.**  
Hi/Lo power switch.
- **Optional "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**  
Stores frequency, band, and repeater offset. Memory 0 stores receive and transmit frequencies independently for odd repeater offsets, or cross-band operation.
- **Programmable Memory Scan**  
Programmable to scan all memories, or only 2 m or 70 cm memories. Also may be programmed to skip channels.
- **Band Scan in Selected 1-MHz Segments**  
Scans within the chosen 1-MHz segment (i.e., 144.000-144.995 or 440.000-440.995, etc.). The scanning direction may be reversed by pressing either the "UP" or "DOWN" buttons on the microphone.
- **Priority Watch Function**  
Unit switches to memory 1 for 1 second each 10 seconds, to monitor the activity on the priority channel.
- **Common Channel Scan**  
Memory 8 and 9 are alternately scanned every 5 seconds. Either channel may be recalled instantly.
- **Dual Digital VFO's**  
Selectable 5-kHz or 10-kHz for 2 m, and 5-kHz or 25-kHz for 70 cm. Depress "UP" or "DOWN" key on the front panel for band change in 1-MHz steps.
- **16-Key Autopatch UP/DOWN Microphone (Supplied)**
- **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**
- **Optional Two-Frequency CTCSS Encoder**  
Easily mounted inside the radio, allows DIP switch programming of two different tone frequencies, for 2 m and 70 cm.
- **"BEEPER" sounds through speaker.**
- **Easy-to-Install mobile mount**
- **TW-4000A accessories:**
- **VS-1 Voice Synthesizer**
- **TU-4C Two-Frequency Programmable CTCSS Encoder**
- **KPS-7A Fixed station power supply**
- **SP-40 Compact mobile speaker**

*Subject to FCC approval*

More information on the TW-4000A and TS-780 is available from all authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.

# KENWOOD

*pacesetter in amateur radio*

## All mode "Dual-Bander"

### TS-780

**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/flight drag switch. VFO steps in 20-Hz, 200-Hz, 5-kHz, or 12.5-kHz, plus "FM CH" channel-

ized 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  $\pm$ 600-kHz TX offset switch with reverse switch • Tone switch for optional TU-4C two frequency tone

encoder unit • VOX and semi break-in CW built-in • FM tune meter • Noise blanker for SSB, CW.

*Subject to FCC approval*





# TS-930S

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

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

### TS-930S FEATURES:

- 160-10 Meters, with 150 kHz-30 MHz general coverage receiver. Covers all Amateur frequencies, plus WARC, on SSB, CW, FSK, and AM. UP conversion digital PLL circuit.
- Excellent receiver dynamic range. Typical two-tone dynamic range, 100 dB (20 meters, 50-kHz spacing, 500 Hz CW bandwidth).
- All solid-state 28 volt operated final amplifier. Lowest IM distortion. Power input 250 W on

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

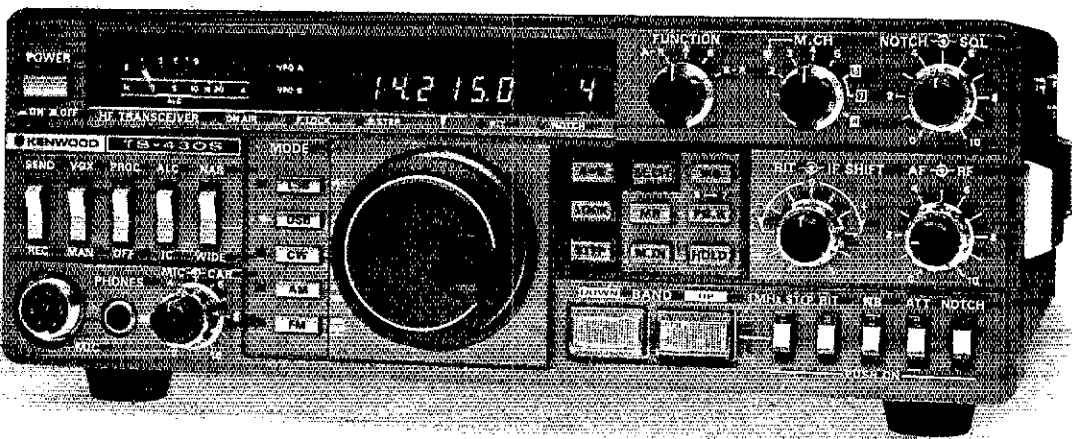
- Available with AT-930 automatic antenna tuner built-in, or as an option. Covers 80-10 meters, including WARC bands.
- CW full break-in. CMOS logic IC, plus reed relay. Switchable to semi break-in.
- Dual digital VFO's, 10-Hz steps, includes band information.
- Eight memory channels. Stores frequency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

- SSB IF slope tuning, allows independent adjustment of the low and/or high frequency slopes of the IF passband.
- CW VBT and pitch control. VBT tunes out interfering signals. CW pitch control shifts IF pass-band and beat frequency. "Narrow-Wide" filter switch.
- Tuneable, peak-type audio filter for CW.
- AC power supply built-in.
- Fluorescent tube digital display (100 Hz resolution, modifiable to 10 Hz) with digitalized sub-scale, in 20-kHz steps.
- RF speech processor.
- One year limited warranty.

- SSB monitor circuit.

### Optional Accessories:

- AT-930 Auto. antenna tuner.
- SP-930 External speaker with selectable audio filters.
- YG-455C-1 (500 Hz) or YG-455CN-1 (250 Hz) plug-in CW filters for 455 kHz IF.
- YK-88C-1 (500 Hz) CW plug-in filter for 8.83 MHz IF.
- YK-88A-1 (6 kHz) AM plug-in filter for 8.83 MHz IF.
- SO-1 commercial grade TCXO.
- MC-60A deluxe desk microphone, 8-pin, with pre-amplifier, UP/DOWN switches.



**NEW**

# TS-430S

**"Digital DX-terity"...**  
**General coverage,**  
**Superior dynamic range,**  
**2 VFO's, 8 memories,**  
**Scan, Notch, COMPACT!**

**Combines compact styling with**  
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### TS-430S FEATURES:

- 160-10 meters, with 150 kHz-30 MHz general coverage receiver. Covers all Amateur frequencies, plus WARC. UP-conversion digital PLL circuit.
- USB, LSB, CW, AM, and FM (optional) all mode.
- Compact lightweight design. (only 10-5/8 (270) W x 3-3/4 (96) H x 10-7/8 (275) D, inches (mm); only 14.3 lbs. (6.5 kg).)
- Superior receiver dynamic range with Dyna-Mix high sensitivity direct mixing system.

- 10-Hz step dual digital VFO's. Operate independently, include band and mode information. Dial torque adjustable. Step switch for 10-Hz or 100-Hz steps. A=B switch shifts "B" VFO to "A" VFO frequency and mode, or vice versa. VFO LOCK switch. RIT for VFO or memory. UP/DOWN manual scan with optional UP/DOWN microphone.
- Eight memories store frequency, mode, and band data. 8th memory stores RX/TX frequencies independently.
- Lithium battery memory back-up. (Est. 5 yr. life.)
- Memory Scan.
- Programmable automatic band scan width.

- IF shift circuit for minimum QRM.
- Tuneable notch filter, built-in.
- Narrow-wide filter selection on SSB, CW, AM (filter optional).
- Speech processor, built-in.
- All solid state. Input rated 250 W PEP on SSB, 200 W DC on CW, 120 W on FM (optional), 60 W on AM. Operates on 12 VDC or on 120 VAC, or 220/240 VAC with optional PS-430 AC power supply.
- Fluorescent tube digital display indicates frequency to 100 Hz (10 Hz modifiable).
- All-mode squelch circuit, built-in.
- Built-in noise blanker.
- RF attenuator (20 dB).
- VOX circuit, plus semi break-in with side-tone.

### Optional accessories.

- PS-430 compact AC power supply.
- PS-30 or KPS-21 AC supplies.
- SP-430 external speaker.
- MB-430 mobile mounting bracket.
- AT-130 compact antenna tuner, 80-10 m, incl. WARC.
- AT-230 base antenna tuner, 160-10 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.

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

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Dean R. Summers, KØQC, 304 4th Ave. NW, Mandan 58554 (701-663-0130)

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Thomas Hammack, W4WLF, 9 Cardinal Cove, Long Beach, 39560 (801-864-4452)

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James R. Seeley, WB8MTD, 14630 Clinton Rd., Springport 49284 (517-569-2411)

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Richard P. Beebe, K1PAD, 6 Tracy Cir., Billerica 01821 (617-667-5609)

Clevis O. Lavery, W1RWG, 17 Fair St., Norway 04268 (207-743-2353)

Robert Mitchell, W1NH, RFD 4, Blueberry Hill, Raymond 03077

Gordon F. Fox, W1YNE, 13 York Dr., Coventry 02816 (401-928-6045)

Reed A. Garfield, WB1ABQ, P.O. Box 571, Lyndonville 05851 (802-626-9430)

William Hall, W1JP, Prospect Hill Rd., Brimfield 01010 (413-245-7140)

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Dennis L. Hall, KK7X, 1614 Montana Ave., Coeur D'Alene, 83814 (208-667-3591)

L. C. "Les" Belyea, N7AIK, P. O. Box 327, Belgrade 59714 (406-388-4253)

William R. Shrader, W7QMU, 2042 Jasmine Ave., Medford, 97501 (503-773-8824)

Joseph N. Winter, WA7RWK, 819 N. Mullen St., Tacoma 98406 (206-759-9875)

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William J. Marshall-Gratrix, KA7C, 304 Bret Harte Ave., Reno 89509 (702-322-3554)

N. A. "Army" Curtis, AH6P, P.O. Box 121, Hilo, HI 96720 (808-959-8885)

Norman A. Wilson, N6JV, Rte. 1, Box 730, Woodland, CA 95095 (916-566-1465)

Robert Odell Smith, NA6T, 320 Park St-P.O. Box 1425, Fort Bragg, CA 95437 (707-954-4931)

Charles P. McConnell, W6DPP, 1658 W. Mesa Ave., Fresno, CA 93711 (209-431-2038)

Ross W. Forbes, WB6GFJ, P.O. Box 1, Los Altos, CA 94022 (415-948-5193)

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Karl S. Thompson, K8KT, 5303 Pioneer Dr., Charleston 25312 (304-776-4352)

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Leonard M. Norman, W7PBV, 933 South Cedar Knolls, Cedar City 84720 (801-586-9859)

Richard G. Wunder, WA7WFC, Box 2807, Cheyenne 82001 (307-634-7385)

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Erich Holzer, N7EH, 3526 E. March Pl., Tucson 85713 (602-326-8978)

Stanley S. Broki, N2YQ, 2645 North Marengo Ave., Altadena, CA 91001 (213-798-8827)

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Arthur R. Smith, W6INI, 4515 Melissa Way, San Diego, CA 92117 (619-273-1120)

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Arthur E. Roberts, W1GOM, 2941 N.W. 44 St., Oklahoma City 73112 (405-947-5347)

Arthur R. Ross, W5KR, 132 Sally La., Brownsville 78521 (512-831-4458)



# "It Seems to Us..."

## Board Stands Firm on No-Code

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

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

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

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

All general correspondence should be addressed to the administrative headquarters at Newington, Connecticut 06111, USA. Telephone: 203-666-1541, Telex: 643958 AMRAD NEWI.

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**Counsel:** Christopher D. Imlay, N3AKD, 1302 18th Street, N.W., Washington, DC 20036

**Canadian Counsel:** B. Robert Benson, Q.C., VE2VW, 1010 St. Catherine St. West, Montreal, PQ H3B 3R5

\*Executive Committee Member

WHEREAS, the FCC has proposed in Docket 83-28 a significant revision in the structure of the amateur service by introducing a new class of code-free amateur license, and

WHEREAS, the League shares the objective of encouraging and facilitating the entry into the amateur ranks of additional persons, especially bright young persons, but has found little evidence that the requirement for a knowledge of Morse code is a significant barrier to such entry, and

WHEREAS, the ARRL, as the national organization of radio amateurs, has carefully assessed the views of its members concerning the importance of the continuation of a Morse code requirement for obtaining an amateur license, and

WHEREAS, the League Officers, Directors and Staff have reviewed the impact of a new license class upon the Volunteer Examination Program proposed in Docket 83-27, and

WHEREAS, the League, conscious of the significant contributions made by an Amateur Radio Service which is composed of highly qualified and highly motivated individuals, is concerned that there be no further reduction in the long-established entry standards, now, therefore,

BE IT RESOLVED by the Board of Directors of the ARRL in Annual Meeting assembled that the General Manager is directed to prepare, for filing by Counsel, comments in the matter of PR Docket 83-28 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.

With the adoption of this resolution on the evening of April 21, the ARRL Board ended months of study of the no-code question — and months of speculation as to whether its firm stand against a no-code license, adopted at the 1982 Annual Meeting, would be modified. Since the FCC action of last July, directing its staff to develop a codeless license proposal, the issue had been hotly debated in amateur circles. Release of the detailed proposal — actually, two alternative proposals — by FCC in February did nothing to alleviate the concerns of the amateur community. While nearly everyone shares the Commission's stated objective of attracting more bright young people into Amateur Radio, a codeless license class is seen by the vast majority of amateurs, members and non-members alike, as an undesirable and unnecessary lowering of standards. Comments by the hundreds flooded Directors' mailboxes, with just a small percentage favoring some form of codeless amateur license. Only a minority of those who opposed the concept went on to discuss the kind of privileges and requirements for such a license they would find least objectionable, many of these only because they assumed some form of no-code license to be inevitable. The message from the members was clear and unequivocal, and the Board responded accordingly.

Where do we go from here? If the question were to be decided today, there is little doubt but that the FCC Commissioners would vote to create a codeless class of amateur license. But the question is not being decided today. June 28 is the deadline for comments to FCC; on or before that date, ARRL will file an extensive and, we hope, persuasive argument demonstrating the fallacies in the Commission's proposals. We hope and expect that thousands of individual amateurs, and hundreds of clubs, will do the same. Then, there is a month for "reply" comments — that is, comments refuting the arguments presented by others. It

is difficult for individuals and clubs outside the Washington area to participate in this phase of rulemaking, because the comments are on file only at the Commission's offices in Washington; however, League representatives will be able to review the entire file, and will identify and respond to any substantive arguments put forth by others in support of a no-code license. Only after the reply period has expired can the Commission take up the question again, and for practical reasons this is unlikely to occur for several months. So, there is still ample opportunity for our voices to be heard.

Let's be honest: it will be an uphill battle. But anyone who claims the decision has already been made is professing little faith in our system of government. At this point, the Commissioners seem to believe that the public interest would be better served by removing the Morse code as a requirement for some form of vhf amateur license, since this step presumably would permit more of the public to participate in the service. It's up to those of us who feel otherwise to show why this simplistic reasoning is both dangerous and wrong, and why they should not substitute their own judgment or that of their staff for the judgment of hundreds of thousands of licensed amateurs who are intimately familiar with the Amateur Radio Service.

Unfortunately, it will not be enough simply to say we're opposed; FCC rulemaking proceedings are not nose-counting exercises, and the Commissioners are not bound to reflect the will of the majority. We have to say *why* we're opposed, and more especially, why the *public interest* requires the retention of the existing requirements for an amateur license.

An old Chinese curse reads, "May you live in interesting times." For those on both sides of the no-code issue, the next few months will be interesting, indeed! — David Sumner, K1ZZ

# League Lines...

ARRL members concerned about the proposed no-code amateur license have been asking Hq. how one should go about contacting their congressmen on this issue. If you wish to write to your U.S. representative and senators, here is some advice. Keep your letters short and to the point. Rambling letters do not give a good impression. Form letters and petitions are generally far less effective than letters from individuals who state their opinions in their own words. Give reasons supporting your opinion. Incidentally, saying that you feel threatened by the possibility of huge numbers of people entering the amateur ranks is not a good argument to make to a congressman. Your senators may be sent mail at the U.S. Senate, Washington, DC 20510. The mailing address for the House is the U.S. House of Representatives, Washington, DC 20515.

Responding to the overwhelming membership opposition to the concept of a no-code amateur license, the ARRL Board of Directors voted at the April Board Meeting to file comments with the FCC stating in the strongest possible manner the opposition of the League to the no-code proposal. See "Moved and Seconded" in this issue for details.

The U.S. Government Printing Office now has available the FCC rules for all private radio services, including the Amateur Radio Service, updated to October 1982. This one paperbound volume may be purchased from the GPO for \$9 by sending payment to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Specify stock number 022-003-95085-1. The Amateur Rules, even more recently updated, are also available from ARRL. Price is \$3 and can be ordered using the form found on page 150. Specify ARRL's The FCC Rule Book.

According to a recent Public Notice, the FCC does not plan to reassign any lapsed amateur call signs in the near future. In previous notices the Commission had mentioned the possibility of reassigning older-format call signs such as 1x2s and 1x3s beginning with the letters W and K.

Radio Control (R/C) and Citizens Band (CB) Radio Services deregulated. The FCC has eliminated individual CB and R/C licenses and has changed its rules to permit CB station operation without station identification. However, CB and R/C station users will still be required to comply with FCC rules. All pending CB and R/C applications and any others received by the Commission in the future will not be acted upon.

The FCC has decided to extend the grace period for making a secondary call sign primary. If you held a secondary call that expired less than two years ago, you may still request that secondary call sign for your primary station.

The new 512-page 4th Edition of the RSGB VHF-UHF Manual is now available from ARRL Headquarters for \$17.50, U.S. funds.

Planning on visiting Hq. this summer? Bring along your 2-meter rig. Members of the Newington Amateur Radio League will try to be on frequency (145.45 MHz receive, transmit down 600 kHz) to provide directions to Hq. over W1AW/R. (Sorry, League employees cannot legally do this during working hours.) The human-sounding voices identifying the repeater are generated by the Advanced Computer Controls RC-850 controller now in use -- "they" can't respond to your questions, either. If you need emergency assistance, \*9 will get the Newington police, and \*0 will get you the State Police. To hang the patch up, hit #. If you need other patch assistance, ask for a control operator. Please remember to i-d properly.

FCC has proposed to deregulate the licensing of individuals in the commercial services. According to a Notice of Proposed Rulemaking (NPRM) in Gen. Docket 83-322, the Commission would retain the present licensing requirements in the Aviation Radio, Maritime Radio and International Public Fixed Radio Services; however, licensing requirements in the other commercial services would be either eased or eliminated. Comment deadline is June 20, 1983; replies to comments are due July 20. This is a proposal and not an order as we reported in last month's column.

If you receive this issue of QST during the last few days in May, then you still have a little time to register your net for the 1983-84 Net Directory. The deadline is June 1, so send the information to Hq. now while it's fresh on your mind.

# SSTV Today

Many new and exciting developments have occurred in SSTV!  
Read about them now and join in on the fun!

By Ron Flynn,\* KB8LU

The appeal of slow-scan television (SSTV) as an Amateur Radio communications mode is visibility. You can see a picture of the person you are in contact with, as well as pictures of virtually any other subject. SSTV pictures can be transmitted to any part of the world. The only operational limitations are the subject material (defined by good taste) and the inherent resolution of the equipment being used.

Copthorne MacDonald, now VE1BFL, is credited with inventing amateur SSTV. His articles on the subject were first published in *QST* in August and September of 1958. Over the next six years, MacDonald and other British and American experimenters improved their systems and ultimately settled on the standards still in use today.<sup>1</sup>

## Some Basics

SSTV pictures are transmitted on the amateur hf bands as a series of audio tones ranging from 1500 to 2300 Hz. Black corresponds to a frequency of 1500 Hz, white is 2300 Hz, and the frequencies between them define 14 shades of gray. The received tones are demodulated, output as video and fed to a monitor.

Each line of an SSTV picture consists of 128 different pixels (picture elements), or dots, and each line scans from left to right.

The 128-line SSTV picture scans from top to bottom in 8.5 seconds. The 1:1 aspect ratio (width to height) produces a square picture. A 1200-Hz sync pulse is used to reset the start of the scan to the top left-hand corner of the monitor.

## Equipment

Over the years, many individuals have published articles describing "homebrewed" SSTV equipment. Several manufacturers have produced various types of SSTV scan converters.<sup>2</sup> Robot Research, Inc., introduced the Robot 400 scan converter in 1976; today it remains the most popular and versatile scan converter in use.

In addition to a scan converter, you need a video monitor to display the pictures. A B & W CCTV (black and white closed-circuit TV) type provides excellent results. An inexpensive audio cassette or reel-to-reel audio tape recorder is useful. The SSTV audio tones can be recorded off the air and saved on tape for later viewing or retransmission.

A B & W CCTV camera allows you to create pictures for live or delayed transmission from audio tape. Using a camera, you can create your own SSTV "programs" on tape for transmission during a QSO.

## Color SSTV

Several people participated in the early experiments to develop a working color SSTV system. This work brought about the three-Robot system described by Jeremy

Royle, G3NOX, in November 1980 *QST*.<sup>3</sup> In this system, three Robot 400s, each capable of storing one full 128-pixel by 128-line SSTV picture, are "slaved." Separate red, green and blue color filters are alternately placed in front of the lens of a B & W CCTV camera focused on a color picture. The filtered B & W representations are alternately loaded into the individual scan-converter memories. Then the memory contents are transmitted in sequential frames, or "frame sequentially," as it is popularly known. The receiving operator loads the picture information into the appropriate converter at his or her station. The combined video outputs produce a composite color SSTV picture on a color monitor. Though this system worked quite well, its main disadvantage was the high initial cost of separate scan converters (three).

At the 1981 Dayton Hamvention, Sam Mormino, WA7WOD, and Howard McAfee, KD6HF, introduced the first commercially available full-color SSTV system.<sup>4</sup> They developed a pc board that mounts inside the '400 cabinet. The 3000C board, with additional circuitry and switching, converts a standard single-memory Robot 400 into a three-memory unit capable of receiving or transmitting one full-color picture or three separate B & W SSTV pictures. In addition, they developed a unique video interface module. It mounts inside the cabinet of specific (but standard) inexpensive uhf/vhf color TV sets that are readily available in the U.S. The complete



Fig. 1 — An RGB frame-sequential color SSTV picture received from KC5VC on 14.230 MHz. From left to right are the red frame in B & W, the red and green frames combined and the full-color RGB composite picture. (photos by George Swift, W8AMB)

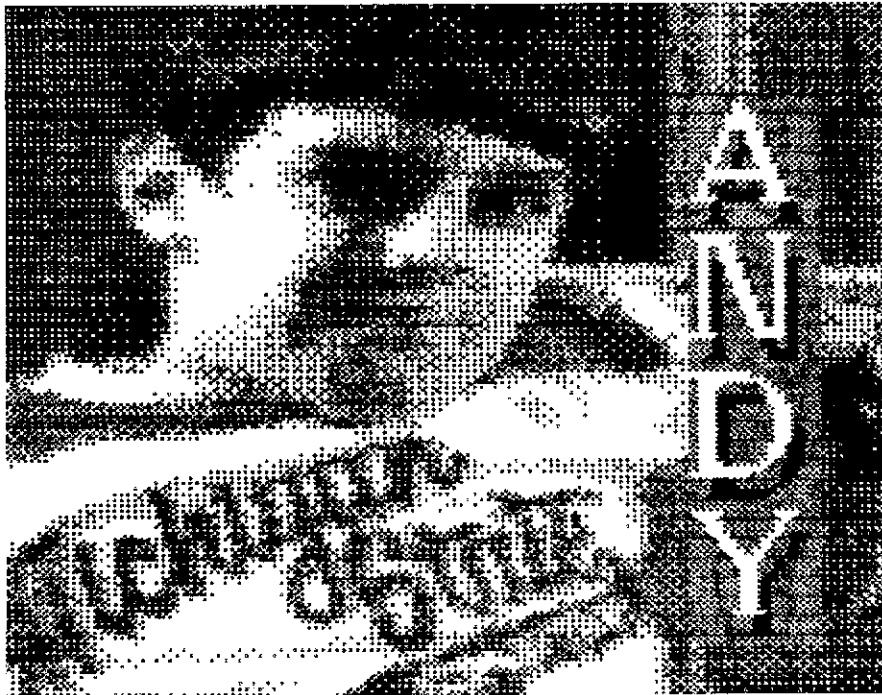


Fig. 2 — Hard-copy printout of an SSTV picture using an Epson MX-80 printer and Commsort's PhotoCaster SSTV system.



Fig. 3 — Four separate pictures can be loaded into a single-memory Robot 400 using the Four Quad modification of KD6HF.

color SSTV system is available in kit form or wired and tested.

The scan converter RGB (red, green, blue) video outputs feed the color monitor

RGB guns, and perfect color reproduction is achieved. A B & W CCTV camera used in conjunction with inexpensive color filters or a color camera can be used to produce

excellent quality color SSTV pictures. Color pictures from uhf/vhf TV programs can be snatched (stored) in the converter and transmitted as color SSTV pictures.

This method uses the standard RGB sequential frame transmission mode. The "two, two and two" heard on the SSTV frequencies alerts receiving stations that two frames from the red memory will be transmitted first, followed by two from the green and, last, two frames from the blue memory. The transmitting station may select any combination of RGB desired, depending upon band conditions and QRM, to allow all receiving stations to get a good picture.

When receiving a color SSTV picture, the first red frame is usually loaded into all three memories to clear the monitor of noise or a previously stored picture. Therefore, you see the picture first in B & W (see Fig. 1). As the green frame is loaded into the second (green) memory, shades of red and green begin to appear on the monitor. When the final blue frame is received, the full-color SSTV picture is displayed before you. Using this system with proper lighting on the subject, all colors and shades (including flesh tones) are reproduced accurately. With the picture contents of three memories overlying each other, the composite color picture looks smoother and the visual resolution is better than a single B & W SSTV picture, which looks somewhat digitized.

Several other color SSTV systems are available to amateurs throughout the world. Syd Horne, VE3EGO, offers a three-memory Robot conversion in kit form called the Colorscan 403.<sup>5</sup> Dave Cowie, ZL1LH, has three-memory color scan converter kits for hams in that part of the world.<sup>6</sup> There is also the German SC422A, a complete, dedicated three-memory color scan converter.<sup>7</sup>

### Computers and SSTV

Computers and keyboards have been a part of SSTV for many years, but their only use was to generate large graphics letters and numbers for transmission. This proved to be an aid to many in SSTV QSOs, but no pictures were sent or received using the computer.

The two most widely used computers on SSTV today are the Radio Shack TRS-80<sup>®</sup> series and the Apple<sup>®</sup>. An early Apple SSTV program produced very limited results. Only black, white and one shade of gray were displayed. In early 1982, Commsort introduced their PhotoCaster hardware/software SSTV system for the Apple II.<sup>8</sup> Such a system is capable of resolving the standard 128 × 128 × 16 gray level B & W SSTV picture. It has the ability to display eight colors of sequential-frame RGB color SSTV. The package contains many other sophisticated features, including picture enhancement and hard-copy printouts of SSTV pictures using a

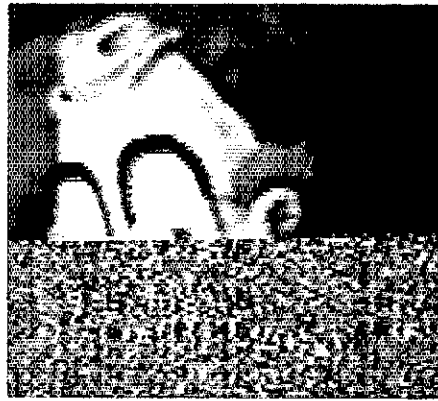
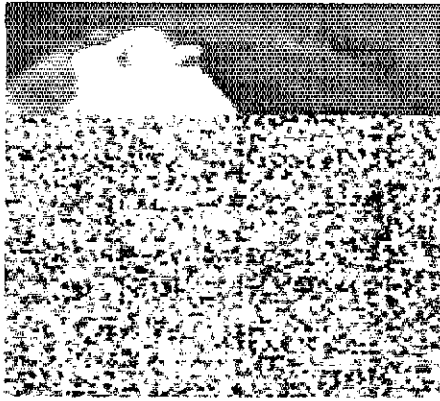


Fig. 4 — A 25.5-second RGB SFC SSTV picture received from KC5VC on 14.230 MHz. From left to right are the picture scan after eight seconds and after 17 seconds, and the full 25.5-second scan.

printer such as an Epson MX-80<sup>®</sup> equipped with Grafrax<sup>®</sup> (see Fig. 2).

In search of an economical and simple way for amateurs to participate in SSTV using computers, Clay Abrams, K6AEP, discovered that the TRS-80 Color Computer has great potential.<sup>9</sup> He designed a simple interface board that allows the computer to become a complete SSTV system. Clay has written several SSTV programs with many features, including graphics generation and hard-copy picture printing. The early system would display only four shades of gray and four colors. During the fall of 1982, Clay, along with Bob Blackstock, WB5MRG, developed an improved hardware/software SSTV system for the Color Computer. It provides 256 × 128 × 16 gray-shade resolution and will display 256 different colors.

#### Robot 400 Modifications

As mentioned earlier, the '400 scan converter is still popular, and thousands are in use today. As hams became more familiar with digital logic, the covers of the converters began coming off and many modifications were developed, especially within the last year or so. Some of these were quite utilitarian, while others simply provided a new dimension of fun and diversity in SSTV QSOs.

QRM can cause a loss of portions of the SSTV picture. Sam Mormino, WA7WOD, and Steve Bruce, WA4OAA, developed a modification that cuts the Robot 400 clock speed in half. In doing so, the SSTV picture is sent and received in 17 seconds instead of 8.5. This reduces the potential for interference to the picture as a whole.

M. H. Emmerson, G3OQD, developed a light-pen addition for the '400. It allows you to display a picture from the scan-converter memory on a monitor, use the light pen to write over the monitor screen, and have the writing superimposed over the picture in memory.

KD6HF has produced many successful Robot circuit alterations. His First Sync modification allows the transmitting station to sync or reset all receiving-station

monitors so that everyone receives the SSTV picture scan in unison. Formerly, receiving stations picked up the first picture scan at various points, and it took up to eight seconds to get in sync with the transmitting station.

Howard also developed a Graphic Overlay feature similar in purpose to G3OQD's light pen. With this, graphics from tape, a keyboard, a camera or a received signal can be superimposed on any existing picture. White or black graphics can be used, depending on the picture color content. The graphics to be superimposed may be positioned anywhere on the picture.

The Four Quad modification is another production of Howard's (see Fig. 3). It allows a single-memory '400 to store four different, small B & W SSTV pictures. These pictures can be loaded into any of the four screen quadrants, in any order, from tape or off the air. This greatly enhances the operating capabilities of the '400. In addition, his Zoom modification allows the operator to take any of the smaller pictures from the four quadrants, expand it to a full-size SSTV picture, and transmit it.

#### Latest Developments

In June 1982, on-the-air experiments began with a new form of color SSTV. They were a departure from the standard 8.5-second SSTV frame scan. By means of a simple modification to the Interface Systems color system, sequential lines (instead of sequential frames) from the red, green and blue memories are transmitted. This is called line-sequential color SSTV. The same amount of video information is being transmitted in a single 25.5-second scan as is transmitted in the RGB frame-sequential overlay method described earlier. Two advantages of this new method are that the true full-color SSTV picture, in all its splendor, "paints" down the monitor screen, and it loads automatically — no switching is required (see Fig. 4). This new approach is called 25.5-second single-frame color (SFC) SSTV.

Sam Mormino, Jim Williams, KC5VC,

and I took part in the first on-the-air experiments using 25.5-second RGB SFC. While the immediate effect of seeing full-color SSTV pictures unfold before your eyes is tremendous, there are other considerations. With the slower scan rate, intermittent QRM is less detrimental to the total picture. However, QRM can knock the line-sequential transmissions out of color sync at the receiving end. This results, for example, in the transmitted picture information from the red memory going into the green or blue memory at the receiving end. The color display is then untrue. A fix is available to "kick" the scan back into color sync, but some true color will be lost. Perhaps the insertion of an individual sync pulse for each line or other refinements will perfect this method of transmission. To date, over 50 amateurs are using 25.5-second RGB SFC SSTV. Quite a few owners of standard single-memory '400s have installed this feature and are copying the slower-scan-rate pictures in B & W.

Microcraft offers a high-resolution, two-memory B & W scan converter.<sup>10</sup> This unit employs three scan rates, 8.5, 17 and 34 seconds, to produce different B & W SSTV picture resolutions. I've received very good 8.5-second B & W SSTV pictures from owners of this unit. Instead of the usual 16 shades of gray, this scan converter has 64. The occasional SSTV phenomenon known as "contouring" seems to be eliminated.<sup>11</sup> The three scan rates can produce pictures with resolutions up to 256 pixels with 256 lines and the 64 shades of gray. However, the 17- and 34-second scan rates are not copyable with other SSTV systems.

Normally, SSTV picture lettering sizes of about 1/2 inch or less are difficult to read on a 9-inch monitor. With the higher-resolution picture capabilities of this scan converter, more detailed pictures (such as schematic diagrams) can be exchanged.

In the spring of 1983, Robot Research Inc., announced that it would begin manufacturing color SSTV equipment. For the thousands of Robot 400 owners, they developed a simple do-it-yourself kit to convert the '400 into a 12-second single-

frame color SSTV system.

Recent developments in electronic technology, combined with the creativity and knowledge of SSTV innovators, have resulted in the many fine advances that have occurred with this mode over the past two years. SSTV has now become one of the most diverse and interesting modes of Amateur Radio communication. Why not join us?

## Appendix

### Robot 400 Modification Information Sources

Robot 400 half-speed, 17-second scan  
Four quadrant  
G3OQD light pen

These modifications were published in the November 1981 issue of *A5 Magazine*. Back issues are not available. Authorized reprints of that issue may be obtained from Ralph Wilson, WBØESF, 4011 Clearview Dr., Cedar Falls, IA 50613. Cost is \$2.50 ppd.

Graphics overlay  
First Sync

Published in *Worldradio*, June 1982. Reprints may be obtained from *Worldradio*, 2120 28th St., Sacramento, CA 95818.

Graphics overlay  
First Sync  
Four quadrant  
Zoom

Schematic diagrams for these modifications are available from Interface Systems Inc., Rte. 4, Box 634-K, Lindale, TX 75771. Please include a large s.a.s.e. and 37 cents postage.

*Ron Flynn was first licensed in 1978 and immediately became involved in SSTV. He currently writes an SSTV column for Worldradio. Ron is a horticulturalist with a BS degree from Michigan State University. Since 1977, he has been semiretired and does landscape consulting.*

### Notes

[Editor's Note: The amateur standard, adopted by gentlemen's agreement in 1968 when SSTV was first authorized for general use in the U.S. and Canada, calls for 120 lines per frame, requiring eight seconds to transmit a complete picture. For some years the trend has been toward 128 lines per frame, especially when digital-logic circuitry is used to develop the sync signals, requiring

8.53 seconds to send a picture. With proper adjustment of the vertical sweep circuitry in a receiving monitor, either rate may be received satisfactorily.]

[Editor's Note: Scan converters are used to transform picture information from SSTV standards to conventional fast-scan TV standards, and vice-versa. Most (if not all) commercially available scan converters also incorporate a modulator/demodulator as an integral part of the unit. As a result, differentiation between the actual scan converter and demodulator sections is at times ignored and the entire unit is referred to as a "scan converter."]

<sup>1</sup>J. Royle, "SSTV in Colour," *QST*, Nov. 1980, p. 11.

<sup>2</sup>Interface Systems Inc., Rte. 4, Box 634-K, Lindale, TX 75771.

<sup>3</sup>Sycol Communications Inc., P.O. Box 893, Belleville, ON K8N 2G6, Canada.


<sup>4</sup>52 Prince Regent Dr., Bucklands Beach, Auckland, New Zealand.

<sup>5</sup>Available in the U.S. from KW Control Systems Inc., South Plank Rd., Middletown, NY 10940.

<sup>6</sup>Commsoft, 665 Maybell Ave., Palo Alto, CA 94306.

<sup>7</sup>Amateur Radio Software, 1758 Comstock La., San Jose, CA 95124.

<sup>8</sup>Microcraft Corp., P.O. Box 5130, Thiensville, WI 53092.

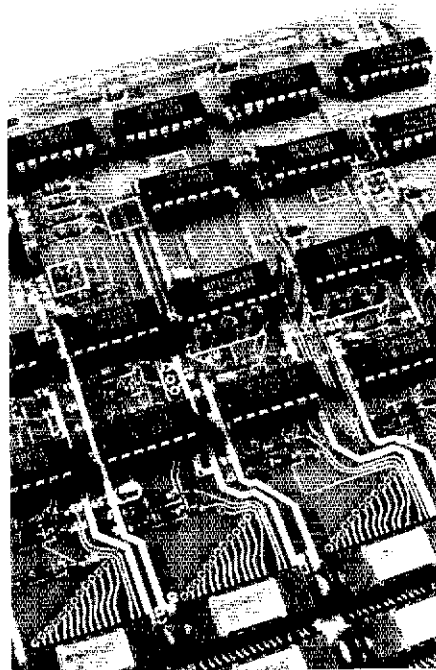
<sup>9</sup>Contouring is a visual imperfection appearing on the SSTV monitor. It occurs when one attempts to display a picture with insufficient contrast or picture detail, or with too few gray levels represented. Parallel wavy lines appear over portions of the picture, similar to the lines on a contour map. 

# New Products

## MOTOROLA HIGH-SPEED CMOS OCTAL INTERFACE DEVICES

□ The Motorola Integrated Circuit Division announces the availability of a family of high-speed CMOS octal interface devices. For the first time CMOS interface devices are available that will offer a feasible alternative to LSTTL for memory and microprocessor systems. The first of these devices to be released are the MC54/74HC373, MC54/74HC374, MC54/74HC533 and the MC54/74HC534. These devices will be followed by 38 others to be released over the next year, bringing the total to 42 devices in the octal interface subfamily. All devices will be mutually sourced by National Semiconductor. These new devices will satisfy the requirements for high-speed digital interfacing including: data and address buffering to increase fan out for driving additional circuits; address decoding as part of a memory mapping scheme for memory and peripheral chip selection; and data or address storage for synchronizing communications between subsystems operating at different speeds.


For the designer there are four basic groups of devices to choose from: octal decoders, octal buffers/line drivers/line receivers and transceivers, octal flip-flops and latches, and octal level translators.



The bases for these four groups are the MC74HC138, MC74HC240/260 series, the MC74HC370/530 series and the MC74HC4300 series, respectively. Within

each basic series a wide variety of options are available. The various members within each series offer noninverted and inverted outputs as well as bus-oriented and conventional pin layouts.

The devices provide the output drive capability and high speed required of interface circuits without sacrificing CMOS high-noise immunity or low power consumption. A 6-mA sink capability exists for the 74HC series of interface circuits across commercial temperature ranges at 0.4 V. In addition to the octal decoders, latches, buffers, transceivers and line drivers, a series of eight-level translators is provided to aid in hybrid systems using a mixture of CMOS, NMOS and TTL devices.

This subfamily within the high-speed CMOS family provides an alternative interfacing solution for microprocessor and memory systems. Now an alternative to LSTTL exists for interfacing with memories and microprocessors through CMOS high-speed logic circuits that provide for systems having much lower power requirements. For further information contact your local Motorola sales office, distributor or Dave Niehaus at Motorola Inc., MOS Integrated Circuits Group, 3501 Ed Bluestein Blvd., Austin, TX 78721. — Paul K. Pagel, N1FB 



# Lightweight Trap Antennas — Some Thoughts

Portable multiband antennas need not be heavy and bulky. Small traps and light-gauge wire can provide a trap dipole that fits in a lunch bag. Try these practical guidelines for your next small antenna.

By Doug DeMaw,\* W1FB

Vacationers, campers, sales people and QRPers take note! You need not carry a large multiband trap dipole afield if your transmitter is in the 150-W-output class, or lower. You can construct your own traps inexpensively with ordinary materials, and they can be made quite small without becoming poor performers. This article describes some easy techniques for fabricating homemade antenna traps. Additional hints are offered for keeping the bulk and weight of portable antennas within reason.

## A Review of the Trap Concept

A "trap" is exactly what the term implies. It traps an rf signal to prevent it from passing beyond a specific point along an electrical conductor. At some other frequency, however, it no longer acts as a trap, and permits the passage of rf energy.

An antenna trap is designed for a particular operating frequency, and there may be several traps in the overall system — each designed for a specific frequency. Therefore, a 40- through 10-meter trap dipole might contain traps for 10, 15, 20 and 30 meters. On 40 meters, all of the traps are "absorbed" into the system to become part of the overall 40-meter dipole. Owing to the loading effect of the traps, the 40-meter portion of the antenna will be somewhat shorter than a full-size 40-meter dipole with no traps. The antenna bandwidth will be narrower when traps are used. Fig. 1 illustrates the general format for a multiband dipole.

A trap style of antenna is not as efficient as a full-size dipole. This is because there will always be some losses in the traps. But the losses in a well-designed

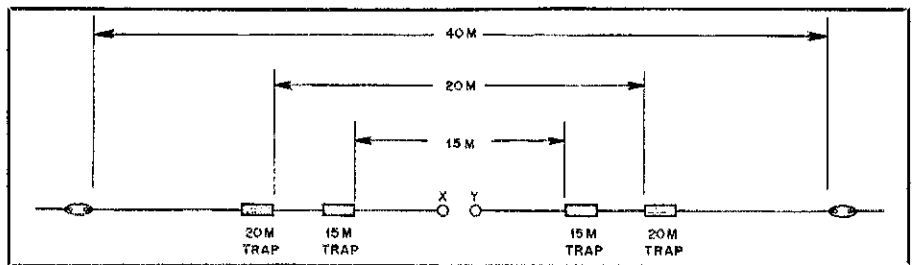


Fig. 1 — Representation of a three-band trap dipole antenna.

system are usually so low that they are hard to measure by simple means. The losses represent a small tradeoff for the convenience of being able to accommodate many ham bands with one radiator and a single feed line. Yagi antennas contain traps in the parasitic elements (directors and reflectors) as well as in the driven element. Therefore, a multielement antenna of that type may have as many as 12 traps.

## Electrical Characteristics

An antenna trap is a parallel-resonant L-C circuit. Therefore, it is similar to the tuned circuit in a transmitter or receiver. A resonator of this kind, if designed correctly, has a moderate Q and a fairly narrow bandwidth. This means that the trap capacitor should have a high Q and the trap coil should contain wire that is reasonably large in cross section. These traits will help to reduce losses.

Fig. 2 shows the equivalent circuit for an antenna trap. Once this network is adjusted to resonance in the desired part of an amateur band, it will not be affected significantly by the attachment of the wires that comprise the antenna. A well-designed and -constructed trap should not change frequency by any great amount when the temperature or humidity around it varies. Therefore, it is important to use

a stable capacitor, a rigid coil and some type of sealant.

## Mini Trap Using a Toroid Core

In an effort to scale down the size of my antenna traps during a design exercise for a portable antenna, I decided to investigate the worth of small toroid cores upon which to wind the coils. Ferrite cores were ruled out because they aren't as stable as powdered-iron ones. Furthermore, the powdered-iron material has a much greater flux density than an equivalent-size ferrite core, which means that the core will not saturate as easily at moderate rf power levels.

Development work started with Micrometals Corporation T50-6 toroids, which are sold by Amidon Associates, Palomar Engineers and RadioKit (see *QST* advertisements). My first effort resulted in a pair of very small 20-meter traps. A silver-mica capacitor was chosen for the parallel-tuned circuit. Ceramic capacitors were not used because of previous experiences I had with changes in value under temperature extremes; I had better results with dipped silver-mica units.

My rule of thumb for choosing the coil and capacitor values for traps is based on a reactance of approximately 200 ohms, although values up to 300 have also

\*ARRL Senior Technical Editor

yielded good results. Using 200 ohms as the basis for the design, I calculated the capacitor to be a value that was very close to a standard one — 56 pF for trap resonance at 14.100 MHz. This was obtained from

$$C(\mu\text{F}) = \frac{1}{2\pi f(\text{MHz}) X_c} \quad (\text{Eq. 1})$$

Hence

$$C = \frac{1}{6.28 \times 14.1 \times 200} \\ = 0.0000564 \mu\text{F} \text{ (56 pF)}$$

Since  $X_c$  and  $X_L$  are equal at resonance, the coil was calculated by means of Eq. 2:

$$L(\mu\text{H}) = \frac{X_L}{2\pi f(\text{MHz})} \quad (\text{Eq. 2})$$

Hence

$$L = \frac{200}{6.28 \times 14.1} = 2.25 \mu\text{H}$$

(approximate)

The value of the coil will have to be adjusted slightly after the trap is assembled to allow for capacitor tolerance and stray capacitance, which accounts for the term "approximate" in Eq. 2.

The Amidon toroid tables were consulted to learn the  $A_L$  factor of a T50-6 core (1/2-inch-diameter toroid). The value is 40. From this I calculated the number of turns from

$$\text{Turns} = 100 \sqrt{L_{\mu\text{H}}/A_L} \quad (\text{Eq. 3})$$

Hence

$$\text{Turns} = 100 \sqrt{2.25/40} = 23.7$$

For practical reasons a 24-turn winding was used; A partial turn is not convenient on a toroid form.

The same procedure was used for the remaining traps in my antenna. This article is not a course in basic math, but the equations can be useful to those who have not previously designed resonant circuits or used toroidal cores.

### Toroidal-Trap Adjustment

It's best to use the largest size wire that will fit easily on the toroid core. The stiffness of the heavier magnet wire will help to keep the coil turns in place, thereby minimizing detuning. I used no. 24 enameled wire.

The capacitor leads and coil "pigtailed" should be kept as short as possible. Fig. 3 illustrates the layout I used. The leads at each end of the mica capacitor are soldered to the related coil leads before final adjustment is made.

A dip meter can be used to determine the resonant frequency of the trap, as shown in Fig. 4. Although a prominent feature of a toroidal coil is the self-shielding characteristic, which makes it difficult for us to get ample coupling with

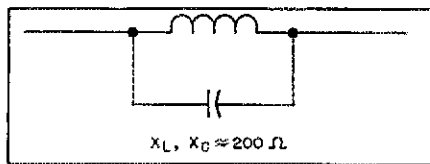


Fig. 2 — Electrical equivalent of an antenna trap. The ac resistance is not shown. A suitable reactance value for the coil and capacitor is 200 ohms.

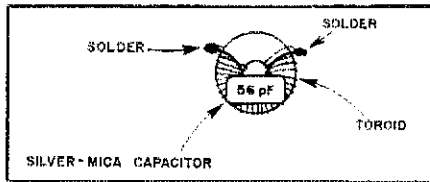


Fig. 3 — Physical arrangement for one of the toroidal L-C traps. Put spaghetti tubing over the capacitor leads to prevent them from shorting to the turns on the toroid.

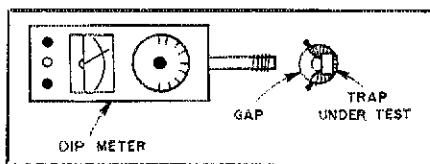


Fig. 4 — Test method for finding the resonant frequency of a trap. Different points around the toroid will yield better dip indications. Experiment with the position of the dipper coil.

a dip meter, it is possible to read a dip. I have found that by inserting the dip-meter coil into the area of the winding gap on the tuned circuit (Fig. 4) a dip can be obtained. By approaching the trap from different angles, it should be easy to find a spot where a dip can be read on the meter. Once the dip is found, back off the instrument until the dip is barely discernible (the minimum coupling point). Monitor the dip-meter signal on a calibrated receiver to learn the resonant frequency of the trap.

Select a part of the related amateur band for trap resonance. I adjust my traps for the center of the frequency spread I am most interested in. For example, I set my 20-meter traps for resonance at 14.025 MHz because I work only cw from 14.000 to 14.050 MHz. For phone-band coverage, I'd pick 14.275 MHz as the trap frequency. A compromise frequency for phone and cw operation would be 14.100 MHz. Owing to the trap Q, coverage of an entire band is not possible without having an SWR of 2:1 or greater at the band-edge extremes. The absolute bandwidth will depend on the trap Q and the Q of the antenna itself.

If the trap is not on the desired frequency, move the turns of the toroid coil farther apart to raise the frequency. Push them closer together to lower the frequency. An alternative method for finding the trap resonance is shown in Fig. 5. The

trap being tested is connected to terminals x and y. The coupling is very light in order to prevent the test-circuit capacitance from appearing in parallel with the trap. For this reason the coupling capacitors are only 2 pF. The station transmitter is adjusted for the lowest power output that will provide a reading on M1. The VFO is then swept manually across the band. When the resonant frequency of the trap is located, the meter (M1) will deflect upward sharply, indicating resonance. Adjust the trap for a frequency that is approximately 5% lower than the desired one. This will compensate for the shunt capacitance presented by the 2-pF coupling capacitors.

When the coil turns are set in the correct manner, spread a bead of fast-drying epoxy cement across the turns on the two flat sides of the toroid. This will prevent unwanted position changes that could cause a shift in resonance later on from handling.

### Housing the Mini Trap

I learned that a 7/8-inch-OD PVC plumbing coupling, 1-1/4 inches long, would serve nicely as a housing for the toroidal traps.<sup>1</sup> A ridge inside the couplings at the center can be filed out easily to provide clearance for the trap. A rat-tail file does the job quickly. Fig. 6 shows a breakaway view of how the trap is assembled. Slices of dowel rod are used for end plugs. A knot is tied in the antenna wire that enters the trap housing; this prevents strain on the trap coil.

After the antenna wire has been soldered to the trap at each end, add a layer of epoxy glue to the outer perimeter of one of the dowel plugs, then insert it into the PVC coupling until it is flush. Fill the coupling with noncorrosive sealant; I used aquarium cement. Finally, place epoxy glue on the remaining end plug and insert it in the PVC coupling. Allow the trap to set for 48 hours, until the sealant has hardened. Fig. 7 is a photograph of a mini trap, along with a dipole center insulator made from a PVC T-coupling. The coupling is filled with sealant after the wires are soldered to the coaxial feed line. Long plugs are used to close the three open ends of the T connector. A closed nylon loop, made from strong spaghetti tubing, was fed through two small holes at the top of the T-coupling to permit erecting the dipole as an inverted V. A small eye bolt and nut could have been used instead.

There was a minor downward shift in trap resonance after the sealant hardened. Both 20-meter traps shifted roughly 30 kHz lower. No doubt this was caused by increased distributed capacitance across the coil turns with the sealant in place.

<sup>1</sup>Notes appear on page 18.

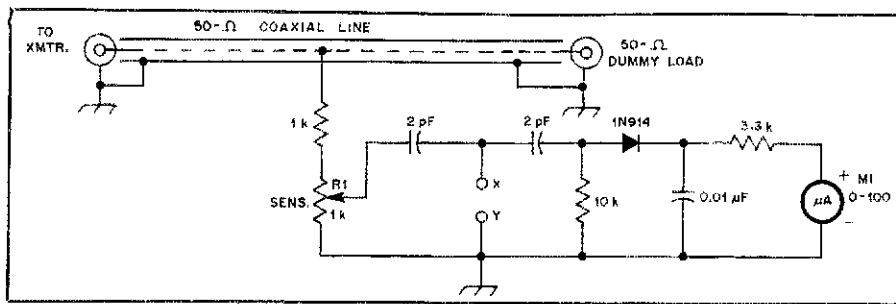


Fig. 5 — Test fixture suitable for checking trap resonance with the station transmitter. Use the least amount of power necessary for meter deflection.

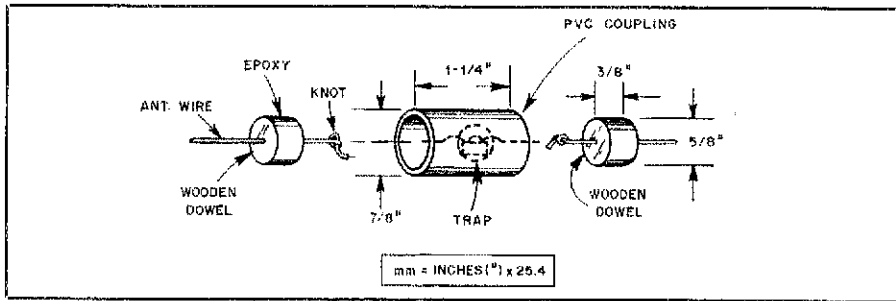


Fig. 6 — Breakaway view of a toroidal mini trap. The knots in the wire prevent stress on the tuned circuit.

This seemed to have no effect on the trap quality; it had a measured parallel resistance of 25 k $\Omega$  before and after encapsulation (using the laboratory RX meter for tests). Generally, anything greater than 10 k $\Omega$  is suitable for an antenna trap.

### Mini Coaxial-Cable Traps

Two very interesting articles concerning antenna traps appeared in the amateur literature during 1981.<sup>2,3</sup> After reading them a second time, I decided to attempt building some traps along the lines discussed in those articles. Some advantages over the usual coil/capacitor style of trap were described by the authors: (1) The traps were not especially frequency sensitive to changes in temperature and climate; (2) the coaxial trap offers greater effective bandwidth; and (3) parallel resistance is quite high — on the order of 50 k $\Omega$ .

The articles under discussion contained practical information about the use of RG-58/U and RG-8/U cable for the trap coils. I wanted a small, lightweight trap, so elected to see what could be done with miniature cable — RG-174/U. A completed mini coaxial trap for 20 meters is shown in Fig. 8.

The principle of operation is covered well by O'Neil (note 2). Since this article deals with the practical aspects of traps, we won't delve into the electrical characteristics of the coaxial trap too deeply. However, a diagram showing how it is hooked up is offered in Fig. 9B. A length of coaxial line is wound on a coil

form, and the inner conductor at one end is attached to the outer conductor at the opposite end. The distributed capacitance of the two conductors and the inductance of the coil combine to provide a resonant circuit. An acceptable Q results, and the trap can accommodate considerable rf voltage and current without being damaged. A parallel resistance of 50 k $\Omega$  was measured for the 20-meter trap of Fig. 8. The bandwidth at the 10 k $\Omega$  points was somewhat greater than with the toroidal trap.

### Coaxial-Trap Assembly

I found 5/8-inch-OD PVC plumbing pipe to be an acceptable and low-cost material for the coaxial traps. End plugs made from 1/2-inch wooden dowel fit snugly inside the PVC pipe. The completed trap contains a length of bus wire inside it for connecting the braid and center conductor of the cable together, as discussed earlier. The ends of the bus wire and the related cable ends are routed outside the PVC tubing through small holes, then soldered. Aquarium cement was again used, this time to seal the six small holes drilled in the tubing. Epoxy cement was applied to the sides of the wooden plugs before inserting them into the tubing. A layer of vinyl electrical tape can be wound over the coaxial coil if desired, although this should not be necessary. If weather protection is desired, a coating of exterior polyurethane varnish can be applied to the completed close-wound coil. This will keep the turns affixed in the desired position after final adjustment.

Tune-up is carried out in the same manner as prescribed for the toroidal traps, using a dip meter or the test fixture described in Fig. 5.

The length of the coaxial cable used will have to be determined experimentally. My 20-meter coaxial trap contains 15 close-wound turns of RG-174 cable (36 inches, 89 pF) to provide resonance at 14.100 MHz. Final adjustment was done by moving the three outer turns at one end until the desired frequency was noted. The coil form for the 20-meter trap is 2-1/2 inches long. The wooden end plugs are 3/8 inch thick. The inside of this trap is not filled with sealant, but it could be if desired. Avoiding the use of filler will make the traps lighter in weight, thereby permitting the use of lighter-gauge wire for the antenna sections.

### Trap Performance

Both styles of trap were subjected to rf power tests to determine whether they could handle the output of a typical 150-W class transceiver. A Bird wattmeter was connected between the trap and the transmitter. A 50-ohm dummy load was attached to the opposite end of the trap. Next, 40- and 80-meter rf energy was applied (in separate tests) gradually while observing the reflected power, which of course was not conducive to providing an SWR of 1:1 with the trap in the line. Neither trap showed signs of heating or breakdown at power levels up to 150 W. A key-down period of five minutes was tried during the tests, using a linear amplifier adjusted for 150-W output. Still no sign of power limitation. The SWR did not change under these conditions. I did not advance the power beyond 150 W, but it's safe to conclude that the coaxial-cable trap could sustain substantially more power without damage. This may not be true of the toroidal trap. I lacked the courage to find out!

### Toward a Lightweight Dipole

Having solved the problem of lightweight, small traps I set about the task of reducing the bulk of the remainder of my multiband dipole. I am a dedicated miser, so the cost of materials was an important factor in the selection of wire and end insulators. I recalled a type of wire I had used on a number of DXpeditions: It was strong and light in weight, and the price was right! This wire is available from Radio Shack and similar outlets for use as speaker cable. It has a clear plastic outer covering, contains a no. 22 conductor (two each) and costs less than \$5 per 100 feet. Hence, for this price we end up with 200 feet of wire (less than 2.5 cents per foot); the parallel conductors can be pulled apart easily without harming the outer insulation. In addition to the insulation aiding the strength of the wire portions of the antenna, it protects the copper



Fig. 7 — View of a toroidal mini trap, an encapsulated toroid and a PVC T-coupling for use as a center insulator. RG-58/U cable is shown in this example (see text).



Fig. 8 — A completed 20-meter coaxial trap with miniature RG-174/U coaxial cable.

wire from corrosion. This can be especially beneficial in areas where salt water and industrial pollutants affect the atmosphere. The Radio Shack number for this wire is 278-1385. I have observed no apparent deterioration of this type of conductor, even though some of my antennas have been aloft for three years.

Although RG-58/U coaxial cable is less offensive in terms of loss per 100 feet than is true of RG-174/U, we may want to trade losses for portability by using '174. Normally, a 50-foot length of feeder cable is adequate for portable work. In an effort to determine exactly what the hf-band losses per 50 feet might be, I tested this cable from 3.5 through 29 MHz. A Bird wattmeter was connected to each end of the 50-foot test cable. One wattmeter was terminated with a 50-ohm dummy load, and the other wattmeter was connected to a transmitter. The loss in decibels was as follows: 3.5 MHz — 1.19; 7.0 MHz — 1.42; 14.0 MHz — 1.67; 21 MHz — 1.93; 29 MHz — 2.0. Therefore, in a worst-case situation (10 meters), a 100-W power input to the cable would result in an antenna feed-point power of 63 W. RG-58/U, on the other hand, would have a 1-dB loss at 29 MHz, which would mean an antenna feed-point power of 79.4 W. This is not too significant when operating in the 50-150 W range, but it can be important when using a QRP rig with only a few watts or milliwatts of output power. I must say in defense of RG-174/U cable that I operated 20-meter cw with 2 W of output power from 8P6EU while using a dipole with 50 feet of RG-174/U feed line, and I worked the world without difficulty. I received many RST 599 signal reports. The tiny feeder cable and the hookup-wire

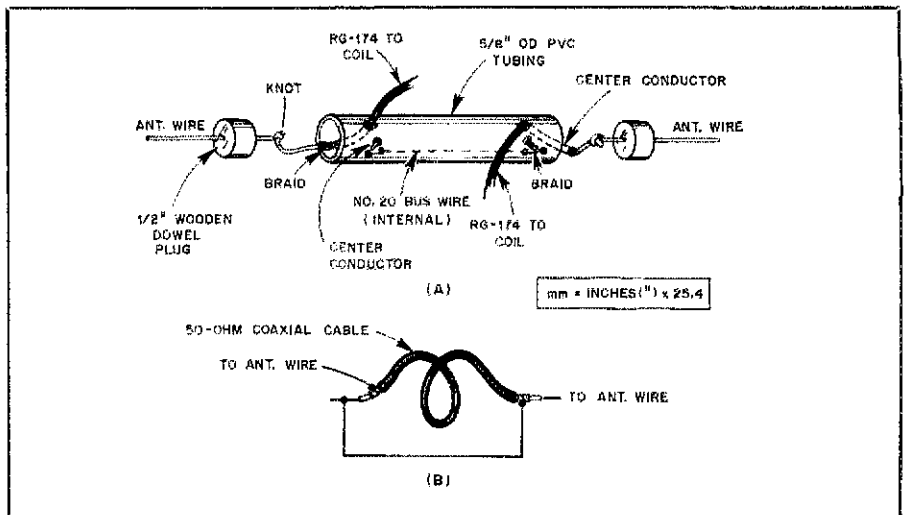


Fig. 9 — At A is a breakaway view of a coaxial trap. The illustration at B shows the electrical connections for a coaxial trap.

dipole could be rolled up and stuffed in my hip pocket! The end and center insulators for that antenna were also lightweight. I made them from scraps of pc board from which the copper had been removed. The end insulators for the trap dipole discussed in this article were fashioned from inch-long pieces of 5/8-inch-diameter PVC tubing through which holes were drilled to accommodate the dipole wires and nylon guy lines.

### Summary Comments

The overall length of any dipole section in a trap type of antenna will be less than if the dipole were cut for a single band without traps. The exception is the first dipole section after the feed point (out to the first set of traps). The following percentages (approximate) were typical in a coaxial-trap dipole I built for use from 40 through 10 meters, compared to the length of a full dipole (100%) for each band: 10 meters — 100%; 15 meters — 92.4%; 20 meters — 88.8%; 40 meters — 83.6%. The shortening becomes more pronounced as the frequency is lowered, owing to the cumulative loading effects of the traps.

These percentages can be applied during initial structuring of the antenna. Starting with the highest band, the dipole sections for each frequency of interest are trimmed or lengthened for the lowest attainable SWR. After the exact dimensions are known, continuous lengths of wire can be used between the traps. This will add strength to the antenna by avoiding breaks in the speaker-wire insulation, if that type of conductor is used. The percentage reductions listed above are not necessarily applicable to antennas that use toroidal or other coil/capacitor traps. The wire diameter and insulation may also affect the final dimensions of the dipole.

For long-term installations, I would

suggest the use of some type of sealer (spar varnish or polyurethane) over the wooden end plugs of the traps. All trap holes need to be sealed securely to prevent moisture from building up inside them.

Miniature antenna traps and lightweight trap dipole antennas are practical and inexpensive to build. Try one during your next vacation or business trip.

### Notes

<sup>1</sup>mm = in. × 25.4; m = ft × 0.3048.

<sup>2</sup>G. O'Neil, "Trapping the Mysteries of Trapped Antennas," *Ham Radio*, Oct. 1981, p. 10.

<sup>3</sup>R. Johns, "Coaxial Cable Antenna Traps," *QST*, May 1981, p. 15.

## Strays

### HQ. EMPLOYMENT OPPORTUNITY

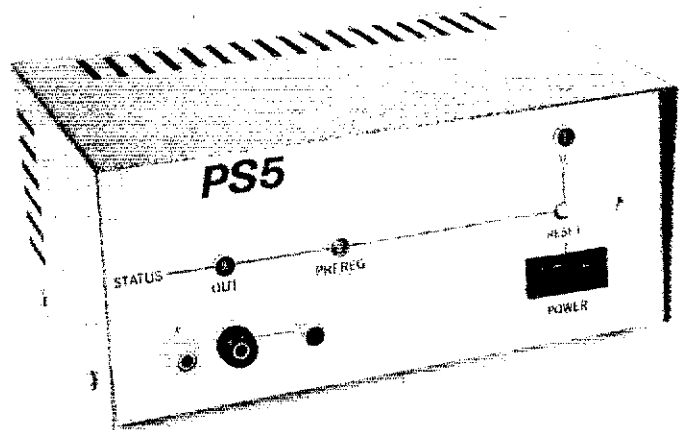
□ There is an immediate full-time opening in the Training Branch at ARRL Hq. — four-day work week, salary and full benefits. An Extra Class license and broad experience in Amateur Radio and education are preferred; solid writing and editing skills are required. If you are interested in this opportunity to help others improve their skills in Amateur Radio instruction, send your resumes and writing samples to "Training Branch" at ARRL Hq.

### I would like to get in touch with...

□ former members of the Communications Division, *USS Volans*, AKS-9, South Pacific area in 1944-45. "Oleo" Boland, K1MZN, 83 Darling St., Central Falls, RI 02863.

# Introducing the PS5 — A Dependable, 5-A Portable Power Supply

This compact 5-20 V dc unit is versatile, rugged and practically indestructible. Why not build one to power your portable transceiver?



By Gerald B. Hull,\* AK4L

Anytime I set out on a "hamcation" (the combination of a vacation and a portable station operation) I try to gather the proper equipment for the trip. This usually includes a small (25-W or less) transceiver, an antenna system, an ac power source and various station accessories. Perhaps the most difficult item to locate is a suitable 12- to 14-V power supply. Many supplies designed for 100-W transceivers are bulky and heavy; small supplies designed for CB sets or automobile cassette players have poor regulation circuits (very few have over-voltage protection). Still others have sharp cabinet edges or heat-sink fins that can catch on clothing or scratch equipment enclosures.

My requirements for a portable-station supply would include a 13.8-V dc output at up to 5 A of current, short-circuit and over-voltage protection, and small size. Since the majority of commercial supplies did not fit my exact requirements, I decided to design and build my own.

Many commercial and home-built supplies in the 5-A range use a fixed low-current regulator IC or Zener diode and a "wrap-around" pass transistor for regulation (Fig. 1A). This arrangement works well — unless the output is accidentally short-circuited. A short circuit can cause the pass transistor to fail, sometimes with an emitter-to-collector short. This results in the full preregulator voltage appearing at the supply output, which can destroy solid-state components. The better units offer a "sorta" protection circuit for over voltage — an SCR "crow-bar" that shorts

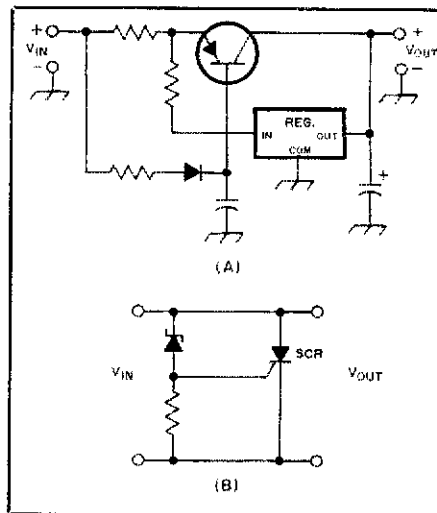


Fig. 1 — A common "wrap-around" regulator circuit is shown at A. An SCR crowbar circuit, which shorts the output when the input exceeds the Zener voltage, is shown at B.

the supply output and blows the line fuse when an over-voltage condition is sensed (Fig. 1B). I call them "sorta" protection circuits because they have a response time of a few milliseconds — more than enough time to destroy semiconductor junctions.

Pass-transistor regulation pitfalls can be avoided by using a high-power hybrid regulator. Fairchild Camera and Instrument Corp. has been a leader in hybrid regulators for years. Fairchild offers the  $\mu$ A78H series of positive regulators in the current range desired for my supply. These units are specified with output currents in excess of 5 A, thermal overload and short-

circuit protection, and 50 W of power dissipation. Since I require 13.8-V output, I decided to use the  $\mu$ A78HGASC 5- to 24-V adjustable device as the heart of my design.

Fig. 2 is the schematic diagram for my portable supply. Several components are included to aid the operator. Instead of a line fuse, a small circuit breaker is used to provide the primary circuit protection — this prevents running out of fuses. Three LED indicators monitor different sections of the supply circuit and warn the operator of impending trouble. The PREREG LED indicates output from the rectifier/filter, and the OUT LED indicates output from the regulator IC. If the OUTPUT LED is off and all others remain on, there is either a direct short at the output or the regulator IC has shut down. The AC LED, of course, indicates that the supply is turned on, but it also indicates the status of the circuit breaker.

## Construction

Several special components are used in the PS5. The voltage-setting potentiometer, R1, is a 10-turn precision trimmer. Do not substitute a single-turn thumbwheel unit, as they are mechanically unstable and hard to adjust! The power transformer, T1, is a low-profile Hammond unit; others may be substituted, but it may be difficult to locate a replacement with the same current capacity in a small package.

The power supply is built in a Radio Shack aluminum cabinet using point-to-point wiring. Fig. 3 shows the general layout of the components. A "universal" heat sink, mounted on the inside rear panel,

\*Assistant Technical Editor

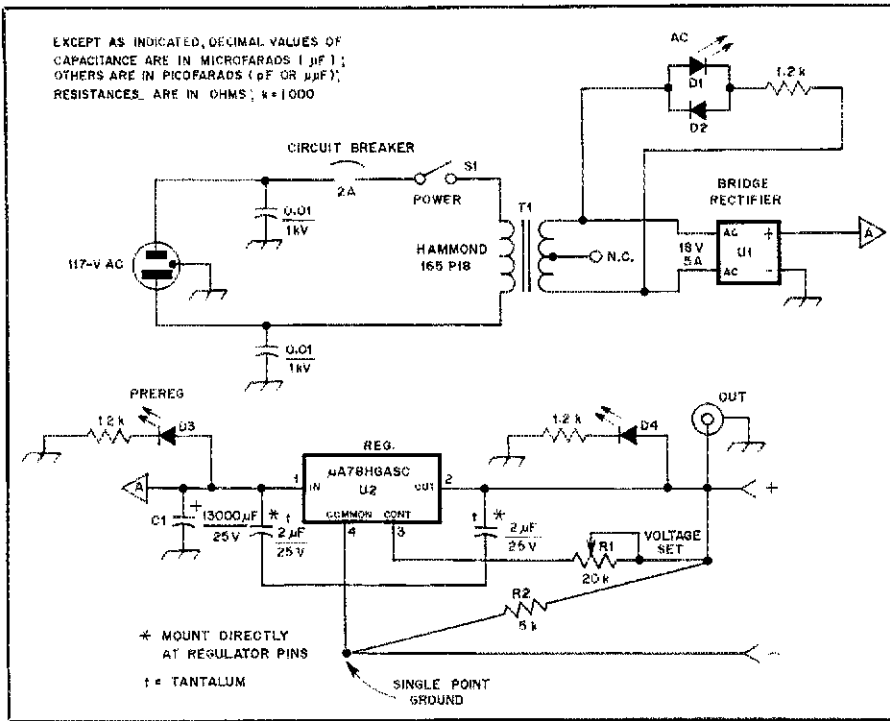


Fig. 2 — Schematic diagram of the PS5 supply. The circuit breaker is a 2-A TV replacement type. Numbers in parentheses are Radio Shack catalog numbers.

D1, D3, D4 — Miniature light-emitting diodes (276-088).

D2 — 1N4001 silicon rectifier diode.

U1 — 25-A, 50 PIV silicon full-wave bridge rectifier (276-1185).

U2 — 5-A, 5-25 V adjustable voltage-regulator IC, Fairchild-type  $\mu\text{A78HGASC}$ .

R1 — 20-k $\Omega$  10-turn potentiometer, Bourns type 3006 or equiv.

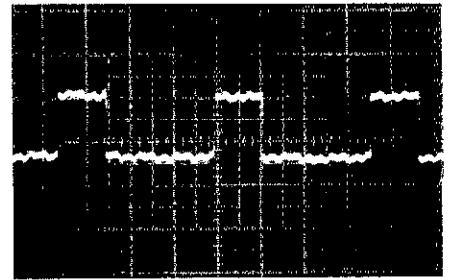


Fig. 4 — Oscilloscope presentation of load regulation in the supply. In this test, a 5.2-A load was pulsed on and off. The vertical divisions on the 'scope are 100 mV.

The dynamic output impedance of my supply is only 20 milliohms; therefore, I must stress the need for low-resistance wiring from the regulator to output. As shown in Fig. 2, there are direct connections from the regulator sense resistors, R1 and R2, to the output terminals. By making these connections directly to the output, the voltage drop across the regulator output wires is included in the feedback loop, improving regulation at the load.

### Operation

After wiring the supply, *check* and *recheck* your wiring. The short-circuit current available from the power transformer can ignite small-gauge wiring before the breaker has time to open. When you are sure the wiring is correct, locate a multimeter and set it for voltage measurement. Plug the supply in and turn it on. Both the AC and PREREG LEDs should light (the OUT LED will not light unless the regulator output is above 5 V). Measure the voltage at the filter capacitor — it should be very close to 25.0. Move the meter leads to the output terminals and adjust R1 for the desired output voltage. The  $\mu\text{A78HGASC}$  will hold regulation, in this circuit, within the range of 5 to 20 V. **Caution:** If you run the regulator at less than 13-V output, be sure to calculate the regulator power dissipation —  $P_D = I_{\text{load}} \times (V_{\text{in}}/V_{\text{out}})$ . If the dissipation is over 50 W, the regulator could shut down.

Fig. 4 shows the output regulation and ripple in the PS5. A 5.2-A load was pulsed on and off. As you can see, the no-load to full-load regulation is better than 1% and the ripple is less than 20 mV.

### Conclusions

With a little design effort a power supply can be simple, yet be a super performer. Commercial products do not fill all needs! The PS5 certainly fits the bill as a dependable power source for my portable station. Now that I have the supply, it's time to plan the next hamcation. Perhaps the Pacific, or the Caribbean, or maybe even Vermont . . .

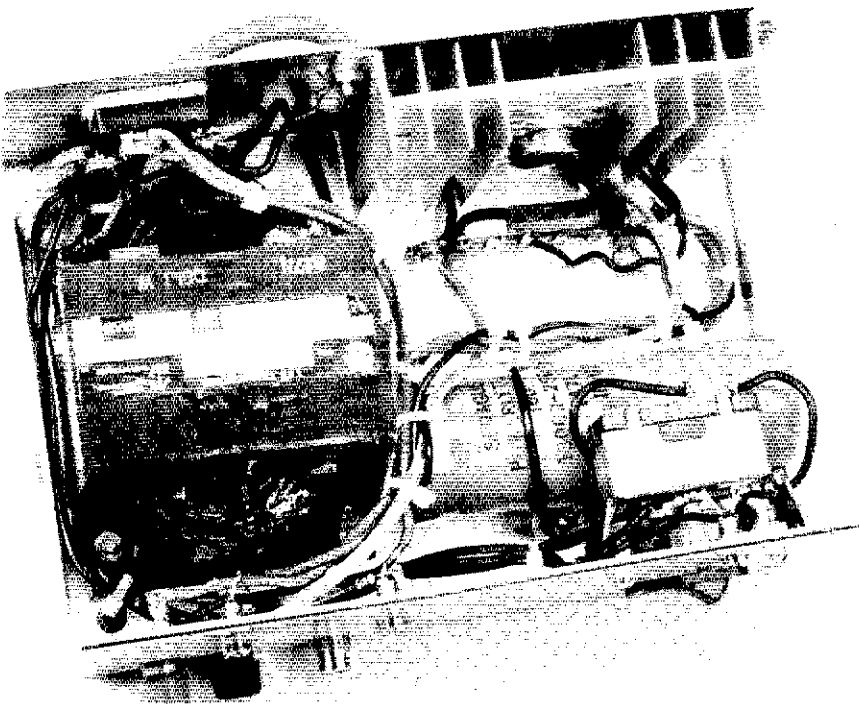


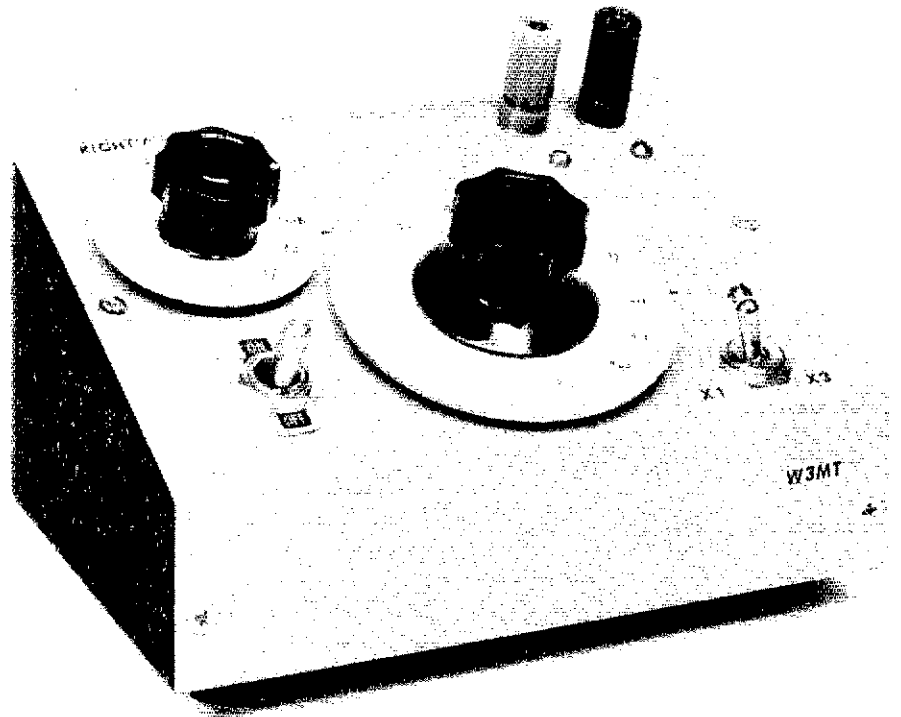
Fig. 3 — Internal layout of the PS5. See text for details.

is used to cool the regulator. Be sure to use heat-sink compound between the regulator/rectifier bridge and the heat sink/cabinet. The most important section

of the supply wiring is from the regulator output pins to the output jacks. In the prototype, I used a combination of twisted pairs of no. 14 wire and a solid no. 12 wire.

# A Shifty-Eyed Resistance Bridge

When was the last time a test instrument winked at you?



By Frank Noble,\* W3MT

The conventional dc Wheatstone Bridge has the virtues of accuracy and simplicity. Its major shortcoming is the requirement of a sensitive meter, which must be protected from overload. Because of this, ohmmeters remain preferred over bridges for measuring resistance — in spite of lower accuracy.

By replacing the balance meter, the Wheatstone Bridge becomes a much more practical circuit. An alternative balance indicator could be a device that only recognizes polarity, since the output polarity of a bridge reverses as the balance point is passed through. A comparator is such a device; it switches output state with an input signal change of a few millivolts either side of the threshold voltage. The comparator output state can be indicated through the use of an LED. In fact, if a dual red-green LED is used, the diode color can be made to change at the bridge balance point. To simplify operation, the bridge circuit can be arranged so that a red indication means to turn the knobs clockwise, or "right on red." These are the features I incorporated into my meterless Wheatstone Bridge. Hence, the name "Shifty-Eyed Resistance Bridge."

## Circuit Details

As shown in Fig. 1, the bridge is a

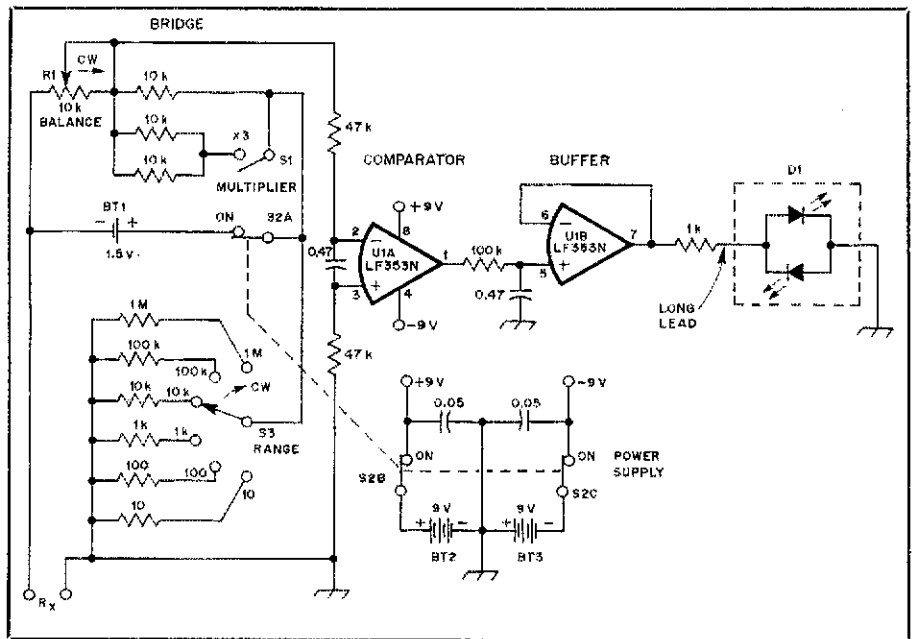


Fig. 1 — Schematic diagram of the Shifty-Eyed Resistance Bridge. Resistors are carbon-composition, 1/2-W, 5%-tolerance or better; capacitors are disc-ceramic or Mylar® 50-V units. D1 — Tri-color LED, Radio Shack 276-035 or equivalent. S2 — 3pst toggle. S3 — Sp8t non-shorting rotary type. R1 — 10-kΩ, linear-taper potentiometer, Ohmite® series AB or equivalent. U1 — LF353N biFET dual op amp, Radio Shack 276-1715 or equivalent. S1 — Spst toggle.

simple Wheatstone circuit using 5%-tolerance resistors and an Ohmite AB potentiometer as the balance control (1%-tolerance resistors may be used for

\*1004 Belhaven Rd., Bethesda, MD 20817

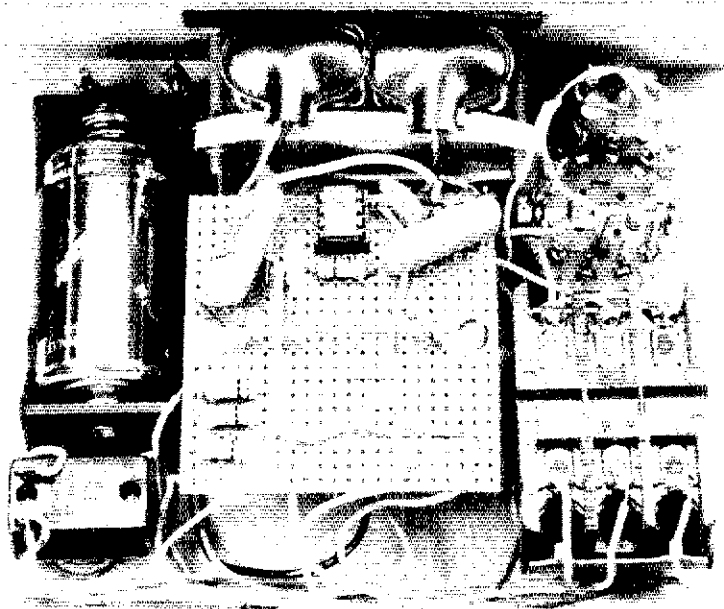


Fig. 2 — Interior of the Shifty-Eyed Resistance Bridge. The unit is built into a Radio Shack 270-264 sloping chassis.

higher accuracy). Switch S1 increases the range by a factor of three, so the bridge has a total of 12 ranges. Resistors from 1  $\Omega$  to 3 M $\Omega$  may be measured; the accuracy depends on the bridge components used.

The bridge supply voltage should be kept as large as possible, while staying within the dissipation limit of the resistor under test. Increasing the bridge supply voltage is equivalent to increasing comparator gain, which reduces offset and drift. Since dissipation is greatest in the lowest resistance range, the ambitious experimenter might increase the bridge voltage with increasing range by ganging a switch and voltage divider circuit with S3.

Any op amp in an open-loop configuration will serve as the comparator. Under these conditions, the output impedance is relatively high. Although it can directly drive an LED, it is only a little more complicated to buffer the comparator with a follower, which has an extremely low output impedance. The comparator is then thoroughly isolated, with no chance of any loading effects. I selected an LF353N biFET dual op amp for this application because it has very high input impedance, low offset voltage and current, and minimal drift.

In a resistance bridge, high-frequency response is undesirable because it makes the comparator noisy, and will also allow balance-potentiometer wiper noise to interfere with the null indication. Accordingly, I shunted the comparator (U1A) input with a large capacitor and fed it from the bridge through two 47-k $\Omega$  resistors, providing a measure of offset balance in the measurement ranges of 10 k $\Omega$  and below. The buffer (U1B) is driven through a high-impedance low-pass network, which unloads the comparator and fur-

ther reduces the bandwidth. The dual LED is wired so that it will change color when the comparator switches output state.

#### Calibration and Use

The BALANCE control scale is made from a cardboard disc, which is glued to the knob. It may be calibrated by comparing the resistance bridge to a digital ohmmeter of known accuracy. Alternatively, 1% tolerance resistors can be used as reference standards for calibration.

If the dual LED is wired correctly, a red glow indicates that the BALANCE control must be rotated clockwise to find the unknown resistance value; a green glow indicates that a counterclockwise motion is necessary.

At the balance point, the LED color changes for a very small rotation of the BALANCE control. If this point occurs near either end of the potentiometer travel, S1 may be closed and balance again obtained in a mid-scale position. The resistance is read from the BALANCE-control dial, with regard for the RANGE and MULTIPLIER switch positions.

That's all there is to it! Put a Shifty-Eye together and enjoy the meterless way of measurement. Who says a test instrument can't wink at you?

*Frank Noble, W3MT, has done most of his operating on cw since first becoming licensed in 1934. During school days, he obtained both the First Class Telephone and Second Class Telegraph licenses, and gained experience as an engineer for commercial a-m broadcast and police radio stations. He later earned his BSEE and MSEE degrees from Cornell. During WWII, he served as a communications and radar specialist with the Air Corps on Saipan. Frank is now retired, following a 26-year-long career in electronics instrumentation for medical research at the National Institutes of Health. His current hobbies include hunting, fishing and cabin building in West Virginia. ☐*

## Strays

### ARTHUR GODFREY, K4LIB

□ Former radio and television entertainer Arthur Godfrey, K4LIB, known to millions in the 1950s as the "king of the airwaves," became a Silent Key on March 16. He was 79. K4LIB became a ham through the influence of Curtis LeMay, W6EZV (ex-KØGRL), then the chief of the Strategic Air Command. Godfrey wrote an article in August 1957 *QST* based on his use of Amateur Radio during a big-game hunting expedition to Africa. He also provided his voice for an ARRL film (*The World of Amateur Radio*) in 1979, and was a friend to Amateur Radio.

### CONTACT-LENS WEARERS BEWARE!

□ Now that more people are wearing contact lenses, more hazards peculiar to their use are being discovered. In a recent incident, a shipyard worker wearing plano-type safety glasses over contact lenses was blinded while connecting a welding cable to a 440-V electrical box. When he opened the circuit breaker, the breaker arced and a flash occurred, causing his contact lenses to be "welded" to the cornea of the eye. Doctors later found that the lenses had served to concentrate the heat from the arc flash onto the cornea. Contact lenses must not be worn where a flash can occur or where welding is being done. — Automotive Independent Magazine, as reprinted in the APG (*Aberdeen Proving Ground, Maryland*) News; tnx KA3HMS

### STRAY HINTS

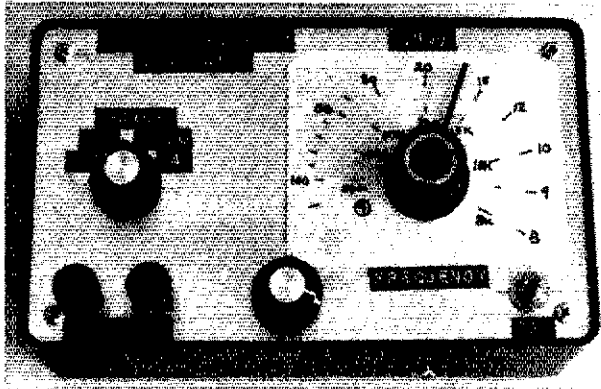
□ "Strays" are those interesting fillers used when space allows in *QST*. Think you have an item with Stray potential? Here are some hints to help your submission become one. (1) Be sure the information will be of interest to most readers of *QST*. (2) Submit your material before deadline — the 8th of the second month preceding desired publication (i.e. arrive at Hq. before June 8 for August *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



# A Wide-Range Variable-Frequency Audio Oscillator



Need a simple and inexpensive audio VFO? This one fills the bill, *and* provides good performance!

By Harry M. Neben,\* W9QB

Electronics experimenters (there are still a few of us left!) frequently have the need for an audio-frequency signal generator that has a reasonable output level and relatively low distortion. Such an audio oscillator was described by Shultz,<sup>1</sup> and is included in the Test Equipment and Measurements chapter of the ARRL Handbook.

My variable-frequency audio oscillator is a modification or update of this oscillator, using readily available components. These modifications were the result of difficulty in obtaining a dual, 20-k $\Omega$ , linear-taper potentiometer, called for in the original circuit.

## Circuit Highlights

The oscillator is a Wien Bridge, or twin-T type (see Fig. 1). If the two R-C arms in this oscillator are of equal electrical value, the frequency is given by

$$f = \frac{1}{6.28 \times R \times C} \quad (\text{Eq. 1})$$

where

- R = resistance in ohms
- C = capacitance in farads
- F = frequency in hertz

Thus, if the resistance or capacitance is changed by a power of 10, the frequency will be changed by the same factor. This provides a convenient decade-scale relationship.

This concept is great in theory, but when the 741 op amp is operated at fre-

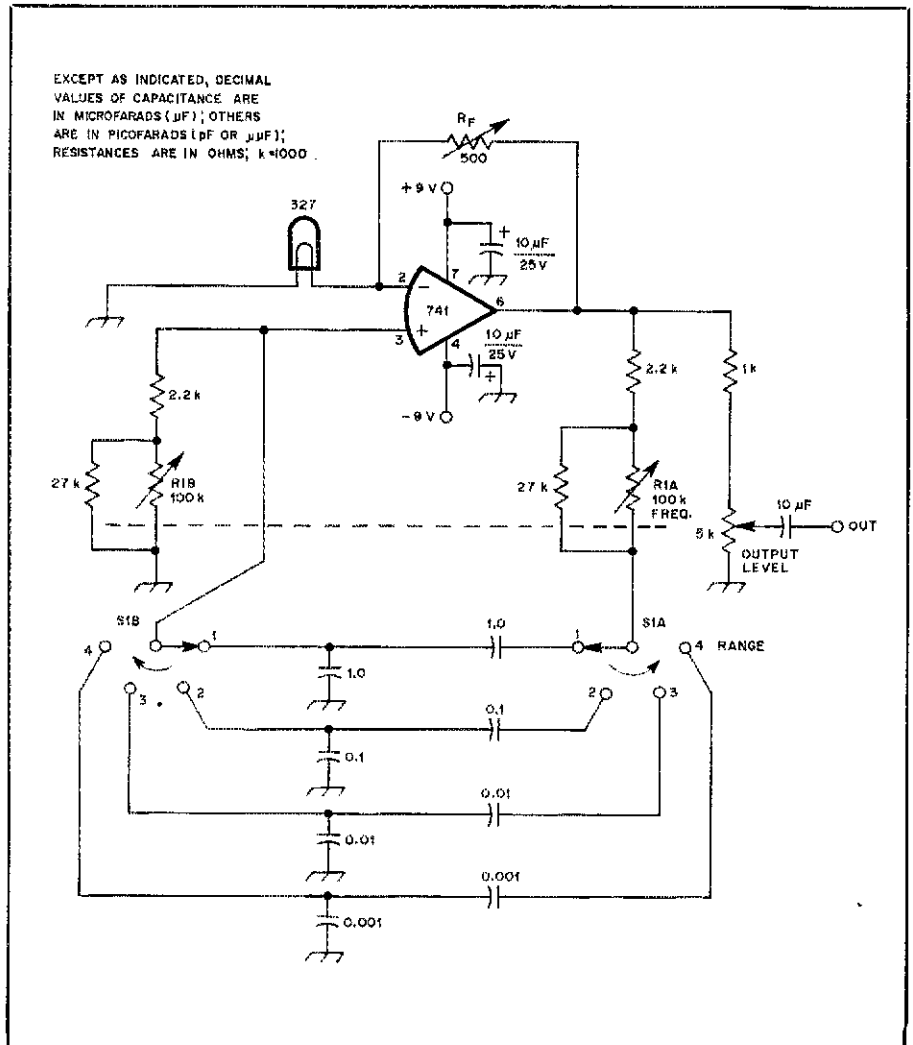


Fig. 1 — Schematic diagram of the Wien-Bridge audio VFO.

<sup>1</sup>Notes appear on page 24.

\*1151 Fairway Dr., Dunedin, FL 33528

**Table 1**  
**Oscillator Frequency Versus Potentiometer Rotation**

Detent	Rotation (Deg.)	R1 Effective Parallel Resistance (ohms)	Frequency (Hz) <sup>†</sup>	Detent	Rotation (Deg.)	R1 Effective Parallel Resistance (ohms)	Frequency (Hz) <sup>†</sup>
1	7	6	265,317.0	21	154	10,800	147.4
2	15	10	159,214.0	22	161	11,489	138.5
3	22	30	53,110.6	23	168	12,122	131.3
4	29	287	5,547.1	24	176	12,981	122.6
5	37	635	2,507.5	25	183	13,745	115.8
6	44	918	1,734.3	26	190	14,644	108.7
7	51	1,240	1,283.2	27	198	15,242	104.4
8	59	1,599	995.2	28	205	15,955	99.8
9	66	2,034	782.4	29	212	16,732	95.1
10	73	2,455	648.4	30	220	17,532	90.8
11	80	2,861	556.3	31	227	18,217	87.4
12	88	3,635	437.9	32	234	18,809	84.6
13	95	4,638	343.2	33	241	19,326	82.4
14	102	5,559	286.3	34	249	19,782	80.5
15	110	6,580	241.9	35	256	20,187	78.8
16	117	7,297	218.1	36	263	20,491	77.7
17	124	7,816	203.6	37	271	20,796	76.6
18	132	8,308	191.6	38	278	21,025	75.7
19	139	9,220	172.6	39	285	21,073	75.5
20	146	10,047	158.4	40	293	21,121	75.4
				41	300	21,121	75.4



<sup>†</sup>Frequency when using 0.1- $\mu$ F capacitor in the Wien-Bridge circuit.

frequencies above 20 kHz, the R-C to frequency relationship is variable, and dependent on the individual 741 used. Regardless, this range is included, but a separate calibration scale is drawn for frequencies above 20 kHz. [This problem can be eliminated by directly substituting a TL081 for the 741 op amp. — Ed.]

The frequency range of the *Handbook* audio oscillator is from 15 Hz to 150 kHz. For my purposes I needed a 10-Hz signal, so the circuit was modified by applying Eq. 1. I used readily available components by doubling the capacitor values to 1.0, 0.1, 0.01 and 0.001  $\mu$ F. These values provided a low-frequency range starting at about 8 Hz. However, those who want to build this little rascal can choose whatever capacitor values are on hand. Of course, this will change the oscillator frequency range!

My greatest problem encountered with the *Handbook* oscillator was trying to locate a dual 20-k $\Omega$ , linear-taper potentiometer. A dual 10-k $\Omega$  potentiometer was tried, and all the capacitor values were doubled. This combination was found to be unstable in the 10-Hz region. A dual, 50-k $\Omega$ , audio-taper potentiometer was tried. This will work, but the audio taper results in an unsatisfactory logging scale. Another solution was sought.

The local Radio Shack store stocks a dual 100-k $\Omega$  potentiometer with an audio taper. This unit has a 41-position detented wheel in it that can be taken off to provide smooth rotation if desired. When a 27-k $\Omega$  resistor is placed in parallel with this unit, the equivalent resistance is suitable for use in this audio oscillator (Table 1). However, if the potentiometer is wired into the circuit correctly, the oscillator frequency will *decrease* as the dial is rotated *clockwise*. To the true ex-

perimenter this shouldn't matter! Here is a scale that is acceptable, providing about 200° of usable potentiometer rotation. Table 1 can be used to determine the approximate oscillator frequency, according to which detent the potentiometer is turned to.

Other modifications to the *Handbook* circuit are the inclusion of a 10- $\mu$ F, non-polarized capacitor in the output to provide isolation from any dc components, and putting a 500- $\Omega$  trimmer potentiometer in place of the 220- $\Omega$  ( $R_f$ ) resistor.

### Construction and Alignment

Construction of the audio oscillator is simple and straightforward. The unit is built into a box measuring 6  $\times$  4  $\times$  2 inches.<sup>3</sup> Capacitors are wired directly to the rotary switch, and the IC socket and other components are mounted on a small perforated board. Front-panel layout is shown in the photograph. The main tuning knob is made from an ordinary knob with a small piece of clear plastic attached as a pointer.

The only adjustment needed before calibration is in the feedback loop. Connect the oscillator to an oscilloscope and view the wave form. Adjust potentiometer  $R_f$  until flat-topping of the sine wave occurs. Slowly back off  $R_f$  until a clean sine wave reappears. Check all frequency ranges while sweeping the main frequency control to ensure that no flat-topping occurs at any portion of all ranges. Re-adjust  $R_f$  if necessary.

To calibrate the oscillator, an oscilloscope or frequency counter is needed. All ranges, except the highest frequency one, are related by a factor of 10. If the lowest frequency range is calibrated first, the next two oscillator ranges will

also be calibrated. I found it necessary to use a frequency counter to calibrate the highest range (above 20 kHz), since it did not track with the other ranges. The degree of mistracking depends on which op amp is used.

This audio VFO is simple to build and inexpensive, and provides substantial output voltage at a reasonable distortion level. Put one together and you will be delighted!

### Notes

<sup>†</sup>T. Schultz, "Audio Oscillator," Hints and Kinks, *QST*, Nov. 1974, p. 43.  
<sup>3</sup>mm = in.  $\times$  25.4

## Next Month in QST

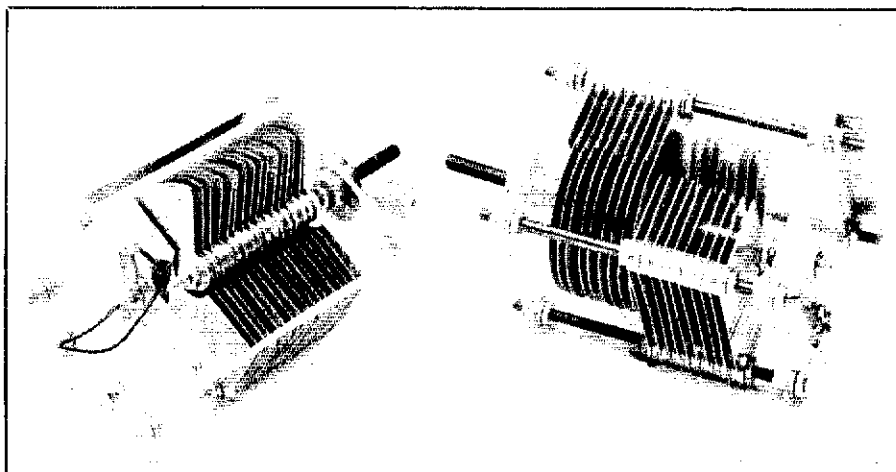
Hams can now use AMTOR. So what's AMTOR, you ask? Why, it's an error-correcting teleprinter protocol. So what, you ask? Find out for yourself, in an article that takes you through the basics of this intriguing new mode.

Also in July QST, look for two other articles relevant to those in the forefront of Amateur Radio. One provides a clear, useful explanation of spread spectrum, and the other describes an easy-to-build serial ASCII/Baudot character generator that you can use to test your printer or video terminal. All this good reading, and a great deal more, in July QST.

# A Homemade High-Power Tuning Capacitor

Transmitting types of variable capacitors are expensive and hard to find! Why not build your own?

By Thomas C. Stephens,\* KD6ED



**D**o you have lots of spare time and good mechanical skills? If so, this project is for you! No longer do you have to pay premium prices for a high-power variable capacitor. One look at the parts list (Table 1) should pique your interest; all the parts should be available from your hardware store and/or junkbox.

First, the mathematics. Before building the capacitor, the number of rotor and stator plates must be calculated. The formula for capacitance between two parallel plates is

$$C = \frac{0.224AK}{d} \quad (\text{Eq. 1})$$

where

C is the capacitance in picofarads (pF)

A is the plate area in square inches

d is the plate separation in inches

K is the dielectric constant (air = 1)

Table 2 shows typical plate spacing for various peak voltages. I chose a plate spacing of 0.075 inch for my first capacitor — enough to withstand 3000-V peak.<sup>1</sup> Since there is a chance of bending plates, a stack of five no. 8 washers (0.042 inches thick) provide approximately 0.0975-inch spacing between rotor and stator plates, allowing a slight margin for bending. This arrangement is shown in Fig. 1.

To calculate the capacitance per rotor plate, first find the total area of the rotor plate, which includes both sides of the

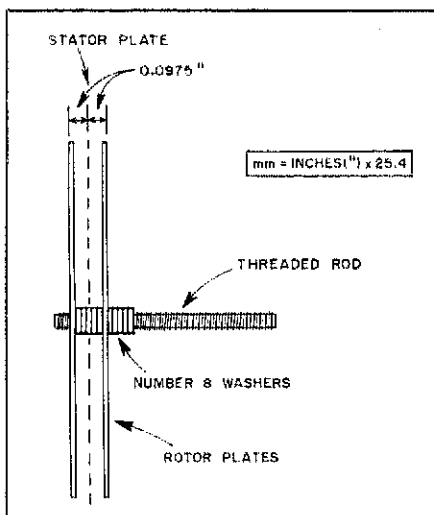


Fig. 1 — No. 8 washers are used to space the rotor and stator plates. See text for details.

plate minus the center notches (which provide clearance for the rotor shaft) in the stator plates.

$$A = \pi R^2 (\text{total plate}) - \pi r^2 (\text{notch}) \quad (\text{Eq. 2})$$

where

A is the total area

R is the radius of the total plate

r is the radius of the notch

Substituting the values for my capacitor:

$$A = \pi(1.4375)^2 - \pi(0.375)^2 = 6.05 \text{ square inches} \quad (\text{Eq. 3})$$

Using Eq. 1, the capacitance per rotor

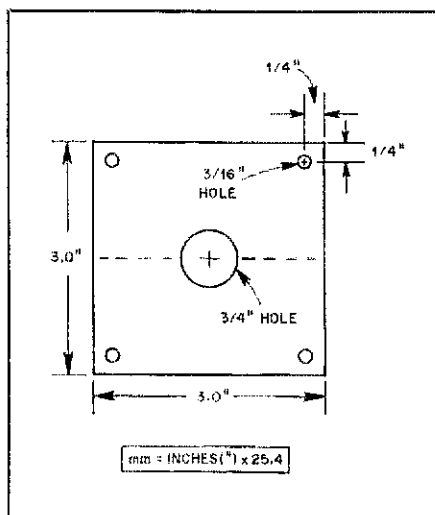


Fig. 2 — Template for the stator, and end-plate jig.

plate can now be calculated:

$$C = \frac{(0.224) \times (6.05) \times 1}{0.0975} = 13.9 \text{ pF} \quad (\text{Eq. 4})$$

The maximum capacitance of one section of a capacitor (two stator plates plus one rotor plate) is equal to the capacitance of this section at full mesh plus the minimum capacitance, which is about 10% of the maximum. Therefore, each section will have a capacitance of  $1.1 \times C$ , or 15.3 pF, in my capacitor.

## Construction

Two 3 × 3 × 1/4-inch Plexiglas® plates are used as end supports, and

\*1mm = in. × 25.4.

\*1715 Brigden Rd., Pasadena, CA 91104

**Table 1**  
**Parts List for the Homemade Capacitor**

Description	Quantity
Flexiglas sheet plastic 3 x 3 x 1/4 inch	2
Threaded no. 10 brass rod	5
No. 10 hexnuts	Box of 100 (more than enough; common-size package)
No. 10 brass hexnut	1
Half-hard aluminum sheet, 0.020 inch thick	Depends on number of rotor and stator plates
Copper strip, 1 x 3 x 0.07 inches	1
No. 8 washers, 0.450-inch dia. by 0.042 inch thick	1 lb box

**Table 2**  
**Typical Capacitor Plate Spacings**

Spacing inches (mm)	Peak Voltage	Spacing inches (mm)	Peak Voltage	Spacing inches (mm)	Peak Voltage
0.015 (0.4)	1000	0.07 (1.8)	3000	0.175 (4.4)	7000
0.02 (0.5)	1200	0.08 (2.8)	3500	0.25 (6.3)	9000
0.03 (0.8)	1500	0.125 (3.0)	4500	0.35 (8.9)	11,000
0.05 (1.3)	2000	0.15 (3.8)	6000	0.5 (12.7)	13,000

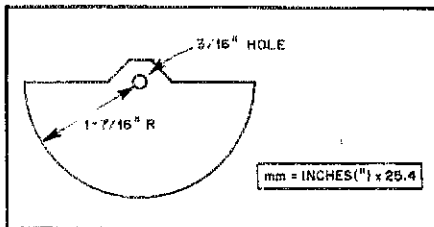


Fig. 3 — Rotor-plate template.

no. 10 rods form the capacitor frame. The length of these rods will vary with the size of the capacitor; it is best to use long rods and cut them to size once the unit is completed.

A drilling jig aids in constructing the end and stator plates. The jig outline is shown in Fig. 2. Use a fairly stiff material for the jig, such as phenolic or 0.04-inch aluminum sheet stock. Drill the end plates while using the jig and place a screw in each drilled hole to ensure proper alignment. Cut out and drill the 3-inch aluminum sheets, again while using the jig. These plates will be cut in two to form the stator plates. Once the sheets have been cut and drilled, enlarge the center hole to 3/4 inch (the best method is to use a chassis punch) and cut each sheet in half. The resultant half-moon shape in each stator plate provides clearance for the rotor shaft.

Each rotor plate is made from the same aluminum sheet, using Fig. 3 as a guide. Note that the rotor radius is 1-7/16 inches instead of 1-1/2 inches. This provides clearance for the frame rods. Once the rotor plates have been cut, you can use a file to smooth and round them. One filing method I tried was to stack all the plates on a rod and fan them out to form a cir-

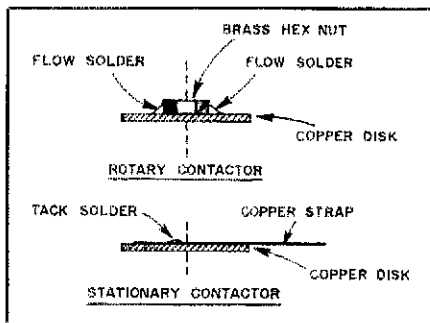


Fig. 4 — Construction details of the stationary and rotary contactors.

cle. The assembly is then tightened with a pair of nuts and placed in an electric drill. While spinning the plates a file is used to smooth the edges. Be *very* careful if you try this method; be sure the drill is secured firmly.

Two contactors are needed to provide an electrical connection for the rotor assembly. These contactors are made from 3/4-inch-diameter copper, brass or silver (best) disks, copper strap and a brass nut. Construction details of the stationary and rotary contactors are shown in Fig. 4.

The rotor shaft is made from a brass no. 10 threaded rod (length depending on the design capacitance) and two 1-1/2 inch lengths of 1/4-inch aluminum shaft material. Drill one end of each aluminum shaft to a depth of 1/2 inch and tap them with a 10-32 *bottoming* tap.

#### Assembly

Assemble the rotor first. Select one of the no. 10 threaded rods as a rotor shaft, screw one of the threaded aluminum shafts over the end of this rod, then secure

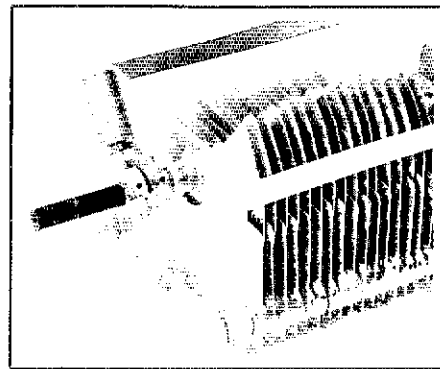


Fig. 5 — Rotor balancing modification. Use enough washers to just balance the capacitor.

it with a drop of glue. Next, slide two washers over the rod and follow with a nut. Tighten the nut slightly; the washers are used as end-play bearings. Slide on another flat washer, followed by a rotor plate, more washers (number depending on chosen spacing) and another rotor plate. Repeat this process until all the plates are in place. Slide one more washer next to the last plate and secure with a nut. Screw on another nut, leaving a 1/16-inch space from the last nut; this nut will serve as a locking device for the contactor assembly. Screw on the rotary contactor so that the flat surface is facing away from the rotor plates. Now, screw on the stationary contactor so that the flat surfaces mate with each other. Finally, screw on the other threaded aluminum shaft. This completes the rotor assembly.

Next, mount the potentiometer bearings to the plastic end plates and install two frame rods in the lower corners of one end plate. Use nuts and washers on both sides of the plate. Install the stator plates on these two parallel rods, using the same procedure as for the rotor plates.

After all the stator plates are mounted, slip the coil spring on the rotor shaft and attach the rear end plate. The end-to-end spacing should be enough to allow some play in the rotor, but the spring should provide a fair amount of tension. Finally, attach the two top frame rods. This completes the assembly of the capacitor.

#### Alignment

It will take a few minutes of adjusting to ensure free rotation of the capacitor. Some of the plates may have to be bent; it is hard not to bend them when assembling the unit. After building several capacitors, I found they needed a little counterbalancing. This was accomplished with a collar on the rotor shaft that has a 1-1/4 inch set screw. This modification is shown in Fig. 5.

Although this project is time consuming, it surely is cost effective. If you use reasonable care when drilling, cutting and bending, you will have a capacitor of which you can be proud.

# Worldwide Beacon Net: The Possibilities Abound

By John G. Troster,\* W6ISQ and Cameron G. Pierce,\*\* K6RU

Monitor 14,100 kHz any time, day or night, for 10 minutes and see how many of the eight worldwide power-attenuating beacon net stations you can hear as they transmit automatically one after the other. In that short time, you can get a quick, general appraisal of the various 14-MHz paths that may (or may not) be open around the world, and the direction and the quality of the opening.

One of the most interesting observations is the consistent strength and readability of the 1-W (and even the 0.1-W) dash from the distant beacons. It's enough to make the QRO fellas turn off their finals and the QRPers cheer!

The beacon net was organized and financed by the Northern California DX Foundation (NCDXF). The overall beacon transmitter concept and rf power-level switching was designed by Dave Leeson, W6QHS. Jack Curtis, K6KU, of Curtis Electro Devices, designed the clock, the microprocessor and the programming components. The engineering, production and packaging was done by Cam Pierce, K6RU.

## Do-It-Yourself

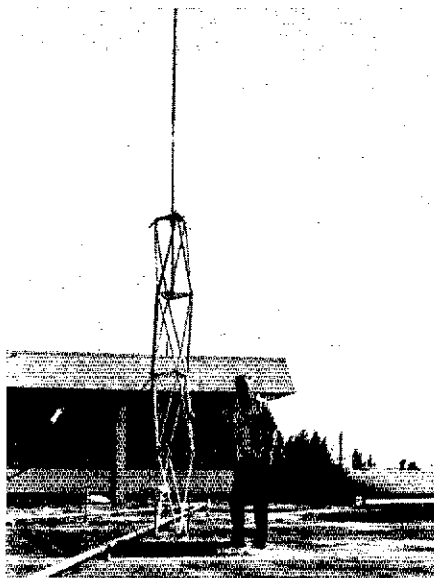
Besides monitoring, the beacons can also be used for several do-it-yourself practical observations or projects. The beacons

1) provide an "in band" time/frequency standard

2) are a means of comparing antennas or receivers by switching back and forth during the same nine-second dash. Check DX versus short-range characteristics of different antennas. When a beacon signal is steady, rotate the beam antenna (from center to side) to check beamwidth.

3) enhance propagation investigation. Record the lowest signal level copied from each beacon (or note "no copy") hour-to-hour and day-to-day. How do your observations and interpretations of the beacon's reception compare with published propagation forecasts, or correlate with various A K indices, WWV broadcasts, sunspot activity or just generally observed band activity? Is there any correlation at all? Can beacon signals be used to improve forecasts of conditions?

This propagation-observation possibility



Bob Jones, KH6O, displays the beacon antenna designed and built by his science-class students at Honolulu Community College, one of eight NCDXF beacon sites worldwide.

**Table 1**  
NCDXF Beacons Transmitting Sequence

Time	Station	Location
0000	4U1UN/B	United Nations, New York
0001	W6WX/B	Stanford University, California
0002	KH6O/B	Honolulu Community College, Hawaii
0003	JA21GY/B	JARL, Mt. Asama, Japan
0004	4X6TU/B	Tel Aviv University, Israel
0005	OH2B	Helsinki Technical University, Finland
0006	CT3B	ARRM, Madelra Island
0007	ZS6DN/B	Transvaal, South Africa

Same sequence repeats every 10 minutes. Beacons are crystal-controlled and are on 14,100 kHz. First "Q" of each beacon's "QST" begins within a fraction of a second of the assigned time, plus or minus human starting error. The sequence may vary as more beacons are added to the net.

**Table 2**  
Text Transmitted by Each Beacon

Power Level	CW Message
100 W	QST de (W6WX/B) beacon
100 W	..... 9-second dash
10 W	..... 9-second dash
1 W	..... 9-second dash
0.1 W	..... 9-second dash
100 W	SK (W6WX/B)

Transmission time: ±58 seconds  
Speed: 20+ wpm  
Power attenuated in 10-dB steps

## Total Solar Eclipse Reports Requested

There will be a total solar eclipse in the area of Indonesia on June 11 from 0209.5 to 0715.8Z. San Francisco State University Professor Lou Berman, K6BW, requests that observers around the world continuously monitor all stations in the NCDXF beacon system (14,100 kHz) an hour or so before, during and after the eclipse time. Please send log of signal reports and other radio or solar observations to K6BW, 1020 Laguna Ave., Burlingame, CA 94010. Even a "no change" report would be much appreciated. — W6ISQ

ty is the principal purpose of the power-attenuating system. Indeed, it is hoped that amateurs will be stimulated by monitoring the beacon net to learn and investigate more about the vagaries and conditions of propagation and propagation forecasting, and to share that knowledge with others.

## Volunteer Observers Needed

The beacon net is looking for volunteers worldwide who can make regular observations and submit them about once a month. (It would make a good science class project.) The observers' interpretations and conclusions would also be of great interest. Anyone interested should write to Observation Coordinator Al Lotze, W6RQ, 46 Cragmont Ave., San Francisco, CA 94116.

## Strays

### SAFETY BELTS

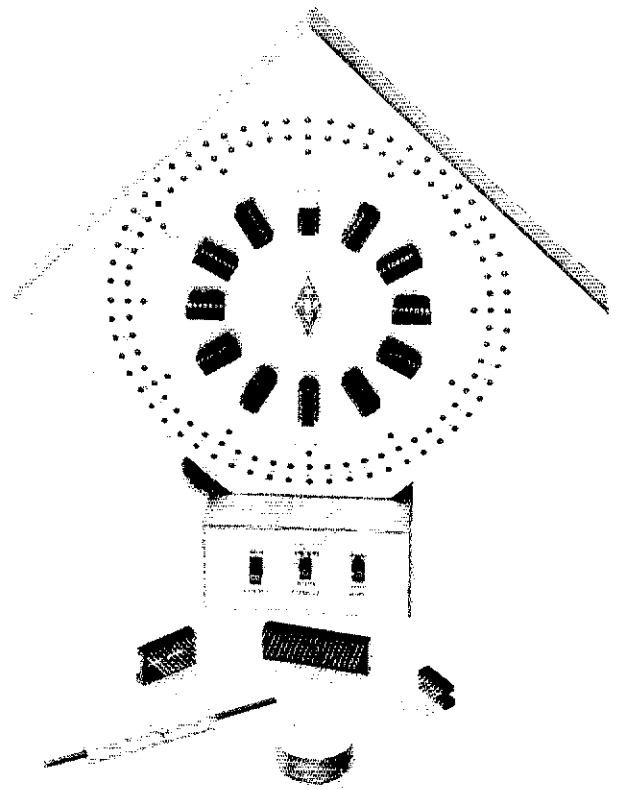
□ All the folderol and a considerable amount of balderdash about using safety belts when climbing the tower is a complete waste of time. Anyone with an ounce of brain will tell you that by the time you lace up the harness and strap the belt on your body you can be up the tower and back down! If anyone would like further info on the folly of safety belts you can drop me a line at this address: R. F. Inshack, Memorial Hospital, 7388 Traction Rd., Brokentutu, Pennsylvucky. — Tamiami ARC, Venice, Florida

\*82 Belbrook Way, Atherton, CA 94025  
\*\*570 La Mesa Dr., Menlo Park, CA 94025

# The Pizza Clock: An Exercise in Wire Wrapping

Wire wrapping is a useful circuit wiring technique for the hobbyist. Add a new "twist" to your home-built gear collection by building this unique conversation-piece.

By Robert Shriner,\* WA0UZO and Gerald B. Hull,\*\* AK4L



This article combines education and fun; you'll learn the technique of wire wrapping and build a unique electronic clock in the process. With the advent of ICs that implement almost any function, the process of wire-wrapping circuits has become popular among hobbyists and the industry alike.

## What is "Wire Wrapping"?

Wire wrapping is a circuit-wiring process in which connections are made by wrapping wire around a square terminal post. A close-up view of a wire-wrapped connection is shown in Fig. 1. An obvious advantage of this technique is the solderless connection — circuit changes and repairs are made easily. The major disadvantage of wire wrapping is the need for a square post — passive components with round leads (resistors, capacitors, and so on) must be soldered to a square wire-wrap post to ensure a good connection. Wire-wrapped connections are as good as, if not better than, a soldered connection; in fact, aerospace electronics equipment is usually wire-wrapped for improved reliability.

Generally, hobbyists construct their wire-wrapped projects on a punched phenolic board (often called "perf board") or a prototype card, which is a perf board with copper traces for dual in-line package (DIP) IC power supply pins

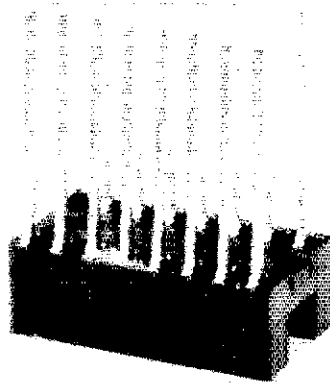


Fig. 1 — Close-up view of a wire-wrapped connection.

etched on one side. Special square posts are available for use as tie points for wire-wrapping passive components, but the majority of wire wrapping is done with special wire-wrap IC sockets. These sockets come in all the standard DIP sizes, as shown in Fig. 2.

Most circuits that are wire-wrapped are of the digital variety; the technique is not suitable for many rf-type or analog designs because of long lead lengths required and large numbers of passive (round lead) components. Wire-wrapped digital circuits can be made to operate into the lower vhf spectrum if care is used when wiring the circuit.

## Tools

Wire-wrapping tools come in many shapes and sizes. The most common (and

least expensive) is the hand-operated tool, shown in Fig. 3. One end of the tool has a sharp-edged V-shaped groove which strips insulation from wire; the other end has a hollow tube with two holes. The wire is inserted in one hole and the wire-wrap post fits in the other.

Once the wire has been inserted into the tube, the tool is placed over the square post and twisted. These steps are illustrated in Fig. 4A, B and C. Other types of wire-wrapping tools are modifications of the simple hand tool. Some tools strip insulation while wrapping. This feature will allow the user to "daisy-chain" connections; in other words, to connect many terminal posts without stopping to strip wire at each connection. Daisy-chain wrapping is illustrated in Fig. 5. Choosing a tool is basically a matter of cost. Usually, the easier a tool is to use the more it will cost.

Wrapping requires wire with a special size of insulation (to fit the stripping tools). The industry standard wire size is no. 30 with Kynar® (plastic) insulation. Most of the tools are designed to accept this size, although a few models use larger wire. The wire is available in many colors and forms; project construction time can be cut considerably by using pre-cut and stripped wire (Fig. 6).

## Wiring a Circuit

A schematic diagram tells a lot about how a circuit can be wired. For example, Fig. 7 is the schematic diagram of our sample wire-wrapping project, the "Pizza

\*Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002

\*\*Assistant Technical Editor

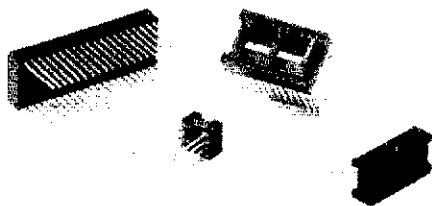


Fig. 2 — Wire-wrap IC sockets.

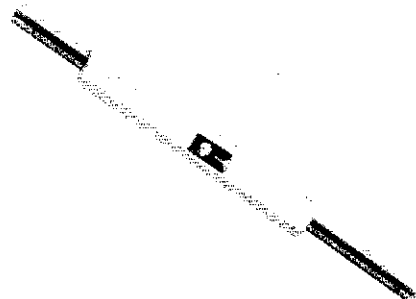


Fig. 3 — Hand-operated wire-wrapping tool.

Clock." Most of this circuit uses the wire-wrap technique, but several portions are soldered together because they are impractical to wire-wrap — these include the power supply section, the indicator LEDs and the time-base oscillator.

When building a project as complex as the Pizza Clock, it is a good idea to make up a "connection table" or wrap chart. Once a project has been completely wired, it is very difficult to check individual connections; a wrap chart provides an invaluable reference during assembly and debugging. A sample of the wrap chart for the Pizza Clock is shown in Table 1.

### The Pizza Clock

Building a discrete-IC 24-hour clock seemed to be a good exercise for wire wrapping, but since the cost of 24-hour digital clocks has dropped to the \$10-15 range, a clock project using digital readouts would be like "reinventing the wheel." The idea for the Pizza Clock came from a unit of similar design that one of the authors had seen in a store. That unit used TTL ICs and lamps to indicate hours, minutes and seconds. The ac power mains provided the power and frequency reference.

Low-power CMOS logic is used in conjunction with LED indicators to produce a nice-looking clock that is independent of the ac line. Another unique feature of the clock circuit is that it uses exactly 12 ICs — one for each hour.

The schematic diagram of the Pizza Clock is shown in Fig. 7. An MM5369 oscillator/divide-by-59659 chip provides a 60-Hz output from a 3.579-MHz color-burst crystal. U2 and U3 divide this 60-Hz signal by 10 and 6, respectively, which yields a 1-Hz signal for the counter/display chain. U4, U6, U7, U8, U10 and U12 are 4017 decimal counter

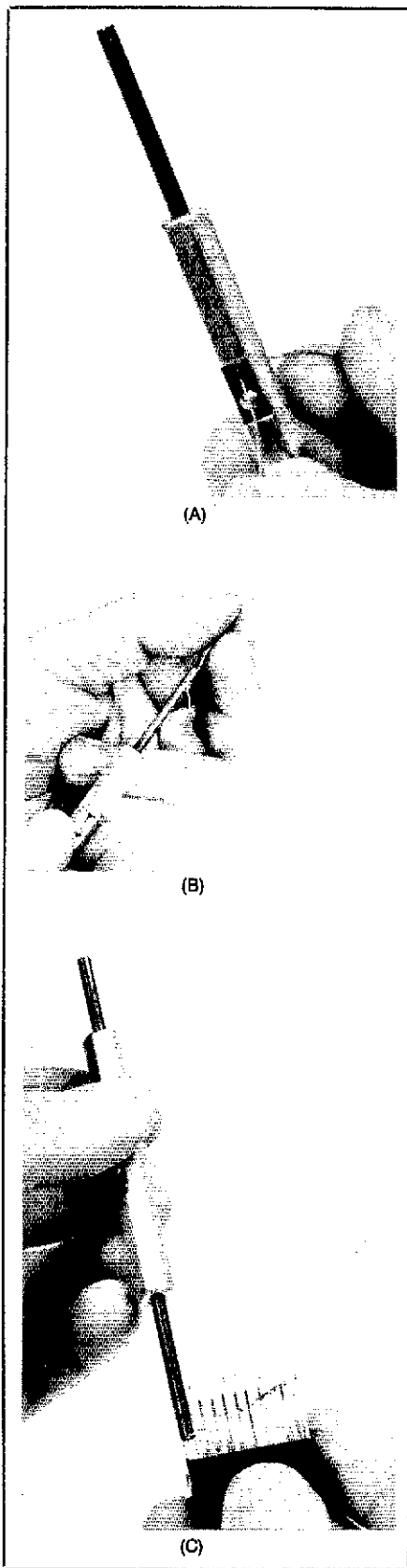


Fig. 4 — The wire-wrapping process — (A) strip insulation from wire (1/2-1 inch); (B) insert wire in tool; (C) place tool over post and twist.

ICs, whose outputs drive the LED indicators. D4 through D33 provide isolation for the counter ICs when the in-

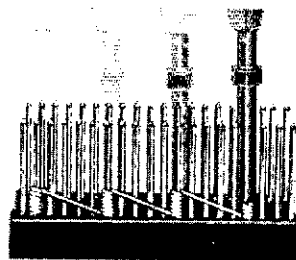


Fig. 5 — Daisy-chain wrapping.

Table 1

Portion of a Wrap Chart for the Pizza Clock

From	To		
U1 pin 1	U2 pin 14	U1 pin 4	N.C.
U1 pin 1	S1A	U1 pin 5	R2
U1 pin 2	GND	U1 pin 5	C1
U1 pin 3	N.C.	U1 pin 5	Y1

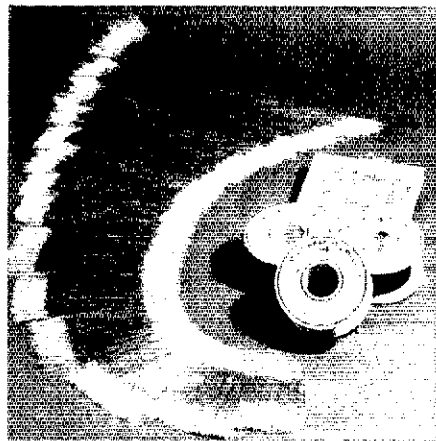


Fig. 6 — No. 30 wire for wrapping comes in many forms. Pre-cut and stripped wire speeds construction time. Photo courtesy of OK Machine and Tool Co.

indicator LEDs are reverse biased. U5 and U9 provide signal inversion to properly drive the LEDs. The minutes and seconds counter circuits are exactly the same; only the hours counter is different — it uses a quad NAND gate (4011) to sequence 12 LEDs instead of 10 and resets the hours-counter circuit.

### Construction

The Pizza Clock case is constructed from double-sided printed circuit board; this material provides a pleasing finish if care is used during assembly. This is not a one-evening project: Take your time and you will be rewarded by a good-looking station accessory.

Fig. 8 and Table 2 show details of the pc-board cabinet and base. The faceplate of the clock is etched with the IC pinout and power supply bus on one side and the

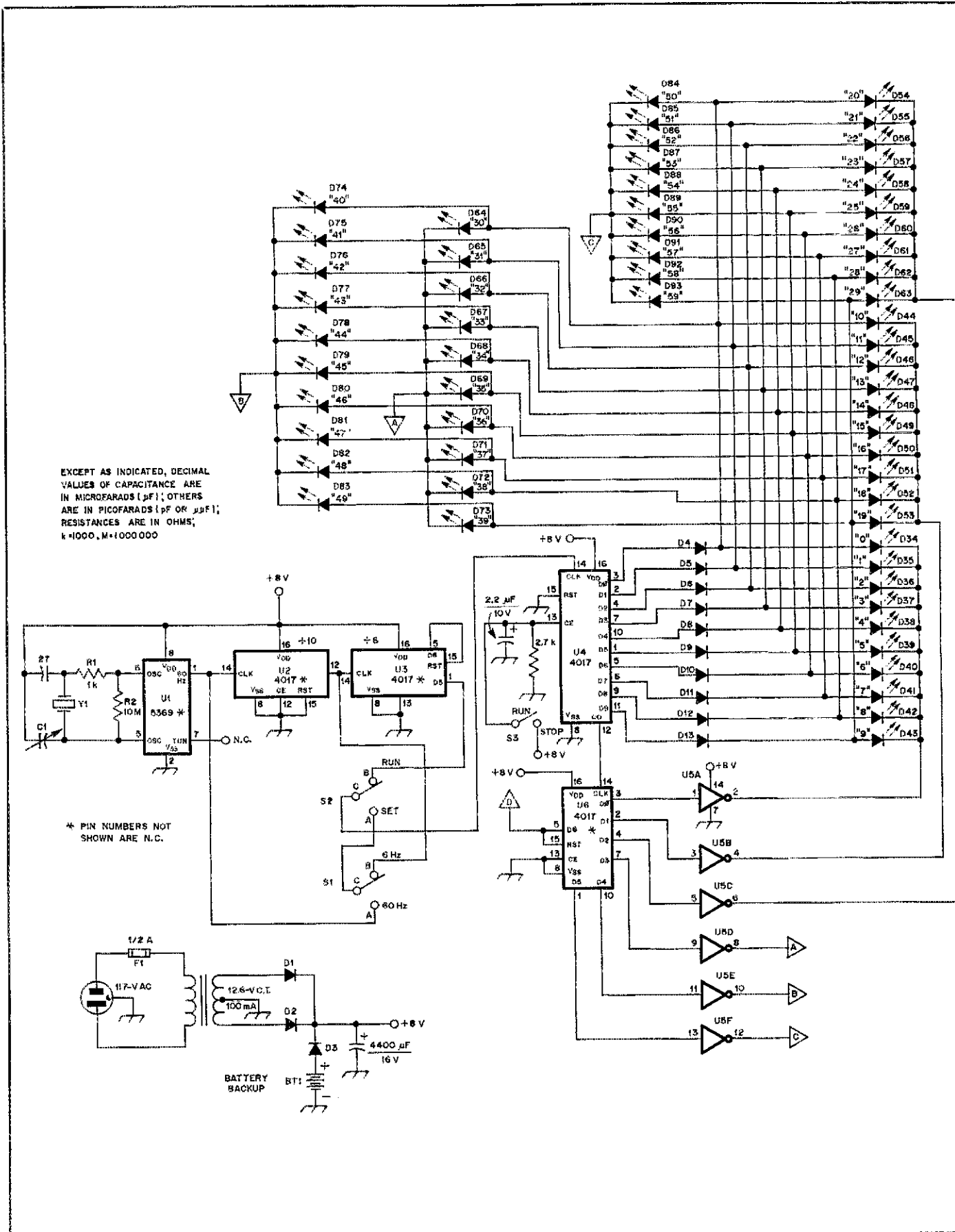


Fig. 7 — Schematic diagram of the Pizza Clock. Fixed-value capacitors are disc ceramic unless they are polarized; these are electrolytic. Resistors are 1/4-watt unless otherwise specified.

- C1 — 5-30 pF plastic trimmer capacitor.
- D1-D3, incl. — 1N4001 silicon power diode.
- D4-D33, incl. — 1N914 silicon switching diode.
- D34-D166, incl. — red light-emitting diode.
- S1-S2 — SPDT slide switch.
- S3 — spst slide switch.
- U1 — MM5369 oscillator/divider IC.

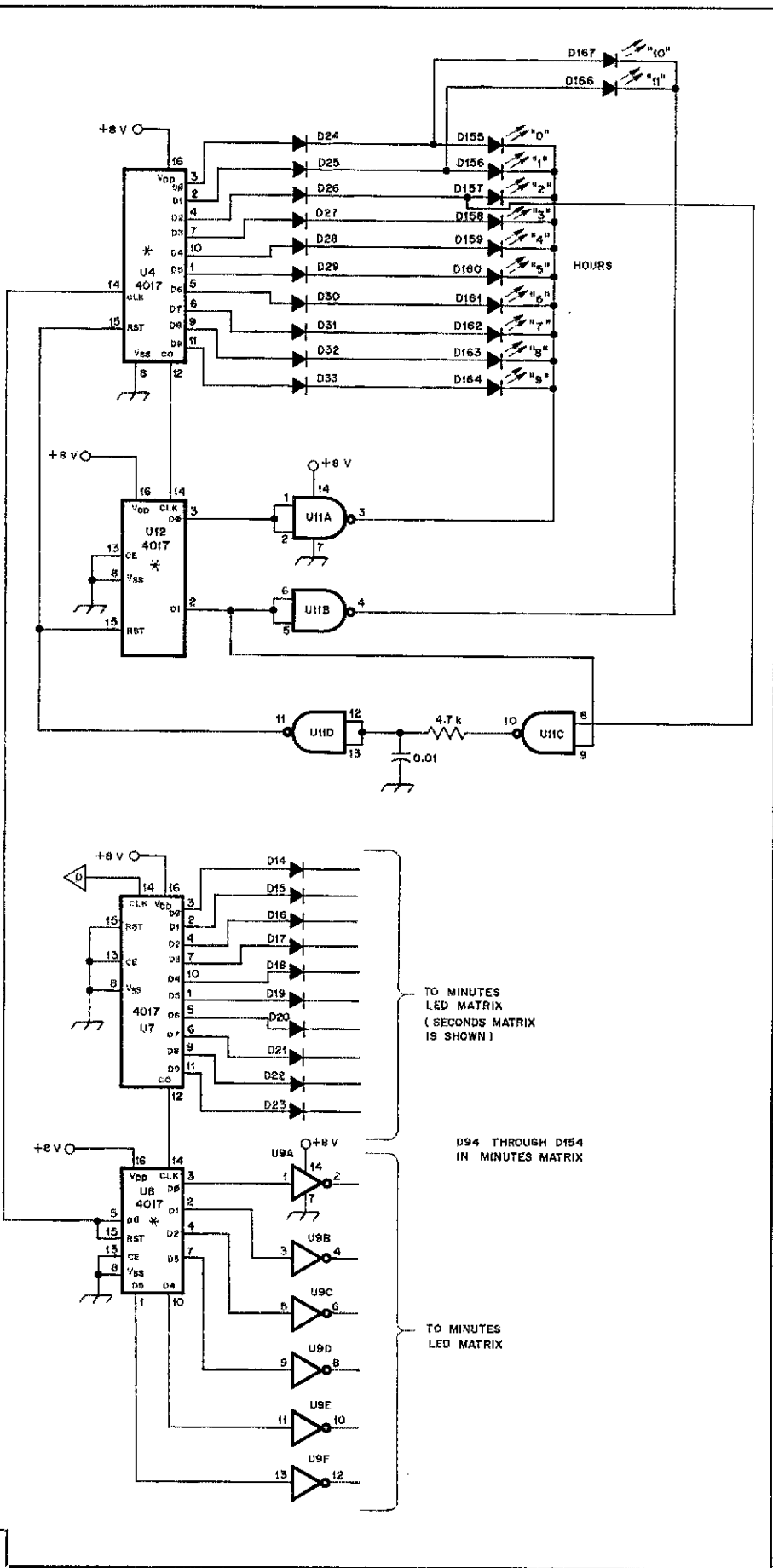


**Table 2**

**Circuit-Board Material Required for the Pizza Clock Cabinet<sup>1</sup>**

Quantity	Size
<b>Base</b>	
2	3-1/2 × 1-3/4 inches (sides)
2	4 × 1-7/8 inches (front and back)
1	4 × 3-1/2 inches (top)
<b>Face</b>	
1	8 × 5-3/4 × 3-1/2 × 5-3/4 × 8 inches (face)
2	8 × 1 inches (side panel)
2	5-3/4 × 1 inches (side panel)

<sup>†</sup> See note 1. (mm = in. × 25.4)



time numbers on the other.<sup>1</sup> The best way to build the clock is to break the assembly down into four stages. Each stage can be completed in an evening or two. First, build the base. Sand the edges of the pc board material using dry, 150-grit sandpaper and check for a tight, smooth fit between edges.

Tack solder the box together and again check for a proper fit. Once you're sure of the fit, solder along the inside edges of the pc material. Then file the outside edges of the box at a 45° angle to bevel the edges smooth. Now mount and wire the power-supply components and install the setting switches. These slide switches can be soldered to the box wall. Check the power supply for proper operation — output should be around 8 volts.

Next, construct the clock face. Follow the methods illustrated. A construction diagram for the clock face is shown in Fig. 9. Once the cabinet has been soldered together, buff both assemblies with steel wool until the copper shines brightly (steel wool leaves an oily finish that can be cleaned away with a damp cloth). After buffing the parts, spray a clear protective finish on the board to prevent tarnishing (Polyurethane varnish in a spray can works best).

The third step is to wire the IC portion of the circuit. If the circuit-board pattern is used in making the clock, the GND and +V pins of the wire-wrap sockets can be soldered to hold them in place. Try to wire-wrap the connections so there are no more than two wraps on each post. When the wiring is completed, place the RUN/STOP switch in the STOP position and apply power. A multimeter (set to the 10-V dc or greater range) attached to pin 1 of U3 should rise and fall at one-second intervals; this indicates proper operation of the timing chain. For precise timing, a frequency counter should be attached to pin 7 of U1. Adjust C1 for a reading of exactly 3.579540 MHz.

Finally, the LEDs are installed and

U2, U3, U4, U6, U7, U8, U10, U12 — 4017 CMOS decimal counter IC.

U5, U9 — 4049 CMOS hex inverting buffer IC.  
U11 — 4011 CMOS quad 2-input NAND gate IC.

<sup>1</sup>Complete parts kits, including components and cabinet parts, are available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002. The pc-board patterns for the clock are available from ARRL Hq. for a business-size s.a.s.e.

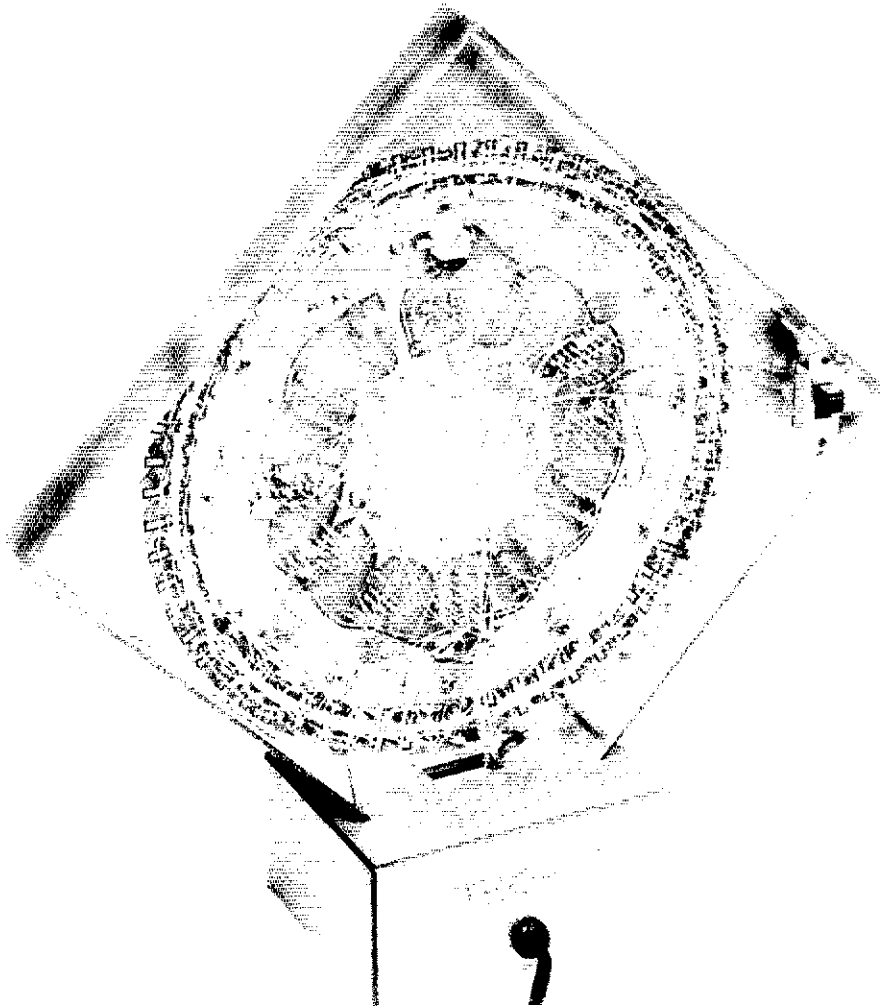


Fig. 8 — Rear view of the Pizza Clock face.

wired in. This is the most time-consuming portion of the assembly. Count out 120 LEDs from the 132 required and bend the cathode lead (usually the short one) into the shape of an L as shown in Fig. 10A. Mount the LEDs in groups of 10 in the minutes and seconds holes with the cathode leads outside (Fig. 10B). Drop a little epoxy on each LED to secure it and

solder the cathode leads of each 10-LED group together. Now mount each hour LED (securing it with a drop of epoxy) and solder a 1N914 diode to each anode. Solder diodes to the anode of each minute and second group also. Wire-wrap wire is used to connect the LEDs to the counter ICs; it is best to solder to the LED terminals.

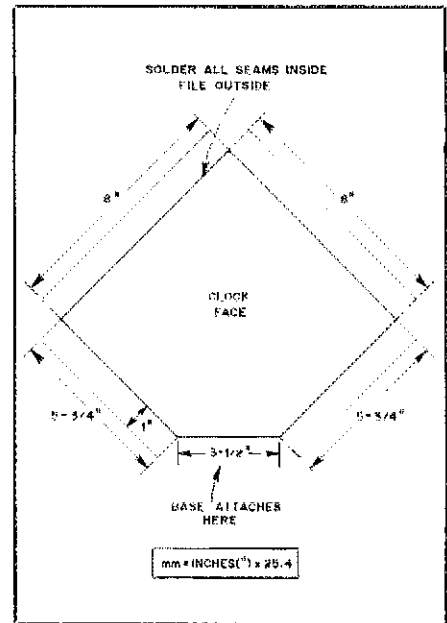


Fig. 9 — Method of assembly for the clock face.



Fig. 10 — (A) The minutes and seconds LED cathodes are bent in this shape prior to mounting. (B) Each cathode of a 10-LED group is soldered as illustrated.

The large number of connections in the Pizza Clock allows lots of room for error. Check each connection against the schematic diagram *before* applying power. If all is okay, the clock should start running immediately. Each setting switch is self-explanatory. What's your next wire-wrapping project going to be? QST

## Strays

### ATTENTION HIGH SCHOOL SENIORS

□ The Atlanta Radio Club will award three \$500 scholarships to graduating high school seniors entering an accredited college or university in the fall of 1983. Recipients must be duly licensed Amateur Radio operators at the time of application. Completed applications and high school transcripts must be postmarked no later than July 31, 1983. For more information and application forms, write to Phil Latta, W4GTS, Secretary, Atlanta RC Scholar-

ship Committee, 259 Weatherstone Pkwy., Marietta, GA 30067.

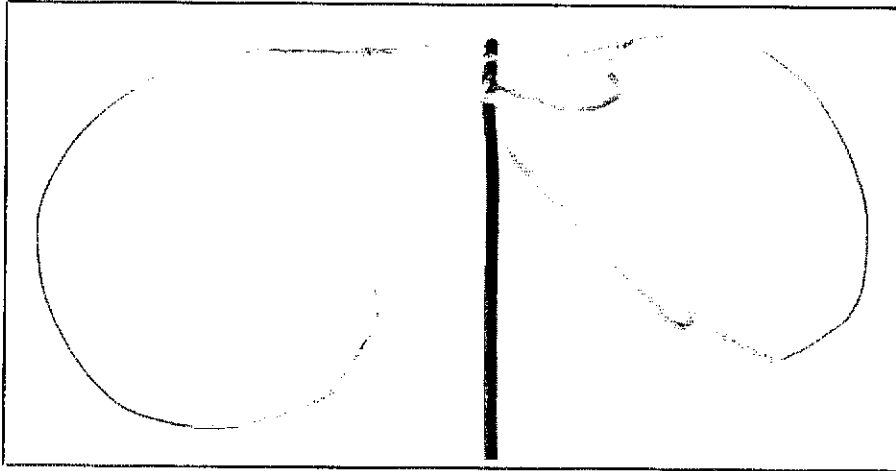
### IS YOUR EVENT ACCESSIBLE?

□ I would like to urge all radio clubs who sponsor flea markets, auctions, club meetings, hamfests or any other event to include in their announcements whether they are wheelchair accessible. It is very discouraging to travel great distances in anticipation of fun and be greeted by stairs or other stumbling blocks to us hams who

are real mobile stations on wheels. — *Steve Rich, WA1DFL, Revere, Massachusetts*

### FRED BERRY, W0MNN

□ Electronics inventor and designer Fred M. Berry, W0MNN, of Leawood, Kansas, became a Silent Key on January 6. He was 69. A very active operator in the early days of single sideband, Fred had a hand in the first post-WW II ssb rig in the Midwest. He also wrote articles on that subject for *QST* in the late 1940s and the early 1950s.



# Wire Antennas for the Beginner

Every ham knows how to make and install wire antennas. But if you've never done it, you probably have a few questions. Here are some answers.

By George H. Woodward,\* W1RN

**A**h, spring — when girls' thoughts turn to boys and boys' thoughts turn to baseball. But if you're a ham of either sex the pleasant weather probably inspires thoughts of improving your antenna farm. Although many experienced amateurs insist that an antenna will work best if it's installed during a howling blizzard, such an approach is a bit intimidating for a newcomer. There's no need to fight the natural elements until you've mastered the electrical and mechanical elements.

## Do it With Wire

Almost every ham likes to experiment with antennas. Your first antenna very likely won't be your last, but you have to start somewhere. Towers and beams are great, but save all that money and effort for later and start with a wire antenna. Why wire? "Skyhooks" made with wire are relatively inexpensive compared to aluminum-tubing types. And they're easy: easy to build, easy to install, easy to disguise and easy to modify.<sup>1</sup> Further, wire antennas are fun to experiment with. Your practical experience will bring your antenna textbooks and tutorial articles to life. Finally, making wire antennas is a rite of passage — you haven't really paid your

dues until you've successfully deployed one or two.

Convinced? Good. But there are so many different antennas — which one should you start with? Here are several considerations that will influence your decision:

- 1) Safety
- 2) Available real estate
- 3) Available supports
- 4) Single-band or multiband operation
- 5) Possession of or need for a Transmatch

6) Type of operation (stateside or DX)  
There may be some compromises inherent in these conditions. For example, if your goal is to work the long path between New England and Japan consistently on 80 meters, you won't make it with a 40-foot wire that's only 20 feet above ground.<sup>2</sup> Above all, follow this safety rule: *Never install an antenna where it can contact a public utility wire.* You may have a pair of 70-foot trees perfectly positioned to support a wire beam aimed at your favorite DX area. But if a power line runs between the trees, forget it.

If you have plenty of room for a real antenna "farm," then a separate antenna and feed line for each band is the way to go. Space is a real constraint for most of us, though, and we usually must ask a single antenna system to work on several bands. A modest multiband radiator can provide satisfactory results if your expectations aren't too high. A reasonable and

realizable goal for a Novice station using one antenna on four bands is to work all states and Canadian provinces, along with some casual DX (Europe and South America for East Coast stations, and Japan and Australia for West Coast stations).

The most common multiband system in use today is a random-length wire coupled to the transmitter or transceiver through a Transmatch, as sketched in Fig. 1. The beauty of the method is its simplicity — just get the flat top portion of the radiator as high as possible, using whatever safe supports are available. Here's the major drawback: You'll need a Transmatch (also called an antenna tuner or antenna coupler) to transform the antenna feed-point impedance to a value the transmitter can deliver power into. A Transmatch is an extremely useful device, but it would be nice if you didn't have to use one, especially if you've just spent your last penny on a transceiver.

The other "rub" is the ground connection. If the radiator is near an odd multiple of a quarter wavelength, a poor ground connection will degrade the radiation efficiency. If the radiator is near a multiple of a *half* wavelength, a poor ground can introduce "rf-in-the-shack" problems. Symptoms of this malady include rf burns from equipment chassis, erratic keyer operation, automatic shut-down of solid-state transmitters and poor VFO notes. If you can locate your station

<sup>1</sup>Notes appear on page 38.

\*143 Carroll St., New Britain, CT 06053

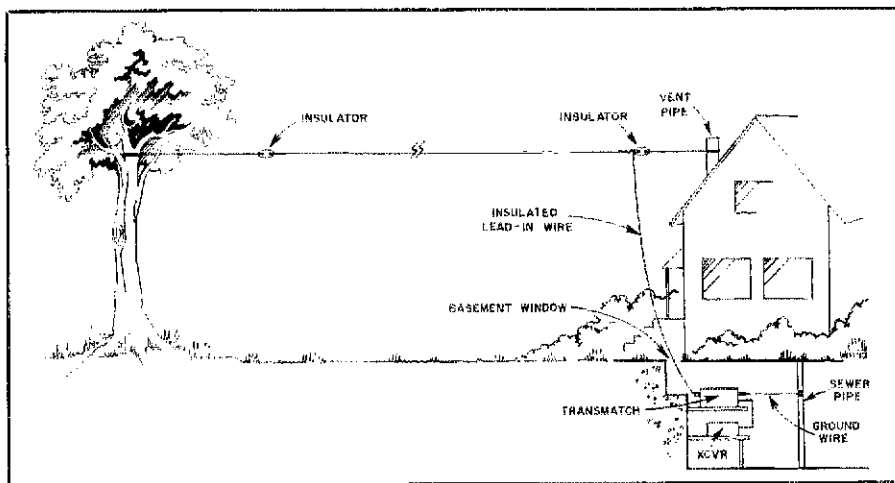


Fig. 1 — A typical end-fed random-wire antenna usable on all hf bands. The assets and liabilities of this system are discussed in the text.

in a basement utility room, the cold water inlet and/or sewer pipe will provide a good ground almost free. The shield braid from RG-8/U coaxial cable makes a good grounding strap. Sand, scrape or brush the pipe and attach the strap with an automotive hose clamp. Test your grounding pipe with a VOM — you should read full ac line potential between the “hot” side of a power outlet and the pipe. If you don’t get this reading, your pipe probably has plastic couplings, which must be shunted with braid.

If you can’t operate from the utility room, the next best spot is a ground-floor room with a window. A few 6- or 8-foot copper-clad stakes driven into the soil just below the window may provide an acceptable ground.

It’s still possible to use an end-fed antenna from an upper floor, but it can get a little tricky. Water pipes aren’t much good as rf grounds up there, so you’ll have to use a *counterpoise* to create an artificial ground. A counterpoise is a quarter-wavelength wire (radial) that is connected to the Transmatch chassis at one end and open at the other end. One such wire is required for each band. They needn’t be straight, but can run around the baseboards. The open ends will have high rf voltage, so make sure they’re well insulated. A counterpoise supplies the “missing half” of the antenna system and will radiate a fair amount of energy. Your shack will be in the rf field when you use a counterpoise, but the equipment chassis should be cold. It should be possible to tame the rf in the shack by bonding all the chassis together and keeping all cables short. For safety you should still have a water-pipe connection or ground rod.

### Whys and Hows of the Hardware

There’s a lot of information in Fig. 1, but you might still have some nagging questions. For example, what size wire

should you use? Electrically, it doesn’t matter. Here’s why: The current in an antenna varies along its length, being zero at the ends and maximum at the center of a half-wavelength section. (A current maximum is called a current *loop*, and a minimum is called a *node*.) The ratio of voltage to current at any point along an antenna is called the *radiation resistance*. This has nothing to do with the wire resistance, but accounts for the work the antenna performs as a *transducer* in converting the electrical energy produced by the transmitter into an electromagnetic field. The radiation resistance is the equivalent value of resistance that would dissipate the transmitter energy as heat instead of radiating it as an electromagnetic wave.

A half-wavelength antenna installed at a typical height over typical earth has a radiation resistance of about 50 ohms at the current loop. The transmitting equipment used by most Novices can produce about 100 watts of rf output. These two pieces of information and Ohm’s Law will allow us to calculate the maximum current in the wire.

Recall that voltage equals current multiplied by resistance:

$$E = I \times R \quad (\text{Eq. 1})$$

and that power equals voltage multiplied by current:

$$P = E \times I \quad (\text{Eq. 2})$$

Substituting  $I \times R$  for  $E$  in Eq. 2 we get:

$$P = I^2 \times R \quad (\text{Eq. 3})$$

Solving for  $I$  yields:

$$I = \sqrt{\frac{P}{R}} \quad (\text{Eq. 4})$$

When we plug in 100 watts for the power and 50 ohms for the resistance, the cur-

rent comes out to be  $\sqrt{2}$ , or about 1.4 amperes. A bare no. 20 copper wire is good for 11 amperes dc in free air, so we can get away with a pretty small conductor for only 100 watts.

But the direct current rating can’t be strictly applied to rf service because of the *skin effect*, which causes rf current to flow only on the surface of the conductor. This means that a no. 20 wire couldn’t be counted on to withstand 6 kW in an antenna. On the other hand, the current has its maximum value in only one place in every half-wavelength section — the current gradually decreases toward the ends, so the low-current portions can act as heat sinks for the current loops. Perhaps that’s more theory than you were expecting, but now you understand why you can use skinny antenna wire with your 100-watt transceiver even though the power-supply cable is fat.

With the electrical matter disposed of, the question of wire gauge becomes one of strength, ease of handling, cost, availability and visibility. The strongest wire that’s suitable for antenna service is copper-clad steel, also known as Copperweld®. The copper coating is necessary for rf service because steel is a relatively poor conductor. Practically all of the rf current is confined to the copper, because of the skin effect. Copper-clad steel wire is outstanding for permanent installations, but can be difficult to work with. Kinking, which severely weakens the wire, is a constant threat when handling any solid conductor.

Enamel-coated “magnet wire” is a good choice for experimental antennas because it’s easy to manage and the coating protects the wire from the weather. Although it stretches under tension, this will have no serious electrical consequences in a random-length antenna such as the one sketched in Fig. 1. If periodic adjustment of the tension is a nuisance after the antenna has been installed, the wire can be prestretched. A local electric motor rebuilder might be a good source for magnet wire.

It doesn’t really matter whether the wire is insulated or bare (in the hf range, at least). Portions that could be touched by persons or animals, however, should be insulated to prevent shocks and burns. The lead-in in Fig. 1 is an example of a wire that should be insulated. This wire may be subject to some movement, so it’s best to use stranded conductors. Hook-up wire, speaker wire and even ac zip cord are suitable for this service. Solid or stranded wire can be used for the main radiator, provided the ends are properly prepared. This subject will be taken up shortly.

The next question might be “how high should the antenna be?” Almost invariably the answer is “as high as possible.” The height affects the radiation angle, azimuthal directivity, radiation resistance and ground losses. For Novice

work, there's no need to be concerned much about directivity, and matching the radiation resistance isn't a problem. But ground losses can eat up a large chunk of your signal if the antenna is too low. The "high as possible" rule has its limitations, too — DXers often argue that 200 feet is too high because of unfavorable radiation angle and other considerations such as feed-line loss. These arguments are academic for most of us — if you can get most of the radiator up 25 feet or higher, that should be satisfactory for many good contacts on all bands. *The ARRL Antenna Book* has a thorough treatment of the effects of antenna height.

What about length? So far, all we've said is "random," along with some references to fractional wavelengths. A *wavelength* is the distance between two points in the radiation field having equal intensity and phase. Wavelength is related to the speed of light and the signal frequency:

$$\lambda = \frac{c}{f} \quad (\text{Eq. 5})$$

where

- $\lambda$  = wavelength in feet,
- $c$  = velocity of light in space ( $\approx 9.8 \times 10^8$  ft/s)
- $f$  = frequency in cycles/s (Hz)

A wavelength at 7.1 MHz would be

$$\frac{9.8 \times 10^8}{7.1 \times 10^6} = 138 \text{ feet.}$$

Using the metric conversion factor given in note 2,  $138 \times 0.3048 \approx 42$  meters, which explains the name for the "40-meter" band.

To exhibit reasonable radiation efficiency an antenna should be at least a quarter wavelength long. Shorter antennas can be made to work well, too, but only if you pay careful attention to conductor and ground losses. So if you want the antenna of Fig. 1 to work on 80 meters, it should have a total length (flat top plus lead-in) of at least 60 feet. An end-fed antenna that is near a quarter-wavelength long is called a *Marconi*, and one that is near a half-wavelength long is called a *Hertz*. A 60-foot end-fed wire is a Marconi on 80 meters and a Hertz on 40 meters. If a 30-foot length is all you can manage, then 40 meters might be your lowest band, but you should give 80 a try anyway — you might be suprised.

You'll need insulators at the ends of the wire. High voltage exists at the free end of an antenna, so you can't just tie the wire to a tree. The tree is neither a good insulator nor a good conductor — it's a resistor. And a resistor is what's inside your dummy load. A perfect insulator would be transparent to your signal and a perfect conductor would reflect or reradiate it. But a tree will absorb and dissipate your signal and may even catch

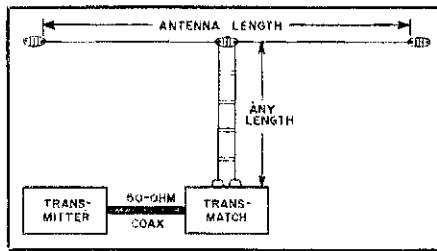


Fig. 2 — This classic antenna is back in vogue because of the widespread use of Transmatches with modern transceivers.

fire. For that reason, the radiator should terminate in an insulator outside the branches. Antenna insulators can be purchased from several *QST* advertisers, but it's easy to make your own. Quarter-inch-thick Plexiglas® is excellent insulating material for the hf bands and can be cut easily with a hacksaw. Drill holes near the ends for the wire loops to pass through, and chamfer these holes to reduce wear on both the wire and insulator. Both commercial and homemade insulators are shown in the title photo. Don't make the loops too tight — they should bear freely on the insulator holes. Twist the wire end back on itself and solder the splice thoroughly, filling in the crevices. Do this indoors if possible, because a cool breeze blowing on a long copper wire will suck the heat out of a soldering iron in no time. You may have to use a propane torch to solder outdoors. A liberal coating of clear acrylic lacquer will retard corrosion of the splice.

### Putting It Up

Buildings often have built-in antenna supports, or at least the inspirations for supports. Examples of these are chimneys, vent pipes and balcony railings. A couple of sections of TV mast strapped to a chimney can really put an antenna up in the clear. Watch those power lines, though!

Use nylon cord for the halyard between the antenna end insulators and the supports. Nylon is the material to use because it can withstand high shock loads. A diameter of 1/8-in. is sufficient for all but the heaviest antennas. Depending on the weave, this cord is called either no. 4 mason line or parachute cord. The halyard can be passed through an eye hook screwed into the top of a mast for hoisting.

The support for the antenna end away from the house is likely to be a tree. Getting a halyard into the highest part of a tree can be a challenge. The most direct approach is to climb the tree, but this is often impractical. The alternative is to propel the line by some mechanical means. Many ingenious methods have been devised for this task, including using a bow and arrow, fishing rod or slingshot. Stay away from harpoon guns and

nautical shot lines unless the tree is really high and the area is free of persons, animals or property that could be damaged.

If you're striving for only modest height, a small power transformer will carry a line over a branch and to the ground. Hold the line about 2 feet above the weight and sling it underhand for a healthy centrifugal boost. Streamline your projectile as much as possible to keep it from snagging branches and to make it easier to retrieve — several tosses will probably be necessary to get the halyard where you want it. Use very small line on the projectile and then tie on the heavier halyard and hoist it with the light line. Tape your knots to prevent snagging.

### What About Center Feed?

A random-length, end-fed wire can perform well, but there are situations that call for a different approach. Perhaps your house is *between* two good antenna supports. In such a case a center-fed antenna may be a good idea. A significant advantage of the center-fed configuration is that you don't need a ground to establish an rf current return. You still need one for electrical safety, but its length isn't important. A flat top of 65 feet or longer that is center fed with open-wire line is usable over the entire hf spectrum. Fig. 2 illustrates this versatile antenna. The lead-in doesn't radiate because the current in the two conductors is flowing in opposite directions at any instant. Because the conductors occupy almost the same space, the two fields cancel each other almost completely. The feeder should be dropped at right angles to the flat top to preserve the current balance.

A half-wavelength flat-top center fed with open-wire line is sometimes called a center-fed *Zepp*, after its end-fed cousin that was trailed from airships called zeppelins. Operated at the second harmonic, it becomes a *double Zepp*.

The Transmatch used to couple the open-wire feeder to a 50-ohm transmitter must be capable of working into a balanced load. Many commercial Transmatches have ferromagnetic baluns that are somewhat particular about the impedance they look into. A link-coupled Transmatch<sup>4</sup> is especially well suited for feeding open-wire line.

### Resonant Antennas

Most modern transceivers are designed to work into a 50-ohm resistive load. If the load deviates too far from this value, a solid-state transmitter will reduce power or trip off completely. Most hams who have solid-state rigs have resigned themselves to the seeming necessity for a Transmatch. Is there a way out? Of course — use an antenna whose feed line presents a proper load to the transmitter.

The simplest antenna that can be made

to present the proper impedance to a solid-state transmitter without a Transmatch is a half-wavelength dipole fed in the center with coaxial cable. A miniature model is featured in the title photograph.

Coaxial cable is a convenient transmission line because the rf current flows (in opposite directions) on the outside of the center conductor and the inside of the outer conductor. The field is contained within the outer conductor, so the cable is *shielded*. Ideally, no current flows on the *outside* of the outer conductor. This property makes coaxial cable easy to handle because it can be installed anywhere (and the outer conductor can contact anything) without upsetting the internal rf currents. (Practical considerations sometimes deface this beautiful picture, but we'll deal with them later.)

How long should a dipole be? Earlier, we derived a crude formula for wavelength, but the effects of insulators and loops at the wire ends weren't considered. The formula most often used for cutting an hf dipole is

$$l = \frac{468}{f} \quad (\text{Eq. 6})$$

where

$$l = \text{length in feet}$$

$$f = \text{frequency in megahertz}$$

This is the total length between the far ends of the insulator loops. The pigtail leads from the coax cable to the flat top are part of the radiator, too. Their length is significant at 28 MHz but practically unnoticeable at 3.5 MHz.

A popular variation of the horizontal dipole is the inverted V. This antenna is supported in the center and the ends droop to form an interior angle of 90 to 120 degrees. Don't make the angle any more acute than this because the fields from the two radiator halves will cancel just like a transmission line.

As you might expect, drooping the ends modifies the resonant frequency and feed-point impedance. Antenna impedance has been neatly explained by Hall in a recent *QST* article.<sup>5</sup> Bill Orr recently reported some length formulas developed for inverted Vs by Ohi, JA5COY.<sup>6</sup> The total length for a 120° inverted V is

$$l = \frac{465.6}{f} \quad (\text{Eq. 7})$$

For the 90-degree model the formula is

$$l = \frac{463.3}{f} \quad (\text{Eq. 8})$$

where *l* and *f* have the same meanings as in Eq. 6. Lengths for all three dipole configurations are given in Table 1. These are *starting* lengths. Proximity to metal structures (such as other antennas) may alter the resonant frequency and impedance.

The inverted V is attractive not only because it requires just one support, but

**Table 1**  
**Half-Wave Dipole Lengths for the Novice Bands**

Freq. (MHz)	Configuration Horizontal (Z ≈ 73 Ω)	120° inv. V (Z ≈ 50 Ω)	90° inv. V (Z ≈ 30 Ω)
3.725	125', 7-1/2"	125'	124', 4-1/2"
7.125	65', 8-1/4"	65', 4"	65', 1/4"
21.15	22', 1-1/2"	22'	21', 10-3/4"
28.15	16', 7-1/2"	16', 6-1/2"	16', 5-1/2"

also because it needs less horizontal space than a standard dipole. Some high-school geometry shows that the 80-meter Novice dipole from Table 1 needs only 109 linear feet when configured as a 120° inverted V and can be shoehorned into 89 feet if the apex angle is 90 degrees. The same geometry shows that the minimum pole height is 32 feet for the 120° model and 45 feet for the right-angle case. We'd like to keep the ends at least 10 feet off the ground to prevent detuning or accidents (the ends can have high voltage, remember?). That calls for an apex height of 55 feet, which may be difficult to achieve with an existing or inexpensive support.

But we can soften the height requirement by taking some liberties with the antenna ends. For example, if you must use a 90-degree inverted V and have only a 45-foot apex support, the antenna ends would just touch the ground. If we can bend a dipole in the vertical plane, however, we can bend it in the horizontal plane as well. Simply tie off the last 14 feet of each leg horizontally. The horizontal portions will be the desired 10 feet above ground. The horizontal sections can extend outward in the plane of the V or can be perpendicular to the plane. If you run them perpendicular to the V, placing them on opposite sides of the V plane is preferable to placing them on the same side. This is because the fields from the extensions will partially cancel each other if the conductors are parallel. The small loss of radiation isn't important but the resulting change in impedance and resonant frequency may be tricky to deal with. Similarly, don't run the extensions in toward the support if you don't have to — this can also complicate the adjustments.

#### Dipole Details

Techniques for putting up a dipole are similar to those for putting up an end-fed random-length wire. The dimensions need to be measured carefully, of course, to permit feeding the antenna without a Transmatch. Other than that, the only new ground to cover is the center insulator and the feed line.

The center insulator serves as an attachment point for the feed line. In addition, this component is the suspension point in an inverted V. Center insulators are available commercially, but here again it's cheaper to make your own. A Plexi-

glas® center insulator is shown in the title photo. It's made in much the same way as an end insulator except for some additional holes to anchor the feed line. A hole or notch at the top of the insulator locates the coaxial cable and two smaller holes on either side allow a locking cable tie to be passed through the insulator and around the cable. Notice how the cable is routed up the back of the insulator, over the top and down the front.

This arrangement serves the dual purposes of strain relief and moisture resistance. Having the pigtail leads pointing down forces water to overcome gravity to enter the cable. Water can still migrate up (and down) the braid by capillary action, so a dab of RTV sealant at the cable end is in order. Solder the pigtail leads to the wire loops and spray some clear lacquer on the connections.

A dipole center insulator needn't be as long as an end insulator. That's because the center is a current loop, where the voltage is minimum (voltage node). Voltage as a function of power and resistance is given by

$$E = \sqrt{P \times R} \quad (\text{Eq. 9})$$

where

$$E = \text{rms potential in volts}$$

$$P = \text{power in watts}$$

$$R = \text{resistance in ohms.}$$

Since a typical Novice transmitter puts out about 100 watts and we're shooting for a resistive impedance of 50 ohms, the potential will be  $\sqrt{100 \times 50}$  or 70.7 volts, which doesn't require much of an insulator.

Now we come to the feed line. I recommend RG-58/U cable because it's light, easy to handle and relatively inexpensive. True, it is lossier than the larger RG-8/U, but unless you're using 100 feet or more at 28 MHz, the difference isn't significant. For long runs, you can compromise by using RG-8/U for the major section and RG-58/U for the portion that hangs from the center insulator. The radiator doesn't support the feed line on an inverted V, so you can run RG-8/U all the way up if desired.

The title photo shows the center conductor and dielectric neatly separated from the shield braid, but it doesn't show how to separate them. This process is explained in Fig. 3. You'll need a connector at the station end of your feed line. Most likely, your equipment will have an SO-239 (UHF female) receptacle, for which you'll need a plug from the PL-259 (UHF male) family. Fig. 4 illustrates the assembly procedure for common combinations of cables and connectors.

If you use the solder-on style of connector, soldering the braid can be tricky. In general, coaxial cable braid coverage isn't what it used to be, so don't be discouraged if you're not successful on the

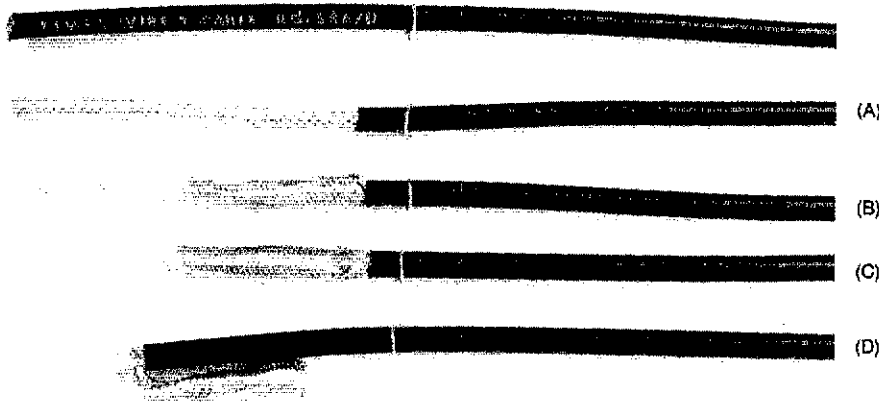


Fig. 3 — The conductors of a coaxial cable can be separated in four easy steps. A — Remove the outer sheath with a knife, being careful not to nick the braid. B — Push the braid accordion fashion against the sheath. C — Make a hole in the braid by separating the strands. D — Bend the cable at the hole and pull the center conductor and dielectric through.

first attempt. When the braid is sparse, pretinning it will ease the soldering job. Use a big iron or gun to solder the braid through the connector body holes — the pencil iron you use for pc boards just won't cut it. The idea is to heat the connector body *quickly* to soldering temperature and remove the iron as soon as possible. If you have foam-dielectric cable, the foam will bubble and ooze through the holes if you heat the body too long. When the connector assembly is complete, check for short circuits and continuity with a VOM.

### Making it Work

Once the dipole is up, it's time to test it. The first thing to do is listen for signals. If the band isn't active, listen for natural or man-made noise — alternately connecting and disconnecting the antenna should have a marked effect on the background noise if the receiver sensitivity is adequate. Failure of this test means something has gone wrong — perhaps there's a short circuit or a connection has fallen apart.

The transmitting test depends on the equipment you have. If you have a transmitter with tube finals (and tune and load controls), just fire it up into the feed line. If the controls behave normally, that is, produce the proper plate dip and loaded current without running out of range, that's good enough — test no more.

You can try something similar with a solid-state rig, too. The test here is to see if the transmitter will draw the rated collector current with the same drive level used with your dummy load. These transmitting tests are best conducted when the band isn't too active, meaning daylight hours for 80 meters and late night for 10.

If the transmitter won't deliver power to the antenna, some different tests are called for. Ask a friend with a higher-class license to try to find the resonant frequency by trying several spots across the band. If the antenna resonates at a frequency

that's 5% too low, shorten the wire by the same percentage and try again. If the antenna doesn't resonate inside the band, you can find the resonant frequency with a noise bridge and a general-coverage receiver.<sup>7</sup>

Suppose the antenna resonates in the band, but the system just won't take power. In that case, the SWR is probably too high for your transmitter. The radiation resistance of a horizontal dipole can be altered without significantly affecting the resonance by changing the height. Inverted V antennas are a little easier to tune. Lengthening the radiator will lower the resonant frequency, of course, but sharpening the apex angle will lower both the resonant frequency *and* the radiation resistance. The Novice subbands are only 50- and 100-kHz wide, so it should be possible to achieve an SWR of 1.5:1 or less across this segment. Any transmitter should be happy with that.

What if everything is cut right and it still won't load up? It sometimes happens, and to explain why we must expose the imperfection of coaxial feed. Recall that the transmission-line current in coaxial cable flows on the outside of the center conductor and on the *inside* of the outer conductor. The current is confined to the inner surfaces by induction and the skin effect. The skin effect completely isolates the inside of the shield from any currents that may be flowing on the outside. The outside of the shield becomes a *third conductor* connected to the feed point. Depending on the length and routing of the cable, this conductor can severely detune the dipole. It is this effect that sometimes causes the SWR reading to change radically with the length of the feed line, in apparent defiance of transmission-line theory.

The solution is to choke off or decouple the outside of the cable. One way is to attach an earth ground to the shield an odd number of quarter wavelengths from the feed point.<sup>8</sup> This ground will be

transformed into a very high impedance at the feed point, keeping rf current off the shield. The limitation of this approach is that it only works on one band or bands that are odd multiples, 40 and 15 meters for example. If you need a broadband decoupler, some excellent designs are described by Cooper and Reiser.<sup>9,10</sup>

Antenna current can appear on your cable from *induction* as well as conduction. Induction can be minimized by orienting the feed line as symmetrically as possible with respect to the radiator, running the cable at right angles to the antenna. Chances are, you won't need any extra devices at the feed point. Direct coaxial feed usually works fine.

### Multiband Dipoles

Separate dipoles for each band is an excellent antenna system if you have room. That's a pretty big "if"! A practical multibanding scheme that avoids a Transmatch is to excite several dipoles from a common feed point. Electrically, this arrangement places the antennas in parallel. The interaction isn't too severe, however, because a dipole exhibits a high impedance when operated at a frequency that is far removed from resonance. An 80-meter dipole, for example, shows a very high radiation resistance on 40 meters. Taking the opposite case, a 40-meter dipole fed with 80-meter energy has a low radiation resistance but very high reactance. In either case, the antenna current (and therefore the radiation) is very small. The current applied to the feed point of a multiband dipole takes the path of least impedance, automatically selecting the proper-length radiator.

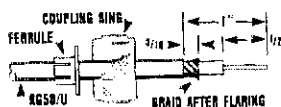
### A Four-band Novice Dipole

Here's one you can build! It covers the Novice segments of 80, 40, 15 and 10 meters, and you should be able to use it without a Transmatch, even if it takes some cut and try. Fig. 5 shows the configuration in a single plane. The radiating elements need not lie in a single plane, however. In fact, my model had the 40/80-meter inverted V skewed about 45° with respect to the 10/15-meter dipole.

Open-wire line is used for the elements for ease of fabrication. It's a simple matter to measure and assemble a 22-foot piece of the line and then cut back one conductor on each side to the proper length for 10 meters. You can do the same thing for the 40/80-meter sections, but you can reduce the amount of open-wire line needed by splicing on a single wire for the 80-meter extension. Open-wire line is sold by several *QST* advertisers, but you can probably obtain it locally from a TV parts jobber. It comes with a characteristic impedance of 300 or 450 ohms. Use either one.

Some of the element lengths given in Fig. 5 deviate considerably from those listed in Table 1. This is because the

### 83-58FCP



1. Strip cable — *don't nick braid, dielectric or conductor*. Slide ferrule, then coupling ring on cable. Flare braid slightly by rotating conductor and dielectric in circular motion.



2. Slide body on dielectric, barb going under braid until flange is against outer jacket. Braid will fan out against body flange.



3. Slide nut over body. Grasp cable with hand and push ferrule over barb until braid is captured between ferrule and body flange. Squeeze crimp tip only of center contact with pliers; alternate-solder tip.

### 83-1SP PLUG (PL-259)



1. Strip cable, *don't nick braid, dielectric or conductor*. Tin exposed braid and conductor. Slide coupling ring on cable.



2. Screw body on cable. Solder braid through solder holes. Solder conductor to center contact.



3. Screw coupling ring on body.

### 83-1SP PLUG WITH ADAPTERS



1. Strip jacket. *Don't nick braid*. Slide coupling ring and adapter on cable. Note — use 83-168 (UG-175) adapter for RG-58/U and 83-185 (UG-176) for RG-59/U, RG-8M or RG-8X.



2. Fan braid slightly, fold back over adapter and trim to 3/8". Strip dielectric and tin exposed conductor. *Don't nick conductor*.

3. Screw body on adapter. Follow 2 and 3 under 83-1SP plug.

Fig. 4 — Cable stripping dimensions and assembly instructions for several popular coaxial cable connectors. This material courtesy of Amphenol Electronic Components, RF Division, Bunker Ramo Corp. (Dimensions on this drawing are in inches.)

Novice bands don't have an exact harmonic relationship and the nonresonant sections couple reactance into the working section. The only way to tune out this reactance is to adjust the element lengths. While the interaction necessitated a lot of adjustment, the shortening of the 80- and 40-meter sections is a blessing, in that less height and horizontal space are required. The 10-meter dipole (actually somewhat a "noninverted V") had to be made a little longer than formula, but the 15-meter antenna was about right. Start with the lengths in Fig. 5, but be prepared to make some adjustments for your installation.

The supports for this antenna need be only 22 feet apart. Perhaps your house has a chimney and vent having this much separation. Then the inverted V can straddle the peak of the roof. The test model had an apex angle of about 120°.

Here's a final word of caution about multiband antennas — they don't discriminate against harmonics. That means you must be careful to tune up your transmitter properly, especially if it's one of the older oscillator-multiplier types. If the plate current dips at more than one position of the tuning control, use the dip corresponding to maximum plate tank capacitance.

I installed this antenna on the roof of

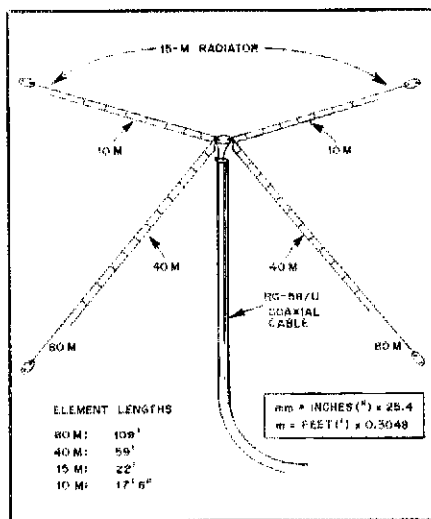


Fig. 5 — A multiband dipole that will work over all four Novice bands without a Transmatch. Construction details are given in the text.

the headquarters building on Ground Hog's Day, with the help of Mike Kaczynski, W1OD. We put it up in a temporary fashion in balmy (for winter) weather. We didn't have the time-tested performance advantage gained from

erecting it during a howling blizzard, but the thing (surprisingly) has survived three major snowstorms. As soon as it was up and trimmed, I answered the first CQ I heard on each of the four Novice bands. Starting at about 8:30 in the morning I worked Vermont on 80, Kentucky on 40, Luxembourg on 15 and Germany on 10, all with good signal reports. Not a world-beater by any means, but entirely respectable. Have fun with *your* antenna. Despite what others may tell you, start now, while the weather is nice!

#### Notes

- 'D, DeMaw, "Antennas for Those Who Can't Have Antennas," *QST*, Feb. 1983, pp. 15-17.
- meters = feet × 0.3048, mm = in. × 25.4.
- 'G. Hall, ed., *The ARRL Antenna Book*, 14th ed. (Newington, CT: The ARRL, Inc., 1982), pp. 2-16 to 2-23.
- The ARRL Antenna Book*, pp. 4-5, 4-6.
- 'Hall, "A Simple Approach to Antenna Impedances," *QST*, March 1983, pp. 16-19.
- 'W. Orr, "Ham Radio Techniques," *Ham Radio*, Dec. 1982, p. 58.
- 'G. Woodward, ed., *The Radio Amateur's Handbook*, 60th ed. (Newington: ARRL, 1983), pp. 16-34 to 16-36.
- 'R. Dome, "Balanced Dipole Antenna Fed By Coaxial Cable," (Technical Correspondence), *QST*, May 1979, pp. 43-44.
- 'W. Cooper, "The Coaxial Cable Balun," *Hints and Kinks for the Radio Amateur*, 11th ed. (Newington: ARRL, 1982), pp. 5-10, 5-11.
- 'J. Reiser, "A Simple and Efficient Broadband Balun," *Ham Radio*, Sept. 1978, p. 12.



## SIMPLER RTTY DIVERSITY COMBINER

I was intrigued by George Woodward's RTTY Diversity Combiner in the September 1982 Hints and Kinks column. After giving some thought to the circuit, I realized that it included more parts than necessary. There are two logic inputs, A and B. If they agree (both 1 or both 0) then the output is the same. If they disagree, however, the desired output must be the opposite of what it was the last time the inputs agreed. This requires another variable, C, representing the value of A and B the last time they agreed. The Schmitt trigger hysteresis in W1RN's circuit provides this function.

I did some work with truth tables and Karnaugh maps to show that the logical function of Eq. 1 provides the desired result:

$$AB + (A + B)\bar{C} \quad (\text{Eq. 1})$$

C can be generated by a simple R-S flip-flop, which can be implemented using NAND gates.

Fig. 1 shows a RTTY Diversity Combiner that requires 8 NAND gates. My unit uses two SN7400N quad NAND gates, with no other parts. The total cost was about \$1.20. — *Carl Hayes, KD5BH, Dallas, Texas*

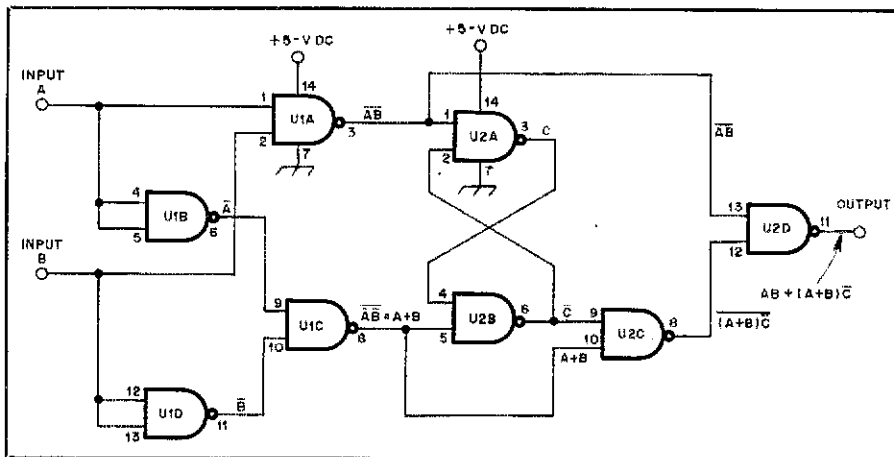


Fig. 1 — Schematic diagram of a simplified RTTY Diversity Combiner requiring only two ICs.

## INEXPENSIVE 30-METER BEAM ANTENNA

In about two months of operating on the new 30-meter band I have worked all 50 states and over 50 countries. My antenna is simple but effective. It is a rotatable inverted V beam. Fig. 2 shows the construction details. The antenna boom is suspended from a tree branch about 50 feet in the air.<sup>1</sup> The antenna can be rotated 360° simply by moving the two ground stakes. All of the materials to build this antenna cost me less than \$25.

Eq. 2 gives the driven element length, Eq. 3 gives the director length, and Eq. 4 gives the element spacing that I used.

$$\text{D.E. length} = 476/f_{\text{MHz}} \quad (\text{Eq. 2})$$

$$\text{Dir. length} = 450/f_{\text{MHz}} \quad (\text{Eq. 3})$$

$$\text{Spacing} = 120/f_{\text{MHz}} \quad (\text{Eq. 4})$$

The feed-point impedance is around 30 ohms. I used a matching transformer made by connecting two 1/4-λ sections of RG-59/U coaxial cable in parallel. One end of the transformer connects to the antenna, and the other end goes to 50-ohm cable to the shack. Fig. 2B shows how this is wired. Perhaps the easiest method to join the two pieces of 75-ohm cable is to use coaxial T connectors. You should use a balun at the antenna feed point to prevent rf from flowing on the outside of the shield strand.

I also built an antenna of this type for 40 meters, and it works great. I guess the key word is rotatable! — *Jon Ferrara, N9DWR, Chattanooga, Tennessee*

## LOW-COST ANTENNA WIRE

Radio amateurs frequently need low-cost copper wire for use in antenna systems. The wire is needed for radiators as well as for on-ground or buried radial systems. Having faced that need

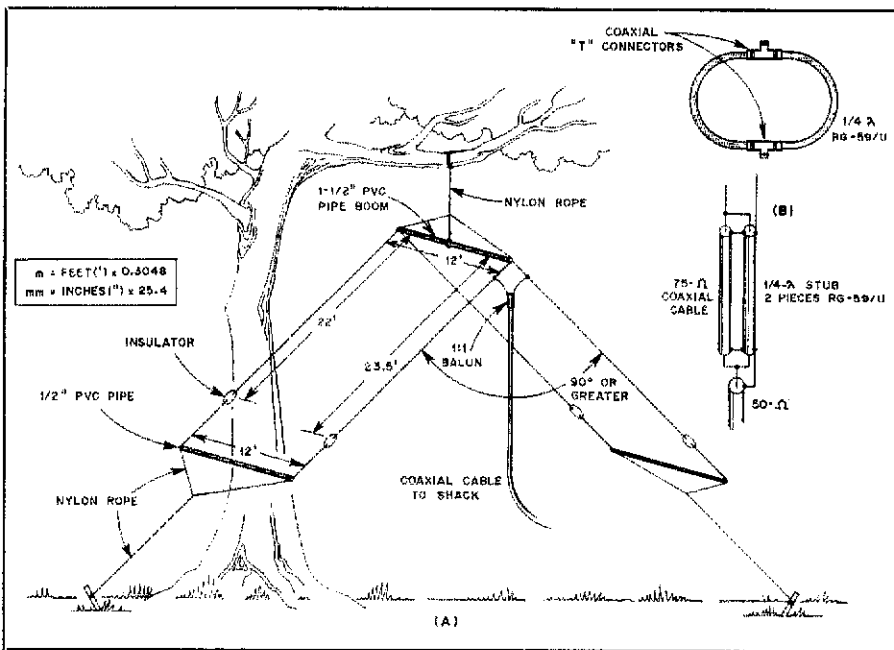


Fig. 2 — Construction details for a 30-meter inverted V beam are given at A. A coaxial-cable impedance-matching transformer is shown at B.

a number of times myself, and being a chap who objects to paying premium prices for such ordinary material, I sought some low-cost sources of suitable wire. You may find this information useful when you begin to accumulate material for that next antenna project.

Multiwire rotator cable for TV antennas is an excellent source of wire for many amateur antenna systems. The five-conductor cable from Radio Shack (15-1201) contains no. 20 wire. A 100-foot length sells for \$10. By separating the five lines from one another you end up with 500 feet of insulated wire, which calculates out to 2 cents per foot. I have used this cable many times to put down a radial system. The conductors pull apart easily, and each retains a coating of plastic insulation.

Another type of wire that I have used extensively for the radiating elements of antennas is

two-conductor speaker or "pot" cable. It has a heavy plastic insulating material that lends strength to the wire. This is especially useful for dipoles or similar antennas. As is the case with rotator cable, the individual conductors can be pulled apart to form separate insulated wires. Radio Shack light-duty cable (278-1387) costs \$5.99 per 100 feet. The roll provides two lengths of no. 20 wire, which equates to 3 cents per foot. Not bad! Heavy-duty speaker wire (16 gauge) is also available from Radio Shack in 100-foot rolls at \$11.95 (278-1384). I have used this vinyl-insulated, two-conductor wire for balanced feeders with dipole antennas and 3-element wire Yagis during DXpeditions. I never measured the loss, but it seemed to perform okay at power levels up to 100 W.

Those wishing to put up long spans of wire (Beverage antennas and such) may want to con-

<sup>1</sup>mm = in. × 25.4; m = ft × 0.3048.

\*Assistant Technical Editor

sider using aluminum electric-fence wire. It is available from Sears, Roebuck and Co. in 1/4-mile-long rolls for a very low price. Another fine low-cost wire from Sears is no. 8 solid-aluminum wire with vinyl jacketing. It is listed as overhead power wiring for farms. The price per foot is very low. I have used this wire for buried radials. The insulation helps prevent corrosion of the aluminum conductor caused by soil acids or alkalis. Electric-fence wire, on the other hand, can dissolve in a few months when buried in some soils.

Finally, when seeking low-cost wire, don't overlook those deflection yokes from junked TV sets. They contain plenty of formvar-insulated magnet wire that is useful for winding coils and making lightweight antennas. — *Doug DeMaw, W1FB, ARRL Hq.*

## TAGS FOR SHACK-WIRING IDENTIFICATION

Recently, I was redoing my station wiring. I was making small tags to identify the interconnecting coaxial cables and affixing them with masking tape. My XYL Florence, WA1IKR, watched for a while, then left. She was soon back with a jar full of the plastic clips used to close bread wrappers. These clips have a small opening that is just right to fit over RG-58/U or RG-59/U coaxial cable. They can also be attached to power cords or to external speaker leads. Florence used a felt-tipped marking pen to write on the clips. The ink from most pens of this type will rub off, but we used a piece of clear cellophane tape over the tag to protect the label. [The ink from a Pilot permanent-marking pen will not rub off. — Ed.] Now it is easy to connect the individual cables that run from the receiver to antenna switch, between the amplifier and exciter, and the many other interconnecting wires that occupy the cable trough behind my operating table. This idea should prove especially useful for those who change equipment often, or for setting up a temporary station such as for Field Day operation. — *Stirling Olberg, W1SNN, Waltham, Massachusetts*

## QRP TRANSMITTER REMOTE CONTROL

My transmitter is a version of the W7ZOI "Universal QRP Transmitter."<sup>1</sup> I use this rig, along with a direct-conversion receiver for 40, 20 and 15 meters, at my home station and for portable operation. Trying to optimize the setup, I became concerned about the signal loss in the more than 50 feet of coaxial cable to my antenna.

I decided to mount my transmitter in the tree that supports the antenna and to key it from my operating position. A length of RG-59/U and a single +12-V dc lead go to the transmitter. A 12-V spdt relay in the transmitter connects the RG-59/U to the antenna for receive, or to the key lead on transmit. A dpdt switch on the receiver cabinet completes the control circuitry. On receive, the coaxial cable is connected to the receiver; on transmit, it is connected to the key. The second pole of the switch provides +12 V to the receiver or transmitter. Fig. 3 shows the wiring details. By mounting the transmitter close to the antenna more of the power is radiated, and that is important for successful QRP operation. — *Bert Halpap, W0KOA, Denver, Colorado*

<sup>1</sup>D. DeMaw, "Experimenting for the Beginner," *QST*, Sept. 1981, pp. 11-15.

<sup>2</sup>Feedback, Nov. 1981 *QST*, p. 50.

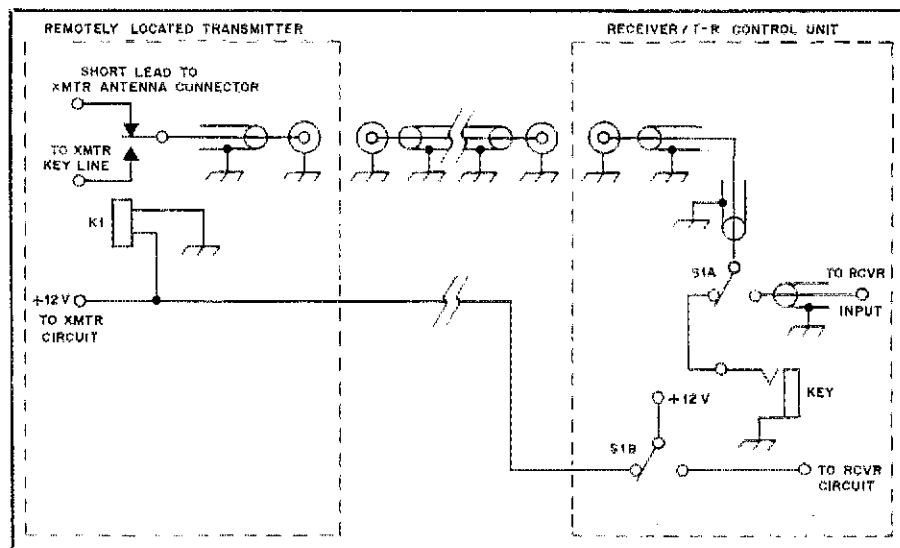


Fig. 3 — T-R control wiring used by W0KOA with his remotely mounted QRP transmitter.

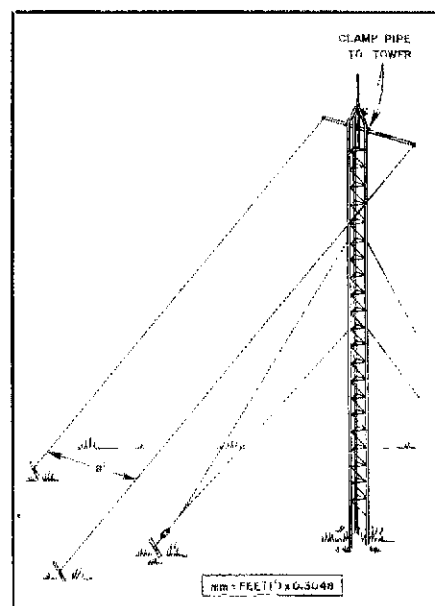


Fig. 4 — The method used by WA10EZ to raise a beam antenna without the guy wires getting in the way.

## RAISING BEAM ANTENNAS

I decided to replace a Mini-Quad antenna with a 4-element triband Yagi on top of my 50-foot tower. A set of guy wires at the 35-foot level prevented pulling the new antenna straight up the side of the tower. My plans also included installing a 2-meter beam above the Yagi. I clamped a 6-foot pipe to the top of the tower and stretched ropes from each end of it to the ground (Fig. 4). I secured the ropes with stakes about 8 feet apart on the ground.

By removing the rotator, I was able to lower the mast until about 1 foot extended above the top of my tower and secured it at the thrust bearing. The new beam was laid on the ropes and pulled to the top of the tower. I placed it over the mast, but did not tighten it in place. I raised the mast, secured the 2-meter beam, then slid the mast up to the final position. I installed the

rotator and positioned the triband antenna. One or two ground assistants are helpful to steady the slide ropes. — *Robert Mims, WA10EZ, Taunton, Massachusetts*

## TS-820S GOES TO MARS

Those interested in MARS activity must find a way to tune their rigs to frequencies just outside the amateur bands. For those using a TS-820S, with or without the VFO-820, a simple adjustment will allow almost full-band coverage, plus coverage of several MARS frequencies.

Either the VFO-820 or the TS-820S VFO can be adjusted in the same manner. The lower frequency limit will be 10 to 15 kHz above the lower band edge, but this would only affect Extra Class licensees. The upper frequency limit will be approximately 40 kHz above the amateur-band edge.

The modification procedure should take no more than 15 minutes, and requires no instrumentation. Remove the top of the VFO or '820S cover. Looking at the VFO with the dial facing you, remove the silver tape covering the two access holes on the top-left side of the enclosure. Set the band switch to 3.5 MHz and turn the power on. Rotate the main tuning knob to the upper limit (reading 4.000 on the display). Adjust the analog dial on the front of the VFO to read "blank 40" using the dial-calibrate knob behind the main tuning knob. Turn the rear adjustment screw until the digital display reads 4.040. Now, turn the main tuning knob to the lowest-frequency stop, and adjust the front screw so the digital display agrees with the analog dial (about 3.500 to 3.550). These two adjustments are interactive, so you will have to repeat the process several times. With some persistence, the digital readout will be synchronized with the analog dial from 3.510 to 4.040 MHz, or whatever limits are set. Do not adjust the exposed adjustment screw on the right side of the VFO top.

This adjustment will affect the other bands in a similar manner. If you ever want to reverse the modification, the band limits are returned easily with a similar procedure. — *E. Benson Scott II, M.D., AE5V, West Monroe, Louisiana*

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

## COLLINS 32S AND KWM TRANSMITTERS IN THE WARC BANDS

□ When this classic series of transmitters is first placed on the 30-meter band, it is often found that the transmitter has practically no grid drive to the final amplifier. It is tempting to simply trim the inductor nearest the rear of the tuning gang — the most critical one of the group. Unfortunately, this can create a parasitic oscillation near 17 MHz, detectable only with a second receiver.

A better solution is to obtain whatever grid current is available at a dial setting of 3 on the preselector logging scale (Fig. 1). Then peak the grid current by rotating each inductor *no more than one-half turn*. Next, peak the capacitors on 20 meters, as prescribed in the Collins manual, and then return to 30 meters for a second try with the inductors. By making no more than one-half turn at a time, you will avoid trouble. Be sure the receiver preselector is peaked correspondingly if you are in transceive operation.

If a general-coverage receiver is available, tune in the parasitic oscillation near 17 MHz and vary the driver plate inductance and the mixer capacitance, noting that the "parasite" occurs only when both these adjustments are not peaked at the same position of the tuning gang.

The 10-MHz power output may be less than that obtainable on 20, 15 and 10 meters, as the tank circuit Q is somewhat high for good efficiency (high circulating current). Reasonable output usually can be obtained with 225 mA of plate current. Do not tune for more current than this, or discoloration of the final tank coil may occur, indicating excessive values of circulating cur-

rent. — *Cliff Buttschardt, W6HDO, Los Osos, California*

## ABOUT "RUBBERING" CRYSTALS

□ Inductance-loaded VXO design is facilitated by the use of the graph in Fig. 2. The operating frequency varies from series resonance,  $\omega_s$ , downward.  $C_0$  is the equivalent parallel capacitance of the crystal;  $r$  is the ratio of  $C_0$  to  $C_1$  (equivalent series-branch capacitance of the crystal) and is the electrical equivalent of the mechanical elastance of the vibrating plate.  $L$  is the equivalent load inductance; it is made continuously variable by various configurations of adjustable capacitors. HC-6/U fundamental crystals have a  $C_0$  in the range of 5 to 9 pF and an  $r$  value in the vicinity of 250. Almost all fundamental high-frequency crystals have  $r$  values between the limiting values of 125 and 500, as shown by the dashed lines in Fig. 2. Stability varies roughly with the slope of the curve. For  $r = 250$ , the best compromise of range versus stability occurs at about 1.5 kHz/MHz. Stability at unregulated room temperature is about one part per million per hour. — *Frank Noble, W3MT, Bethesda, Maryland*

## NOTES ON COAXIAL BALUNS

□ [Editor's Note: The following is taken from a letter by John Belrose, VE2CV, to D. A. Christie, WB5KFP, who asked Belrose if the antennas he modeled in his Dec. 1982 QST article, "The Effect of Supporting Structures on Simple Wire Antennas," were fed using a balun or not, and what the effects of this were.]

The model antennas we built were all connected to the feed line through a coaxial balun of either a 4:1 or a 1:1 type. For the inverted-V dipoles, a 1:1 coaxial balun was constructed by sliding a decoupling sleeve ( $\lambda/4 \times 0.95$  long) over the RG-174 coaxial feed line. This arrangement proved to be unacceptable at 200 MHz.

We noticed a problem while making impedance measurements. When the rf bridge was "balanced," bringing one's hand near the feed line unbalanced it. The decoupling sleeve, which was formed from the braid of a coaxial cable, was then made "solid" by soldering; after this the bridge no longer became unbalanced when a hand was brought near. We did, however, notice asymmetry in the vertical-plane pattern of the inverted V, for vertical polarization measured in the plane of the antenna. This effect was more noticeable when a conducting support tower was employed (Figs. 3 and 4). The effect was attributed to an imperfect transformation in the balun.

We subsequently learned how to make better coaxial baluns for use at vhf and uhf, but we did not repeat our measurements while using them. The outer sleeve should be made of solid material and the coaxial cable should have a solid outer sheath, or be constructed from tubing of a similar size, with an insulated wire (of proper diameter for the desired impedance) running down the center. There should be sufficient air space between the coaxial cable and the inner wall of the sleeve so that dielectric material can be inserted to electrically "lengthen" the inner sleeve.

I mention *inner* sleeve because it has different electrical lengths on the inside and outside. The outer surface is excited by the radiated field, so from a radiation point of view the physical length is shorter than the electrical length by a factor that depends on the electrical diameter of the

\*Assistant Technical Editor

†F. Noble, "Phantom-Coil VXO," *Ham Radio*, Jan. 1982, p. 66.

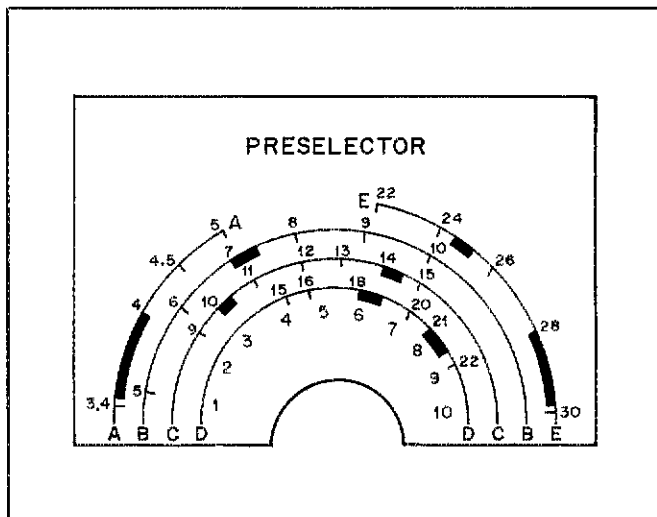


Fig. 1 — New preselector template (including WARC bands) for Collins S-Line and KWM transmitters.

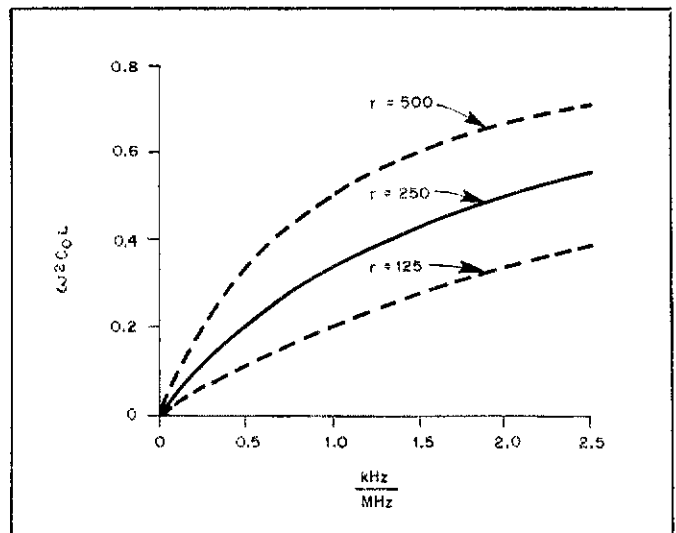


Fig. 2 — Graph used to aid in the design of VXOs.

sleeve. At vhf, this factor is 0.7-0.85. On the inside, the sleeve behaves like a transmission line. So for air dielectric the physical length is shorter than the electrical length by a factor of about 0.975. Hence, if the sleeve is "cut" to the right outside length, it is too short to be an electrical  $1/4\lambda$  on the inside. By dielectric loading (dielectric material should be low loss and have a constant of about 1.8), the electrical length on the inside can be made equal to that of the outside.

Let us now look at the effect of supporting towers on the patterns for an inverted-V dipole. In my *QST* article I showed only "symmetrical" smoothed patterns. In Figs. 3 and 4 are the unsmoothed, measured vertical-plane patterns for vertical polarization, measured in the plane of the antenna for  $\Delta = 90^\circ$  and  $127^\circ$ . You will notice that there is indeed some asymmetry, which is more marked for a conducting tower and at low elevation angles.

This effect is attributed to a slight unbalance in the feed to the dipole, and therefore I decided (for my *QST* article) to plot a smoothed symmetrical pattern. The field strength plotted was the geometric mean value at each elevation angle. Since care was taken to construct the balun, and yet the pattern unbalance at low elevation angles (say  $10^\circ$ ) can be as much as 5 dB, I conclude that without a balun the bidirectional nature of the antenna would be completely spoiled . . . but I do not have any measurements to verify this.

Incidentally, I have been reexamining our notes on these antenna measurements, and I have noticed that the inverted-V having a  $\Delta = 127^\circ$  was almost a perfect match for the 50- $\Omega$  feeder. The impedance of the half-wave dipole was 67  $\Omega$  (should have been 72  $\Omega$ ), and the impedance of the inverted-V for a  $\Delta = 90^\circ$  was 36  $\Omega$ . My statement in the *QST* article that a configuration of  $\Delta = 90^\circ$  provides a better match to 50- $\Omega$  feed line than a horizontal dipole does was therefore not correct. However, if you wish to work DX, the configuration of  $\Delta = 90^\circ$  provides better low-angle radiation in the plane containing the antenna.

I should emphasize, so that there will be no misunderstanding, that the extreme sensitivity to any unbalance is only for the vertically polarized field. The balun was "plenty good enough" for the horizontally polarized field in the orthogonal directions . . . the pattern was symmetrical. — *John S. Beirose, VE2CV, Aylmer, Quebec*

### LEGAL WIRE SIZE

Over the years, I have read numerous articles concerning so-called "invisible" antennas made of small-diameter wire. The appearance of a recent article in *QST* prompts me to observe that many hams are apparently unaware of the National Electrical Code Table 810-52 — which specifies that the minimum size of antenna conductors be *no. 14*.

Amateurs should consider the possible implications of presenting a claim to an insurance carrier as the result of a liability caused by an antenna erected in violation of this code. — *William H. Tilton, K7OKC, Centralia, Washington*

### POWER-TUBE FILAMENT CONSIDERATIONS

When the filament opened up on my 8877 tube, I found that I couldn't pick up a \$1.98 replacement at the corner drug store. I figured

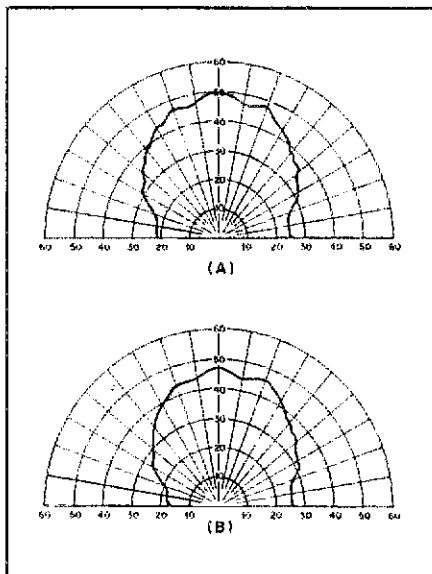


Fig. 3 — Vertical-plane polar diagrams of  $1/2\lambda$  inverted Vs, for vertical polarization measured in the plane of the antennas. The angle between dipole arms ( $\Delta$ ) is  $90^\circ$  in both cases. A nonconducting support tower is used in A, and a conducting support in B. Note increased asymmetry in B. [The patterns are drawn on a linear scale and are not in *QST* style. They are included for relative comparison only. — Ed.]

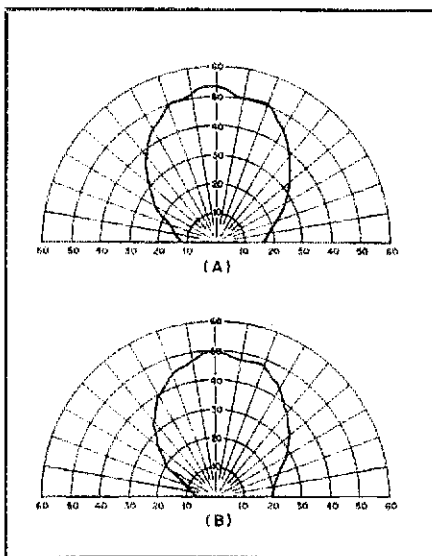


Fig. 4 — Same as in Fig. 3, except  $\Delta = 127^\circ$ .

it was time to do a little investigating to see what could be done to help prolong the life of this tube. The Eimac specifications for the 8877 note the following:

- 1) The filament voltage should be  $5.0 \pm 0.25$  V.
- 2) The cathode warm-up time should be a minimum of 180 seconds.

The warm-up period in my Alpha 77 was only 60 seconds, and the instruction book stated that the warm-up period should be between 80 and 120 seconds (still too short!). I changed the R-C network in the timing circuit to over 180 seconds — assuring I didn't apply drive too soon.

Page 192 of the 1977 ARRL *Handbook* specifies 6-V ac for the 8877 filament. [Later edi-

tions have been corrected. — Ed.] I also did not notice any mention of tube warm-up time.

The bottom line is a warning that anyone designing or using an amplifier using the 8877 tube should be aware of the proper filament voltage. Also, the required warm-up period is at least 180 seconds before drive power is applied. — *Howard A. Miller, W4KXE, Luray, Virginia*

## Feedback

Please note these corrections to "Amateur Use of Solar Electric Power — Part 2," November 1982 *QST*. Fig. 3 should have a connection dot joining the negative output line of module 17 to the BANK 2 negative bus. In Fig. 10, the 20- and 50-A breaker labels should be swapped.

The book review "Three New Directories For Amateurs," in March *QST*, page 35, should have made clear that the *Amateur Radio Call Directory* is the type with which we are all familiar. That is, call signs, names and addresses are listed by districts. The other directories are a *Geographical Index* and a *Name Index*, respectively.

Two items in the April 1983 Hints and Kinks column have apparently confused a number of readers. We know of no way to produce a 24-hour-format display on the small stick-on clocks. Dave Geiser, WA2ANU, suggested setting one to 12-hour-format UTC. If anyone does know of a simple modification to provide a 24-hour display on these clocks, please send details to the Hints and Kinks Editor.

Sharp-eyed readers have been quick to point out references that are appropriate to append to the list on page 27 of April 1983 *QST* for the article "The Search for a Simple, Broadband 80-Meter Dipole" by J. Hall, K1TD. They are: Lawson, J. L. "160/80/75-Meter Broad-Band Inverted-V Antenna." *QST*, Nov. 1970, p. 17 (considers parallel-fed dipoles of different lengths).

Vissers, W. "Build a Double Bazooka." 73, Aug. 1977, p. 36 (indicates the broad-band characteristics of the parallel-connected coaxial dipole, a more apt name for what Hall calls a "double bazooka with crossed connections at the feed point").

Harbach, A. B. "Broad-Band 80-Meter Antenna." *QST*, Dec. 1980, p. 36. (treats number of conductors versus equivalent diameter in a cage antenna, and mechanical and other considerations).

## Strays

### SSCs — WE HEAR YOU!

When applying for the Special Service Club program through your section's Affiliated Club Coordinator (see December 1982 *QST* or contact Hq. for further information), you may now list your club's ARRL members by *call sign* instead of by membership number. We hope this will ease the process of applying so that your club can more quickly and easily get down to the business of working more effectively within your community for the betterment of Amateur Radio.

## Yaesu FT-230R 2-Meter FM Transceiver

The Yaesu FT-230R is a microprocessor ( $\mu$ P)-controlled, synthesized fm transceiver that packs 25 W of output power (at least) and is designed for use with a 13.8-V dc negative-ground supply. Front-panel layout is superb; the most often used controls are in easy reach. Because of the small size of the radio, the controls are close together yet far enough apart to avoid accidental operation of another control. Five '230 models are produced, one for the American market and the others for the rest of the world.

### Features

The '230 is equipped with a microphone, a fused power cord, a mounting bracket, a removable wire stand and an SO-239 connector on the rear panel. A large heat sink takes up most of the back panel. The rest of the space is occupied by the power connector, a 1/8-inch jack for an external speaker, a tone burst ON/OFF control and a control for the frequency scanner.

A frequency coverage of 143.500 to 148.495 MHz surpasses the rated specifications. With the five-digit display, a resolution of 0.1 kHz is achieved. (When the display shows 5.545.0, the actual frequency is 145.545.0 MHz; the first two digits are assumed.) The front-panel-mounted VOLUME control doubles as the ON/OFF switch, and an outer ring on the same knob sets the SQUELCH level. A rotary switch selects the repeater offsets of  $\pm 600$  kHz, and simplex operation. TONE CALL and TONE SQUELCH controls are located on the front panel. (In the European models, a HIGH/LOW [25/3W] power switch replaces the TONE SQUELCH control.) Red and green LEDs indicate a transmit condition or an opened squelch, respectively. A horizontal meter indicates power output on a scale of 0 to 10 and received signal strength. The MIC jack accepts microphone audio input and control lines for the PTT switch and frequency scanner. The  $\mu$ P and frequency controls occupy the rest of the front panel.

### The Microprocessor

In addition to the small size, the most attractive aspect of this transceiver is the microprocessor. While operating frequencies can be selected using the 1-inch-diameter click-stop tuning dial, why not take advantage of all the conveniences a four-bit  $\mu$ P can provide? With switches on the microphone and on the front and back panels, the operator can make full use of the frequency-selection flexibility of this rig. Ten memory channels are available; each will recall a repeater offset of  $\pm 600$  kHz or will store transmit and receive frequencies for simplex operation. To load the memories, the desired frequency is selected using the main dial, one button is pressed and the necessary information is entered, erasing whatever frequency was stored previously in that channel. A scanner, controlled by UP and DOWN buttons on the microphone, will zip through the 4-MHz frequency range in 45 seconds when using the 10-kHz steps



### Yaesu FT-230R VHF FM Transceiver Serial No. 2F 050470

#### Manufacturer's Claimed Specifications

Frequency coverage: 144.00 to 147.995 MHz in 5- and 10-kHz steps.  
Mode of operation: Fm.  
Readout: Five-digit LCD array.  
S-meter: Horizontal bar meter.  
Receiver sensitivity: 1  $\mu$ V for 30 dB S/N.  
Audio output power (8- $\Omega$  load): 1 W.  
Transmitter rf power output: 25 W.  
Spurious suppression: Better than 60 dB.  
Current drain: Receive, 0.3 A; transmit, 5.0 A.  
Size (HWD): 2  $\times$  5.9  $\times$  6.8 in. (51  $\times$  150  $\times$  173 mm).  
Weight: 2.9 lb (1.3 kg).

#### Measured in ARRL Lab

143.500 to 148.495 MHz in 5- and 10-kHz steps.

0.27  $\mu$ V for 20 dB.

1.32 W.

30 W.

See Fig. 1.

Receive, 0.21 A; transmit, 5.85 A.

by the PLL frequency synthesizer. A 5-kHz step rate may be used, doubling the scan time. The scanner can also go through the memory channels; a front-panel button selects the scanner range. The scan will stop for five seconds for any of three commands: a clear frequency, a busy frequency — when the squelch is opened — or manually, by pushing the UP, DOWN or PTT buttons on the microphone. The scanner is activated by holding the UP or DOWN buttons for more than 1/2 second. If pressed for less than 1/2 second, these same buttons will advance the synthesizer one step — 5 or 10 kHz. The microphone has a LOCK switch that disables the frequency-selector buttons.

### Other Specifics

Two VFOs are selected by an A/B button on the front panel. The VFOs may be used with the memory channels to cover unusual repeater pairs. In this mode, the receive frequency is fixed and controlled by the memory channels, and the main VFO dial selects the transmit frequency. When this function is activated (by pressing two

buttons on the front panel), a small bar appears on the LCD. A priority channel is available, the desired frequency being checked every five seconds during operation. The scanner will stop on the priority frequency if it is busy or clear, depending on how the scanner is set. A lithium battery is provided to retain the last function and frequency selected prior to disconnecting the transceiver from a power source. Whenever a major function is varied, or if the scan locks for five seconds, a beep sounds, alerting the operator to the change in status.

The manual is easy to read; approximately half of its 52 pages are devoted to control operations, installation and operating instructions. A thorough maintenance and alignment section is included.

### Impressions

The FT-230R feels right at home in a car. I took the rig on several trips around the north-eastern U.S. With a 1/4-wavelength whip on the roof of my car, I was easily able to work repeaters 50 miles away. The high-power output

\*Assistant Technical Editor

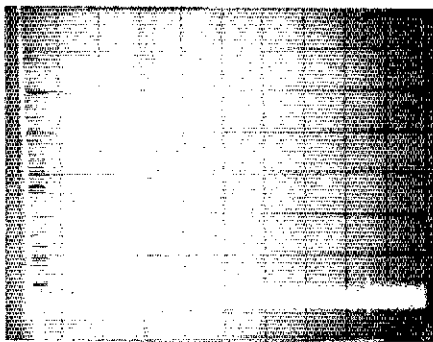


Fig. 1 — Worst-case spectral display of the FT-230R. Vertical divisions are each 10 dB; horizontal divisions are each 50 MHz. Output power is approximately 30 W at a frequency of 148 MHz. All spurious signals are at least 62 dB below peak fundamental output. The fundamental has been reduced in amplitude approximately 32 dB by means of notch cavities; this prevents analyzer overload. The FT-230R complies with current FCC specifications for spectral purity.

is a big plus. Transmit audio quality was never criticized. All front-panel controls have a decisive feel to them, and the status-change beep was a help while I was concentrating on my driving. Before a trip, I cut out portions of an *ARRL Repeater Director* and taped them in my atlas next to the various cities I would be passing through. It was a simple matter, when coming close to a metropolitan area, to load up the 10 memories with the appropriate frequencies and offsets. The  $\mu$ P memory feature was a blessing here. All further frequency control was performed through manipulations of the microphone buttons, making my driving quite a bit safer.

I noticed several minor drawbacks when using the rig. The sound from the built-in, bottom-mounted speaker tends to be mushy. While this is no trouble when the rig is used as a base station, careful listening is required when driving at highway speeds. The large LCD is easy to see, although in bright daylight the digits are unreadable when viewed at an angle. I never found the priority channel feature to be of use. If I had a favorite net or repeater frequency, though, it would be indispensable. The rig draws a hefty amount of current commensurate with its high power. It is unfortunate that the American version has no low-power setting. With such high power, the heat sink gets *hot*. Air should be permitted to flow past the rear of the rig. I found that out-of-band transmission can occur, but only when the simplex mode is selected.

The FT-230R is an excellent 2-meter rig. If you're looking for small size and high power, this rig may be for you. The Yaesu FT-230R is available from Yaesu Electronics Corp., P.O. Box 49, Paramount, CA 90723. Price class is \$300. — *Leo D. Kluger, WB2TRN*

### FLESHER CORPORATION TU-300 AND -470 RTTY TUs

□ One of the more popular RTTY terminal units (TU) to have entered the Amateur Radio

ranks is the Flesher TU-170.<sup>1</sup> RTTY buffs found this unit to be an economical and highly effective modem, and many are still in use today. But there were many '170 users who craved a little more in the way of operating features. The TU-300 and -470 should fill this need.

My TU-300 review was on its way to be typeset when I received news of the birth of the TU-470. After I spoke with Joe Elliott of the Flesher Corporation, we agreed it would be a good idea to combine the reviews of the two units because of their similarity.

To a great extent, the circuitry of the two units is the same. Some circuit changes, a different board layout, a built-in loop supply, and a front-panel face lift distinguish the '470 from the '300. It comes with all the plug-in boards that are options with the TU-300. Perhaps the most distinguishing characteristic of the '470 is that it is not available in kit form. Only wired and tested units are available from Flesher.

### Description

The TU-300 and -470 are each housed in a smooth-lined, heavy-duty, blue-gray steel cabinet. The units are powered from the ac line by a built-in, triple-voltage-regulated power supply. A series of five function-indicator LEDs and a 10-segment LED bar graph display occupy the upper-right portion of the front panel. The lower front-panel section supports a neat row of flag-type push-button switches.

The bar-graph display is used as a signal strength indicator and provides a relative filter-output level indication. Most of the five LED indicator functions are self-explanatory: POWER, ac power on; SEND shows the TU-300 is in the transmit mode; RDA (receive data available) indicates the presence of a signal and closure of the autostart relay; MARK/SPACE, illuminated when a signal is present at the respective filter output when in the receive mode and during transmit, indicates the presence of the appropriate tone at the afsk input.

### Up Front

TU-300 front-panel push-button switch functions include: POWER ON/OFF, OPERATE/STANDBY, RECEIVE/SEND, REVERSE

SHIFT SEND/REC, and AUDIO FREQUENCY-SHIFT 170 HZ, 425 HZ, 850 HZ. The '470 has added RTTY/CW and FILTER NARROW switches. In the STANDBY position, the demodulator output is locked in the MARK state and the autostart relay is energized. It takes approximately one second for the relay to drop out after restoring the switch to the OPERATE position.

With the REC/SEND switch in the REC position, the filters selected by the FREQUENCY SHIFT switch are enabled and the demodulator output placed on the RS-232C and TTL output lines. In the SEND position, the demodulator output is locked in the MARK condition, the afsk audio output is enabled and a pair of auxiliary switch contacts is closed. (Access to these contacts is made via a 25-pin connector on the rear panel.)

Locking the REVERSE SHIFT REC switch reverses the MARK and SPACE assignments of the selected audio frequencies. The SEND switch section reverses the output frequency assignments to the MARK and SPACE afsk inputs. The two switches are used when receiving or transmitting "upside down." (Convention calls for the use of lsb when using afsk on the hf bands.)

Mutually exclusive switches are used to select the FREQUENCY SHIFT used. In each case, the switch selects a separate filter board for the SPACE frequency, MARK remaining at 2125 Hz. For 170-Hz shift, a 2295-Hz filter is chosen, a 2550-Hz filter for 425-Hz shift, and a 2975-Hz filter for 850-Hz shift. For the '300, remember that the individual boards should be installed for the shifts desired, but MARK-only copy is possible for any of the shifts for which no SPACE frequency filter is present. All boards are installed in the '470.

The RTTY/CW switch of the '470 selects either mode of operation. The cw demodulator has a center frequency of 750 Hz. That corresponds closely to what most transceivers use nowadays for the audio pitch delivered when a cw signal is centered correctly in the filter passband. As the cw demodulator board's center frequency is adjustable, some deviation from the nominal 750-Hz figure is possible.

A FILTER NARROW switch on the '470 inserts a 170-Hz shift preselector filter that has a bandwidth of approximately 350 Hz. This filter is

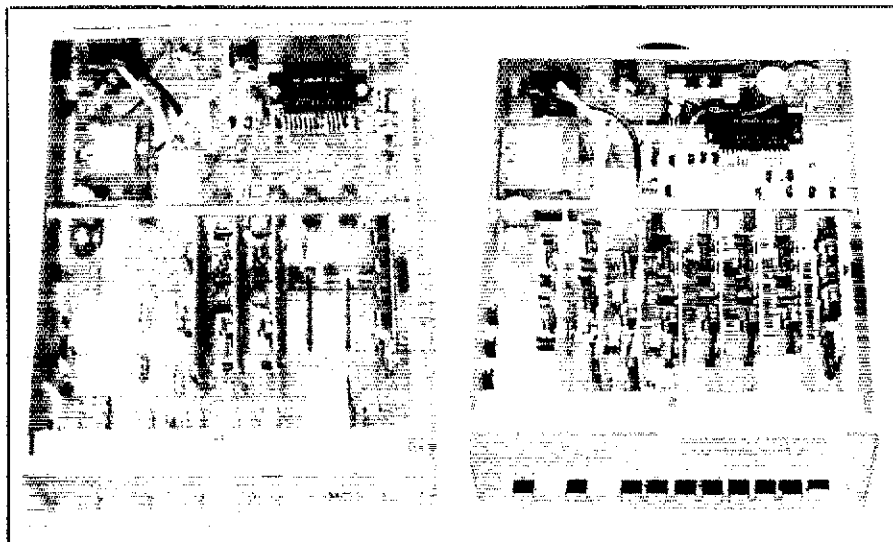


Fig. 2 — Views of the attractive interiors of the TU-300 and TU-470. The TU power transformer is at the left rear of the cabinet; the autostart relay is to the right of the transformer. All ICs are socketed.

<sup>1</sup>"Flesher Corporation TU-170 RTTY Terminal," *Product Review*, March 1979 QST, p. 42.

<sup>2</sup>The successor to the TU-170 is the TU-170A, announced in December 1982.

disabled when any frequency shift other than 170 Hz is used and should be manually disabled when using the cw demodulator feature. The manufacturer does not recommend the filter be used for 300-baud operation.

### Bringing Up the Rear

The TU-300 and -470 rear panels are similar. On the '300 rear panel there is a DB-25 socket for I/O connections (a mating plug is supplied), a four-pin plug for use with the optional external loop supply, a grounding post, entry point for the ac line cord, and a three-conductor auxiliary ac socket that will provide autostart-relay-controlled 117-V ac line power to an external device such as a printer. The four-pin plug is absent from the '470 rear panel. A 1/4-inch key jack is located in the upper-left corner instead. It is used as the 20- or 60-mA loop output connector. Loop current is determined by the use of a jumper.

### Other Differences

Some control pin function differences exist between the two TUs. Pin 23 of P1 on the '300 (now, more appropriately, S1 on the '470) is unused. In the '470, a SEND-P line has been added here. This is essentially a dupe of SEND-N, but where SEND-N is a TTL level, SEND-P is a bipolar  $\pm 3$ -V "RS-232C" level. XMIT-P and XMIT-N provide transistor keying for positive or negative PTT or cw key lines. These functions take the place of the mechanical SW1/SW2 function of the TU-300. XMIT-P/N are keyed by the front panel SEND/RECEIVE switch, the SEND-N or SEND-P inputs.

### TU-300 Assembly

There are bound to be a number of readers who have constructed the TU-170 and are familiar with the (shall I say "concise"?) assembly instructions. In contrast, the '300 assembly manuals are quite detailed.

It took me a little over 6-1/2 hours to build the TU-300. Before construction began, information from some addenda sheets had to be transferred to a couple of the manuals (of which there are four, not counting the optional afsk unit: an operator's manual, and assembly manuals for the main/display, filter and demodulator boards.) These changes have been incorporated into the later editions of the manuals.

The main circuit board has provisions for a plug-in demodulator board, four filter boards, the optional afsk board and two expansion slots. Such construction makes assembly/disassembly and troubleshooting easy. You'll find that the plug-in boards can be installed backward, so be careful and pay attention to the illustrations. If you're installing the optional afsk unit, leave one end of D1 (at the gate of the output FET) lifted from each of the filter boards. Otherwise, you'll have to unsolder it later.

The unit I received called for some below-the-board changes to be made for better autostart/antispaces action. I added these after first determining that the circuit was working normally otherwise. Later production units have these changes included.

During the review period, I received notice that a cw-demodulator option had been developed. This board is placed into one of the expansion slots on the main board. This option also requires the mounting of a front-panel switch for which a panel hole and space have been provided.

Low-tone kits for the 1275- and 1445-Hz frequencies are available, too. This option is not meant to be a modification for existing filter boards, however. Flesher recommends the filter boards be constructed initially with your choice of high or low tones.

Component quality is excellent. The pc boards are all glass-epoxy types, double-sided with plated-through holes, solder masked and with screened parts locations. A metal bracket fitted between the chassis side rails is slotted to accept the edges of the plug-in boards and secure them, as well as provide some additional structural strength to the overall assembly. The front panel/chassis assembly slides into the wrap-around steel cabinet and is secured by two screws at the rear. The complete unit is as rugged as it is attractive.

### Alignment

This procedure consists simply of adjusting three potentiometers on each of the filter boards for maximum response. A number of alignment methods are offered, the first requiring no test equipment whatsoever! With this method, the output of the optional afsk unit is connected to the demodulator input by placing a wire jumper between two pins on the DB-25 connector. Since the tones produced by the afsk unit are crystal-controlled, they are smack on the nose — 2125 and 2295 Hz (measured with an Optoelectronics 7010A frequency counter) — with the 170-Hz filter in use. The afsk output adjustment potentiometer is set to produce a usable indication on the front-panel LED bar graph display, and the three potentiometers on the individual filter boards are adjusted for a maximum display. The SEND/REC switch is used to select the proper filter and tone. This is possible because, during assembly, certain selection diodes have not been soldered in place.

If you have a VTVM or an oscilloscope, I'd recommend you use it during alignment because you can obtain a finer degree of filter tuning, but I doubt you'd notice the results in on-the-air use. Should you not have ordered the afsk unit, you'll have to supply the proper tone frequencies to the demodulator. You can use an audio generator or you may try using the marker signal from your receiver or transmitter. Just make sure you have the proper input frequencies.

Once the filters are aligned, solder the remaining diodes in place and assemble the case. You're now ready to put the '300 to work. Since the '470 is up and ready to run when you get it, no alignment should be necessary. There are alignment instructions in the manual for each of the boards should you ever need to perform those tasks.

### On Line

The rear panel TU connectors provide for interconnection among the station radio equipment, a 20- or 60-mA current loop teleprinter (with the optional '300 loop supply), and a computer or other device requiring RS-232C or TTL levels. A TTL-compatible SEND control pin permits placing the TU in the transmit mode by external control. The cw key input (for required station identification) is TTL compatible, too. The latter provides a shift of 100 Hz.

If you're not planning on using the loop supply, the manufacturer recommends the supply be disabled. Instructions for accomplishing this are given in the manual. The purpose of this is

to eliminate excessive heat build-up in the chassis from power dissipated by the loop-keying transistor. The manufacturer also recommends the key-down time for the loop supply not exceed 15 minutes.

You'll find the TUs easy to use. Receiver tuning is done while observing the MARK and SPACE LEDs, and the LED bar graph indicator. Tuning is adjusted for a maximum display on the bar graph, with alternating action on the MARK/SPACE LEDs. (I would have liked to have had a bit more resolution on the bar-graph display at the upper end of its range.)

If you wish, you can connect an oscilloscope to observe the RTTY cross pattern. While not an absolute necessity, it provides you with a fine-tuning indicator and permits observation of selective fading of the incoming signal. (If you've got visitors in the shack, they're sure to be impressed!) The display consists of two ellipses rather than a perfect cross, but it is still quite usable.

Unlike the TU-170 and TU-470, there is no threshold adjustment in the '300; it is fixed. Under most conditions, the fixed level is such that good copy is obtained, but under some signal conditions, one might consider altering the threshold level to provide better copy. The TU-470 has an internal threshold-level adjustment potentiometer. It is R64 and is accessible through a hole in the right-hand side of the cabinet.

The TUs proved themselves to be good performers. I'm sure either will run rings around some others you've used, both commercial and "homebrewed."

The TU-300 and TU-470 are available from the Flesher Corp., P.O. Box 976, Topeka, KS 66601, tel. 913-234-0198. Kit price classes: TU-300, \$300; optional afsk unit, \$40; loop supply, \$48; filters, \$30 each; TU-470, \$500. — Paul K. Pagel, N1FB



### ICOM IC-R70 COMMUNICATIONS RECEIVER

□ I was especially interested in reviewing the ICOM IC-R70 receiver because of my long-term interest in high-performance receiver design. Therefore, I did not hesitate to say "yes" when the review editor, N1FB, asked if I'd volunteer my time for the project! Over the years I have evaluated more inferior commercial receivers than good or excellent ones. It is difficult to rule out subjectivity when a person with an rf-engineering background lays hands on a piece of gear he or she did not design. But for the purpose of reviewing a product it is essential that we stick to the performance facts and ignore what we might have done differently in designing the unit. I like to compare the performance

## ICOM IC-R70 Receiver, Serial No. 01234

### Manufacturer's Claimed Specifications

Frequency coverage: 0.1 to 30 MHz, general coverage or ham-band only, via switch.  
Modes of operation: cw, ssb and a-m;  
fm when optional fm module used.  
Frequency readout: six-digit blue luminescent display.

kHz per turn of knob: 1 kHz, 10 kHz or 100 kHz (tuning rate switch selected).

Backlash: Not specified.

RIT range: Greater than  $\pm 800$  Hz.

S meter response ( $\mu\text{V}/\text{S9}$ ): Not specified.

AF/i-f notch filter depth: Not specified.

Receiver sensitivity (preamplifier on): cw, ssb, RTTY — less than  $0.15 \mu\text{V}$  for 10-dB S + N/N. For a-m — less than  $0.5 \mu\text{V}$  for 10-dB S + N/N above 1.6 MHz.

Frequency stability: Less than 250 Hz from one minute after on to 60 minutes.

Audio output (8- $\Omega$  load): Greater than 2 W.

Noise blanker: Dual timing mode (selectable) for normal pulses and OTHR QRM.

Synthesizer noise: Not specified.

Color: Black.

Size (HWD): 4-3/8  $\times$  11-1/4  $\times$  10-7/8 in. (110  $\times$  285  $\times$  275 mm).

Weight: 10.3 lb (4.85 kg).

Power requirements: 117- or 234-V ac at 50-60 Hz, 30 VA. As specified.

### Measured In ARRL Lab

As specified.

As specified.  
3/8-inch digits. Has 2-digit mode indicator also. Skirt of tuning knob has analog increments to match the programmed frequency tuning rate of the receiver.

As specified.

None discernible.

$\pm 1000$  Hz.

All amateur hf bands and 1.8 MHz;

$-61$  dBm (200  $\mu\text{V}$ ); preamp off.

Approximately 70 dB.

	80 m	20 m
Noise floor (MDS) dBm	-130	-130
Blocking DR (dB)	90.5	94.5
Two-tone 3rd-order IMD (dB)	94	87.5
3rd-order intercept (dBm)	+ 11	+ 12.5

Less than 50 Hz.  
2.25 W.

Satisfactory.

Not measured, but very low noise in terms of reciprocal mixing, even when strong signals are nearby in frequency.

10-kHz steps. The loop output is divided by 100 and used for the reference frequency of the second loop. The LO frequency for the first loop is 20.48 MHz.

The second-loop output is from 30.8515 to 30.9514 MHz, with 10-Hz steps. The local oscillator is a VXO from which the output is tripled to 30.72 MHz.

The third (main) loop has an output from 70.4515 to 100.4514 MHz. This output is used as the first LO for the receiver. Four VCOs are employed to divide the LO frequency range into four segments.

### Performance Impressions

I put on my demon's mask, smiled sardonically and subjected the IC-R70 to the customary WIFB receiver-torture test — just two blocks from the 1-kW, multiband onslaught of WIAW. I fully expected to see the excellent receiver dynamic range negated by reciprocal mixing problems resulting from synthesizer output noise. I was amazed to note that no discernible evidence of the malady existed, even a few kilohertz away from the WIAW 80-meter frequency!

Why check this on 80 meters? Well, I once terminated my 80-meter vertical antenna in 50 ohms and measured the WIAW energy across the resistor with a Tektronix 453 scope: The rf level was 5 V peak to peak! It is not nearly so high on the other hf bands. So, 80 meters has always been my most difficult challenge with respect to keeping receivers from "crunching" at my QTH. I did not observe blocking, cross-modulation or excessive IMD responses while testing the receiver on 80 meters (or any other band), and I was able to copy weak cw signals as close to the WIAW frequency as 5 kHz. There was no apparent performance degradation when I switched in the 10-dB preamp, and that was a surprise!

If I were to "pick nits" about the performance, I would mention that the agc tends to lock up more readily from strong signals in the passband than is characteristic of some other receivers I have used. Also, the audio-output signal becomes distorted at room-listening level and higher when using the speaker (see note 3), even though the af channel is rated for a minimum of 2-W output. This malady seems to afflict most of the solid-state receivers we have tested, but it is not a problem when headphones are used or when the audio-speaker level is moderate. If you weren't born with "golden ears" you may not observe this condition. I'm just a grouch about audio quality, even in communications receivers.

I was delighted to note an absence of agc-caused clicky signals. The attack time is entirely acceptable, and the decay time can be controlled by means of a panel switch to provide fast or slow agc. There is also an agc-disable switch position, which comes in handy when a big signal does lock up the agc circuit and desenses the receiver.

Noise-blanker operation is good, and there is no appreciable deterioration of the receiver dynamic range observed when it is actuated. I am favorably impressed, because many receivers completely "fold up" at my QTH when the blankers are turned on.

This receiver should be fine for amateur use. It would also be a good choice as a laboratory-grade instrument. I'd like to own it for that purpose myself!

Price class: IC-R70, \$750. Available from ICOM America, Inc., 2112 116th Ave. N.E., Bellevue, WA 98004.

— Doug DeMaw, W1FB

against the cost and circuit complexity. That is, if a large number of components are used in the product, it stands to reason that performance in keeping with the price tag should be easy to realize. Basically, it is how the parts are used that determines the relative quality of the product. Two ingredients are essential: (1) knowledge of the amateur's operating and equipment-performance needs, and (2) competent design engineering.<sup>3</sup> It appears to me that the criteria were met with respect to the IC-R70 receiver. I would definitely rate this unit as a clean, high-performance box.

### Significant Operating Features

- 1) General coverage (0.1-30.0 MHz) or ham-band only (1.8-28 MHz, including the WARC bands), at the push of a switch.
- 2) Quadruple superheterodyne circuit with continuously variable bandwidth control.
- 3) Filters for a-m, ssb, RTTY and cw are standard equipment.
- 4) Selectable preamplifier (panel switch).
- 5) Selectable tuning rate of 1 kHz, 100 Hz or 10 Hz per step.
- 6) Two internal VFOs. Can be used independently in any chosen band.
- 7) Band-pass tuning.
- 8) No preselector to peak (contains broadband front-end filters), thereby permitting rapid UP-DOWN band changing by means of panel buttons.
- 9) A panel switch permits turning on a monitor for the transmitter signal, thus enabling

the operator to check the actual signal quality.  
10) Variable-frequency notch filter.

11) Front-panel RTTY mode switch automatically selects the cw (500 Hz) and ssb (2.3 kHz) i-f filters for RTTY reception. Both filters are used for RTTY.

12) VFO memory switch permits retaining the programmed VFO frequencies even when the main power switch is turned off. There are numerous other features, but those mentioned should be of special interest to prospective buyers.

### Circuit Highlights

The following features are probably of interest to the performance-conscious amateur or engineer:

- 1) Drift: 250-Hz maximum first hour; less than 50 Hz after one-hour warmup.
  - 2) Passband tuning is  $\pm 500$  Hz for ssb, cw and RTTY;  $\pm 2.7$  kHz for a-m.
  - 3) A 250-Hz cw filter (FL-63) is available as an option. A 500-Hz cw filter is supplied with the receiver.
  - 4) An internal frequency-adjust control permits the operator to align the PLL oscillator to WWV at 10 MHz.
  - 5) A panadapter/scope monitor jack is located on the rear of the chassis. It samples the 70-MHz i-f at the first mixer output.
  - 6) The selectable preamp is broadband and has a gain of 10 dB. The attenuator (same switch) reduces the signal by 20 dB.
  - 7) A DBM (diode ring) is used as the first mixer. The i-f of this mixer is 70 MHz. A monolithic filter follows the mixer.
- The PLL contains three phase-locked loops. Output from the first is 13.15 to 23.14 MHz, with

<sup>3</sup>D. DeMaw and W. Hayward, "Modern Receivers and Transceivers — What Ails Them?" QST, Jan. 1983.



# Eavesdropping on Other Worlds

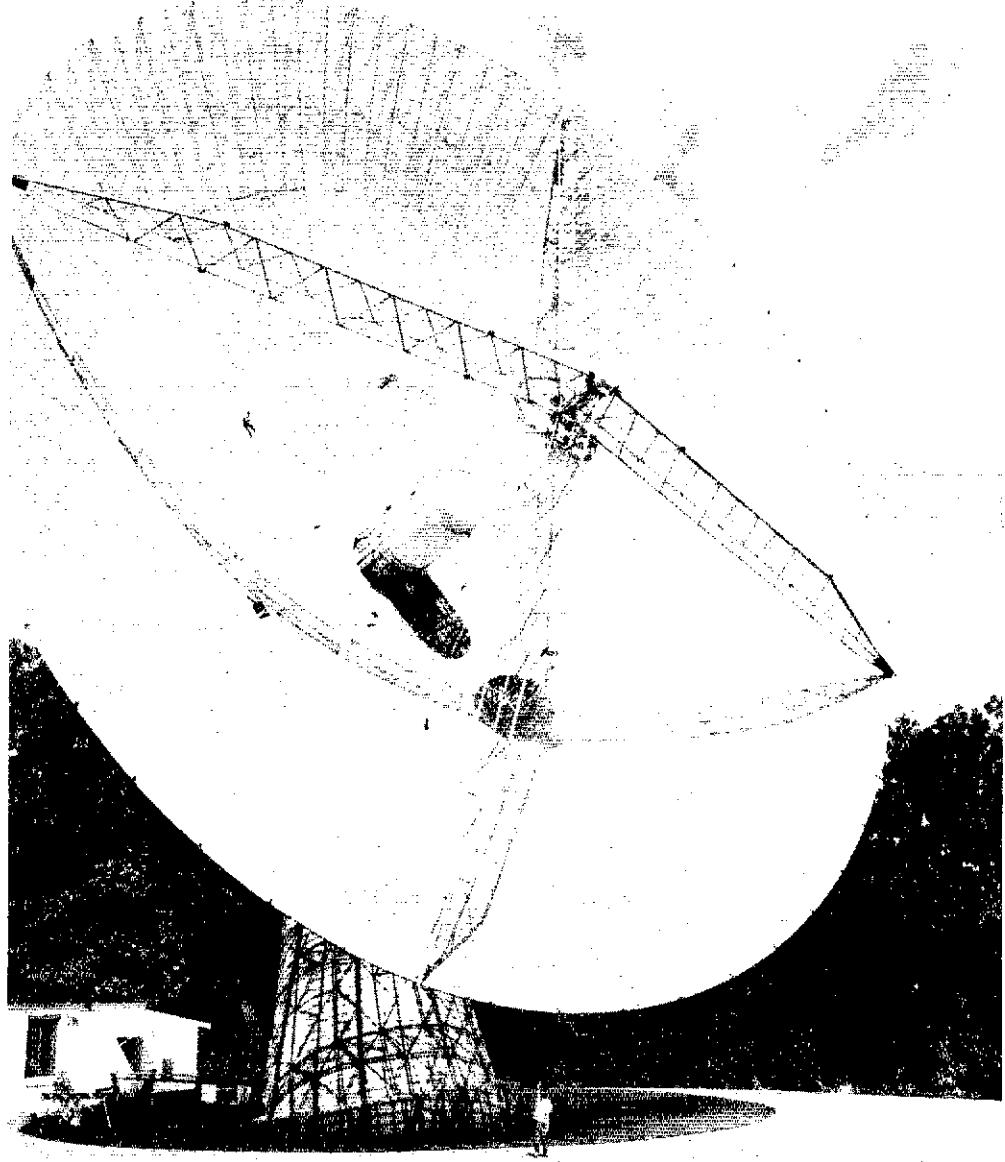
By Louis Berman,\* K6BW

*Twinkle, twinkle little star  
Out in space so very far,  
If you're as bright as I think you are,  
Beam a signal, dahdidah. — adapted from a  
poem by Katherine O'Brien*

The premise that we are not alone has been considered from time immemorial. Contemplate the words of the Greek philosopher Metrodoros in the 4th century BC: "To consider that Earth is the only populated world in infinite space is as absurd as to assert that on a vast plain only one stalk of grain will grow."<sup>1</sup> Although we haven't yet discovered extraterrestrial life, we have no reason to believe that absence of evidence is evidence of absence.

With the development of large radio telescopes, advances in microminiaturized electronics and high-speed computer data processing, the search for extraterrestrial intelligence is being given serious consideration. We have the capability to detect radio messages from communicative societies hundreds of light-years distant — but only if we know the direction of origin, frequency and type of modulation. Not only is it much easier and more economical to listen than it is to transmit, but listening gives us results now! No waiting around for a responding signal 10 to 10,000 years in the future.

About a dozen radio observatories in the U.S., the USSR and Canada are now engaged in the search for narrow-band artificial signals on a part-time basis; the same radio telescopes are used primarily to observe the thousands of natural radio sources in the sky. For the most part, the



The 84-foot equatorially mounted radiotelescope at the Oak Ridge Laboratory at Harvard University used by scientists who hope to detect radio signals emanating from a distant civilization. (photo courtesy W1HFA)

search has concentrated on a few specific frequencies inside the "microwave window" between 1000 and 10,000 MHz, where noise from terrestrial and celestial natural sources is at a minimum. We expect the artificial signals to have narrow bandwidths since natural cosmic sources are broadbanded and more power can be concentrated in narrow-band transmissions.

The most popular "scanning frequency" is around 1420 MHz, the radiating frequency of atomic hydrogen, the most abundant molecule in the Milky Way galaxy. It is assumed that other technological civilizations are aware of the distribution of hydrogen in the galaxy, and would most likely transmit on a frequency within the so-called "water hole," which lies between the radiating frequency of hydrogen, H (1420 MHz), and that of the hydroxyl ion, OH (1662 MHz). Note that the combination of H and OH equals H<sub>2</sub>O (water).

What about the possibility of eavesdrop-

ping on radio leakage from communicative societies? Our planet pours out a constant flood of vhf and uhf signals into space from powerful radars, and TV, fm and commercial stations, along with weaker signals from land-mobile, marine, weather and Amateur Radio transmissions. Some of this radio traffic might be intercepted by civilizations up to 50 light-years away — about as far as our radio waves have traveled in space since the early days of vhf propagation.

The total amount of power radiated daily from the earth is a staggering 300 million W, most of which is contributed by television and radar transmitters, with the greatest output from the U.S. and Europe. Extraterrestrial eavesdroppers with antennas and receivers equivalent to the best we have could detect a brief daily crescendo of radio noise when eastern North America and western Europe are on the edges of the earth as viewed from a point in space. A listener monitoring terrestrial transmissions

<sup>1</sup>[Editor's Note: The League's founder and first president, Hiram Percy Maxim, W1AW, also had an intense and enthusiastic interest in the philosophical implications of the cosmos. His always-active mind was intrigued with the possibility of life on other planets. He created a mild stir many years ago with his book *Life's Place in the Cosmos* in which he speculated on these possibilities.]

\*1020 Laguna Ave., Burlingame, CA 94010

over a long period of time could gain an insight into the cultural and scientific values of our civilization.

A project to detect intelligent signals from nearby stars is in the works. Known as SETI (Search for ExtraTerrestrial Intelligence), it involves a joint seven-year search by the NASA Ames Research Center and the Jet Propulsion Laboratory (JPL) to detect radio signals emanating from planets harboring communicative societies. Even when large radio installations combined with the most advanced receiver techniques that employ maser amplification and the latest solid-state circuitry are used, the total amount of funding for SETI is estimated to be less than \$3 million per year, no more than the cost of building a couple of miles of interstate highway. A good start has been made; Congress has allocated \$1.5 million to NASA for its 1983 SETI program.

The Ames/JPL program consists of two parts: a targeted search and an all-sky survey. The targeted search is confined to a selected list of 773 solar-type stars within 80 light-years from the earth. The all-sky survey will scan the entire sky with the 26, 34 and 64-meter dishes of the NASA Deep Space communications complexes located around the globe. Both searches are concentrating on frequencies between 1 and 10 GHz, plus several spot bands between 10 and 25 GHz. Some 8 million microwave channels of 1, 32, and 1024-Hz and 74-kHz bandwidths will be monitored simultaneously by means of multichannel spectrum analyzers. A computer will analyze the incoming data for any sign of intelligent transmissions. The equipment will also be attached to the 1000-foot radio reflector at

Arecibo, Puerto Rico, the world's largest single dish, and possibly to several other large radio telescopes in the Northern and Southern Hemispheres.

Since March 1983, a program nicknamed "Suitcase SETI" has been in operation at Harvard University using the 84-foot Oak Ridge Radiotelescope. Directed by Harvard Professor (and *QST* author) Paul Horowitz, W1HFA, Suitcase SETI consists of a multichannel spectral analyzer that resolves an input bandwidth of about 2 kHz into 128,000 channels of 0.03 Hz each, a dedicated computer with graphics display, a swept-frequency receiver and a 1/2-inch videotape recorder for data storage.

The Oak Ridge laboratory is available 24 hours a day and, with state-of-the-art instrumentation, searches more stars and frequencies in one minute than could the 1960 project OZMA, had OZMA been in operation for 100,000 years.<sup>2</sup> Operating funds for this search have been provided by the Planetary Society, a public membership organization formed to promote interest in the exploration of the planets and the search for extraterrestrial life.

When observers listen to signals that originate millions or billions of miles away, some difficulties must be contended with. One of these is that the multipath scattering effect of the ionized gas and dust that pervades interstellar space tends to smear out and add noise to signals as they travel toward the earth. The earth is another source of radio interference.

<sup>2</sup>For more on Project OZMA, see D. Atchley, "Speculations on Communications With Other Planet Civilizations," *QST*, March 1960, pp. 71-75.

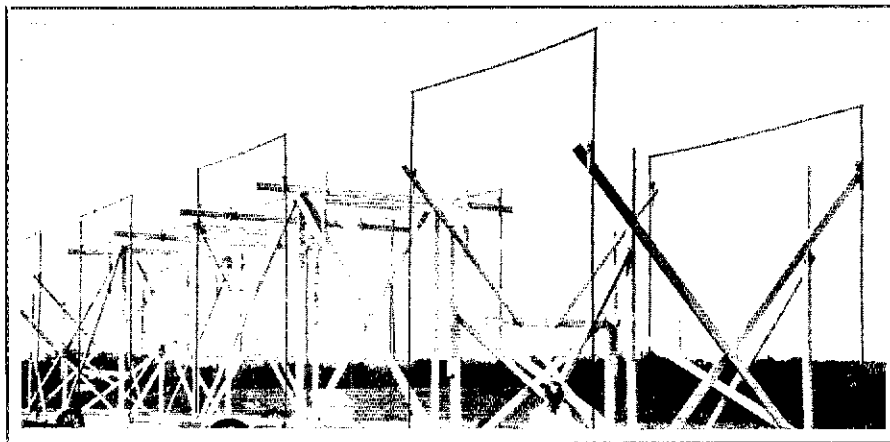
The equipment in use at the Oak Ridge observatory is designed to eliminate these problems. By monitoring extremely narrow bandwidths and by using a receiver that sweeps through a series of frequencies, only a non-natural, narrow-frequency signal will show up; wide-band interstellar noise is spread out over a series of channels and is rejected by the computer. Because terrestrial interference does not exhibit the Doppler shift caused by the earth's spin, it stays on one frequency. Only narrow-band frequencies that vary within the limits defined by the Doppler effect are detected by the computer, so terrestrial noise is eliminated.

Radio amateurs also have a place in this exciting field; Delta Vee, a nonprofit group based in California, is encouraging amateurs to participate in SETI projects. Delta Vee sponsors *AstroSearch*, a newsletter devoted to amateur SETI techniques, and holds monthly meetings. Amateurs there have built a prototype suitcase SETI system that can easily be duplicated by any vhf'er who has a microcomputer.

Why not get involved? You too can eavesdrop on the stars — and maybe be the first to hear E.T.! To learn more about Delta Vee, write to P.O. Box 3294, Saratoga, CA 95070. To contact the Planetary Society, write to 110 South Euclid Ave., Pasadena, CA 91101.

*Louis Berman, K6BW, Emeritus Professor of Astronomy at the University of San Francisco, holds a doctorate in astrophysics from the University of California at Berkeley. He is coauthor with Dr. John Evans of the astronomy textbook Exploring The Cosmos. The book was selected by the California Consortium of Community Colleges for its television course, Project Universe, which began in 1978 and was shown on several PBS stations around the country.*

## Strays



Karl Jansky used this Bruce-type broadside receiving array for his discovery of extraterrestrial radiation at 20.4 MHz. Designed in 1929, the rotatable antenna measured 100 feet in diameter by 12 feet high. Nicknamed the "merry-go-round," it was mounted on four Model-T wheels and rotated around a circular brick track once every 20 minutes. Although the original antenna was dismantled at the completion of the Bell Laboratories experiments, a precise replica was dedicated at the National Radio Astronomy Observatory in Green Bank, West Virginia, in 1966. (photo courtesy the National Radio Astronomy Observatory)

## INTERNATIONAL SATELLITE CONFERENCE THIS MONTH

□ The National Oceanic and Atmospheric Administration and NASA are cosponsoring an International Direct Broadcast Service Users' Conference on environmental satellites launched, managed and operated by U.S. federal agencies. The conference will be held on June 7-10 at the Sheraton Inn, New Carrollton, Maryland. For programs, registration and more information, write to Alberta Moran, Creative Management Associates, Inc., 11529 Montgomery Rd., Beltsville, MD 20705.

I would like to get in touch with...

□ anyone who has a rebuilt or who has suggestions on rebuilding the final of a Galaxy GT-550. R. E. Ertz, W8SMY, 5019 Burt St., Omaha, NE 68131.

# HANDI-HAMS Go West

## HANDI-HAM Radio Camp, rodeo-style

By Rick Palm,\* K1CE

*Last March, Rick Palm, K1CE, of ARRL Hq., hightailed it out to the Calamigos Star C Ranch in Malibu, California, where he took part in the HANDI-HAM Radio Camp West '83. An active participant in past radio camps, Rick spent a week teaching the Advanced license class and being an "assistant cowpoke." Here's his account of that experience.*

**"G**o West, young ham," someone said over a century ago. And that's precisely what one and fifty more did when the HANDI-HAMS stampeded to Southern California for Radio Camp West '83. This week-long roundup brought together physically handicapped "pardners" from all corners of the country and all walks of life. Why? To lasso a new ham ticket, that's why!

HANDI-HAM Director (and Chief Cowpoke) Bruce Humphrys, KØHR, says the idea is to mix structured classroom radio instruction with enjoyable things like fishing, boating and, of course, hamming. The informal setting and activities relieve

\*Coordinator, ARRL Program for the Disabled



Radio Camp instructors Sr. Alverna O'Laughlin, WAØSGJ, and Dr. Tom Linde, KCØL, discuss the progress of their students, which, judging by the looks on their faces, is very satisfactory. (photo by Rick Palm, K1CE)

### Who Are the HANDI-HAMS?

The Courage HANDI-HAM System is a program of the Courage Center, a large facility in suburban Minneapolis, Minnesota, for persons with physical disabilities. HANDI-HAM membership is composed of individuals who are studying for their licenses and those who already have them; it also includes disabled and nondisabled hams who volunteer their time, effort and services to help the students. Study materials, equipment and personal assistance are provided to students wishing new or upgraded ham tickets on a "pay what you can" basis. But you must learn the material and earn your own license. The most important element in becoming a HANDI-HAM member is an intense personal desire to pass the exams. It may involve hard work and study, but once you've passed the FCC exam there's no other thrill quite like it!



Mike Killian, KA6WZN, gets some personal instruction from Ralph Andrea, WØFCO. (K1CE photo)

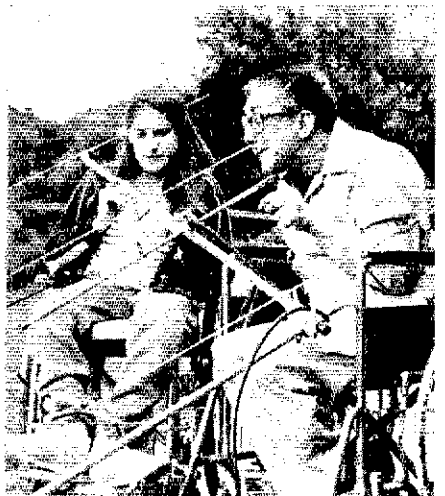
exam "nerves" by putting folks at ease for the end-of-week FCC tests. "We've had great successes," Bruce says, "and each Camp simply gets better and better. Radio Camp is more than ham radio — it's a lesson in people and life."

It's true. Staff, faculty and students alike return home at the end of the week with a feeling of exhilaration, new friends and (hopefully) a new ham ticket to boot!

Special treats included visits from Irv



The ins and outs of antennas, courtesy of guest speaker Fred Shmitka, K6AQI. (K1CE photo)

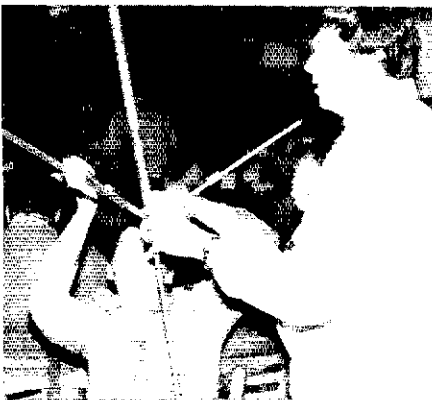


The esoteric aspects of a 2-meter beam don't seem so hard to understand for Amy Vogel, NØECX, when KCØL explains them to her. (photo by Bruce Humphrys, KØHR)

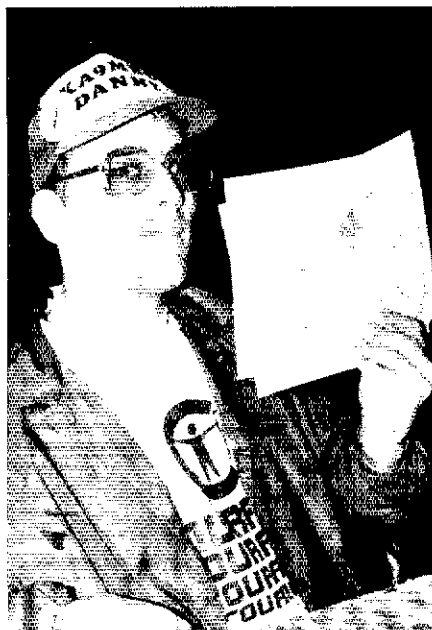
Emig, W6GC, who spoke on a recent China sojourn, and Fred Shmitka, K6AQI, of antenna fame. And, of course, there was the Rajah of Radio himself, Bruce, KØHR. His wit and wisdom, perpetual smile and quick joke, and unwavering dedication to purpose set the tone of the session. It's this tone, too, that pervades every nook of the HANDI-HAM organization; the HANDI-HAMS are more than students and members, they're a close-knit



"Civilization" is only a QSO away from Calamigos Ranch for KC0L (front) and Dr. Dave Justis, KN6S, who take a moment out to practice what they've been teaching. (K1CE photo)



KN6S helps a Camper get the feel of an hf mobile antenna. (K1CE photo)



Radio Camper Danny Kawka, KA9MBC, "dares" anyone to challenge his membership in the Royal Order of the Wouff Hong. Radio Campers were initiated into this prestigious order at the stroke of midnight Wednesday evening. (K0HR photo)

## HANDI-HAMS Speak Out on No-Code

One of the FCC's arguments for a no-code amateur license is that it would attract "individuals with a physical handicap which prevents them from being able to successfully complete a Morse code examination." The FCC seems to feel that an exam not containing a code test would make it easier for persons with a disability to get a license.

Balderdash, says the Courage HANDI-HAM System. In their comments on FCC Docket 83-28, the HANDI-HAMs said, in part: "In only six cases over the past 16 years have we encountered a situation where a *physical* (as opposed to mental) disability has absolutely prevented an individual from learning the code at the prescribed speeds!" Why the high success rate? It's because the Courage HANDI-HAM System has developed learning methods and transcription techniques that bring the Morse code well within the abilities of persons with severe disabilities. *Where there's a will, there's a way* is much more than a simple cliché to the HANDI-HAMs.

And why do so many severely handicapped radio amateurs put forth the tremendous effort to learn the code? For many, the Morse code is the *only* means of communications available to them. As the HANDI-HAM comments explain: "You must realize that the very person who is so severely handicapped that he has a great deal of difficulty transcribing the code is precisely the person who, by reason of severe speech involvement with his physical handicap, NEEDS the code to communicate."


And most important, radio amateurs with disabilities have vehemently refused special treatment. They have passed the requirements for an Amateur Radio license just like everybody else — and they want to keep it that way.

The HANDI-HAM bottom line? "Whatever 'justifications' the Commission sees for a no-code license, easier entry into Amateur Radio for handicapped persons is *not* one of them!"

group constantly looking for new friendship.

Much of the success of Radio Camp belongs to the instructors and staff who have contributed their expertise to ensure that Campers have the best possible chance of passing their FCC tests. Instructors are often found coaching students on a one-on-one basis before, between and after classes. Staffers from the HANDI-HAM System's parent organization, the Courage Center, of Golden Valley, Minnesota, are professionals who provide outstanding personal attention to the special needs of the Campers. To these folks — a hearty well-done!

But most of the success is caused by the Campers themselves. To a person, each displayed a profound "go for it" spirit. The sounds of code keys and tapes, the rustling of study papers and books, and pencil-pushing permeated the quiet still of day and night at the Calamigos Star C Ranch.

But enough words! Take a look for yourself and get a feel for the incredible experience that is Radio Camp. 

## Strays

### AN OPEN LETTER TO DEAF RADIO HAMs

□ A Stray in December 1982 *QST*, page 58, issued a general call for hams (and aspiring hams) who are deaf to get in touch with me. It pleased me that some letters reached me in response to this, bringing the number of known deaf hams to 10, including me.

Perhaps there are as many as two or three dozen other deaf, deafened and hearing-impaired hams. The question is: Should we try to set up a formal organization to serve the needs of the identified deaf hams? If so, what should our goals, objectives and philosophy be?

I need to hear from all of you. I cannot do the job alone, nor can I turn the ideas into policies by myself. Tell me your feelings and views, and please include a line on how you passed the Morse code test. — Barry Strassler, KA3KDF, Executive Director, Telecommunications for the Deaf, Inc., 814 Thayer Ave., Silver Spring, MD 20910, tel. 301-589-3006 (voice/TTY)

### THE ARRL PROGRAM FOR THE DISABLED

□ Scenario: Your Novice class has a blind student who is unable to use print study materials. Sure, you could read appropriate passages of the textbooks aloud in class, but how can the student study at home? Answer: Get these materials in other-than-printed forms. The ARRL Program For The Disabled publishes a guide that lists organizations and companies that produce books such as the *Radio Amateur's Handbook*, the *License Manual* and others in Braille, cassette or flexible-disc form. The guide has a wealth of other information of interest to the handicapped amateur community: lists of on-the-air nets for hams with disabilities, sources of specially adapted operating aids and devices, relevant *QST* reprints and organizations that have an interest in Amateur Radio and the handicapped. Basic information for the aspiring Novice is also provided.

For more information and a copy of the program guide, write to the ARRL Program for the Disabled, 225 Main St., Newington, CT 06111, or contact your regional National Library Service for an audio version of the guide. *QST* is also available from the NLS on flexible discs.

I would like to get in touch with...

□ any Vietnam veterans interested in joining a net. Larry Mittman, N9AUG, Box 158, Rte. 5, Eau Claire, WI 54701, tel. 715-874-6473.

# Mobile in China

By Robin Maule,\* VS6HH

The time is 0800, the place is Kowloon, Hong Kong, and now at last we are on the move. Our destination is Beijing, only this time it will be different — we are not going to fly, we are going to drive.

The purpose of our journey is to finalize the route for the first Hong Kong-to-Beijing car rally, and to plan a communications system that will ensure the event will run smoothly and safely. Our transportation consists of two rally vehicles supported by a minibus that is carrying spare parts, tools and all the other bits and pieces we will need on the 2000-mile journey across China. All vehicles are fitted with 100-W vhf fm radios, and the minibus has a synthesized 100-W hf ssb unit and two 5-W vhf hand-held units.

1000. We reach the border control area, where the Hong Kong authorities check our papers.

1100. At last we are in China, monitoring 7075 on hf ssb. I can hear Ed Nance, VS6DX, calling me on our first schedule, but this is no time to hold a QSO. We are met by a reception committee and the team that will accompany us on the journey: representatives of the China Motor Sport Federation, the Sports Service Corporation, the Traffic Police and the Public Security Department, the press, our interpreters, and a host of others. Our team has become a convoy, with three minibuses, a full-sized bus and a small truck loaded with fuel (there are no fuel points along the way). Lunch over, we are on our way again.

1500. We stop to survey a rally collection point. It's also time for my schedule with VS6DX, and there he is right on time! It is the first of our skeds planned for the next few days. Watched by curious eyes, I exchange reports and sign "VS6HH/BY."

Although the operation has been approved by the Ministry of Telecommunication and the Radio Sport Federation has made the application for us to use the amateur frequencies, our mandate is to provide communications for the rally trial run, both between vehicles and back to the rally office in Hong Kong. So I resist the temptation to work a little DX. It is gratifying to note the courteous way in which the many JA and other stations clear the frequency and allow us to pass rally traffic. Many stations call me after we have completed send-



In Hong Kong, the radio-equipped minibus that will be used for communications on the 2000-mile trek to Beijing is the center of attention for the news media.



The troupe makes a brief stop in the mountainous Hunan Province to refuel.

ing traffic, but we do not feel it would serve the long-term interests of Amateur Radio in China to go beyond what we have the authority to do.

We have our next QSO as we move down a miserably bad track in the dark and in pouring rain. This time it is Phil Weaver, VS6CT, and we try both 14 and 7, but neither was good. The static and the rattle of the vehicle make it very hard work. Finally, we stop for the night, but I'm soon out in the rain putting up a dipole for our 2100 sked. Our sked is 5 and 9 both ways; there is already quite a good deal of traffic in both directions.

Next morning, our first QSO is at 0730. Then, it's down with the dipole and off we roll. Now the serious vhf work begins. Our job is to control a 30-mile section of road where the drivers will move at very high speeds, making sure that whomever enters leaves. Communications in this area wouldn't be too bad if it weren't for a mountain. The 100-W vhf fm rigs with 3-dB mobile antennas generally do the job, and we can usually find some bit of mountainside to bounce a signal off of.



A vhf fm mobile rig (above) and an hf ssb unit, the primary communications system on the journey, are installed in the minibus.

It takes us five days to travel the 1000 miles to Wuhan, where I leave the party and fly back to Hong Kong. In that time, I've had twice-daily contacts with VS6DX, VS6CT and L. S. Drakeford, VS6EK. In addition, I had contacts with two Japanese amateurs to pass good wishes to the families of Japanese correspondents traveling with us.

The actual rally is scheduled for September. At this time, we anticipate that a small group of hams will set up stations in Beijing, Wuhan and Hong Kong, in conjunction with the China Radio Sport Federation. While this operation will be in support of the rally and will not be a DXpedition, we hope it will strengthen the links between radio amateurs in Hong Kong and China, and we hope it will lead to further joint radio activities. [Editor's Note: As a postscript, Ed Nance, VS6DX, has reported that the trial run in February was so successful that the Hong Kong Automobile Association has requested that Amateur Radio be the primary communications tool during the official road rally in September.]

QRP

\*House No. 1, Rocky Bank, 6 Deepwaterbay Rd., Hong Kong

# Board to FCC: "No-Code? No Way!"

The Board's April meeting in Hartford produced spirited responses to FCC actions and other hot issues.

By Harold M. Steinman,\* K1FHN

I suppose almost everyone is aware of the whimsical nature of New England weather. "If you don't like the weather now, just wait a minute," the old saw goes. ARRL directors have had their share of New England weather, too. Meetings of the Board used to take place in January. It snows a lot in January. One January meeting was punctuated by the collapse of the Hartford Civic Center roof, an event that gained national notoriety. So the Board experimented by holding its 1982 meeting in March. Well, it's still cold and it snows in March, too. So this year the Board met during the third week in April just to be *extra* safe (Connecticut had a major snowstorm the first week of April 1982). What could happen then?

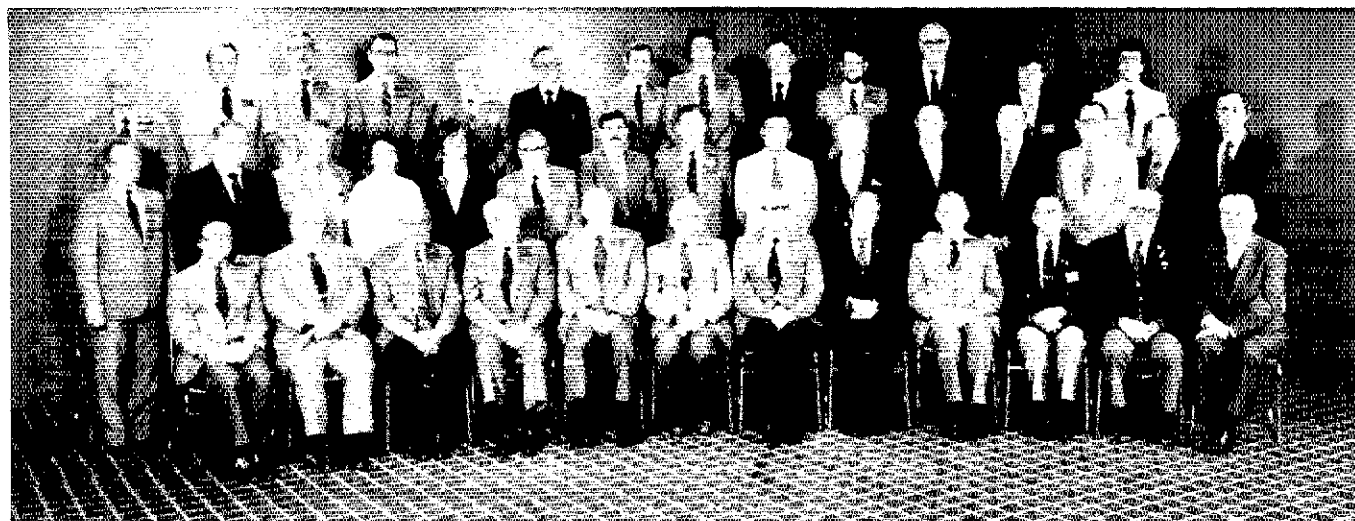
I'll tell you what could happen, and did!

\*Manager, Membership Services, ARRL

Snowstorms, rainstorms, flooding and mudslides all greeted the Board members. Fortunately, spirits weren't dampened, and the Board proceeded about its business in an efficient manner. In fact, this meeting was unusually efficient and speedy. There were two reasons for this. First, the Board followed the recommendations of its Ad Hoc Committee on Board Procedures to eliminate oral reports that are merely informational and add little to previously submitted written reports, and to keep closing remarks to a minimum. Evening sessions were briefer, better organized and, indeed, nonexistent the second day of the official meeting. Second, the committees, where the real work is done, and which were charged with several studies as a result of the July 1982 Board meeting, did their homework thoroughly and presented the Board with concise, concrete, well-thought out recommendations for consideration.

All this, by the way, bodes well for League members. Exhaustive committee studies and well-prepared presentations to the Board mean, in the long run, a more thorough airing of members' views and a deeper analysis of the problems facing Amateur Radio. As a result, when the Board meets in its entirety, more time can be spent discussing substantive matters that need the entire Board's attention, and less time need be spent on internal housekeeping. For example, in spite of the relative brevity of this April's meeting, several hours were spent, both in formal and informal session, discussing the major issues of the day — the no-code license proposal and volunteer examination proposals — which means we can now put to an end to these prefatory remarks and get on to what you've all been waiting for...

*No-Code:* The position taken by the Board, consistent with its past position on



The Board during a candid moment: First row (l to r): W8RC, W1HHR, W0OZC, W9PRN, K0GA, W0FIR, W4KFC, K1ZZ, W0BWJ, W4UG, W1QV, W3ABC. Second row: W1RU, W4RA, AG0X, W4WYR, W7QGP, W2IHA, N3AKD, VE2VW, W5CH, VE3CDM, N5TC, W5EDZ, N4MM, W6RFF, W6EJJ. Third row: W6ZM, WA6WZO, K0PGM, W4RH, W0JCP, W1UED, K1LLU, K2KIR, W1XX, WA2DHF, W7JIE, K1PAD, K1FHN.

## No-Code Evolution

The evolution of the ARRL Board's position on the FCC no-code proposal is summarized in the following statement:

"1) The Board initially registered opposition to the concept of a codeless license when it was first raised, citing amateur opinion disclosed by the LRPC Florida State survey.

"2) Following issuance of Docket 82-28, and up to the time of this Board Meeting, ARRL has maintained an essentially neutral stance, editorially, in correspondence and in discussions. ARRL leadership, to this point, has refrained from attempts to direct or prejudice membership response.

"3) Membership opinion continues to be overwhelmingly opposed to dropping the code requirement. Any tolerance for a no-code license appears to arise more from acceptance of its presumed inevitability than acknowledgment of any intrinsic benefits perceived for the Amateur Radio Service.

"4) Board discussions in depth have led to the conclusion that no satisfactory compromise formula for a codeless license can be established in the foreseeable future. Considering the obligation of the Amateur Radio Service to its public service commitments and disciplined use of the radio spectrum, the Board has no alternative but to reject the proposal.

"5) The Board is keenly aware of the desirability of encouraging more people, particularly young persons, to join the ranks of Amateur Radio. It is only the method proposed by the Commission that is unacceptable. For its part, the Board will continue to seek to improve and extend ARRL programs to reach and support the entry of newcomers to Amateur Radio."

the no-code concept, is simple and unequivocal: The no-code license is unacceptable to the amateur community. Any hint of acceptance is usually evidenced only after the "inevitability" of such a license is emphasized, but this is hardly a satisfactory way to forge the future of Amateur Radio. Please see Minute 59 and the discussion elsewhere in this article.

**Volunteer Licensing:** The Board, in informal session, put the finishing touches on a previously prepared draft of comments in Docket 83-27. Please see Happenings, this issue.

**Other FCC Matters:** The Board reaffirmed support of 10-year license terms for amateur licenses (Docket 83-337) and the phone-band expansion for the 80, 15 and 10-meter bands proposed in the FCC Further NPRM in Docket 82-83. Both these Board actions came as no surprise because ARRL had requested both actions. See Happenings, this month, for details on both issues.

**Operating:** At Minute 24, the Board approved a plan designed to breathe new life into the Intruder Watch program. You'll be seeing more about this in upcoming issues of *QST*. The Board also adopted the recommendations of the VRAC concerning 15-kHz "splinter" repeater channels in the 146-148 MHz band (Minute 54). For repeaters east of the Continental Divide,

## Studies Initiated by the Board

When insufficient information to make a decision is at hand, or a subject is worthy of further exploration before specific action is warranted, the Board will often refer the matter to an appropriate committee or individual. Recommendations are to be made to the Board at a later date. The Board originated 13 studies at its April meeting.

The Membership Affairs Committee will study:

- Changing the Articles of Association and By-Laws to enable Technician class licensees to run for League office (Minute 44)

- Initiation of a National High School ARRL Affiliated Amateur Radio Club System (Minute 84)

- Establishing a conflict-of-interest clause for Section Manager qualifications (Minute 89)

- The distribution of the *ARRL Letter, Directors' Letters* and other publication releases to ARRL field officials (Minute 94).

The Management and Finance Committee will study:

- ARRL volunteer expenses in order to make recommendations for 1984 (Minute 57)

- By-Laws 1 through 6 to clarify the availability of memberships at the \$2 rate (Minutes 17 and 81)

- Advantages and disadvantages of a change in the length of terms for elective ARRL office (Minutes 64 and 85).

The Plans and Programs Committee will study:

- The feasibility of sponsoring an Amateur Radio "Public Information Day" (Minute 51)

- Petitioning the FCC to allow RTTY and other digital modes on the 160-meter band (Minute 53).

The DX Advisory Committee will study:

- Making endorsements available for RTTY DXCC (Minute 65).

The VHF Repeater Advisory Committee will study:

- Frequency coordination and ways to improve the process (Minute 79)

- A band-usage plan for the proposed 902-928 MHz band and the existing 1215-1300 MHz band. This is a joint study with the VUAC (Minute 91).

The General Manager will study:

- A program for encouraging increased experimentation with hf direction-finding equipment and techniques (Minute 67).

## How You Can Help

If you would like to contribute to one of these studies, simply send a letter to ARRL Hq., addressed to the proper committee or individual. It will be acknowledged, and copies will be made and distributed to all parties concerned. You should also send a copy to your own division director, whose address can be found on page 8. You can influence League policy.

the ARRL suggests standardizing on upright 15-kHz splinter channels; that is, all repeater frequency pairs are low-in/high-out between 146 and 147 MHz, and high-in/low-out between 147 and 148 MHz. To minimize any expense and inconvenience, the ARRL recommends that this system be phased in over a five-year period.

**General ARRL Membership Meetings:** As a two-year pilot project, general

meetings of League members will be held at the 1983 and 1984 National ARRL Conventions in Houston and New York City, respectively (see Minute 35). This grew out of a Membership Affairs Committee study of opening ARRL Board meetings to League members. It was determined that there was no practical way to do this, but recognizing a need for better communication and more openness with ARRL members, the MA Committee recommended the pilot program of membership meetings. These meetings will enable League members and leadership officials to exchange views on matters affecting Amateur Radio. The President will moderate and the members of the ARRL Board will be present. *Only ARRL members* may attend — you'll have to show your credentials at the door.

**Organizational Matters:** The Board, at Minute 25 and 26, approved plans to effect a more continuous presence in Washington, DC and the eventual autonomy of the CRRL over a five-year period. Minute 34 directs the General Manager to continue discussions with national youth groups to make them more aware of Amateur Radio. And through Minutes 63 and 75, the ARRL will be signing Memoranda of Understanding with the National Communications System and REACT International, similar to a standing agreement now in effect between the League and the American National Red Cross. The possibility of a similar agreement with the Associated Public Safety Communications Officers, Inc. (APCO), will be explored (Minute 92).

**Product Review:** Minutes 37 and 38 deal with a change in ARRL Hq. procedure for reviewing new products in *QST*. Presently, the manufacturer submits an item for review. If it's not submitted, it's not reviewed. In an effort to make the Product Review column more useful to members, Hq. will be purchasing new amateur equipment "off the shelf." This will, to be sure, cost more money, and the Board authorized an initial \$12,000 for purchases. Some of this money will be recouped by selling the items after review. The Board feels that the increased usefulness of the column justifies the additional expense. Your views will be important after the new procedure gets started.

**Goldwater Scholarship:** In tribute to a good friend to all amateurs, the Board established an ARRL Scholarship Endowment Fund in honor of Senator Barry M. Goldwater, K7UGA, and appointed the ARRL Foundation as the fund administrator.

## The Fine Print

The following pages contain everything you ever wanted to know but were afraid to ask about what happened at the Board meeting. So take your shoes off, lean back, reach for the popcorn and read. You'll enjoy.

# Moved and Seconded...

## MINUTES OF THE 1983 ANNUAL MEETING OF THE BOARD OF DIRECTORS THE AMERICAN RADIO RELAY LEAGUE, INC. April 21-22, 1983

### Agenda

1. Roll call
2. Moment of silence
3. Consideration of the agenda for the meeting
4. Approval of minutes of 1982 Second Meeting
5. Supplementary oral reports by the officers
6. Receive reports and consider recommendations of the committees
7. Acceptance of reports
8. Election of Directors to the Executive Committee
9. Appointment of committees
10. Election of ARRL Foundation Directors
11. Directors' motions
12. Authorization of certain administrative expenses for 1983

1) Pursuant to due notice, the Board of Directors of the American Radio Relay League, Inc., met in annual session at the Civic Center Holiday Inn, in Hartford, Connecticut, on April 21, 1983. The meeting was called to order at 9:00 A.M. with President Victor C. Clark, W4KFC, in the Chair, and the following directors present: Thomas B. J. Atkins, VE3CDM, Canadian Division; Frank M. Butler, Jr., W4RH, Southeastern Division; Lys J. Carey, K8PGM, Rocky Mountain Division; George A. Diehl, W2IHA, Hudson Division; Paul Grauer, W6FTR, Midwest Division; Jay A. Holladay, W6EJJ, Southwestern Division; Clyde O. Hurlbert, W5CH, Delta Division; Mary E. Lewis, W7QGP, Northwestern Division; Howard Mark, W8OZC, Dakota Division; Edmond A. Metzger, W9PRN, Central Division; Gay E. Milius, Jr., W4UG, Roanoke Division; Leonard M. Nathanson, W8RC, Great Lakes Division; William J. Stevens, W6ZM, Pacific Division; John C. Sullivan, W1HHR, New England Division; Hugh A. Turnbull, W3ABC, Atlantic Division; Raymond B. Wangler, W5EDZ, West Gulf Division.

Also in attendance, as members of the Board without vote, were Carl L. Smith, W0BWJ, First Vice President; Larry E. Price, W4RA, Vice President; Garfield A. Anderson, K8GA, Vice President; Richard L. Baldwin, W1RU, International Affairs Vice President; and David Sumner, K1ZZ, General Manager. Also in attendance, at the invitation of the Board, as nonparticipating observers, were the following Vice Directors: Richard P. Beebe, K1PAD, New England Division; Thomas W. Comstock, N5TC, West Gulf Division; C. Richard Dyas, W8JCP, Midwest Division; Evelyn Gauzens, W4WYR, Southeastern Division; M. L. Gibson, W7JIE, Northwestern Division; Fried Heyn, WA6WZO, Southwestern Division; Jettie B. Hill, W6RFF, Pacific Division; John C. Kanode, N4MM, Roanoke Division; Stephen A. Mendelsohn, WA2DHF, Hudson Division; and Marshall Quiat, AG6X, Rocky Mountain Division.

There were also present Honorary Vice President Robert York Chapman, W1QV; Treasurer James E. McCobb, K1LLU; Counsel Christopher D. Imlay, N3AKD; Canadian Counsel B. Robert Benson, Q.C., VE2VZ; Communications Department Manager John Lindholm, W1XX; Membership Services Manager Harold M. Steinman, K1FHN; and Washington Area Coordinator Perry Williams, W1UED.

2) The assembly observed a moment of silence in recollection of Past President Goodwin L. Dosland, W0TSN; Vice Director Mel Ellis, K7AOZ; Jorge Dawson, HP1GD, Region 2 IARU Net Manager; Lawrence E. Steimel, W0ACD, Section Manager, Colorado; Leonard Hollar, WA5FSN, Section Manager, Oklahoma; and other amateurs who have passed away since the previous meeting of the Board.

The Chair welcomed new Directors Thomas B. J. Atkins, VE3CDM, and George A. Diehl, W2IHA, and new Vice Directors M. L. Gibson, W7JIE, Fried Heyn, WA6WZO, Howard Mark, W8OZC, and Stephen Mendelsohn, WA2DHF, to the meeting.

3) Without dissent, the agenda was accepted as printed.

4) On motion of Mr. Nathanson, seconded by Mr. Stevens, it was unanimously VOTED that the Minutes of the 1982 Second Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

5) Supplementary reports of the officers were the next order of business. President Clark mentioned a number of important issues: the Ad-Hoc Committee on the Strengthening of the Canadian Radio Relay League, the "No-Code" License Proposal, the prospect for Amateur Radio aboard the space shuttle, the video show being organized by Roy Neal, K6DUE, reorganization of the International Amateur Radio Union (IARU), American amateur activities in the World Communications Year, receipt of \$10,000 to fund reinstatement of the Hiram Percy Maxim Award for young amateurs, a scholarship program in honor of Senator Barry Goldwater, K7UGA, the forthcoming IARU Region 2 Assembly in Cali, Colombia, and the proposed volunteer examination program. The President commended coordination within ARRL and team work between staff, officers and volunteers. An extensive written report, containing a valuable check list of work in progress, was also presented and placed on file.

6) Continuing agenda item 5, First Vice President Smith presented his written report covering changes in officer personnel of the League during 1982, and extensive travel, including the IARU Region 3 Conference in Manila, visits to Thailand, Bangladesh, India, Bahrain, the Federal Republic of Germany and Brazil, and a second visit to Thailand. Mr. Smith mentioned the importance of the IARU and of ARRL's functions within it.

7) Vice President Price presented his written report, emphasizing forward planning, management depth, financial outlook for the League, capital spending decisions and the no-code license proposal of FCC.

8) Vice President Anderson presented a brief written report covering his work on committees and transition to the Vice Presidency from Directorship of the Dakota Division.

9) International Affairs Vice President Baldwin presented an extensive report with details on travel to the Manila Conference of IARU Region 3, Peking, Japan, Hong Kong, Singapore and Germany. The report also covered administrative activities in connection with the International Amateur Radio Union, which Mr. Baldwin serves as President. The second trip to Japan, late in the year, led to progress toward a reciprocal-operating agreement between the United States and Japan. In oral remarks, Mr. Baldwin described the first meeting of the IARU Administrative Council as very satisfying; nine people from all over the world representing a variety of viewpoints made substantial progress toward revision of the Constitution and By-Laws of the Union.

10) General Manager Sumner placed on file an extensive report in two parts, covering finances, personnel, publications, membership promotion, section reorganization, special service clubs, volunteer exams, QST advertising and a Project Goodwill update. Part 2 of his report reviewed actions taken by the General Manager in response to Board directives. His oral remarks updated the report as concerns the Hiram Percy Maxim Memorial Award and personnel matters.

11) The written report of Treasurer McCobb outlined how the financial events during 1982 affected the League's invested reserves. The report showed finances of the League currently in a healthy state. Mr.

McCobb's oral report brought matters up to date for the first quarter of 1983, again a strong showing.

12) A brief oral report of Counsel Imlay covered interference matters in Northern California, antenna cases, especially three in U.S. District Courts, and the effectiveness of Public Law 97-259 in assisting with RFI and federal preemption cases. It supplemented a thorough written report covering telephony subband expansion, biological effects of rf energy, revised criteria for antenna case funding, the volunteer-counsel program, cable-television interference, 10-year license terms, volunteer monitoring, RFI-rejection standards for home electronic equipment, use of volunteers for amateur examination and administration, actions of the FCC Review Board, transmitter power, elimination of logging, implementation of the WARC-79 agreements by FCC, and radio-frequency interference from devices such as touch-controlled lamps and cordless phones.

13) Canadian Counsel Benson reported on adjustments to the By-Laws for the Canadian Radio Relay League and zoning and covenant cases in which his office supported the work of local attorneys.

14) The final segment of agenda item 5 was the report of ARRL Foundation President Chapman highlighting grants to AMSAT and the awarding of scholarships. Mr. Chapman invited all Directors to the Foundation Annual Board Meeting to be held at the conclusion of the ARRL Board Meeting.

15) Agenda item 6 began with the report of the Plans & Programs Committee by Vice President Anderson, Acting Chairman. His written report covered the two assignments of the committee, recommendations for changes in the phone-band allocations and recommendations on the preparation and distribution of handout material for talks and demonstrations about Amateur Radio. His oral remarks updated the written report with good news about adoption by FCC of ARRL recommendations concerning phone expansion.

16) The report of the Membership Affairs Committee was postponed until later in the meeting. Mr. Wangler, as Chairman, reported on activities of the Management and Finance Committee. Matters touched on were reworking of investment policies for the Life Membership fund, development of the club liability insurance program, reduced membership dues for members under the age of 18, creation or revision of job descriptions, adjustments to audit procedures, and review of the 1983 budget.

17) It was moved by Mr. Wangler, seconded by Mr. Milius, that By-Law 5 be amended to read as follows (italics indicates addition): Provided that a member is without sight or is the husband or wife, brother or sister, son or daughter, father or mother of another member living at the same address and either a Life Member or one paying dues in accordance with By-Law 4, or in accordance with By-Law 6 by virtue of having reached the age of 65 years, he may at his request pay dues of \$2 per year in advance but without the right to receive QST, said membership to be concurrent with that of the member receiving QST. After discussion, upon motion of Mr. Nathanson, seconded by Mr. Butler, it was unanimously VOTED that the matter is laid on the Table.

18) Mr. Butler, as liaison, presented the report of the VHF Repeater Advisory Committee concerning the five assignments it had received, accepting the 6-meter band plan, recommending that the 15-kHz splinter channels be upright east of the Continental Divide, and turning down proposals for a geographic identifier, subaudible tones for each splinter channel, and tone access codes for time, temperature, and the like.

19) The report of the Contest Advisory Committee was deferred until later because of the absence of its Board Liaison, Director Olson.

20) Mr. Kanode, as liaison, presented the report of the DX Advisory Committee covering lists and DX nets, outgoing QSL bureau listings, low-power DX Century Club award, deletions of entities recognized for DXCC, the possibility of additional DXCC awards, ethics, and recognition of Peter I Island as a "country." Updating the written report was a proposal to delete Spratly Island because of major political changes in recent months.

21) The report of the Emergency Communications

\*Vice Director acting on behalf of Director Tod Olson, K0TO, until 8:15 P.M.



Advisory Committee was submitted by its liaison, Mr. Sullivan. Its assignments included Minute 60, 1981 Second Meeting, collection of information about amateur communications assistance; Minute 83, 1981 Second Meeting, emergency communications volunteer certification program; Minute 13, May 1982 Executive Committee Meeting, concerning an agreement with REACT; Minute 83, 1982 Second Meeting, concerning selection of standard tone access codes; Minute 97, 1982 Annual Meeting, recommending adoption of the ABIZ emergency alerting plan (p. 83, February 1982 QST); and Minute 90, 1982 Second Meeting, where the committee recommends that the Technical Department of ARRL work with industry to standardize power plugs. It was moved by Mr. Sullivan, seconded by Mr. Milius, that the Board accept the report of the Emergency Communications Advisory Committee and directs the General Manager to implement the committee recommendations contained therein with respect to Minute 97 of the 1982 Annual Meeting and Minute 90 of the 1982 Second Meeting. It was moved by Mr. Nathanson, that the motion be amended by deleting all after "... Emergency Communications Advisory Committee," but there was no second, so the motion to amend was LOST. The question then being on the motion as originally offered, the same was unanimously ADOPTED.

22) Mr. Mendelsohn, as liaison, presented the report of the Public Relations Advisory Committee, a thorough study of ARRL literature used as handouts to the media and the public. Mr. Mendelsohn expressed the thanks of the committee for the work of past chairman John Brown, W7CKZ, and support for the new chairman, Jack Shepherd, W8OMY.

23) Mr. Holladay, as liaison, presented a brief oral report for the VHF/UHF Advisory Committee recommending that the League continue its efforts to obtain early use of the 902-928 MHz band. On his motion, seconded by Mr. Butler, it was unanimously VOTED that the Board of Directors adopts the 6-meter band plan as approved by the VUAC and the VRAC. This band plan shall be published in an early issue of QST and in the next edition of the ARRL Repeater Directory. During the course of the above, the Board was in recess from 10:30 to 10:57 A.M.

24) Mr. Price, as Chairman, presented the report of the Ad Hoc Committee to Formulate a Revitalization Plan for the Intruder Watch Program. The report offered a new name, ARRL Interference Reporting System (AIRS), stated objectives for AIRS, described membership in AIRS, the role of the Headquarters, the role of the FCC, priorities of AIRS and liaison with other IARU interference-monitoring systems. On motion of Mr. Milius, seconded by Mr. Holladay, it was unanimously VOTED that the preliminary report of the Ad Hoc Committee to Formulate a Revitalization Plan for the Intruder Watch Program is adopted and the Committee is directed to monitor the implementation of the program. The Committee is further directed to render a final report with any appropriate recommendations not later than the 1984 Annual Meeting of the Board. During the course of the above, Mr. Gibson took the seat for Mrs. Lewis from 11:03 to 11:25 A.M.

25) Mr. Smith, as Chairman, presented the report of the Ad Hoc Committee on a more continuous Washington presence. It recommended that the General Manager designate staff members to function as back-up for the Washington Area Coordinator; proceed to recruit or employ a Washington Area resident to assist in Washington work on a part-time basis; maintain an agenda of Board policy for legislative or regulatory goals; maintain an intelligence network; and establish an effective organized membership response procedure to specific problems. On motion of Mr. Smith, seconded by Mr. Nathanson, it was unanimously VOTED to accept the report and adopt the recommendations of the Committee.

26) Mr. Clark, as Chairman, presented the report of the Ad Hoc Committee on the Strengthening of CRRL. The report recommended a policy of strengthening CRRL, development of a multiyear program leading toward autonomy and arrangements for future liaison between the respective Leagues. A number of steps were outlined to be taken over a five-year span. It was moved by Mr. Atkins, seconded by Mr. Butler, that the Rules and Regulations of the ARRL Field Organization be amended to provide for the conducting of Section Manager elections wholly within Canada, as follows:

1) In paragraph 5, subparagraph (a), the first sentence is amended by the addition of the following phrase: "... in the case of sections consisting of U.S. territory, and with the CRRL Secretary in the case of Canadian sections."

2) In paragraph 5, subparagraphs (b), (c) and (e), and in paragraph 6, the phrase "(or CRRL Secretary)" shall be added following the phrase "General Manager" wherever the latter appears. A roll call vote being required, the matter was decided in the affirmative, with all directors voting in favor. So the Rules and Regulations were AMENDED.

27) The report of the Ad Hoc Committee on Licensing and Monitoring was presented by its Chairman, Mr. Anderson. The Committee monitored and assisted in preparation of plans to modify amateur regulations for conformance with Public Law 97-259 concerning volunteer examiners and volunteer monitoring. The Committee presented a draft filing for PR Docket 83-27.

28) The Board was in recess for lunch from 12:28 to 1:30 P.M., reconvening with all persons hereinbefore mentioned present except Mrs. Lewis and Mr. Mark. Mr. Gibson took the seat for Mrs. Lewis. George W. Hippisley, K2KIR, Vice Director from the Atlantic Division, joined the meeting at this point.

29) Mr. Stevens, as Chairman, presented the report of the Ad Hoc Committee on Board Procedures, with the observation that most of the recommendations were in place and seemed to be working.

30) Mr. Holladay, as Chairman, presented a brief oral report for the Amateur Satellite Service Council, offering the information that OSCAR Phase IIIB is expected to be launched on June 3, 1983. During the course of his remarks, at 1:35 P.M., Mr. Mark and Mrs. Lewis returned to the meeting and took their seats.

31) Mr. Turnbull, as Chairman, presented the report of the RFI Task Group. The report covered relations with the National Cable Television Association, an interference package for reporting cable interference problems, and a possible symposium on radio-frequency interference. Mr. Turnbull also reported orally that ARRL had filed a brief statement with the Senate Subcommittee on Communications concerning Senate Bill 66 calling attention to interference problems associated with cable television. New problems include touch-controlled lamps and switches, telephone deregulation and cordless phones.

32) The report of the Biological Effects of RF Energy Committee was presented by its Chairman, Mr. Wangler. The Committee's activities include: opposing a Massachusetts law to regulate operators of devices emitting rf energy; participating in FCC's Notice of Proposed Rule Making, Docket 79-144; filing comments in Docket A-81-43 of the Environmental Protection Agency and working with an interindustry committee that has been explaining the issue to FCC bureau chiefs and other staff members. The Committee recommends adoption of a federal radio protection standard that preempts the efforts of state and local government to regulate rf emissions from FCC licensees; adoption of ANSI C95.1-1982 as the rf exposure standard; and recognition that Amateur Radio, because of its intermittent nature and relatively low powers used, presents no hazard to the public.

33) Mr. Quait, as liaison, presented the report of the ARRL Committee on Amateur Radio Digital Communications. The Committee was asked to monitor pending League requests in Docket 81-699, to allow additional digital codes, and RM-4122, to permit AMTOR transmissions in the amateur band. The first was authorized by FCC on September 21, 1982, and the second by order released February 8, 1983. The Committee also reviewed frequencies designated for RTTY in League band plans, and worked with packet radio and RTTY groups to develop standards for digital communications. The Committee is also tasked with developing a data communications directory and reviewing material for the *Radio Amateur's Handbook* and other League publications dealing with RTTY and digital communications. The Committee recommended that the ARRL petition FCC to permit F1 operation in a portion of the 160-meter band.

34) Mr. Sullivan, as Chairman, presented the report of the Membership Affairs Committee. On motion of Mr. Carey, seconded by Mr. Sullivan, it was unanimously VOTED that the General Manager is directed to continue discussions with national youth groups for the purpose of making the youths and their leaders aware of Amateur Radio, and to report to the Membership Affairs Committee monthly during the next 12 months.

35) On motion of Mr. Sullivan, seconded by Mrs. Lewis, it was VOTED, 9 votes in favor to 7 votes opposed, that the Board of Directors convene a General Meeting of the membership at the next two ARRL National Conventions for the purpose of exchanging views on matters affecting Amateur Radio. Further, the ARRL President shall serve as moderator and the members of the ARRL Board shall be present to respond to the membership's queries. Further, this meeting shall be open only to ARRL members in good standing upon their furnishing proof of such membership. Further, Roberts Rules of Order shall govern the proceeding, and sufficient time shall be provided to satisfy the membership's need.

36) On motion of Mrs. Lewis, seconded by Mr. Butler, it was unanimously VOTED that the Membership Affairs Committee continue to monitor the production of reproducible material to be made available to affiliated-club newsletter editors.

37) On motion of Mr. Price, seconded by Mr. Butler, it was unanimously VOTED that the General

Manager purchase all items that are to be evaluated in QST's "Product Review." After completion of such evaluation, the item shall be made available for sale. The Board was in recess from 3:00 to 3:22 P.M.; Mr. Comstock departed from the meeting during the recess.

38) On motion of Mr. Price, seconded by Mr. Sullivan, VOTED that a reserve of \$12,000 is established for the purpose of funding equipment purchases for "Product Review."

39) On motion of Mr. Nathanson, seconded by Mrs. Lewis, it was unanimously VOTED that all labels for election purposes be shipped no later than five working days after receipt of request, or time of certification, whichever is later.

40) Moving now to Agenda item 7, on motion of Mr. Sullivan, seconded by Mr. Butler, it was unanimously VOTED that the reports of the officers and committees are accepted and placed on file.

41) The Chair announced, under Agenda item 8, the opening of nominations for Directors to serve on the Executive Committee. Mr. Sullivan nominated Mr. Grauer. Mr. Hurlbert nominated Mr. Nathanson. Mr. Nathanson nominated Mr. Stevens, but Mr. Stevens withdrew his name and nominated Mr. Milius. Mr. Grauer nominated Mr. Metzger. Mr. Atkins nominated Mr. Holladay. On motion of Mr. Wangler, seconded by Mr. Butler, it was unanimously VOTED that nominations are closed. The Chair appointed Messrs. Beebe and Quait as Tellers. The results of the first vote being inconclusive, a second vote was called. Messrs. Grauer, Nathanson, Milius and Holladay were declared elected. During the course of the above, the Board was in recess from 3:42 to 3:53 and from 3:56 to 3:59 P.M.

42) Under Agenda item 9, the Chair appointed the following standing committees:

Management & Finance — Mr. Stevens (Chairman), Mr. Metzger, Mr. Wangler, Mr. Hurlbert, Vice President Price.

Plans & Programs — Mr. Carey (Chairman), Mrs. Lewis, Mr. Turnbull, Mr. Olson, Vice President Smith.

Membership Affairs — Mr. Sullivan (Chairman), Mr. Diehl, Mr. Atkins, Mr. Butler, Vice President Anderson.

43) The President announced the opening of nominations for ARRL Foundation Directors. On motion of Mr. Sullivan, seconded by Mrs. Lewis, it was unanimously VOTED that Mr. Carey, Mr. Metzger and Andrea Parker, K1WLX, are elected to the Foundation Board.

44) Turning next to Agenda item 11, on motion of Mr. Turnbull, seconded by Mr. Nathanson, it was unanimously VOTED that a study be conducted by the Membership Affairs Committee to establish the desirability of changing the Articles of Association and By-Laws to enable holders of Technician class licenses to offer for election to ARRL office.

45) On motion of Mr. Hurlbert, seconded by Mr. Sullivan, it was unanimously VOTED that the Ad Hoc Committee created by Minute 57 of the second 1982 Meeting is commended for the excellent progress to date in laying a foundation for eventual transition of the amateur licensing-examination process from the Federal Communications Commission to a Volunteer Examination Coordinating body, that is, the ARRL; further, that the Committee is directed to continue a careful appraisal of developments in this matter, as well as in the matter of the use of volunteers in monitoring activities, with the understanding and intent of the Board that the Committee shall refer to the Board for prior approval any proposed agreement, written or otherwise, between the ARRL and the Commission.

46) It was moved by Mr. Nathanson, seconded by Mr. Stevens, that the By-Laws provide that no applicant for membership in the ARRL shall be eligible for Full membership unless their license class shall have required Morse code as a requirement. After discussion, on motion of Mr. Price, seconded by Mr. Holladay, it was unanimously VOTED that the matter is referred to the Membership Affairs Committee.

47) On motion of Mr. Diehl, seconded by Mr. Turnbull, it was unanimously VOTED that the General Manager is instructed to consolidate and update existing ARRL handout materials as to content, target audience and logo graphics, with the material to be coded so as to assure proper use by field volunteers.

48) On motion of Mr. Grauer, seconded by Mr. Sullivan, it was unanimously VOTED that the Board of Directors reaffirms its support of the proposal to extend amateur license terms from five to 10 years and the ensuing period of grace from one to two years, and instructs the General Manager to file comments in Docket 83-337 endorsing this step.

49) On motion of Mr. Grauer, seconded by Mr. Holladay, it was VOTED that the Headquarters staff prepare comments for filing by ARRL Counsel in support of the FCC proposals for expansion of the high-frequency phone bands as proposed in the Further Notice of Proposed Rule Making in PR Docket 82-83. Such comments shall be reviewed by the Executive Committee prior to filing. Mr. Atkins requested to be recorded as voting opposed.

50) It was moved by Mr. Sullivan, seconded by Mr. Butler, that section 5(e) of the Rules and Regulations of the ARRL Field Organization be modified to read as follows (italics indicates addition): (e) Vacancies in the office of Section Manager occurring between elections shall be filled by appointment by the General Manager in consultation with the Director and upon recommendation of the outgoing SM. A roll call vote being required, the question was decided in the AFFIRMATIVE, with all of the directors voting in favor. So the Rules and Regulations were AMENDED.

51) Moved, by Mr. Stevens, seconded by Mr. Holladay, that the League sponsor an Amateur Radio "Public Information Day" in order to increase the general public's awareness of Amateur Radio and its public service aspect. On motion of Mr. Price, seconded by Mr. Nathanson, it was unanimously VOTED to refer the matter to the Plans and Programs Committee in conjunction with the Public Relations Advisory Committee.

52) On motion of Mr. Milius, seconded by Mr. Stevens, it was unanimously VOTED that the General Manager is directed to prepare a written plan proposing a system of management development and training for Headquarters employee managers and potential managers. The plan should be submitted to the Management & Finance Committee prior to the end of the year. At this point, at 4:49 P.M., Mr. Gibson took the seat for Mrs. Lewis.

53) It was moved by Mr. Carey, seconded by Mr. Milius, that a petition for rule making be prepared by the General Manager with Counsel and the manager of the Technical Department for filing with the FCC to amend Subpart (C), Part 97, of the FCC Regulations as necessary to permit RTTY and other digital code communication in the 160-meter amateur band. On motion of Mr. Price, seconded by Mr. Holladay, it was unanimously VOTED to refer this matter to the Plans and Programs Committee.

54) On motion of Mr. Butler, seconded by Mr. Diehl, it was VOTED that the Board adopts the following recommendation of the VRAC regarding the utilization of the 15 kHz "splinter" channels on the 146-148 MHz amateur band, and commends this policy to repeater operators and frequency coordinators:

For repeaters located east of the Continental Divide, the ARRL suggests standardizing on upright 15-kHz splinter channels; that is, all repeater frequency pairs are low in/high out between 146 and 147 MHz, and high in/low out between 147 and 148 MHz. Recognizing the existence of a significant minority of inverted split repeaters east of the Divide, and wishing to minimize expense and inconvenience of these repeater groups, the ARRL recommends a phase-in period of five years from this date for converting to the suggested system.

55) On motion of Mr. Holladay, seconded by Mr. Sullivan, it was unanimously VOTED that the ARRL Board of Directors establish the ARRL Scholarship Endowment Fund honoring Senator Barry M. Goldwater, KTUGA, and that the ARRL Foundation shall serve as fund administrator. The ARRL President shall appoint a committee of not less than three individuals to develop suitable selection criteria for the endowment scholarship award, with the objective of an initial award on or about September of 1984.

56) On motion of Mr. Wangler, seconded by Mr. Holladay, at 5:07 P.M., it was unanimously VOTED that the Board resolve itself into a Committee of the Whole to discuss staff matters. Staff members present left the room. The Committee of the Whole rose at 5:14 P.M. and reported to the Board. On motion of Mr. Wangler, seconded by Mr. Butler, it was unanimously VOTED that the Board accept the report of the Committee of the Whole. At this point, Mr. Comstock returned to the meeting and took the seat for Mr. Wangler.

57) On motion of Mr. Hurlbert, seconded by Mr. Sullivan, it was unanimously VOTED that the Management and Finance Committee is directed to review the amounts authorized in fiscal 1983 for expenses by volunteers, the study to include expenses of members of the field organization as well as members of the Board. The Committee is further directed to prepare specific recommendations for fiscal 1984 using modern budgeting techniques.

58) The Board was in recess for dinner from 5:28 to 8:15 P.M., reassembling with all persons hereinbefore mentioned present except Mr. McCobb. Mr. Wangler and Mrs. Lewis had returned to the Table. Mr. Olson arrived at the meeting and took his seat.

59) On motion of Mr. Stevens, seconded by Mr. Olson, after lengthy discussion, the following resolution was unanimously ADOPTED:

WHEREAS, the FCC has proposed in Docket 83-28 a significant revision in the structure of the amateur service by introducing a new class of code-free amateur license, and

WHEREAS, the League shares the objective of en-

couraging and facilitating the entry into the amateur ranks of additional persons, especially bright young persons, but has found little evidence that the requirement for a knowledge of Morse code is a significant barrier to such entry, and

WHEREAS, the ARRL, as the national organization of radio amateurs, has carefully assessed the views of its members concerning the importance of the continuation of a Morse code requirement for obtaining an amateur license, and

WHEREAS, the League Officers, Directors and Staff have reviewed the impact of a new license class upon the Volunteer Examination Program proposed in Docket 83-27, and

WHEREAS, the League, conscious of the significant contributions made by an Amateur Radio Service which is composed of highly qualified and highly motivated individuals, is concerned that there be no further reduction in the long-established entry standards, now, therefore,

BE IT RESOLVED by the Board of Directors of the ARRL in Annual Meeting assembled that the General Manager is directed to prepare, for filing by Counsel, comments in the matter of PR Docket 83-28 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 the knowledge of the Morse code.

Mr. Atkins requested to be recorded as abstaining.

60) The Board was in recess from 9:28 P.M. until 8:38 A.M. the following morning, assembling with all persons hereinbefore mentioned present except Mr. McCobb and Mr. Williams.

61) On motion of Mr. Nathanson, seconded by Mrs. Lewis, it was VOTED that the American Radio Relay League cease funding any Amateur Radio cases, and that League participation be restricted to support by collating briefs and pleadings as well as amicus filings when appropriate. Further, that the League continue to promulgate the Volunteer Legal Counsel Program by quarterly requests for volunteers in QST.

62) On motion of Mr. Grauer, seconded by Mr. Milius, the following resolution was unanimously APPROVED:

WHEREAS Amateur Radio operators engage in assistance to people in need throughout the world, and daily communication between common people from all parts of the world, and

WHEREAS Amateur Radio is the only medium where average people throughout the world can meet to talk to each other and spread goodwill across otherwise impenetrable political boundaries, and

WHEREAS the world is in need of positive efforts toward international understanding and peaceful communication,

BE IT RESOLVED that the American Radio Relay League hereby establishes a committee for the purpose of developing an annual international prize to be awarded to truly outstanding Amateur Radio operators in areas of international humanitarianism and the furtherance of peace.

63) On motion of Mr. Sullivan, seconded by Mr. Nathanson, it was unanimously VOTED that the President is authorized to sign, on behalf of ARRL, the draft memorandum of understanding between ARRL and the National Communications System, developed in response to Minute 69 of the July 1982 Board Meeting.

64) Moved by Mrs. Lewis, seconded by Mr. Stevens, that the Board endorse the principle that four-year terms of office for directors would be a more cost-effective procedure lending continuity to Board operations. The Board directs the President to appoint a special committee to draft appropriate By-Law revision language following these principles:

- 1) Four directors should be elected each year for four-year terms.
- 2) No presently serving directors would have their terms of office automatically extended beyond the terms for which they were originally elected.
- 3) The new procedures would be effective with the elections beginning in 1984.
- 4) The Committee should present its report for consideration by the Board no later than 60 days prior to the Second 1983 Board Meeting.

On motion of Mr. Metzger, seconded by Mr. Sullivan, it was VOTED, 9 votes to 7, that the matter is laid on the Table.

65) Moved by Mr. Stevens, seconded by Mr. Milius, that

WHEREAS, a growing number of ARRL members are equipping their stations for RTTY operation, and

WHEREAS, it is the policy of the League to encourage versatility in the use of the various modes of emission, and

WHEREAS, ARRL has recognized the desirability

of encouraging RTTY operation in a number of ways, including the issuance, upon recommendation of the DX Advisory Committee, of a RTTY DXCC award, and

WHEREAS, so as not to aggravate the workload in the DXCC branch, the award was made available initially without endorsements for levels of achievement above the basic 100 countries, and

WHEREAS, for a number of reasons, including commendable efforts by the staff, the backlog in the DXCC branch has been reduced to manageable proportions,

NOW THEREFORE BE IT RESOLVED, that endorsements for RTTY DXCC shall be available beginning 1 July 1983, for contacts made on or after 15 November 1945, under the same provisions as apply to the cw and phone DXCC awards.

After discussion, on motion of Mr. Sullivan, seconded by Mr. Holladay, it was VOTED that the matter is referred to the DX Advisory Committee, which is to report its findings to the Board by the second meeting of 1983.

66) Moved by Mr. Milius, seconded by Mr. Carey, that the Federal Communications Commission be requested to grant an honorary award of top Amateur Radio privileges to Amateur Radio operators who have continuously held an Amateur Radio operator's license for 50 years or more in recognition of their achievement and devotion to Amateur Radio; provided, however, that they make personal application therefore and present suitable documentary evidence of their periods of license. After discussion, on motion of Mr. Price, seconded by Mr. Sullivan, it was VOTED that the matter is laid on the Table.

67) On motion of Mr. Butler, seconded by Mr. Wangler, unanimously VOTED that the Board of Directors instructs the General Manager to undertake a staff study to develop a program for encouraging increased experimentation by amateurs with high-frequency direction-finding equipment and techniques, with the objective of enhancing the ability of the Amateur Radio Service to assist in monitoring activities as provided for by Public Law 97-259.

68) On motion of Mr. Holladay, seconded by Mr. Butler, it was VOTED that the President is directed to appoint an Ad Hoc Committee on Forward Planning. This Committee shall consist of such members of the Board and other League Members as the President judges appropriate. The Committee shall review the report of the former LRPC in light of implementation of programs already accomplished and underway, as well as changed environmental circumstances. The Committee shall include in its report a specific recommendation for the ways in which planning shall be accomplished in the future. The Ad-Hoc Committee shall render its report not later than the 1984 Annual Meeting of the Board. Mr. Carey and Mr. Grauer requested to be recorded as voting against the motion.

69) On motion of Mr. Wangler, seconded by Mr. Holladay, it was unanimously VOTED that

WHEREAS, there continues to be a general lack of knowledge and understanding of Amateur Radio in the political circles of the United States, and

WHEREAS, Government leaders at all levels of legislative concern continue to generate laws adversely affecting Amateur Radio, and

WHEREAS, increased public awareness of the service and purpose of Amateur Radio must be expanded through knowledge from some centralized publication,

The ARRL staff shall generate a current document explaining Amateur Radio in detail with the objective of informing elected and appointed officials at the city, state and federal levels of the national resource available to the public for emergency communications through the voluntary services of the Amateur Radio operators in this country.

70) At this point Mr. Olsen, as Board Liaison, presented the report of the Contest Advisory Committee, which dealt with the status of the District of Columbia as a separate multiplier in contests, DX contest multiplier structure, DX contest KH6/KL7 multiplier status, guest operator separate category and host station privileges, and other matters.

71) On motion of Mr. Olson, seconded by Mr. Sullivan, it was unanimously VOTED that the General Manager is directed to clarify the regulations regarding the use of the outgoing QSL Bureau by affiliated clubs for QSOs made while using the club's station to assure that individual amateurs wishing to utilize the outgoing Bureau are ARRL members.

72) Moved by Mr. Hurlbert, seconded by Mr. Nathanson, that

WHEREAS, the FCC in its Further Notice of Proposed Rule Making dated March 31, 1983, PR Docket No. 82-83, invites comment on 40-meter phone-band expansion, and

WHEREAS, this Notice requires comment on or before July 1, 1983, and

WHEREAS, although the Board of Directors has previously considered this matter and rejected at that

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time any recommendation for expansion of the 40-meter phone band, and

WHEREAS, certain factors influencing that decision have changed, among which is the expansion of the Canadian phone band below 7.1 MHz, and

WHEREAS, there are no frequencies available to U.S. amateurs below 7.1 MHz for 40-meter phone operation, and

WHEREAS, 7.0 MHz to 7.1 MHz is the only portion of the 40-meter band internationally allocated to Amateur Radio on an exclusive basis,

The Plans and Programs Committee shall give further study to the proposition of expansion of phone privileges on the 40-meter band below 7.1 MHz, and make appropriate recommendations to the Board of Directors of the ARRL at its next regular meeting; and further, that Counsel is directed forthwith to file on behalf of the ARRL a request for extension of time to file comments with reference to 40-meter phone-band expansion to a date subsequent to the date of the next ARRL Board Meeting, so as to give reasonable time for a review of policy and any necessary action resulting therefrom. A roll call vote being requested, the motion was DEFEATED with all Directors voting opposed with the exception of Mr. Hurlbert and Mr. Nathanson who voted in favor. Mr. Atkins abstained.

73) On motion of Mr. Nathanson (jointly sponsored by Mr. Hurlbert), seconded by Mr. Sullivan, the following resolution was unanimously ADOPTED:

WHEREAS, Doug DeMaw, W1FB has served ARRL and its members loyally and faithfully for 18 years while ascending to the position of Technical Department Manager and Senior Technical Editor, and

WHEREAS, Doug has written in excess of 200 articles for QST and brought ARRL into the Solid-State Era, and

WHEREAS, Doug's wife, Jean, W1CKK, has brought joy to thousands of her fellow amateurs as manager of the ARRL Awards Branch, and

WHEREAS, Doug and Jean have earned the love and respect of their co-workers and many friends for many years,

THEREFORE BE IT RESOLVED that the ARRL Board of Directors assembled April 22, 1983, extends a hearty "well done," and good wishes and the best of luck to Doug and Jean on the occasion of their well-deserved "working retirement" to their homeland of Michigan. (Applause.)

74) On motion of Mr. Grauer, seconded by Mr. Sullivan, it was VOTED that the General Manager is authorized to proceed with the publication of a directory of Amateur Radio call signs, names and addresses, if in his judgment such a publication is economically feasible and would be responsive to the needs of the members. At this point, the Board was in recess from 10:30 A.M. to 11:00 A.M.

75) On motion of Mr. Sullivan, seconded by Mr. Milius, it was VOTED that, to better facilitate effective disaster communications and to delineate communications responsibilities on the scene of a disaster, the ARRL effect a Memorandum of Understanding with REACT International, Incorporated. Mr. Grauer requested to be recorded as voting against the motion. Mr. Hurlbert requested to be recorded as abstaining.

76) On motion of Mrs. Lewis, seconded by Mr. Butler, it was VOTED that the General Manager follow through on making available for purchase a scarf or cloth neck attire for female League members. Mr. Hurlbert requested to be recorded as abstaining.

77) On motion of Mr. Stevens, seconded by Mr. Holladay, it was unanimously VOTED that the President communicate in writing with the chairman of the Federal Communications Commission to increase the latter's awareness of the serious present malicious interference in Northern California, and the need to commit resources to seek revocations of the licenses of severe violators. The efforts of the Washington Area Coordinator and counsel shall continue on the staff level to accomplish the same goal, and to take additional action as necessary to reduce such malicious interference.

78) Moved by Mr. Milius, seconded by Mrs. Lewis, that the Management and Finance Committee study the feasibility of offering payment to authors for articles published in QST and report to the Board at the 1984 Annual Meeting. After discussion, on motion of Mr. Price, seconded by Mr. Olson, it was VOTED that the matter is laid on the Table.

79) On motion of Mr. Butler, seconded by Mr. Wangler, it was unanimously VOTED that the VHF Repeater Advisory Committee (VRAC) is directed to study the problem of frequency coordination nationwide and to recommend to the Board possible ways to improve the process, including possible greater participation by ARRL.

80) On motion of Mr. Holladay, seconded by Mr. Nathanson, it was unanimously VOTED that, given the concern of the Board of Directors over the status of present litigation in Cerritos, California, the President of ARRL appoint a special committee to include

League Counsel and the Division Director. The Committee is charged with arranging a meeting with the plaintiffs in the case and their legal counsel to explore means by which the League may be of assistance in this case other than by direct contribution of funds.

81) On motion of Mr. Wangler, seconded by Mr. Butler, it was unanimously VOTED to take from the Table the previous motion concerning By-Law 5. On motion of Mr. Wangler, seconded by Mr. Nathanson, it was unanimously VOTED that the matter is referred to the Management & Finance Committee to consider the redrafting of By-Laws 1-6 to clarify their intent.

82) On motion of Mr. Metzger, seconded by Mr. Sullivan, the following resolution was unanimously ADOPTED:

WHEREAS, Margaret "Peg" Crowe has served the membership faithfully for more than 31 years, and Ruth Matyschysk has likewise served for more than 11 years,

BE IT RESOLVED by the Board of Directors of the American Radio Relay League, Inc. in annual meeting assembled at Hartford, Connecticut this 22nd day of April, 1983 that it does warmly thank "Peg" and Ruth for their devotion to the League and wishes them both well upon their respective retirements from the Headquarters staff.

83) On motion of Mr. Olson, seconded by Mr. Nathanson, it was unanimously VOTED that the General Manager is directed to revise and update the ARRL Employee Conflict of Interest Policy and to coordinate this policy with the Management and Finance Committee.

84) On motion of Mr. Nathanson, seconded by Mr. Holladay, it was unanimously VOTED that the Membership Affairs Committee study and report to the Board the advisability of initiation of a National High School ARRL Affiliated Amateur Radio Club System to introduce high school students to Amateur Radio. At this point, Mr. Hill took the Chair for Mr. Stevens.

85) On motion of Mrs. Lewis, seconded by Mr. Butler, it was VOTED, 8 to 7 with one abstention, to take from the Table the previous motion concerning four-year director terms. On motion of Mrs. Lewis, seconded by Mr. Nathanson, it was VOTED, 10 to 6, to strike the text of the motion as taken from the Table and substitute the following: Moved, that the Management and Finance Committee study the possible advantages and disadvantages of a change in the length of terms for elective ARRL office, taking into consideration not only responsiveness to the desires of the membership but also effectiveness in office, with a report to be rendered to the Board no later than the 1984 Annual Meeting. The question then being on the motion as amended, the motion was APPROVED with 10 voting in favor and 6 opposed. The Board was in recess for lunch from 12:02 P.M. until 1:30 P.M., reconvening with all hereinbefore mentioned present with the exception of Mr. McCobb and Mr. Williams. Mr. Mendelsohn was in the Chair for Mr. Diehl, and Mr. Stevens had returned to his seat at the Table. There was discussion concerning the no-code proposal, wherein a formal position statement was read by the President and it was agreed that the General Manager would promulgate the statement to the League membership.

86) On motion of Mr. Wangler, seconded by Mrs. Lewis, it was unanimously VOTED that the Secretary is directed to publish in QST a notice advising members that proposals from ARRL-affiliated clubs for hosting the 1986 ARRL National Convention are solicited. Any group wishing to submit a proposal should promptly contact their Director and the Secretary. The Board will select the candidate at the Second 1983 Board Meeting. Mr. Diehl returned to his seat at the Table.

87) On motion of Mr. Stevens, seconded by Mr. Butler, it was unanimously VOTED that the DXCC Country List will indicate, for the USA ARRL members only, which countries are served by the ARRL Outgoing QSL Bureau. Mr. Hill took the Chair for Mr. Stevens. Mr. Quiat took the Chair for Mr. Carey. Mr. Dyas took the Chair for Mr. Grauer. Mr. Comstock took the Chair for Mr. Wangler.

88) On motion of Mr. Hill, seconded by Mrs. Lewis, it was unanimously VOTED that the General Manager reprint in QST, at intervals, some of "The Old Man's" letters in order to make the new amateurs aware of the history and philosophies of Amateur Radio. Mr. Beebe took the Chair for Mr. Sullivan.

89) Moved by Mr. Hill, seconded by Mrs. Lewis, that the qualifications of a Section Manager be changed to include a conflict of interest clause. Under Rules and Regulations of the ARRL Field Organization, Paragraph 4, change to read: Any candidate for the office of Section Manager must have been both a member of the League for a continuous term of at least two years and a licensed amateur of General class (or Canadian Advanced Amateur Certificate) or higher preceding receipt of a petition of nomination. No person shall be eligible for or hold the office of Section Manager whose business connections are of such nature

that he could gain financially through the shaping of the affairs of the League, or by the improper exploitation of his office for the furtherance of his own aims or those of his employer. The primary test of eligibility under this By-Law shall be the freedom from commercial or government connections of such nature that his influence in the affairs of the League could be used for his private benefit. After discussion, on motion of Mr. Holladay, seconded by Mr. Atkins, it was unanimously VOTED to refer the matter to the Membership Affairs Committee.

90) On motion of Mr. Milius, seconded by Mr. Butler, it was unanimously VOTED that QST publish monthly information indicating the previous issue of QST in which may be found certain informational tables, calendars and lists, such as third-party traffic countries, WIAW Schedule, contest rules, etc. Mr. Kanode took the Chair for Mr. Milius.

91) On motion of Mr. Butler, seconded by Mr. Diehl, it was unanimously VOTED that the VRAC and YUAC are directed to devise a band-usage plan including repeater standards and standard frequencies for the proposed 902-928 MHz band and the existing 1215-1300 MHz band, and report back to the Board no later than the Second Board Meeting of 1983.

92) On motion of Mr. Butler, seconded by Mr. Kanode, the following resolution was unanimously ADOPTED:

WHEREAS, the amateurs of the United States have a long tradition of service in emergencies, to the people and their government; and

WHEREAS, agreements in advance to broad principles concerning emergency communications facilitate action in time of need; therefore,

BE IT RESOLVED that ARRL explore the possibility of a Memorandum of Understanding with the Associated Public Safety Communications Officers, Inc. (APSCO).

Mr. Stevens returned to his seat at the table.

93) Moved by Mr. Holladay, seconded by Mr. Stevens, that the League Counsel working with the General Manager and Headquarters staff investigate possible means of obtaining a more clear and reasonable definition of permissible third-party communications which may be undertaken by radio amateurs while carrying out their responsibility for public service communications. On motion of Mr. Stevens, seconded by Mrs. Lewis, it was VOTED, 9 to 6 with 1 abstention, that the motion is laid on the Table. The Board was in recess from 2:21 P.M. to 2:50 P.M. Mr. Milius, Mr. Wangler, Mr. Sullivan and Mr. Grauer returned to their respective seats at the Table.

94) On motion of Mr. Price, seconded by Mr. Holladay, unanimously VOTED that the Membership Affairs Committee is directed to review the distribution to Section Managers and other field officials of the ARRL Letter, Directors' Letters and other publication releases to ensure that the maximum utilization is made of these informational materials. The Committee shall report to the Board at the Second 1983 Meeting.

95) On motion of Mr. Price, seconded by Mr. Wangler, it was unanimously VOTED that the previous motion concerning third-party traffic is lifted from the Table. After discussion clarifying the intent of the motion, the motion as taken from the Table was unanimously APPROVED.

96) Turning now to Agenda item 12, on motion of Mr. Stevens, seconded by Mr. Milius, it was unanimously VOTED that the General Manager is hereby authorized to reimburse the Division Directors for actual expenses incurred by them during the year 1983 in the proper administration of ARRL affairs in their respective divisions, up to the amounts as follows:

Canadian Division	\$ 9000
Atlantic Division	11,000
Central Division	7500
Dakota Division	3500
Delta Division	8500
Great Lakes Division	9500
Hudson Division	5000
Midwest Division	5000
New England Division	7000
Northwestern Division	9000
Pacific Division	9000
Roanoke Division	9500
Rocky Mountain Division	5250
Southeastern Division	8000
Southwestern Division	8000
West Gulf Division	7000

97) On motion of Mr. Turnbull, seconded by Mr. Sullivan, it was unanimously VOTED that the General Manager is hereby authorized to reimburse the following Committees of the Board for expenses incurred by them during the year 1983 in the proper execution of their duties, up to the amounts as follows:

Biological Effects Committee	\$ 3500
RFI Task Group	2500

98) On motion of Mrs. Lewis, seconded by Mr. Atkins, it was unanimously VOTED that, to continue

the Board's policy of reimbursing QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1983 a total amount not to exceed \$4000 under terms prescribed by the general pattern established by the Board.

99) On motion of Mr. Butler, seconded by Mr. Wangler, it was unanimously VOTED that, to continue the Board's policy of reimbursing National Traffic System officials above the section level for certain approved expenses in furthering ARRL organizational activities, the General Manager is hereby authorized to

pay during the year 1983 a total amount not to exceed \$16,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

100) All those present were invited to make brief informal remarks at the close of the meeting. Mr. Lindholm left the meeting at 3:14 P.M. Mr. Gibson took the Chair for Mrs. Lewis. Mr. Mark took the Chair for Mr. Olson. Mr. Hippisley took the Chair for Mr. Turnbull. Mr. Dyas took the Chair for Mr. Grauer. Mr. Beebe took the Chair for Mr. Sullivan. Mr. Hill took the Chair for Mr. Stevens. Mr. Comstock took

the Chair for Mr. Wangler. Mrs. Gauzens took the Chair for Mr. Butler. Mr. Hurlbert departed the meeting at 3:25 P.M. Mr. Kanode took the Chair for Mr. Milius. Mr. Heyn took the Chair for Mr. Holladay. Mr. Mendelsohn took the Chair for Mr. Diehl. There being no further business, the Board adjourned *sine die* at 3:59 P.M. Total time in session as a Board: 12 hours, 23 minutes; as a Committee of the Whole: 7 minutes; total direct authorizations: \$159,750. Respectfully submitted, David Sumner, K1ZZ Secretary

**MINUTES OF EXECUTIVE COMMITTEE MEETING**  
No. 405  
April 20, 1983

**Agenda**

1. Approval of minutes of February 12 meeting
2. Recognition of new Life Members
3. Affiliation of clubs
4. Approval of conventions
5. Report on local antenna/RFT legal matters, and requests for funding
6. Report on FCC matters
7. Consideration of IARU Proposal No. 174
8. Report on 1983 ARRL National Convention in Houston

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 9:37 A.M. EST, Wednesday, April 20, 1983, at the Administrative Headquarters of the League in Newington, Connecticut. Present were President Victor C. Clark, W4KFC, in the Chair; First Vice President Carl L. Smith, W0BWJ; Directors Paul Grauer, W0FIR, Jay A. Holladay, W6EJJ, and William J. Stevens, W6ZM; and General Manager David Sumner, K1ZZ. Also present at various times during the meeting were Vice Presidents Larry E. Price, W4RA, and Gar Anderson, K0GA; Honorary Vice President Robert York Chapman, W1QV; Directors Frank Butler, W4RH, Lys Carey, K0PGM, George Diehl, W2IHA, Clyde Hurlbert, W5CH, Mary Lewis, W7QGP, Edmond A. Metzger, W9PRN, Gay Milius, W4UG, Hugh Turnbull, W3ABC, and Raymond B. Wangler, W5EDZ; Vice Directors C. Richard Dyas, W0JCP, Evelyn Gauzens, W4WYR, M. L. Gibson, W7JIE, Fried Heyn, W6WZO, Jettie Hill, W6RFF, John Kanode, N4MM, Howard Mark, W0OZC, and Stephen A. Mendelsohn, WA2DHF; Counsel Christopher D. Imlay, N3AKD; Membership Services Manager Harold M. Steinman, K1FHN; and Deputy Membership Services Manager W. Dale Cliff, WA3NLO.

The Chair welcomed those Directors and Vice Directors who, on the eve of their first Board Meeting, were observing their first meeting of the Executive Committee.

1) On motion of Mr. Stevens, the Minutes of the February 12 meeting (No. 404) were accepted in the form in which they were distributed.

2) On motion of Mr. Stevens, the Committee

recognized the names of 1441 newly elected Life Members, and directed the General Manager to list their names in QST.

3) On motion of Mr. Grauer, the affiliation of the following clubs was approved (Category I unless otherwise indicated): Calumet ARES, Hilbert, WI; Carthage ARS, Carthage, TX; Central Kentucky DX Association, Lexington, KY; Chaverim of New Jersey, Perth Amboy, NJ; Childress ARC, Childress, TX; Connecticut DX Assn., Andover, CT; Dawson County ARC, Dawson County, NE; Fort Armstrong Wireless Assn., Inc., Fort City, PA; 4-Landers VHF Group, Gainesville, GA; Green County ARA, Skiatook, OK; Hams of Green Swamp, Clermont, FL; Hermiston ARC, Umatilla, OR; International Mission Radio Association, Inc., Newton, NJ (Category II); Kokomo ARC, Kokomo, IN; Marissa ARC, Inc., Marissa, IL; Meadowlands ARA, Little Ferry, NJ; Memphis Radio Relay Club, Memphis, TN; Mid South VHF Association, Murfreesboro, TN; Napa Valley Radio Club, Angwin, CA; Portage ARC, Inc., Mantua, OH; Radio Amateur Mobile Society, Inc., Sacramento, CA; Rotten Radio ARC, Louisville, KY; St. Louis Repeater, Inc., St. Louis, MO; San Lorenzo Valley Repeater Club, Felton, CA; South East Michigan DX Assn., Livonia, MI; Spring Valley Repeater Services, Inc., Spring Valley, NY; Toronto VHF Society ARC, Mississauga, Ontario, Canada.

With this action, the League now has the following number of active affiliated clubs: Category I, 1669; Category II, 10; Category III, 182.

4) On motion of Mr. Holladay, approval was granted for the holding of the following ARRL conventions: Indiana State, July 10, 1983, Indianapolis, IN; Tennessee State, October 22-23, 1983, Chattanooga, TN; Florida State, November 26-27, 1983, Clearwater, FL.

5) Mr. Imlay reviewed the status of local litigation and regulation concerning Amateur Radio as follows:

5.1) *Spencer (AB0I) v. County Court of Clay County, Missouri*. Mr. Spencer brought suit to overturn the denial by zoning officials of his application for Special Use Permits for four of his five towers. His home and station are on rural property. The trial court found in favor of Mr. Spencer, and granted a permanent injunction against enforcement of those sections of the Clay County Zoning Regulations which require him to obtain the special permit. A request for ARRL financial support during the appeals process was received from Mr. Spencer's attorney. After discussion, it was agreed that no action would be taken until Director Grauer had had an opportunity to investigate the level of support which exists for the case in the local area.

Stevens, W6ZM, John C. Sullivan, W1HHR, and Hugh A. Turnbull, W3ABC; Vice Directors C. Richard Dyas, W0JCP, Evelyn Gauzens, W4WYR, Fried Heyn, W6WZO, George W. Hippisley, K2KIR, and John C. Kanode, N4MM; and Counsel Christopher D. Imlay, N3AKD.

The first item of business was to determine the dates of the Executive Committee meetings for the remainder of the year. Tentative dates and meeting places are July 23, Phoenix; September 10, Hartford; and October 4, Houston.

Next, the group discussed the composition of the Ad Hoc Committees established at this Board Meeting without taking formal action, committee appointments being the prerogative of the President.

On motion of Mr. Nathanson, seconded by Mr. Milius, expense allocations were established for the following Committees for their operation until the 1984 Annual Meeting of the Board:

5.2) At this point the Committee discussed the fact that ARRL provides considerable support to local antenna/zoning cases, other than actual cash grants, including extensive written material and considerable time of Counsel and staff. On motion of Mr. Stevens, it was VOTED that the General Manager is to survey the records of the past two years to determine the approximate dollar value of this support to each case in which significant League involvement has been requested.

5.3) *Guschke v. City of Oklahoma City*. A request for financial support was pending from the previous meeting. After discussion, on motion of Mr. Holladay, it was VOTED that, in recognition of the funds which had been raised locally in support of this case, the extensive support already provided by the League in other forms is supplemented by a grant in the amount of \$1000.

5.4) *Goumas, et al. v. City of Cerritos, California*. Since the previous meeting, the City had, indeed, adopted a more restrictive ordinance (see Minute 5.1 of the February 12 Meeting). An amended complaint has been filed in federal court on behalf of the plaintiffs, and the request for financial assistance has been renewed. After extensive discussion, it was agreed that the matter be held over for consideration by the full Board on the following day.

6) Mr. Imlay reviewed briefly the status of FCC rule making proceedings now underway. At the request of the Committee, Mr. Cliff reported on FCC actions in imposing "24-hour quiet hours" upon an amateur in Texas without a determination that his station was at fault and without providing the opportunity for a hearing. The case will be monitored closely by the League to ensure that no precedent results which is harmful to amateur interests.

7) On motion of Mr. Smith, the Secretary was directed to cast an affirmative vote on IARU Proposal No. 174, concerning the admission to Union membership of Club Oceanien de Radio et d'Astronomie.

8) At the request of the Committee, Mr. Wangler presented a report on the status of preparations for the 1983 ARRL National Convention in Houston.

There being no further business, the Committee adjourned at 11:45 A.M. Respectfully submitted, David Sumner, K1ZZ Secretary Victor C. Clark, W4KFC President

[The list of Life Member applicants approved at the April 20 Executive Committee meeting will be printed in July QST. — Ed.]

**MINUTES OF EXECUTIVE COMMITTEE MEETING**  
No. 406  
April 22, 1983

The Executive Committee of the American Radio Relay League, Inc., met at 4:19 P.M. Friday, April 22, 1983, at the Civic Center Holiday Inn, Hartford, Connecticut, at the conclusion of the Annual Meeting of the Board of Directors. Present were President Victor C. Clark, W4KFC, in the Chair; Directors Paul Grauer, W0FIR, Jay A. Holladay, W6EJJ, Gay E. Milius, Jr., W4UG, and Leonard M. Nathanson, W8RC; First Vice President Carl L. Smith, W0BWJ; and General Manager David Sumner, K1ZZ. Also present as observers were Vice Presidents Gar Anderson, K0GA, and Larry Price, W4RA; Directors Frank M. Butler, Jr., W4RH, George Diehl, W2IHA, William J.

Ad Hoc Committee on the Strengthening of the CRRL	\$6000
Ad Hoc Committee on Preparations for Monitoring and Licensing Activities	\$4000
Ad Hoc Committee on the ARRL Interference Reporting Service (AIRS)	\$4000
Ad Hoc Committee on Washington Representation	\$2000
Committee for International Humanitarianism Award	\$1000
On motion of Mr. Grauer, seconded by Mr. Smith, it was unanimously VOTED that the meeting is adjourned, at 5:08 P.M. Respectfully submitted, David Sumner, K1ZZ Secretary Victor C. Clark, W4KFC President	

- **20-Meter Phone Band — U.S. Amateurs Get Relief**
- **Volunteer Examining — New Twists**
- **License Term, Grace Period Extensions Proposed**
- **Cordless Telephones — Temporary Home Proposed for "Frequency Vagabonds"**

## HF Telephony Expansion Proposal — FCC Acts

Recent action on the proposed expansion of hf telephony subbands (PR 82-83) has broken on two separate fronts: (1) in a First Report and Order effective in late May, the commission expanded 20-meter phone frequencies and (2) in a Further Notice of Proposed Rulemaking, it made specific proposals for expansion of the other amateur hf bands. As of 0001Z May 22, 1983, U.S. amateurs may operate 20-meter phone (A3 and F3 emissions) on

- 14,225 to 14,350 kHz — General, Advanced and Extra Class licensees;
- 14,175 to 14,225 kHz — Advanced and Extra Class licensees;
- 14,150 to 14,175 kHz — Extra Class licensees.

The proposed U.S. phone-band expansion brought comments that fell into two camps: U.S. amateurs, who were eager to get more available band space for their overcrowded 20-meter phone operations, and non-U.S. amateurs, who wanted to protect frequencies they had become accustomed to think of as free from U.S. amateurs. (See April 1982 *QST*, p. 57, and October 1982 *QST*, p. 51, for details.)

Of the several hundred comments filed, the Commission revealed that the "vast majority received from U.S. amateur operators supported the concept of expanding the 14-MHz telephony subband." Virtually all comments addressing the issue also favored deleting from General class operators the privileges between 14,150 and 14,200 kHz, and instead substituting new privileges between 14,225 and 14,275 kHz, so their telephony privileges would be on contiguous frequencies.

Comments were divided on the issue of whether to delete 14,150 to 14,175 kHz Advanced class privileges. Some thought taking away any license class privileges would be unfair. Others felt, however, that for all practical purposes Advanced class operators don't use those frequencies and that such a move would enhance incentive licensing. The Commission took this approach, stating that, "although we are reluctant to remove privileges from any class of license, we are persuaded by the comments recommending this approach. We also believe that this approach will permit the greatest flexibility in the future after we have had an opportunity to assess the long-term impact of our action. Although we are reluctant to establish a new 'incentive subband,' we do not find this action to be unduly unfair to Advanced class licensees in view of the fact that they currently make little use of the frequencies in question."

Canadians supplied most of the comments from outside the U.S. Typically, they felt that the portion of 20 meters in question would be unusable for them because of "generally prevail-

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*"We are persuaded that the small potential impact of the proposed telephony subband expansion on non-U.S. amateurs is outweighed by the necessity to alleviate the extraordinary overcrowding that U.S. amateurs currently face in the 14-MHz band." — FCC*

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ing propagation conditions" and the "sheer numbers of American amateurs who will move into that part of the band." The Wireless Institute of Australia, however, was "persuaded that having regard to the capabilities of modern equipment, such band extension would most likely have minimal effect." The ARRL pointed out in its comments that, given the proposed expansion, there will still be 50 kHz available to non-U.S. amateurs for phone operation without the presence of U.S. amateurs.

The Commission concurred, saying that "no significant detrimental impact on international operations should result from expansion of the 14-MHz telephony subband."

### Other HF Bands — More Comments Sought

The Commission also released a Further Notice of Proposed Rule Making in Docket 82-83, seeking more comments for the disposition of the proposed expansion of the 10, 15, 40 and 80-meter U.S. phone bands. The "vast majority" of the comments received in the original NPRM, the FCC said, "supported the concept of expanding many or all of the hf telephony bands. Expansion of two of the subbands in question — the 3.5- and 21-MHz bands — had uniform support." The following breakdown of the bands reveals the current thoughts on, and the further questions posed for, the proposed expansions.

- **10 meters.** Many original commenters suggested authorizing phone operations down to frequencies as low as 28,200 kHz (as low as 28,300 kHz was a common recommendation). The

Commission asks, however, if such an extension is

truly warranted in light of the sliver of spectrum that will remain for modes of operation using the international Morse code and digital communication (radio teletyping). For example, we [FCC] may be inclined to continue to allow both of these modes on the frequencies 28,300-28,500 kHz even if we do expand the 28-MHz telephony subband. In any case, Morse code operation would continue to be permitted on all frequencies as it is now, even though we recognize that such operation is normally not conducted on frequencies adjacent to wider-bandwidth telephony operations.

- **15 meters.** Many original commenters agreed that the operator privileges for 15 meters should be changed to 21,300-21,450 kHz for General, Advanced and Extra Class licensees; 21,225-21,300 kHz for Advanced and Extra Class licensees; 21,200-21,225 kHz for Extra Class licensees. The Commission feels that these privileges would be "most fair to all license classes," and it proposes that these changes be adopted.

- **40 meters.** Since there was no consensus about the actual need or the best approach to expansion at 7 MHz, the Commission decided to make no proposals for changes in this band at this time. However, it "invites comments as to whether some future action may be warranted and what approach would be most beneficial."

- **80 meters.** Some original commenters suggested that more frequencies be reserved for higher class licensees on the 80- and 15-meter bands. The FCC, however, said that "it would be unwise to limit the relief we hope to provide to operators by reserving unnecessarily large portions of the proposed expanded telephony subbands to higher class licensees." Proposed for 80 meters are: 3850-4000 kHz for General, Advanced and Extra Class licensees; 3775-3850 kHz for Advanced and Extra Class licensees; 3750-3775 kHz for Extra Class licensees.

- **Hawaiian 40 meters.** The Commission included a proposed rule change, RM-4228, initiated by Randall Sobol, KH6XX, that would authorize 7075-7100 kHz for telephony operation in and around Hawaii. U.S. stations located west of "150 degrees West longitude and south of 30 degrees North latitude" would be affected. The petitioner reasoned that: "A few hundred miles to the south of the Hawaiian Islands, we would be in Region 3, thusly able to operate A3 on these frequencies. . . (while the Hawaiian Islands are almost 2500 miles from the nearest possible point on the U.S. mainland. Our geographic proximity to Region 3 renders extremely strong Asian broadcast interference. This is noticeable prior to sundown in the Islands and lasts several hours after sunrise the following day."

Deadline for further comments is July 1, 1983; reply comments are due August 1, 1983. All relevant and timely comments will be considered by the Commission before final action is taken in

this proceeding. The FCC also stated that in reaching its decision, it "may take into consideration information and ideas not contained in the comments, provided that such information or a writing indicating the nature and source of such information is placed in the public file, provided that the fact of the Commission's reliance on such information is noted in the Report and Order." *Ex parte* contacts (relevant informal written or oral communications between the FCC and someone outside the Commission) are also permitted.

## VOLUNTEER EXAMINING — LEAGUE COMMENTS

The ARRL has filed its comments in response to the FCC NPRM in Docket 83-27, the proposal to allow the use of volunteers to prepare and administer Amateur Radio examinations. (The Quarter Century Wireless Association had requested that comment deadlines be extended. The FCC agreed, and the comment deadline was changed to April 25, 1983; the reply comment deadline was changed to May 19, 1983.)

The League supported the overall intent of Docket 83-27. It asked for several changes, however, and requested greater clarity in certain proposals. (See January 1983 *QST*, pp. 56-57, and March 1983 *QST*, p. 57, for details.)

The ARRL would like:

- *nominal, mandatory fees to be charged by Volunteer Examiner Coordinators (VECs).* The fees may not be a money-making source of income for the VEC, but should cover necessary expenses. The ARRL added that, "*The League would require such a fee in order to participate in the program.* If the Commission isn't willing to establish a minimal license fee, either through early concurrent rulemaking or by seeking amendment of the Communications Act, the long-term viability of the Volunteer Examining Program is questionable."
- *prior public notice of examination sessions.* Volunteer Examiners' announcements of exams should be made in Amateur Radio and public media, well in advance of registration deadlines or testing sessions.
- *VECs to be authorized to establish deadlines for applicants to register in advance for an exam if needed.* This allows the VEC to provide adequate test materials to the VE team, thus avoiding turning applicants away. (Options for "walk-in" tests are suggested.)
- *Rules provisions to accommodate handicapped persons at exam sessions.*
- *an applicant who fails an exam to wait until the next calendar month before retesting.* At least two newly designed and assembled tests should be issued by the VEC each calendar month.
- *contingency plans to be built in for occasions when three accredited VEs are not readily available (as in sparsely populated areas).*
- *clarification of conflict-of-interest provisions applying to employees of Amateur Radio related publications or equipment manufacturing companies.* For example, employees of remote, unrelated divisions of huge business conglomerates that have a division that produces Amateur Radio Equipment should not necessarily be disqualified from eligibility as Volunteer Examiners.
- *explicit statements of qualification standards or decision criteria for VECs to be issued.*
- *all completed examination answer sheets to be returned to the VEC.* The VEC must keep a file of all exam applications, exam booklets and test results. Contrary to the FCC's proposal that the



Standing in front of a "Texas Raider" are (l-r) K5MUS, KB5AX and W5CBN, all of whom were involved in the filming of the soon-to-be-released WW II movie, *The Long Ride*. (photo courtesy Floyd Miller)

VE team chief retain test answer sheets among other things required to be kept in the station log, the League pointed out that VECs will need the answer sheets to perform required statistical analyses.

The League also commented on certain provisions, contained in *this* Docket, for the Novice program, urging again that Morse code sending and receiving tests be required. (For Technician and higher class code tests, the ARRL now proposes that a *sending test* of 5 wpm be required only when a previously unlicensed person applies for a license.)

Because all the procedural details of the Volunteer Examining Program can't be addressed in the FCC Rules, a written agreement will be made between a VEC and the FCC following detailed negotiation. This "contract" would spell out further administrative details.

## Are You a Lawyer? Amateur Radio Wants You!

Your legal expertise is needed in the Amateur Radio community to help build and maintain the legal foundations for our hobby. The League is initiating a Volunteer Counsel Program, designed to help stem the tide of overly restrictive regulations on Amateur Radio. You can help. If you have an interest in this exciting area of communications law, are a reputable member of the bar of at least one state and are a League member, please contact us. As a Volunteer Counsel, you will be kept well informed about areas of law affecting Amateur Radio. For further information, write the ARRL Volunteer Counsel Program, 225 Main St., Newington, CT 06111.

## LICENSE TERM, GRACE PERIOD EXTENSION PROPOSED

The FCC has proposed to act on an ARRL suggestion to extend Amateur Radio license terms to 10 years. (See February 1983 *QST*, p. 62, for details.) The NPRM in PR Docket 83-337 would revise the language of Parts 97.13, 97.47 and 97.59 to read:

- §97.13 Renewal or modification of operator license.
- (d) If a license is allowed to expire, application for renewal may be made during a period of grace of two years after the expiration date. During this two year period of grace, an expired license is not valid. A license renewed during the grace period will be dated currently and will not be backdated to the date of its expiration. Application for renewal shall

be submitted on FCC Form 610 and shall be accompanied by the applicant's expired license. §97.47 Renewal and/or modification of amateur station license.

(b) If a license is allowed to expire, application for renewal may be made during a period of grace of two years after the expiration date. During this two year period of grace, an expired license is not valid. A license renewal during the grace period will be dated currently and will not be backdated to the date of expiration. An application for an individual station license shall be submitted on FCC Form 610. An application for an amateur club or military recreation station license shall be submitted on FCC Form 610-B. In every case the application shall be accompanied by the applicant's expired license or a photocopy thereof.

§97.59 License term.

(a) Amateur operator licenses are normally valid for a period of ten years from the date of issuance of a new, modified or renewed license.

(b) Amateur station licenses are normally valid for a period of ten years from the date of issuance of a new, modified or renewed license. All amateur station licenses, regardless of when issued, will expire on the same date as the licensee's amateur operator license.

Anticipating that "the extension of license terms will result in a reduction of the time period between application and granting of license applications for any one year," the Commission is looking forward to savings from this action. The FCC requests comments "as to the feasibility of immediate implementation of 10-year terms by extending all current licenses by an additional five years." It asks whether licenses should be given a blanket, five-year extension, or whether it should phase in 10-year licenses as they come up for renewal.

Comments for PR Docket 83-337 are due on or before June 13, 1983; reply comments, July 13, 1983.

## CALL-SIGN ASSIGNMENT SYSTEM — MORE NEWS

The Commission recently released a public notice containing further information about its Amateur Radio call-sign assignment system. Much of this information is not new, but judging from the number of questions we receive about this subject at Headquarters, it is worthy of being repeated.

- *all new and changed call signs are assigned according to operator class and mailing district.*
- *call-sign letter combinations and the format from within a call-sign group are always selected by the Commission.* Do not request a specific call sign or format. Such requests are not honored, without exception, and can result in processing delays for your application.
- *a call sign will not be changed unless the licensee specifically requests and is eligible for a change.* The licensee always has the option to keep the current call sign upon license renewal, upgrade, change of station location, change of mailing address or change of name.
- *to request a call-sign change, an eligible licensee must place a mark in Item 2F on the application (FCC Form 610) in addition to any other items that may pertain to the application.* Editions of Form 610 issued prior to August 1980 are obsolete and may not be used to obtain an amateur license. Applying on an obsolete form will delay issuance of your license, as you will be required to reapply on a current form.
- *licensees (including Novice) who are upgrading to a higher operator class are eligible to request a call-sign group change at the time of upgrade.*
- *licensees (including Novice) who are modifying their mailing address to a different district must make a choice.* Option A: Keep present call sign. Option B: Request call-sign change. Place mark in item 2F. Failure to mark item 2F means

that you will keep your current call sign. When a change is requested, a call sign will be assigned.

- the primary station may retain the same call sign if the application is received by the Commission within two years of the license expiration date.

- upon request, a secondary station call sign will be assigned to the primary station if the application is received by the Commission within two years of the secondary license expiration date. Secondary station licenses are no longer issued, renewed or modified.

- Desecheo Island, formerly KP4, will be known by the new prefix block, KP5.

Copies of the latest call-sign assignment lists issued by the FCC are available to League members from the Membership Services Department. (They are also published regularly in "The ARRL Letter.") Please include in your request a business-size s.a.s.c. (for expeditious handling!).

## CORDLESS TELEPHONES — NEW TEMPORARY HOME PROPOSED

Cordless telephones, those devices that have been causing so much havoc around the country in our 160-meter band, will be moving to 46.6-47.0 and 49.6-50.0 MHz for the next several years, if General Docket 83-325 is adopted. (See June 1982 QST, p. 62, and December 1982 QST, pp. 68-69, for background information.)

Growth of these duplex devices has been enormous and is expected to continue. That fact, coupled with the contemplated reallocation of 1.6-1.7 MHz to broadcasting and the lack of real technical suitability of currently allocated frequencies for cordless telephones, made finding a new home for the phones necessary.

The Commission hints that 900 MHz could be the final resting place in the spectrum for cordless telephones. Manufacturers, however, say they will need five to 10 years to develop affordable, suitable equipment in that band. Interim relief is needed in the meantime, and the 47- and 49-MHz bands, which will be shared with government services, are proposed.

The FCC points out that these 47- and 49-MHz bands would only be temporary solutions. "The government frequencies proposed in this Notice will not be available indefinitely for cordless telephone use," it says. Additionally, the Commission solicits comments on "the selection of the proposed interim frequencies at 46 MHz with respect to the potential interference to the 45-MHz IF of TV receivers."

Docket 83-325 proposes that cordless telephones may be manufactured or imported until five years after the effective date of the Rules and that they may be marketed until six years after the same effective date. Comment deadline was May 19, 1983; reply comments are due June 3, 1983.

Of specific interest to amateurs, cordless telephones must abide by these labelling and noninterference requirements:

### §15.234 Labelling and identification requirements for a cordless telephone.

Both the base station and portable handset of a cordless telephone system shall be identified and labelled pursuant to §§2.925, 2.926 and 2.1045 of Part 2 of this Chapter. In addition, the label attached to the handset portion shall contain the following statement:

This cordless phone is a low power communications device operating pursuant to the provisions of Part 15 of FCC Rules. Privacy of communications may not be ensured when using this phone. Operation is subject to two conditions: (1) it may not cause harmful interference; and, (2) it must

## Amateur Radio Station Call-Sign Assignment System

All call signs available for assignment to Amateur Radio stations by the FCC are arranged in lists according to the sequences given here. Call signs are selected for assignment from these lists.

When all call signs within a block have been assigned, the next assignment is made from the next consecutive block within the group.

The call sign format consists of the prefix, followed by the single digit, followed by the suffix.

The call sign prefixes can be one or two letters. Single-letter prefixes are either K, N or W. Two-letter combinations are either AA-AL, KA-KZ, NA-NZ or WA-WZ.

Some two-letter prefixes are not listed. WT is used for temporary licenses, WC-prefixed call signs were assigned to Radio Amateur Civil Emergency Service (RACES) stations prior to March 1978 (no new RACES licenses are now issued; however, existing licenses may be modified and renewed). Additionally, some two-letter combinations are assigned by other U.S. Government authorities to Amateur Radio stations not under FCC jurisdiction.

The digit is a single number, 0 through 9, indicating a geographical district.

The suffix can be one, two or three letters. Single-letter suffixes are A-Z. Two-letter combinations are AA-ZZ. Three-letter combinations are AAA-ZZZ. As in the case of the prefix, and for similar reasons, some combinations are not used.

### Group A Call Signs (Extra Class)

Block no.	Contiguous USA
*1	K###
*2	N###
*3	W###
4-13	AA##-AK##
14-36	KA##-KZ##
37-59	NA##-NZ##
60-82	WA##-WZ##
83-92	AA###-AK###
93	Group B

The following prefixes will not be assigned to stations in the contiguous 48 states: AH KH NH NL NP WH WL WP. Pacific-area stations will be assigned AH## KH## NH## WH##, then Group B. Alaska-area stations will get AL7## KL7## NL7## WL7##, then Group B. Atlantic-area stations will be assigned KP## NP## WP##, then Group B.

### Group B Call Signs (Advanced Class)

Block no.	Contiguous USA
1'	KA1##
2-23	KB##-KZ##
24-46	NA##-NZ##
47-69	WA##-WZ##
70	Group C

'KA prefixes will be assigned only to persons living in the first call district. Other KAs are assigned to U.S. personnel living in Japan. The following prefixes will not be assigned to stations in the contiguous 48 states: KH KL KP NH NL NP WH WL WP. Pacific-area stations will be assigned calls in the format, AH##, Alaska-area stations, AL7##, and Atlantic-area stations, KP##. Once these blocks are used up, assignments will be made from Group C call signs.

### Group D Call Signs (Novice Class)

Block no.	Contiguous USA
1-23'	KA###-KZ###
24-41	WA###-WZ###

'Except KC4AAA-AAF and KC4USA-USZ. The following call-sign formats will not be assigned to stations in the contiguous 48 states: KH### KL### KP### WC### WH### WK### WL### WM### WP### WR### WT###. Pacific-area stations will be assigned KH### WH###; Alaska-area stations KL7### WL7###; Atlantic-area stations KP### WP###.

\*Call signs using these prefixes are not currently being issued.

### Group C Call Signs (Technician and General Class)

Block no.	Contiguous USA
*1	K####
2	N####
*3	W####
4	Group D

Pacific-area stations will be assigned KH### NH### WH###, in that order; Alaska-area stations KL7### NL7### WL7###; Atlantic-area stations NP### WP###. After these are depleted, Group D will be used.

accept any interference received, including that which may cause undesirable operation.

### §15.235 Non-Interference requirement.

Notwithstanding compliance with the technical specifications herein, a cordless telephone is subject to general conditions of §15.3 of this part. The operator of a cordless telephone may be required to stop operating his device upon a finding that the device is causing harmful interference and it is in the public interest to stop operation until the interference problem has been corrected.

## GOODWIN L. DOSLAND, WØTSN

We regret to report the death of ARRL past President Goodwin L. Dosland, WØTSN, of Moorhead, Minnesota. A former Central and Dakota Division Director, "Dos" steered the League as President from 1952-62. Under his leadership, Amateur Radio saw a wide range of technical and regulatory changes. Single-sideband, satellite communications, licensing

changes — all came about during Dos's tenure.

An attorney who practiced in Chicago and Moorhead, President Dosland felt that his role as ARRL leader was to "continually impress upon amateurs that our hobby is not one only for our own enjoyment, but that the lifeblood of Amateur Radio is our individual and joint service in the public interest, convenience and necessity. If we amateurs fail in that service, either individually, jointly or as an organization, we won't be able to justify our existence and our claims upon the frequencies we need so badly." President Dosland fulfilled his goals. Under his leadership, both League membership and our frequency allocations grew.

Dos made a point of keeping in personal contact with amateurs throughout the country. He made an extra effort to make sure that all League members' views were heard. He made many friends and acquaintances on official League travels. We'll miss him. □



## CRRL Officers and Directors

President: Thomas B. J. Atkins, VE3CDM  
Vice President and Secretary: Harry MacLean, VE3GRO

CRRL Box 7009, Station E, London, ON N5Y 4J9, Tel. 519-451-3773

Honorary Vice President: Noel B. Eaton, VE3CJ

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

Directors: G. Andrew McLellan, VE1ASJ  
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A. George Spencer, VE6AW  
William Kremer, VE7CSD

## Ham Radio Rescue

It was January 3. Jean Ness, VE6BLJ, had just finished walking her dog and had little in mind for the rest of the day other than lounging in her west Edmonton home. At about 11:30, she turned on her radio, located in a corner of her kitchen, and tuned in the Trans-Canada calling frequency. She listened as she worked, and through the clatter of her own dishwashing picked up the rhythm of a message repeated in code — SOS.

There were several sideband signals on frequency. Only part of the message had come through. Jean calmly asked the other operators to clear the frequency for emergency traffic. The caller was Jim Prior, VE7CKF. The 39-year-old planning analyst and outdoorsman had been hiking at the 3000-foot level of the Five Fingers Mountain Range, 30 miles northeast of his home in Vancouver. The day before he had been hit by a snowstorm, and had decided to descend. By the time he reached the lakeside, miles away, the snow had turned to rain, his fingers ached from the cold and his body temperature had



Northern Alberta ARC President Don Miller, VE6XF (left), and CRRL Prairies Region Director George Spencer, VE6AW, present a plaque to Jean Ness, VE6BLJ. Jean's quick action may well have saved the life of an amateur stranded in the mountains northeast of Vancouver. (NAARC photo)

begun to lower. Exhausted from his four-day trek in the mountains, he was barely able to pitch his tent. Next morning, he found he was unable to inflate a rubber raft that could have taken him to cottages for help. His plane was three days away. He decided to use his radio.

By the time Jean heard Jim's signals, Jim had been calling for over an hour. The mountains had apparently acted as a shield. Immediately after copying Jim's message, Jean relayed it to Dan Gentry, VE7DG, Burnaby. Dan called Skyway Air Service in Langley and had a plane pick Jim up. Within two and one-half hours of the first SOS, Jim was on his way home — cold, wet and weak, but feeling a whole lot more comfortable.

Was Jim in real danger? We'll never really know. He was heard and rescued. Jim feels that Jean's quick action may well have saved his life. As for Jean, it was all in a day's work. "If I hadn't picked him up on the radio, someone else would have..." (Compiled from articles in the *Edmonton Journal* and the *Alberta Report*)

## DOC NEWS

□ DOC has released its new TRC-24, the syllabus for all Amateur Radio examinations, in its final form. The document is now available from local offices of DOC. The new TRC-24 explains the requirements for the technical portions of examinations in great detail, and there is one other welcome change: the Morse code sending test is reinstated. The new TRC-24 does not take effect until February 1, 1984. There will be two more sets of examinations based on the old syllabus, one on June 15, the other on October 19.

□ DOC has confirmed that the special prefixes, VX1 for Newfoundland and VX2 for Labrador, will be available for the entire month of August.

□ At presstime, there were indications from Ottawa that changes in the Radio Regulations, in the works for over a year, would be ready soon. These changes would deregulate the 160-metre band, permit foreign amateurs operating under reciprocal agreements to use our entire 2-metre band, permit fm repeaters on 10 metres, and permit fast-scan television with a bandwidth of 6 MHz.

## CRRL NEWS

□ IEEE, the Institute of Electrical and Electronic Engineers, held an international conference on vehicular technology on May 25-27 in Toronto. CRRL supplied an Amateur Radio booth, and on May 25, CRRL and IEEE co-

sponsored an Amateur Radio night. Exhibits and a cash bar promoted the fraternal side of Amateur Radio; a talk on packet radio, presented by Doug Lockhart, VE7APU/3, promoted the technical side.

□ In the first three months of this year, the CRRL Central Incoming QSL Bureau processed a total of 150,345 cards and forwarded them to the 10 League-sponsored QSL bureaus in the provinces and territories. Here's the breakdown: January — 40,495; February — 27,640; and March — 82,210 cards. In February, the new CRRL-Membership Outgoing QSL Bureau began operation, processing a total of 14,000 cards.

□ Bill Bowman, VE4AFO, and your editor have been working on a *CRRL Canadian Repeater Directory*. Lists of known repeaters were circulated among Canadian League workers from coast to coast for update and correction. The *CRRL Repeater Directory* is likely the most accurate list of Canadian repeaters available. For your free copy, send a self-addressed, stamped envelope to CRRL, Box 7009, Station E, London, ON N5Y 4J9.

## CONGRATULATIONS TO . . .

□ Cathy Hrischenko, VE3GJH, who was the first Canadian YL to receive 5-Band DXCC. Cathy may well be the first YL in the world to earn this difficult award.

□ Bill Choat, VE3CO, who received a League Certificate of Merit for his many years of work with blind amateurs. Bill recently retired as manager of the CNIB Amateur Radio program.

□ Roy Ellis, VE6XC, who will begin another

term as Alberta Section Manager on July 1.

## NEWS FROM ALL OVER

□ A new *Canada Call Book* is now available. It features large, easy-to-read type and contains the names, addresses and call of over 23,000 Canadian amateurs. For more information, contact Pen Publishing, Box 4386, Station D, Hamilton, ON L8V 4L8.

□ Converse with the world on cw in Spanish, German, French, Russian and six other languages! A new book, *CW Into Foreign Languages*, will show you how. For more information, contact CW Publications, Box 2571, Station A, London, ON N6A 4G9.

□ What's a teleconference net? It's a net in which nearly 100 repeaters across North America were linked by telephone to hear ARRL President Vic Clark, W4KFC, speak on the future of Amateur Radio. That net, held March 3, was such a success that its sponsor, Honeywell ARC of Minneapolis, Minnesota, plans to conduct similar nets four times a year. This month, Joe Reiser, W1JR, will speak on antennas. Canadian repeaters VE3TTT in London and VE3RPT in Toronto and a system of repeaters in south-central Ontario linked by VE3ULR will be in on the net. Interested in becoming involved? For more information, contact the net's coordinator, Rick Whiting, W0TN, 4749 Diane Dr., Minnetonka, MN 55434 USA.

□ Amateurs using computers will want to know that duty on electronic data machines, imported from most-favoured nations such as the U.S., is reduced to 5.1%. Peripherals may enter duty-free. Of course, 9% federal sales tax continues to apply.

\*163 Meridene Crescent West, London, ON N5X 1G3





President: Richard L. Baldwin, W1RU  
Vice President: Carl L. Smith, W0BWJ  
Secretary: David Sumner, K1ZZ  
Assistant Secretary: Naoki Akiyama,  
JH1VRQ/N1CIX

Regional Secretaries:  
C. Eric Godsmark, G5CO  
Secretary, IARU Region 1 Division  
"Pebblemead", The Old Court  
Mantle Street, Wellington,  
Somerset TA21 8AR  
England

Pedro Seidemann, YV5BPG  
Secretary, IARU Region 2  
P.O. Box 2253,  
Caracas 1010A  
Venezuela

Masayoshi Fujioka, JM1UXU  
Secretary, IARU Region 3 Association  
P.O., Box 73, Toshima  
Tokyo 170-91  
Japan

The International Amateur Radio Union — since 1925, the federation of national Amateur Radio societies representing the interests of two-way Amateur Radio communication.

## Administrative Council Meets in Tokyo

There are meetings, and then there are meetings. The first meeting of the newly formed IARU Administrative Council, held in Tokyo during the last week of March, was one of the finest meetings this writer has ever had the privilege of participating in. The principal task of the Council was to completely revise the IARU constitution in line with the thoughts on restructuring that had been shared by member societies of the IARU for the past three and a half years. The Administrative Council is composed of nine individuals of widely varying backgrounds and experience from around the world. Yet these nine, with no major disagreement whatsoever, were able in five working days to produce a document that will, we believe, substantially strengthen IARU and make it even more capable of meeting the challenges of the future.

This new constitution must, of course, be approved by the membership of IARU, and it will be circulated to the members later this year after the by-laws have been similarly revised.

Among the major points of the proposed new constitution are the following:

- The list of IARU objectives has been expanded and modernized, most notably in the areas of providing communications in the event of natural disasters and of enhancing the recognition of Amateur Radio as a valuable national resource.

- The autonomy of the regional organizations is retained, with their responsibilities and authority clarified and enhanced.

- The long-standing principle of each member-society having one vote is reaffirmed.

- The concept of "IARU Headquarters" has been eliminated, with policy-making functions to be assumed by the Administrative Council and administrative functions to be assumed by an "International Secretariat." Member societies will select one of their number to serve as International Secretariat.

- New procedures for the selection of IARU officers are proposed. The president and vice president shall be nominated by the International Secretariat, after consultation with the Administrative Council, and their names submitted to the member-societies for ratification. They must be licensed amateurs, and may be members of any IARU member-society. The secretary shall be designated by the International Secretariat.

Those participating in the meeting included the officers of IARU — W1RU presiding as chairman, with the more-than-able assistance of Carl Smith, W0BWJ, IARU vice president, and



Members of the Administrative Council in Tokyo. Left to right are JM1UXU, 9V1RH, W0BWJ, PA0LOU, JA1AN (host), K1ZZ, W1RU, YV5BPG, N1CIX (IARU assistant secretary), HK3DEU and G5CO.



W1RU (left) and K1ZZ drool over the array of equipment — and prices — in the electronic supermarkets of Akihabara.

David Sumner, K1ZZ, IARU secretary. Representing Region 1 were Louis van de Nadort, PA0LOU, chairman of Region 1, and Eric Godsmark, G5CO, secretary of Region 1. From Region 2 were Pedro Seidemann, YV5BPG, secretary of Region 2, and Alberto Shaio, HK3DEU, Region 2 Executive Committee member. From Region 3 were David Rankin, 9V1RH, chairman of the Region 3 Association, and Masayoshi Fujioka, JM1UXU, Region 3 secretary. Providing clerical support for the council were Naoki Akiyama, JH1VRQ/N1CIX, and

Miss Tsuyako Miyagi. The Japan Amateur Radio League and the Region 3 Association secretariat provided invaluable logistic support both prior to and during the meeting.

Amateur Radio faces a continuing series of challenges in the future, and on the international scene not the least of these is a number of specialized World Administrative Radio Conferences. If IARU continues to display the same vitality and commonality of purpose that were displayed during the first meeting of the Administrative Council, we're going to be in mighty good shape.

Speaking as president of IARU, please let me express my personal thanks to everyone who has played a role in bringing us this far along the path toward the restructuring of IARU.

### LICENSING MINI-SURVEY

Well, as Cass is wont to say, "son-of-a-gun!" There were more responses to the little paragraph in this column in the April issue of *QST* (concerning the obtaining of licenses in other countries) than we recall there were in response to page 9 editorials a year or more ago. That tells you something, doesn't it! The five countries that our correspondents most wanted to hear about are Japan, England, Mexico, Germany and the USSR. Fifteen other countries were mentioned by one or more writers, but the five just listed were by far the most inquired about. We'll get our facts together and be with you another month.

\*President, IARU

## Tell It To The FCC

Did you know that you can tell FCC what to do? Did you know that they must listen? It's true, thanks to procedures made by Congress years ago. Every interested person has the opportunity to file his or her comments on any FCC rule-making proposal for consideration by its decision makers. And this is a very good year to find out how you can get involved. With the no-code license, volunteer exams and phone-band expansion scheduled for FCC action, 1983 will be one of the most exciting years to come down the pike in recent history. Here's the scoop on the rule-making process in plain language — from beginning to end.

Anyone who feels a change in the rules is desirable may file a *Petition* for rule making. The original, plus five copies, should be sent to the Secretary, Federal Communications Commission, Washington, DC 20554. When the Commission receives a petition for rule making, it assigns the petition a number and issues a notice to the public stating that the document has been received and is available for inspection at the Commission's document room in Washington. Normally, interested parties have 30 days in which to comment on the merits or demerits of the petition. RMs (*Rule Makings*) are listed in the *Happenings* column of *QST* whenever possible.

At some point, the FCC will either dismiss a petition for rule making (if it appears to have no merit or deals with an issue already decided) or, if it has merit, assign it a docket number and release it to the public in the form of a *Notice of Inquiry*, or *Notice of Proposed Rule Making*.

A Notice of Inquiry (NOI) simply shows that the Commission wishes to explore the subject further, but does not propose any specific changes to the rules. The latter is the purpose of a Notice of Proposed Rule Making (NPRM).

When an NOI or NPRM is released, interested parties have the opportunity to provide formal comments to the Commission. Comment periods of 30 or more days are customary. Deadline extensions are sometimes granted. Following the deadline for comments, a period of time is af-

\*Assistant Manager, Membership Services, ARRL

### Caption Format To Be Used for Petition or Formal Comments

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554  
In the Matter of \_\_\_\_\_ )  
Amendment of Section 97\_\_\_\_\_ )  
(Insert rule number, if an )  
amendment is )  
proposed, and the )  
subject matter of the )  
Amateur Radio Service.) ) RM.

### ARRL Rule-Making Actions

The League continuously monitors FCC Amateur Radio regulatory proceedings, and participates formally in the majority with comments and replies to Commission proposals. Members have an important say in the manner in which ARRL responds. News of significant proceedings are carried in such *QST* forums as *Happenings* and *League Lines*. If you feel strongly about a certain rule-making matter, voice your opinions to your ARRL Division Director (name and address appears on page 8 of every *QST*). It is the League's Board of Directors that effects ARRL policy, and it is your elected representative on this Board who ensures that your voice will be heard.

forded for replies to comments; that is, parties may file comments on the initial comments made in the proceeding.

To file your comments in an FCC matter, head your first page with the caption shown in the accompanying sample format. Give some brief background of your interest in the proceeding, then express your position — for, against, part support/part opposed, for example. Finally, give your arguments in favor of your position. Keep them simple and concise. For most proceedings, only a couple of typewritten pages are necessary. Send the original and five copies to the FCC Secretary, Washington, DC 20554.

### Table 1

#### Pending Dockets Affecting Amateur Radio

Docket	Subject/QST Reference
21008†	Proposed relaxation of leakage standards for CATV systems (March 1982 <i>QST</i> ).
78-369†	Inquiry into means of dealing with RFI (September and December 1981 <i>QST</i> ).
79-144†	NPRM to solicit comment on effects of RF exposure standards on radio services and equipment; and proposal to adopt regulations to protect health of employees and the public exposed to radiation in excess of national standards (March and August 1980 <i>QST</i> ; April 1982 <i>QST</i> ).
80-739†	NPRM on WARC-79 Implementation (March and May 1983 <i>QST</i> ).
81-414†	NOI/NPRM to allow use of spread-spectrum techniques (September and December 1981 <i>QST</i> , May 1982 <i>QST</i> ).
82-83	Further NPRM for phone-band expansion (this issue). Deadlines for comments: July 1, 1983; replies: August 1, 1983.
82-824†	NPRM to rewrite power limitation terms (December 1982 and April 1983 <i>QST</i> ).
82-726†	NPRM to eliminate most station log requirements (December 1982 and March 1983 <i>QST</i> ).
82-727†	NPRM to eliminate Novice exam mail-back procedure (January and April 1983 <i>QST</i> ).
83-27†	NPRM for Volunteer Exam Program (March and April 1983 <i>QST</i> ).
83-28	NPRM for no-code amateur license (March 1983 <i>QST</i> ). Comments due June 28, 1983; replies by July 28, 1983.
83-337	NPRM for 10-year amateur license terms, two-year grace period for expired licenses (this issue). Comments due June 13, 1983; replies by July 13, 1983.

†Comment deadlines passed. Awaiting Commission Action.

A Notice of Proposed Rule Making eventually leads to a *Report and Order*, in which the proposed rules may be adopted as proposed, adopted in part or rejected. Upon publication of a Report and Order in the *Federal Register*, an individual has 30 days in which to file a *Petition for Reconsideration* should he or she be dissatisfied with the new rules.

*QST* carries reports of FCC actions in *Happenings* and *League Lines*. A copy of the League publication "Pending Dockets" is available from Hq. upon request (s.a.s.e., please). Table 1 lists FCC matters now under consideration affecting Amateur Radio.

## Strays

### AMATEUR RADIO GOES TO COLLEGE

□ ARRL Instructor Gordon West, WB6NOA, of Costa Mesa, California, offers an Amateur Radio curriculum through a local college whereby students enrolled in Novice through Extra Class license courses can earn college credit in addition to getting licensed or upgrading. For more information, write to Gordon West, WB6NOA, 2414 College Dr., Costa Mesa, CA 92626, tel. 714-549-5000.

### I would like to get in touch with...

□ amateurs anywhere who have had a VO call sign in Newfoundland and Labrador at any time. Roland Peddle, VO1BD, 11 Vaughan Pl., St. John's, NF A1B 1R3, Canada.

### QST congratulates...

□ James R. Bullington, N4HX, of Bethesda,

Maryland, on being appointed U.S. Ambassador to Burundi.

□ ARRL Section Manager Peter Kemp, KA1KD, on being appointed to the Area Cable Television Advisory Council by the town of Bethel, Connecticut.

□ Earl C. Radding, KA3HAW, of Seaford, Delaware, on being named the Outstanding Engineer for 1982 by the Delaware Society of Professional Engineers.

# 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.

## THE GOOD, THE BAD AND THE UGLY DXER

□ Your editorial (April 1983 QST, p. 9) on DX, pileups & common sense, made a lot of sense to me and was also enjoyable. I think that's a nice combination. — *Dick Huhn, Kerrville, Texas*

□ I fully agree that the problem of band spread is limited largely to 20 meters, although 10 meters has experienced an unusual spread during a recent Pacific venture. However, from bitter experience, I can assure you that the rarer the country, the louder the pileup.

I think the solution lies in educating the DX operator to communicate his or her intentions to the pack and educating the pack in using receivers so instructions can be heard first, and secondly understood. — *Stuart P. Greene, WA2MOE, Peekskill, New York*

□ Every complaint directed at DXers and DXpeditions usually will clear long before the castigating editorial is off the press. Any long existing and serious problem will be recognized and acknowledged by DXers themselves long before the ARRL can get its wheels spinning. Inasmuch as DXing seems to be able to pass the happy days between major DX efforts without incurring the wrath of the ragchewers, I believe that my belief that DXers themselves handle their ongoing problem is proven.

My opinion is that your editorial is a "sop" to some chronic ragchewers who found their sessions interrupted. But what I would like to know is whether the ARRL has retreated from its once firm policy that the frequencies are the property of no one, but rather the property of all. — *Hugh Cassidy, WA6AUD, San Rafael, California*

□ In my opinion, the only common sense solution to this situation is to eliminate or discourage the creation of the situation which causes these large pileups, which happen when a DXpedition goes to an uninhabited island for a limited length of time.

Society benefits little or nothing from these DXpeditions. These sites are of trivial importance in human affairs, and there is no contribution to international understanding. Any technical information that is obtainable from such contacts could be obtained just as well or better from inhabited sites.

The steps that should be taken are (1) to modify the list of DXCC countries to eliminate all uninhabited islands and (2) require that, for DXCC credit, DXpeditions be self-financed except for reasonable reimbursement for direct QSL costs. — *Yardley Beers, W0JF, Boulder, Colorado*

## ARRL AND REPEATERS

□ Many amateurs are quick to criticize the

ARRL for a variety of reasons. Let these detractors note the following:

Our North Shore Radio Club, now three years old, decided to install a 2-meter repeater. I was mentioning that fact on the air one night when I was called by an amateur to whom I had never talked before. He mentioned the fact that he was the area Emergency Coordinator for the ARRL and he would give us what help we needed in establishing our emergency repeater facility. He stated that his name of Bob Schenck, and his call was KA9JMG. I thanked him for his offer and asked whether he would be willing to be a speaker at our monthly club meeting. He said he would, and the next month he gave a fine presentation.

Not three weeks passed when Mr. Schenck asked if our club would like a complete repeater at no cost to the Club. Of course we said yes. Within a week, he arranged for the delivery of a complete Motorola repeater formerly used by the local county fire department. — *Alan Marcus, WB9FRM, Highland Park, Illinois*

## QSL QSL QSL?

□ I recently received a very interesting computer-generated QSL card. I would like to see some discussion of how computer-generated QSL cards could possibly be used to reduce the expense of postage, both domestic and DX. A bureau could generate several cards on one sheet of paper for delivery to a DX station. A DX station could send one sheet of input to a bureau, which could then generate 10 to 15 cards for distribution. Bureaus could exchange data on the air or by diskette.

This would be no small data-processing project. It would face the same problems banks solved in establishing computer-based fund transfers. However, most banks today use such a system. The increasing cost of postage, compared to the decreasing cost of small, powerful computers, should make a computer-based QSL system worth consideration. — *Russ Ryle, N9DHX, Bloomington, Indiana*

□ I will be eternally grateful to the 452 fine operators who gave my 10-year-old son Terry, KB4DOV, a contact in the 1983 Novice Round-up. Terry received his license on January 8 and was justifiably excited about the NR. My only regret is that some of the operators — they know who they are — that he sent QSL cards to, one from each state, did not have the common courtesy to return his QSL. As a contester and QSL manager for KG4AW, I know full well the time and expense involved with QSLing. Some of the cards that Terry received requested a return card for confirmation of Kentucky on a certain band. He has returned all requests 100%. Why not QSL? — *Shelby Summerville, KA4TAY, Louisville, Kentucky*

## NEW BOOK A BIG HIT

□ Just received *The FCC Rule Book* today. What a great surprise! Like a mailing from the

"Burro" and finding 10 new countries among the cards.

This is so much better than the rewrite of the rules the Candy Company attempted to do a while ago. I think we have somebody on our side doing the job — that's why. Hold the regulations in legal terms as is. With coordinated interpretations as this, I don't see how we can lose. — *R. L. Nitsch, W4NTO, Spartanburg, South Carolina*

[The new *FCC Rule Book* is available from Hq. for \$3 + \$1 postage, or from your local dealer. — Ed.]

## SCATOLOGY 101

□ This letter concerns the obscenity ruling by the FCC Review Board in the case of N6BHU, reported most recently in *The ARRL Letter* of March 3, 1983.

The Hildebrand case is one which impacts upon me indirectly but importantly. I have a young son who, one of these days, will probably take an interest in listening to one of my pieces of radio gear. With the sort of trash I've heard from others of N6BHU's ilk, I can imagine what my boy would think were he to tune in on some of it on his own father's radio. I don't want that now or ever. I agree wholeheartedly with the ARRL that this is a ruling adverse not only to the spirit of the law but to the very spirit of our hobby and, indeed, of America. — *Jon Danity, Sr., KB0UX, PPO San Francisco, California*

## THE DESTINY OF FM

□ Each year, the Unicorn Hunters of the Lake Superior State College of Sault Ste. Marie, Michigan, publish a list of words to be banished from the English language. I am happy to report that they have accepted my nomination of "destinate," as in: This will be my final transmission, as I am about to *destinate*. The Unicorn Hunters awarded *destinate* with a dishonorable mention. — *John J. Corcoran, KA6MFH, Playa del Rey, California*

## ARRL FOOL

□ I wrote to Logistics Corporation, Ltd., to get a Logistics Corporation Fire-Fist 1000 CW System (see p. 44, April 1983 QST), but they wrote back and said TIENM NNTMUAIDNT AIAD MNM ATRITING! — *J. L. Evans, Jr., W2BBK, Englewood, New Jersey*

## RETURN OF THE CODEMASTERS

□ The ARRL does not support my views concerning a no-code license. I am in favor of a no-code license above 30 MHz as well as below. I am not biased because I don't know code. I am capable of buzzing most extras at 35-40 wpm. I guess if we have to wait until the old fogies die off to change Amateur Radio, so be it. Beware! A new generation of hams is coming up the ranks bent on changing the current bigoted, cliquish, antiquated system. — *Howard Medlock, Jr., KA5PNS, Lubbock, Texas*

\*Public Information Officer, ARRL

## Field Day Cross-Check and Report Program

Before long, another Field Day will have come and gone, and all of the equipment will be back on the operating table at home. The logs and cross-check sheets for the FD operation will await attention. If your club's FD operations are anything like ours, the hardest job is not getting the 160-meter vertical up, getting the generator voltage to stay below 135 V or keeping the beer cold, but getting the FD results compiled and sent off to the ARRL.

Having had a home computer for several years, I decided it could be used for this task. As soon as FD was over, I started writing the program that will be presented here. It made the preparation of the FD results much easier and quicker.

The program, which is available by sending an s.a.s.e. (preferably no. 10, business-size) to ARRL, Dept. PX, 225 Main St., Newington, CT 06111 (request program no. 18), was written on a Z80-based system, running CP/M and using Microsoft BASIC version 4.51. The program should run without major modifications on any system using Microsoft BASIC and one disk drive. My system uses a CRT console and a 132-column printer. The printer width is not critical since the program adjusts the width.

The program supports six functions that are used to process the FD results. Each of these functions uses a two-letter abbreviation. The functions are

**EC** — *Enter Calls*. This function allows the user to enter the call of stations worked from the FD logs and write them out to a disk file, referred to as the call-file. Calls may either be added to an existing call-file or to a new call-file. The user enters "DONE" to terminate input and close the file.

**EL** — *Entry List*. The EL function prints the call-file in entry order, along with record numbers. This is used for checking the entered data with the logs.

**ED** — *Edit*. Once all the calls from a given set of logs have been entered and checked, any errors may be corrected with the ED function. The user enters the record numbers, and the program will print the call from the call-file and prompt the user for the correct call.

**SC** — *Sort Calls*. After all the errors in the calls are corrected, the calls are sorted by call area and suffix to make checking for duplication much easier. Then, a second disk file, which contains the record numbers of the call-file in sorted order is written. This function will require some time for the computer to complete, depending on the size of the file (number of calls).

**DC** — *Display Calls*. After the calls have been sorted, they may be checked for duplication and printed. The DC function prints the calls numerically by call area and alphabetically by suffix, counts unique calls and removes duplicates. The total numbers of scored calls (unique calls) and the total number of duplicate calls are printed. This printout is then ready to send to the ARRL.

**EX** — *Exit program*. This command brings the program to an orderly halt.

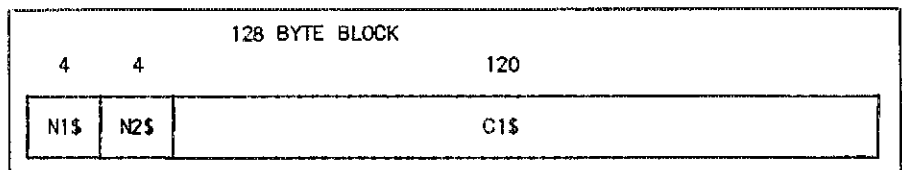


Fig. 1 — Call-file block organization

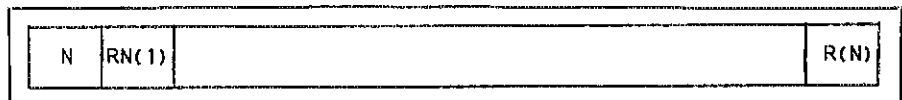


Fig. 2 — Record-number file organization

### PX

VIC-20 RTTY programs are now available via PX. The programs, written by K9JRI and modified by WA9BVS, are designed to run on VIC-20s with 8K or 16K (or more) of memory. The 16K version allows the user to "type ahead" the text to be transmitted (into a 3K transmit buffer) and to save received text in a 3K receive buffer. Both versions of the VIC-20 RTTY program are available by sending an s.a.s.e. (preferably no. 10 business-size with 37 cents postage) to ARRL, Dept. PX, 225 Main St., Newington, CT 06111 (request program no. 19).

### PX Ground Rules

The PX crew is happy to make computer programs available to readers of On Line; however, for your requests to be filled quickly and efficiently, please follow these rules:

- 1) Request PX programs by their catalog number. If the program number is not specified, the request will be delayed interminably.
- 2) Send a separate s.a.s.e. for each program you request. For example, if you request three programs, send three s.a.s.e.'s. Three programs that are each multiple pages in length cannot be mailed in one s.a.s.e. with 20 cents postage. Write the program number on the lower-left corner of the s.a.s.e.
- 3) Send all requests to Dept. PX, ARRL Hq. Do not send your requests to Stan Horzepa, WA1LOU. I do not have the means to make copies of the programs for PX distribution. If you'd like to make comments not directly related to the program exchange (PX), write to me at the address listed at the bottom of each installment of the column.

There are two disk files for each FD station entry. The first file, the call-file, is randomly organized with a fixed block length of 128 bytes. Each block is arranged as illustrated in Fig. 1.

N1\$ represents the number of blocks in the file; it is only used by block number 1. All other blocks have zero.

N2\$ represents the number of calls in this block (up to 20 six-character calls per block).

C1\$ represents the calls, right-justified every

six characters and padded with space.

The name of the call-file may be anything you desire, except file extensions are not allowed. If one uses descriptive names, such as PHONE75M and CW80M, it will be easy to recognize what information the file contains.

The second file, created after the sort, will have the call record numbers in the sorted order. This file is organized sequentially and is arranged as illustrated in Fig. 2.

N represents the number of calls in the call-file. RN(1) represents the record number of the first call after sorting.

RN(N) represents the record number of the last call after sorting.

The name of this file is given the name of the call-file name, plus the extension ".SEQ". Thus, if the call-file name was CW20M, then the sequential file name would be CW20M.SEQ. The program creates this file and provides the extension.

The program would normally be used in the following way:

- a) Create the call-file with the EC function.
- b) Produce an entry order list with the EL function.
- c) Check and correct the entry order list transcription errors.
- d) Edit the call-file with the ED function, correcting any errors.
- e) Sort the calls with the SC function.
- f) Produce a duplicate-free, ordered list of calls with the DC function.

Since each program function independently opens and closes the files it needs, there is no need to follow the sequence in a single session. One might, for instance, enter some calls to one call-file, edit another call-file and produce a final report for still another file.

If you have a home computer and want to use it in your ham radio hobby, you might give this program a try. It has been very helpful in getting the FD results together and ready to send to the ARRL — G. M. Palmer, K8LG, Morgantown, West Virginia

### APPLE NET CORRECTION

There was an error in the On-the-Air Computer Nets listing in the April installment of On Line. The frequency of the National Apple Computer Nets is 14.329 MHz (not 14.239 MHz). Sorry about that!

\*72 Stiles St., Waterbury, CT 06706



## Honor Roll Analysis

The March 1983 QST DXCC Honor Roll is quite a massive compendium of those within our DX ranks who have achieved the "top ten numbers" in the DXCC roles — the top ten *deleted* numbers, that is!

The DXCC has always been a numbers game, a natural evolution in the chasing of DX and comparing of country totals. However, it wasn't until April of 1962 that deleted countries became a real factor in comparing the DX horse race! As last year's history lesson revealed, countries began to "disappear" at a compelling rate in the years following World War II. It began to be difficult to fairly compare those who held the top totals *unless* those countries that no longer existed (deleted countries) were factored into the equation. At any rate, the March 1983 listing furnished a great deal of interesting fodder for analysis. So much so, in fact, that initially only an analysis of the "mixed" Honor Roll, non-W at that, was attempted!

Another way you can look at the tabulation lets you explore the overall *undeleted* numbers. You'll soon discover those DXers who are the *real* old-timers in the DX ranks. They have to have been around a long time, back to those days prior to the massive number of changes that took place in the world in the '50s and '60s, for example. Those top non-W/VE "mixed" *undeleted* totals are: (365) LU6DJX, (364) PY2CK, (363) OE1ER, (362) DL7AA, (361) DL1KB ON4NC, (360) GW3AHN, (359) I6AMU OK1FF 4X4DK, (358) DJ2BW DL3RK

Country/ Callbook Pop.	Honor Roll Members	Callbook Pop. Per Honor Roll Member
Azores (91)	1	91:1
Zimbabwe (168)	1	168
Salvador (342)	2	171
Sweden (10,019)	32	313
Finland (3543)	11	322
Israel (1028)	3	342
Belgium (4267)	11	387
Northern Ireland (891)	2	445
Switzerland (3586)	6	448
Japan (28,451)	8	466
Czechoslovakia (3279)	6	540
Austria (4485)	7	640
Italy (17,216)	23	748
Yugoslavia (5216)	6	869
Canada (22,490)	25	899
Mexico (1805)	2	902
Norway (5550)	6	925
West Germany (47,004)	50	940
Denmark (8778)	9	975
Rumania (2198)	2	1099
Brazil (20,919)	19	1101
England (25,886)	18	1427
France (11,667)	7	1666
Wales (1684)	1	1684
Hawaii (1861)	1	1861
Scotland (1977)	1	1977
Venezuela (15,199)	7	2171
USSR (20,383)	5	4076
Australia (14,510)	3	4836
Netherlands (12,418)	2	6209
Argentina (25,065)	3	8355
Spain (10,207)	1	10,207

G3FXB HB9MQ SM3BIZ, (357) DL1BO DL7EN, (356) DL6EN 4X4JU.

With 315 entries on the DXCC tabulation possible to work, your reporter next looked at *how many* Honor Roll members there were in

the various non-W countries: (61) Japan, (50) West Germany, (32) Sweden, (25) Canada, (23) Italy, (19) Brazil, (18) England, (11) Finland-Belgium, (9) Denmark, (8) Switzerland, (7) France-Austria-Venezuela-Norway-Yugoslavia, (5) Czechoslovakia-USSR-New Zealand-South Africa, (3) Argentina-Australia-Israel, (2) Netherlands-Mexico-Northern Ireland-Salvador-Rumania, (1) Azores-Spain-Scotland-Wales-Hawaii-Zimbabwe. (The number of JA Honor Roll members seems particularly noteworthy in view of the late start Japanese radio amateurs faced in reactivating Amateur Radio in the years following the end of WW II.)

Probably the most interesting aspect of the Honor Roll is that you can indeed make the listing without spending a lifetime doing so. Some years back, an analysis revealed that it was possible to make the Honor Roll, starting from "scratch," in as little as seven years. The particular list under analysis shows three in the top grouping who must be fairly current in their DX chasing. JR7TEZ shows just six deletions at 306/312, as does YU1DZ at 309/315. Close on their heels is I0DUD with 7 deletions, 307/314. Food for further inquiry by *this* reporter!

The ratio of Honor Roll membership to the *Callbook* totals of hams in each "country" presents yet another perspective. The lineup is open to some surprising interpretations best left to you, the reader! Future "How's" scheduling may permit a similar look-see for the W-contingent!

## TRAVELING ABROAD

WB2UGM brings up an important element in today's international travel. Ole's thought-provoking comments are particularly timely in view of the inability of the March S21 operation to get gear into the country.

Where do you start? Obviously, you want to know what countries permit such operation by nonnationals, and the procedure for acquiring such permission. ARRL Headquarters (Membership Services and International Affairs Departments) maintains an extensive file on each of the IARU countries: if a visiting amateur from another country is permitted to operate, how permission must be obtained, etc. Your Headquarters can also furnish you a degree of guidance on the political climate of the country in question. If illicit operation occurs, not only will the QSL cards in question be invalid for ARRL award purposes, but the greater harm — the danger to the status of the resident amateur population — is not to be underrated. Obviously, there are a lot of tips by former operators on how you do and don't do certain things. When in doubt, err on the side of what is good for the resident hams. What is good (and safe!) for *them* cannot help but enhance the stature of Amateur Radio worldwide. In line with the general theme, a sure-to-be-popular series is planned by IARU President W1RU concerning "How To Get An Amateur License In ????" His series will deal with becoming a licensed amateur in the country, not how to get a reciprocal-operating permit...

In April, the relevance of the above seemed particularly poignant as DXers worldwide learned of the fate of the German ham expedition to Spratly Island. Details will follow.

## THE YEAR OF THE CASTLE

1983 is World Telecommunications Year, and it is also being celebrated by Wales as The Year of the Castle.



N6RJ, with a penchant for operating in beautiful ZF1, has found the ideal way to thank the station owner permitting him DX Competition operation. On his recent "rerun," Jim presented Doc, ZF1MA, with *his* copy of the beautiful plaque won by Jim in the 1982 extravaganza. A fine way to say "Thank you."

The Bridgend and District Amateur Radio Club is commemorating both by organizing a competition on July 24. Each Amateur Radio club in Wales will adopt a local castle and contact as many other castles as possible between 1000-1800Z on that day, any band/mode. Any international station contacting five such castles on that day will be eligible for a certificate of merit, on receipt of the valid information, a large s.a.e. and appropriate IRCs. One of contest rules is that "rubber stamp" contacts are not permitted, and information/brief history of each castle must be transmitted.

## EUROPEAN COMMUNITY AWARD

This new award is issued by the Luxembourg Short-wave Amateur Radio Club to commemorate the 25th

anniversary of the European Community. Each station may be counted just once. No more than 20% of the points may be obtained with contacts with the same country. A contact with the special station LXØRL may replace a missing contact with any of the member countries. Contacts via passive reflectors or active repeaters do not count. No band/mode restrictions. Non-EU stations must amass 50 points (each of the countries must be worked at least once and three LX stations must be collected). Log submissions must be verified by two licensed amateurs or a club. The application fee is \$4 U.S. or 10 IRCs. Eligibles: DL, I (includes IS, IT), ON, F (includes FC), LX, PA, EI, G (includes GD G1 GJ GM GU GW), OZ, SV. Applications go to LX1CC, Box 1764, L-1017, Luxembourg. (Special thanks to N6ZX/7)

## THE CIRCUIT

- HZ1AB: Confirmations for the ARRL DX Contest cw weekend go to Yasme, following the operation by the ubiquitous Colvins.
- Liechtenstein: June 10-12 should see WA8ZLJ and WD4Z QRV, primarily on 10, 15 and 20, looking for cw, RTTY and phone (low end of the General class segment). Each will be signing /HBØ, with cards going to their home addresses.
- St. Pierre: VE1CCM is planning to be active from FP8 during the month of August.
- Malawi: WA1DBR notes the availability of Les, 7Q7LW, active on 10 meters around 1830Z.
- K5YY: San Hutson has returned from trip no. 10 to 9V1, VS5 and 9M6, with concentration on cw and the low bands. San worked 4440 from VS5, 5920 from 9M6 and 750 from 9V1 — a total of 121 countries! He took a Project Goodwill rig to the Boy Scouts of Sabah, along with a Butternet vertical. With two offspring ready for college in the next four years, K5YY will be staying pretty close to home and his medical practice.
- Nauru: The current legal stations operating in Nauru are C21 AA AM DM EF FS KH RK VD NI,

\*19620 SW 234 St., Homestead, FL 33031

reports Amateur Radio Society of Nauru Secretary F. Smith.

□ The Western Pennsylvania DX Assn. welcomes recruits. Address correspondence to new club Secretary Wayne Albert, KB3KV, at 1508 Ligonier St., Latrobe, PA 15650. New officers include President WB3GPR, Vice President WB3JWJ and Treasurer KJ3Q.

□ Bangladesh: JH1KRC & Co. had enthusiastic plans for S21 operation late March, but optimism wasn't enough. The "DX Family Foundation" was not permitted to bring the gear into the country.

□ Belize: WD0BCX has finally received his logs and is ready to send cards to anyone needing his card for contacts with VP1BCX (for contacts on or before August 13, 1981), VP1X (August 13, 1981 only) and V3X (since September 1981). Cards go to Peter DeWolf, Box 2-38015-A, Lansing, KS 66043-0002.

□ Help! In May 1971, WA5ZIJ worked KS4DY on 14-MHz cw and is looking to confirm the contact. Any helpful information goes to Evest Broussard, 1043 Rodney Dr., Baton Rouge, LA 70808. K7RDH is looking for traces of EP2JJ, operating in October 1978. W2QEU is seeking the whereabouts of TU2KC (Jan. 1982), EL2P (March 1982) and VP8AI (Feb. 1979). Your help is welcomed by Leo Hance, 224 Brookvalley Rd., Towaco, NJ 07082. Anxious to help an active DX station, preferably any Arabian peninsula station, CN, 7X or SU, is Mike Castellano, KMIR (ex-WA1CUN), 631 Great Hill Rd., Guilford, CT 06437. K8NW is in need of an address (other than *Callbook*) for a 9G1WA station operating 1979-1980. Contact Mike at his *Callbook* address.

□ W0IJN notes that an s.a.e. from the DX station wanting a card would sure help the manager; some addresses are downright confusing! Jim handles cards for CX7BY. Likewise, K3CHP is willing to be a manager.

□ KP4AM says that he still has the original logs and QSL cards of the 1979 KP4AM/Desecheo operation and will keep them until July 31. Send requests with s.a.s.e. or s.a.e./IRCs to Dave's *Callbook* QTH.

□ WA3EPX recently had the opportunity to visit a local radio club meeting in Japan. Both Bernie and the JA members of the Ishikawa DX Assn. had a great

laugh since the talk on the agenda for the meeting was "Effective Ways to Catch DX!"

□ The recent Dayton Hamvention has picked KH6IJ as "Ham of the Year!" Congratulations and Aloha, Nose.

## QSL Corner

Administered by Joan Becker, KA1IFO

### The ARRL DX QSL Bureau System (Incoming)

Within the U.S. and Canada, the ARRL DX QSL Bureau System is made up of call area bureaus that act as central clearing houses for QSLs arriving from foreign countries. These "incoming" bureaus are staffed by volunteer workers. The service is free, and ARRL membership is not required.

#### How it Works

Most countries have "outgoing" QSL bureaus that operate in much the same manner as the ARRL-Membership Overseas QSL Service. Members send cards to their outgoing bureau, where they are packaged and shipped to the appropriate countries.

A majority of the DX QSLs are shipped directly to the individual incoming bureaus, where volunteer workers sort the incoming QSLs by the first letter of the call sign suffix. One individual may be assigned the responsibility of handling from one to three letters of the alphabet.

For detailed information on the operation of the bureau serving your district, please send an s.a.s.e. for a prompt reply.

#### Claiming your QSLs

1) Send a 5 × 7-1/2 in. s.a.s.e. to the bureau

serving your district.

2) Neatly print your call sign in the upper left-hand corner of the envelope.

3) A preferred way to send envelopes is to affix a 20-cent stamp. If you expect to receive more than 1 oz of cards, please affix postage accordingly.

4) When requesting any information from the bureau serving your district, always include an s.a.s.e. for a prompt reply.

Some incoming bureaus sell envelopes or postage credits in addition to the normal handling of s.a.s.e.'s. They provide the proper envelope and postage upon prepayment of a certain fee. The different stages of presorting and sorting cards take time. A period of six to eight months, or longer, may take place before you receive your cards.

#### Helpful Hints

Good cooperation between the DXer and the bureau is important to ensure a smooth flow of cards. Remember that the people who work in the area bureaus are volunteers. They are providing you a valuable service. With that thought in mind, please pay close attention to the following DOs and DON'Ts.

#### DOs

Do keep self-addressed 5- × 7-1/2-in. envelopes on file at your bureau, with your call in the upper-left corner, and affix at least one unit of First Class postage.

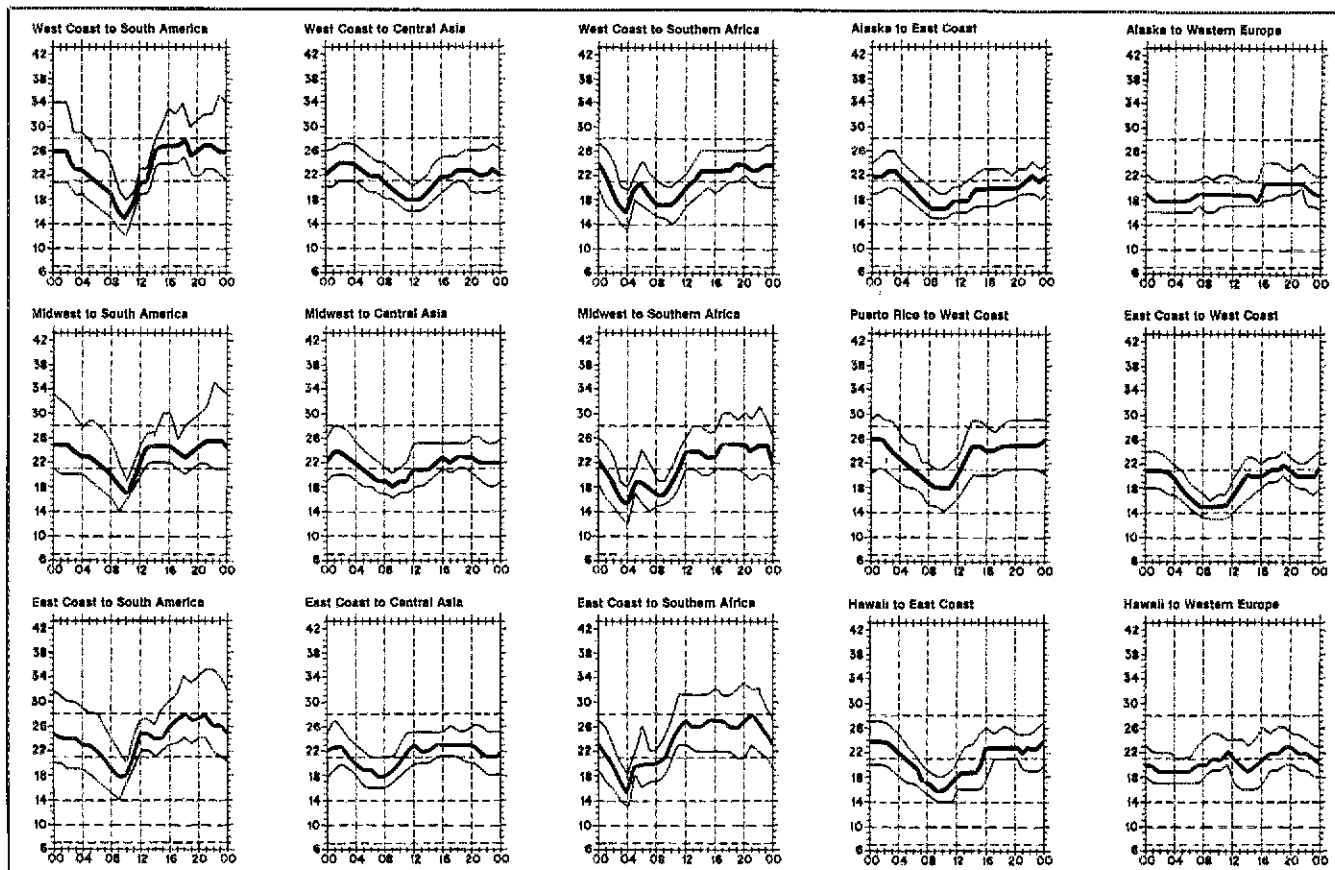
Do send the bureau enough postage to cover envelopes on file and enough to take care of possible postage-rate increases.

Do respond quickly to any bureau request for envelopes, stamps or money. Unclaimed card backlogs are the bureau's biggest problem.

Do notify the bureau of your new call as you upgrade. Please send envelopes with new call, in addition to envelopes with old call. Please put only one call on an envelope.

Do include an s.a.s.e. with any information request to the bureau.

Do notify the bureau *in writing* if you don't want your cards.



When are the bands open? These charts predict this month's average propagation conditions for high-frequency circuits between the U.S. and various overseas points. One chart for East Coast to West Coast is also included. On 10 percent of the days of the month, the highest frequency propagated will be at least as high as the uppermost curve (highest possible frequency, or hpf). On 50 percent of the days of the month, it will be at least as high as the middle curve (maximum usable frequency, or muf). On 90 percent of the days of the month, it will be at least as high as the lowest curve (optimum traffic frequency, or fof).

Do be appreciative of the fine efforts of these volunteers.

**DON'Ts**

Don't expect DX cards to arrive for several months after the QSO. Overseas delivery is very slow. Many cards coming from overseas bureaus are over a year old.

Don't send your outgoing DX cards to this bureau (see "ARRL-Membership Overseas QSL Service" in this column in April 1983 QST.)

Don't send envelopes to your "portable" bureau. For example, WA1SQB/2 sends envelopes to the W1 bureau, *not* the W2 bureau.

**ARRL DX QSL BUREAU SYSTEM**

**First Call Area:** all calls\* — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.

**Second Call Area:** all calls\* — NJDXA, P.O. Box 599, Morris Plains, NJ 07950.

**Third Call Area:** all calls\* — Leon Lapkiewicz, K3GM, P.O. Box 6238, Philadelphia, PA 19136.

**Fourth Call Area:** single-letter prefixes — Mecklenburg ARS, P.O. Box DX, Charlotte, NC 28220.

**Fourth Call Area:** two-letter prefixes — Sterling Park Amateur Radio Club, P.O. Box 599, Sterling Park, VA 22170.

**Fifth Call Area:** all calls\* — ARRL W5 QSL Bureau, Box 1690, Sherman, TX 75090.

**Sixth Call Area:** all calls\* — ARRL Sixth (6th) District DX QSL Bureau, P.O. Box 1460, Sun Valley, CA 91352.

**Seventh Call Area:** all calls — Willamette Valley DX Club, Inc., P.O. Box 553, Portland, OR 97207.

**Eighth Call Area:** all calls — Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.

**Ninth Call Area:** all calls\* — Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.

**Zero Call Area:** all calls\* — W0 QSL Bureau, Ak-Sar-Ben Radio Club, P.O. Box 291, Omaha, NE 68101.

**Puerto Rico:** all calls\* — Radio Club de Puerto Rico, P.O. Box 1061, San Juan, PR 00902.

**U.S. Virgin Islands:** all calls — Send cards (and envelopes) to ARRL Hq.

**Canal Zone:** all calls — LPRA, P.O. Box 9A-175 Panama 9A, Republic of Panama.

**Hawaiian Islands:** all calls\* — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.

**Alaska:** all calls\* — Alaska QSL Bureau, 4304 Garfield St., Anchorage, AK 99503.

**Guam:** AH2, KH2, WH2 and KG6 calls — MARC, Box 445, Agana, Guam 96910.

**SWL — Mike Witkowski, WDX9JFT, 4206 Nebel St., Stevens Point, WI 54481.**

QSL Cards for Canada (VE and VO) may be sent to CRRL Central QSL Bureau, Kennebecasis Valley Amateur Radio Club, Box 51, St. John, NB E2L 3X1. Or, QSL cards may be sent to the individual bureaus.

**VE1\*** — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, NS B3J 2T3.

**VE2** — A. G. Daemen, VE2IJ, 2960 Douglas Ave., Montreal, PQ H3R 2E3.

**VE3** — The Ontario Trilliums, P.O. Box 157, Downsview, ON M3M 3A3.

**VE4\*** — Larry R. Lazar, VE4SL, 30 Bathgate Bay, Winnipeg, MB R3T 0L2.

**VE5** — Charles Zsoka, VE5AAD, 1108 Walker St., Regina, SK S4T 5N4.

**VE6\*** — G. D. HOLETON, VE6AGV, 4003 1st St., N.W., Calgary, AB T2K 0X2.

**VE7\*** — Burnaby ARC, Box 80555, South Burnaby, BC V5H 3X9.

**VE8\*** — Rolf Ziemana, VE8RZ, 2888 Lanky Ct.,

Yellowknife, NT X1A 2G4.

**VO1, VO2** — CRRL VO QSL Bureau, P.O. Box 6, St. John's, NF A1C 5H5.

**VY1** — ARRL QSL Bureau, W. L. Champagne, VY1AU, P.O. Box 4597, Whitehorse, YT Y1A 2R8.

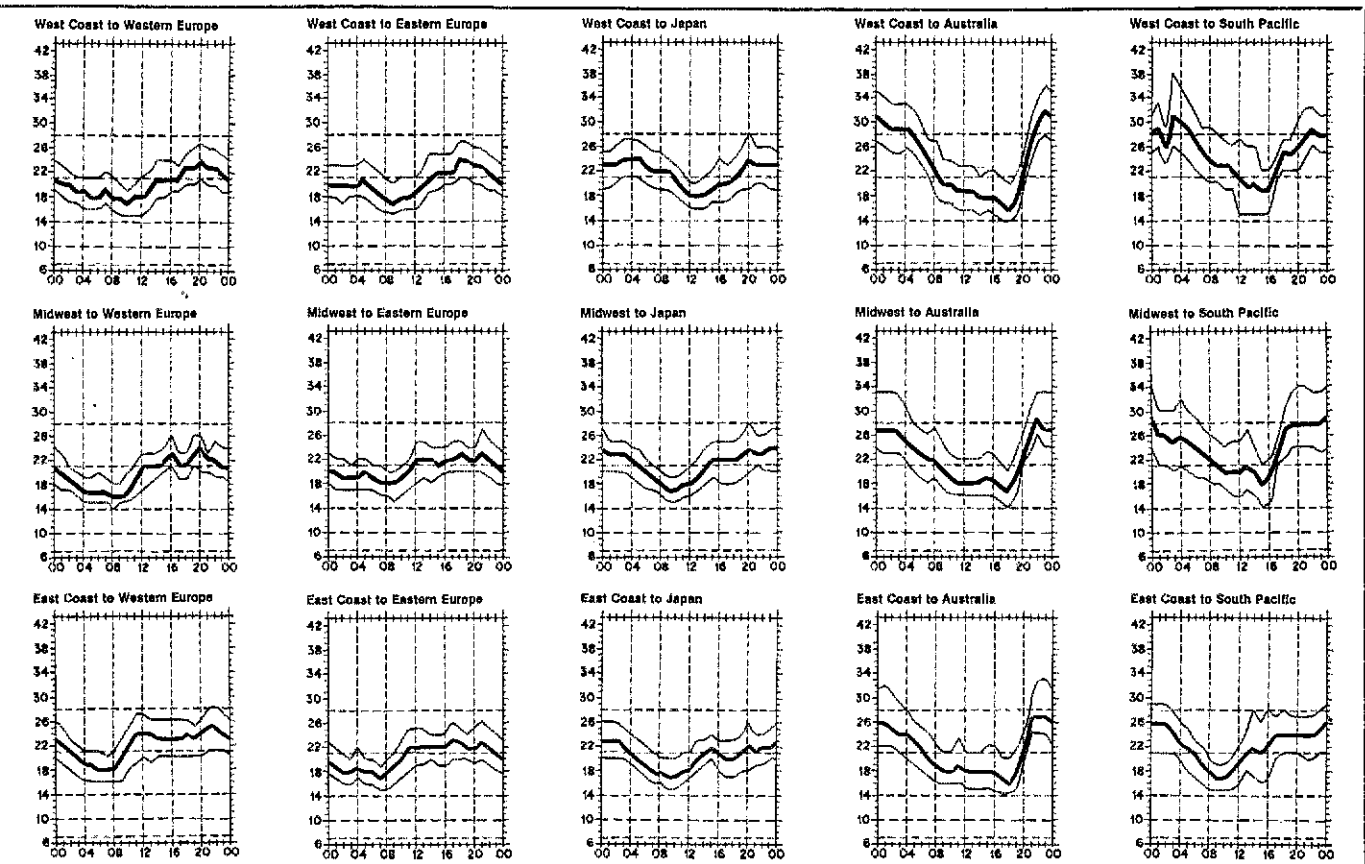
\*These bureaus sell envelopes or postage credits. Send an s.a.s.e. to the bureau for further information.

**And Finally . . .**

April 1983 QSL Corner, page 65, contains information on the operation of the ARRL-Membership Overseas QSL Service. For information on the bureau operations (Incoming and Outgoing), send a self-addressed, stamped envelope to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.



K5YY's recent operation as 9M6YY culminated in San's presentation of a Project Goodwill rig to the Boy Scouts of Sabah, along with a Butternut vertical. The local scouts made San the "guest of honor" at a big banquet, presenting him with an engraved pewter plaque in recognition of his help to the scouting program.



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 megahertz. Data are provided by the Institute for Telecommunication Sciences, Boulder, Colorado. These predictions, for June 15 to July 15, 1983, assume a sunspot number of 68, which corresponds to a 2800-MHz solar flux of 119.

# 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 in the official ARRL DXCC List. You may also submit cards to endorse your award in 25-country increments through 250, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from March 1 through March 31, 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

CT2DF/203 DF4FG/128 DK8WV/108 DL2HD/226 DL2SAD/124 DL7MAE/186 DL7MAT/116 EA7BXQ/173 E16BA/150 G4ANH/125 GM4GIF/100	HB9CDZ/138 I8WY/262 J88AF/126 JM1VPH/109 JN20NE/114 JF2CCN/157 JF2IRT/260 JH2RMU/109 JA3HZT/321 JA6QDU/110 JA7BGM/105	KP4EQG/198 NP4BN/208 OE2DYL/139 ON7VN/104 OZ1IPA/114 OZ1HFF/112 PA3BEJ/101 PY2HLW/100 SK3BG/101 SM7LMN/100 VE1BWQ/118	VE2DQL/100 VE4FAJ/110 XE2ADY/104 YU2CBP/100 YU3HAM/156 YU4VWQ/164 YU5GBC/139 AC1L/109 KA1DIM/104 KA1HFH/108 KF1K/103	KA2O/139 K62RW/100 K2CPG/101 K52M/105 N2IS/300 W2YM/102 WA2ROJ/J10 WB2BMC/147 WB2RC/J104 N3AAH/111 K4STK/151	K4SWN/118 K4WJ/273 K4ACMG/101 KE4MM/108 K64SA/104 K0AP/149 W42CID/260 N4FYF/124 W4VY/211 N4FC/166 W4DCL/104	W4HIR/108 WA4SCF/104 WB4DNL/102 WD4PZ/100 WD4RI/2105 K5HUI/208 K5KSY/111 W5IDZ/107 W5KWK/158 W5PLN/283 K4BNG/J105	K06PY/316 K6BAR/102 N6DLQ/107 N6FZD/103 NG6W/124 W6NWS/231 W6BFA/J169 KM7L/108 WA7RCT/100 N8CP/110 N8CQA/109	N8DUY/110 W8QTO/102 K8HAC/101 K9NUJ/103 K9R/107 K9RF/110 W9WY/200 K9STT/100 AG02/105 KG0E/108 W9BYM/109
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### Radiotelephone

C6ADC/101 CT1BG/C162 CT1KH/108 CT2DF/203 CT4UW/118 C4AAU/219 DA2CK/151 DK6BT/111 DL26AD/122 DL5LV/102 EA1AWW/110 EA1BDB/197 EA3BNX/103	E5AHE/215 E67ABW/263 E8AMH/108 E8ASH/105 G3UAS/123 G4IWC/109 GM5BC/146 IK1AOD/103 IW1Y/170 JM1VPH/108 JN20NE/161 JF2CCN/157 JA3HZT/202	J6WVT/103 JF6RWU/108 JF6RVG/100 KP4EQG/123 LU6DDF/108 NP4BN/106 O4AARQ/HK5/102 OE2DYL/139 OESJTL/140 P57JD/161 SM7LMN/108 SMBJHF/100	UW1FF/101 VE1BRQ/107 VE2DRN/131 VE3KCU/150 Y03AK/310 Z9BBV/110 Z56N/103 K1GZM/100 KA1DIM/104 KA1HBW/103 KB1BE/263 KB2C/105	WA2HMU/113 WA2ROJ/J110 WB2GJG/220 K53C/104 W3TNQ/237 K4SLC/113 K4STK/103 K4WJR/189 K4BQJ/104 K4GR/140 K4ZL/101 K4RHR/130	KE4MM/108 N45C/259 N4DKB/102 N4FYF/113 N4V/113 NY4H/174 K4STK/103 W4DGA/114 W4YDK/100 WB4HNW/150 W4BBE/133 W4FLR/109	K5HUI/203 N65C/125 W5KWK/152 W5RJJ/108 W5SD/119 W5ZKK/108 W5AAH/104 W6L/TW/112 W6NWS/171 KM7L/101 W7BMM/100 W7MLJ/251	WA7EJU/100 WB7CJF/100 K8BN/271 K83RH/106 N8DUY/104 W8NBN/103 K9ADP/105 K9DGS/102 K9C/112 K9GH/101 K9R/105 W9HUW/101	W9VAJ/105 W9YB/103 W9BYO/131 AG02/105 K9JL/105 K9JN/100 N9CLM/106 N9CHL/100 N9CLM/106 W99PHS/104 W99PLV/266 W99JG/100 W9BYM/109
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### CW

DF4ZL/105 DF87P/118 DK8ED/138 DL4BAS/110	DL7MAE/185 HB9CDZ/122 I8WY/246 JK1WOC/104	JH2RMU/104 JA3HZT/116 LA5BS/106 LZ2AX/135	NP4BN/106 OZ1HFF/106 FZ1ACZ/107 SM7KNW/108	KB1FK/107 K4WJR/180 K04W/110	WB4DNL/102 W5JE/102 K6TMB/102	K8E7/110 W6JX/100 W6ROY/104	K7QKA/107 W8FVQ/101 K9C9/116	W9BYO/129 N9CQ/DU/109 W8FF/101
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### RTTY

K1LPS	K4JAF							
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### 5BDXCC

LA2GV F6CQT CT1XKA	K1DG W5AYZ CP6EL	ZL4LZ UP2BAS JA1HG	LA4AT K28Y WB5UIH	AB9E I4YNO	DF92P N9RF	K7ICW DJ9MH	VK3Q1 AO4TY	W2YC K9GX
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## Endorsements

### Mixed

DF4ZL/272 DF92P/274 DJ6DU/281 DJ7ZG/342 DJ8QJ/341 DK2PS/198 DK6AD/307 DK6AD/306 DK6ED/276 DL1QT/291 DL3BK/353 DL4FL/289 DL6MK/339 DL7ZR/203 DL8AK/264 DL8VK/203 EA6ET/260 EA9GJ/179 F3CJ/287 F3JJ/10 G4FEU/277 HB9D/348 HK3YH/251 I3VJW/197 JA1EMQ/150 JA1NAQ/256 JA1ZZ/335 JF1EZ/302 JG1TSF/278 JH1BSR/274 JH1FD/252 JK1WOC/209	JR2XJO/256 JH3XCL/301 JR4QZ/127 JA5ELM/230 JA5NG/287 JH5FCQ/276 JA6HUG/306 JA6VA/318 JA7XBG/234 JH7BRG/284 JA8BIO/319 JA9FP/277 KP4BJD/281 LA4AT/234 LA5WN/250 LA8CE/212 OE1ZL/230 OH5GQ/340 OK3VE/125 OZ1R/318 PA8TAU/338 PY1BF/182 PY1DF/196 SM2EJE/258 SM5BFC/301 SM5HYL/210 SM6CMU/377 TF3S/302 VE1BWP/194 VE3CWE/282 VE3LD/277	VE6AJF/226 XE1OW/291 XE2MX/270 YU1NZW/262 YV5BZ/346 4Z4DX/316 6V5HM/175 K1GSK/304 K11TS/209 KA1GC/203 KB1BE/261 W1BFT/287 W1BPP/320 W1ENE/252 W1ESN/307 W1ETH/226 W1GDI/322 W1PZR/227 W1UN/335 W1WH/300 W1WZQ/128 WA1DVE/179 WA1FSD/150 K2AGJ/321 K2BSM/252 K2CL/335 K2HVM/186 K2HVN/316 K2LE/340 K2NY/324 K2POF/128	K2SD/239 KB2DX/125 KF2P/262 K1G2/178 KQ2O/280 KV2Y/227 W2LL/340 W2NCG/231 W2TE/282 W2UI/324 W2XJ/250 W2YC/251 W2CFUE/276 WA2OES/273 WA2VEE/292 WA2YS/J150 WB2CMU/318 K3CTR/125 N3ANP/225 N3QY/130 W3VIG/202 W3Y/299 W3YX/315 AA4AR/306 AA4SC/291 AGAL/290 K4BAI/324 K4CAI/339 K4CFH/255 K4HAV/259	K4JEX/296 K4JW/283 K4NYV/290 K4PVZ/307 K4RIG/286 K4SE/303 K4VW/247 W4XJ/334 WA4BEC/295 WA4BSN/188 WA4EMA/154 WA4OBO/300 WA4OBX/322 K4J8V/279 WA4VC/280 WA4VEK/276 WA4WZ/125 WB4CSK/251 K4QR/147 WD4F/265 W4M/333 AF5H/305 A15B/302 W6RD/321 N4WB/322 NE4G/221 N6M/243 K5B5A/291 K5BEK/230 N4VZ/203 K5M/280 K5VQ/153 K5VJ/270 K5D/268	W4JD/328 W4MAF/251 W4OQ/315 W4OMY/271 W4TL/276 W4VN/290 W4VW/247 W4XJ/334 WA4BEC/295 K6GA/349 K6UWD/237 K46GJW/158 WA4OBX/322 K4J8V/279 WA4VC/280 WA4VEK/276 WA4WZ/125 WB4CSK/251 W4BQNP/314 WD4F/265 W4M/333 AF5H/305 A15B/302 W6RD/321 N4WB/322 NE4G/221 N6M/243 K5B5A/291 K5BEK/230 N4VZ/203 K5M/280 K5VQ/153 K5VJ/270 K5D/268	NA5U/129 W5HE/242 W5SD/321 W5UCQ/308 W5AIP/128 W5BUIF/242 W5IAJ/257 W5MBS/227 AB6R/276 K6GA/349 K6UWD/237 K46GJW/158 WA4OBX/322 K4J8V/279 WA4VC/280 WA4VEK/276 WA4WZ/125 WB4CSK/251 W4BQNP/314 WD4F/265 W4M/333 AF5H/305 A15B/302 W6RD/321 N4WB/322 NE4G/221 N6M/243 K5B5A/291 K5BEK/230 N4VZ/203 K5M/280 K5VQ/153 K5VJ/270 K5D/268	N7MW/299 W7JKA/228 W7T6/258 W7WW/271 W5UCQ/308 W5AIP/128 W5BUIF/242 W5IAJ/257 W5MBS/227 AB6R/276 K6GA/349 K6UWD/237 K46GJW/158 WA4OBX/322 K4J8V/279 WA4VC/280 WA4VEK/276 WA4WZ/125 WB4CSK/251 W4BQNP/314 WD4F/265 W4M/333 AF5H/305 A15B/302 W6RD/321 N4WB/322 NE4G/221 N6M/243 K5B5A/291 K5BEK/230 N4VZ/203 K5M/280 K5VQ/153 K5VJ/270 K5D/268	N7MW/299 W7JKA/228 W7T6/258 W7WW/271 W5UCQ/308 W5AIP/128 W5BUIF/242 W5IAJ/257 W5MBS/227 AB6R/276 K6GA/349 K6UWD/237 K46GJW/158 WA4OBX/322 K4J8V/279 WA4VC/280 WA4VEK/276 WA4WZ/125 WB4CSK/251 W4BQNP/314 WD4F/265 W4M/333 AF5H/305 A15B/302 W6RD/321 N4WB/322 NE4G/221 N6M/243 K5B5A/291 K5BEK/230 N4VZ/203 K5M/280 K5VQ/153 K5VJ/270 K5D/268	K9RF/326 K9TI/290 K9EMF/225 K9OUV/275 K9A/290 K9SJ/282 K8L/328 K8DAQ/152 N9AL/260 K9C/251 K9CJ/181 K8IUM/215 K8BKW/300 K8BV/206 K8CCQ/285 K8ND/133 K8NP/272 K78P/256 K8BT/305 W89D/178 K8N/270 K8CQ/292 W8L/175 W8PR/343 W8QHQ/301 W8RV/261 W8ZET/339 W8ABCZ/250 W8AOC/230 W8BYJF/175 K9CT/320 K9MF/300 K9QAM/176	W8ND/253 W8NDJ/130 W8ZET/339 W8ABCZ/225 K9RF/320 K9TI/280 K9MF/128 K9MI/291 W8BM/310 W8HG/132 W9NBJ/299 W9NLU/127 W9TJ/280 W9AGS/126 K9D/290 K9VZ/290 W8W/287 K8CCQ/249 W8BE/290 W8DGO/250 W8JJK/291 W8KKF/300	W8ND/253 W8NDJ/130 W8ZET/339 W8ABCZ/225 K9RF/320 K9TI/280 K9MF/128 K9MI/291 W8BM/310 W8HG/132 W9NBJ/299 W9NLU/127 W9TJ/280 W9AGS/126 K9D/290 K9VZ/290 W8W/287 K8CCQ/249 W8BE/290 W8DGO/250 W8JJK/291 W8KKF/300
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### Radiotelephone

CP6EL/280 CT4IB/251 CT4NH/219 DF4ZL/270 DF92P/269 DK3KD/240 DK5AD/293 DK8DB/264 DL2VK/ST3/134 DL7ZR/190 EA6G/181 EA7BM/281 EA7JA/191 E8AR/181 F3JJ/192 G3YJ/301 G4FEU/277 JH3AMF/177 IX1BG/J326 I1XA/266 IP8AD/322 ISJHW/272	JA1NAQ/252 JF1EZ/212 JG1TSF/259 JH1BSR/274 JK1WOC/179 JF2IRT/260 JR2XJO/256 JA5NG/287 JH5FCQ/276 JA6HUG/306 JA6VA/318 JA7XBG/195 JA8BIO/319 JA9FP/277 K6GCR/343 KH4MEE/282 OE2WJL/254 OZ1IBUR/206 P2ZJK/153 PP2ZDD/206 PY4VX/290 PP8DD/280 SM2EJE/252	SM5BFC/292 SM5BMD/288 SM5HYL/258 SM6JO/213 V2AO/163 VE1BWP/162 VE2WA/315 VE3CWE/224 VE4IS/260 V6KMS/359 VP2VD/261 VF1QW/291 Y4AT/125 YBAC/L/179 YU1NZW/210 ZL1CN/201 6W8HL/129 K1FEV/154 K1GSK/302 K1LHT/315 KA1GC/202 N1AIS/128	W1LTC/293 W1PZR/226 K2AGJ/275 K2EY/274 K2HVM/151 K2SD/227 KA2HHW/133 KB2EN/287 KB2OM/200 KB2UC/255 KV2Y/220 N2IS/301 K4V/294 W2QLE/158 WB2QMU/314 WB2TKY/270 N3CQM/200 W3HAY/212 W3YX/282 WB3KDY/207 AGAL/286 AKAT/262	K4HAV/246 K4JW/283 K4MEZ/315 K4RIG/286 K4SE/299 K4VHT/153 KB4FU/293 KB4HU/281 KC4DY/279 KD4NI/175 KD4NZ/192 KE4H/245 K4V/294 N4AQA/173 N4AVV/290 N4BAA/232 N4BUU/279 N4CRU/286 N4CSF/249 N4MM/329 N4VA/280 NE4G/201	W4BQY/318 W4CJ/262 W4JD/278 W4PKM/257 WA4BEC/294 WA4HSE/300 WA4OBO/294 WA4QB/311 WA4QHN/198 WA4JNZ/232 WA4VCC/280 WA4VEK/275 WB4CT/225 WB4KDU/202 W4BQNP/282 WB4YZ/159 WD4AVY/208 AF5H/300 K5CON/272 K5GOE/253 K5HKG/206	K85EK/225 K85CV/224 K85M/278 K85W/248 W5A/YZ/297 W5HE/337 W5JJE/201 W5PLN/282 W5TK/199 W5UCQ/232 W5UJO/227 W5B5CJ/285 W5B5P/225 W5MBS/227 K6GA/313 K6CQY/150 K46GJW/156 K86W/200 K86T/155 K86CS/300 K86Z/167	W6MND/228 W8DUJ/150 W6JAZ/126 W6RD/258 W6TST/230 WA85LO/263 WB6ICJ/252 W6B5R/281 W5TK/199 KU7F/130 WB7WGE/225 K8CFU/344 K8L/303 W6JAZ/126 K8D/210 K8VW/287 K8CCQ/249 W8BE/290 W8DGO/250 W8JJK/291 W8KKF/300	W8ND/253 W8NDJ/130 W8ZET/339 W8ABCZ/225 K9RF/320 K9TI/280 K9MF/128 K9MI/291 W8BM/310 W8HG/132 W9NBJ/299 W9NLU/127 W9TJ/280 W9AGS/126 K9D/290 K9VZ/290 W8W/287 K8CCQ/249 W8BE/290 W8DGO/250 W8JJK/291 W8KKF/300
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### CW

DF8ZH/241 DK3KD/204 DK3O/124 DK5AD/274 DL3BK/263 EA5QR/201 HB9AL/280 HK3YH/203 JATBK/267	JA1BN/285 JG1TSF/218 JH3XCL/283 JA5JA/130 JA6VA/243 JA7XBG/130 JH7BRG/290 KL7H/224	LA4AT/181 OZ1IBUR/209 OZ3Y/286 SM6CMU/267 VE1BWP/166 VE4AE/130 VE6AJF/183 YU1NZW/218	4Z4DX/233 A11S/258 W1A/Q/134 W3E/VW/290 W3YV/259 AA4AR/262 AA4KT/291	W2TE/152 W2YC/201 KB3TN/175 W3A/283 W3E/VW/290 W3YV/259 AA4AR/262 AA4KT/291	K4SE/286 K4JEE/245 K4VF/225 N4MM/284 N4RR/120 N4VA/250 N4VZ/285 NY4H/159	W4BQY/238 W4JD/269 W4JSTU/148 W4ZB/125 WD5DBV/208 ABRR/175 K6GA/308 K6YGM/210	W6ENZ/124 W6NWS/200 K75P/168 N7CW/280 N7M/290 W7TS/205 WA7ROS/224 K8TL/203	W8BYJF/175 K9MI/274 K9TI/252 K9S/222 N9CA/130 N9CA/177 K9CQ/155 W8YBV/200
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## DXCC Notes

**HONOR ROLL REMINDER:** Those wanting to update their Honor Roll standings or make the Honor Roll must have their cards into Hq. no later than June 30, 1983. Cards arriving after June 30, 1983, will not be included in the Honor Roll listing.



# Silent Keys

It is with deep regret that we record the passing of these amateurs:

N1BSC, George B. Rivers, Southington, CT  
W1DSO, John R. Manning, Arlington, MA  
W1FXW, Edward E. "Bucky" Ingalls, Peabody, MA  
W1GLX, William E. Bastable, Dedham, MA  
W1GVH, Howard A. Corey, Jr., Warwick, RI  
W11WD, Herbert A. Stearns, Groton, CT  
W1LQX, Carl C. Williams, Augusta, ME  
W1MCO, Douglas H. Hickox, Holiday, FL  
W1MH, George Vaughn, Brattleboro, VT  
W1ISDP, Frank R. Gethro, Gorham, ME  
W1VON, Rathbun B. Griffin, Granby, CT  
K2AUJ, John Bruce, Sr., New York, NY  
KA2DGI, Walter H. Ryan, Oakwood, GA  
W2EO, Robert W. Gassin, Upper Montclair, NJ  
WB2FLD, Michael J. Schram, Utica, NY  
W2FNF, Mike Rosenberg, Roslyn Heights, NY  
WA2HAB, Raymond J. Reiser, Lynbrook, NY  
W2QJM, Francis N. Kryss, Fairport, NY  
W2UDO, Clinton A. Hoar, Verona, NJ  
W2XZ, Geoffrey V. Azoy, Little Silver, NJ  
K2ZHY, Norman L. Happ, Farmingdale, NY  
W3AIQ, George A. Schmidt, Williamsport, MD  
W3DJF, C. LeRoy Green, Mechanicsburg, PA  
W3GR/K4GT, Frank J. Shannon, Sr., Tampa, FL  
KA3HTR, Erna S. Broujos, Wilmington, DE  
W3SLW, Clayton W. Greninger, Milton, PA  
WA4AYZ, William T. Pitts, Gadsden, AL  
W4BBO, Emmett B. Farr, Hampton, GA  
WA4DXF, Ralph Q. Butler, Huntsville, AL  
W4EDQ, Robert D. Mitchell, Lexington, SC  
K4FIM, William R. Roach, New Smyrna Beach, FL  
WB4HGT, John D. Andrews, Farmville, NC  
K4LKP, Kenneth E. Jenkins, Clinchport, VA  
W4MOT, Ernest L. Horne, Batesburg, SC  
\*WD4MVU, Robert H. Bonds, Nashville, TN  
KE4NO, Paul B. Mathews, Delray Beach, FL  
K4VYN, John M. Guion, McLean, VA  
K5BN, Hayden C. Coker, Jr., Albuquerque, NM  
KA5CER, Alvin E. Turner, Harahan, LA  
W5FEUG, Al J. Hotard, New Orleans, LA  
W5FTJ, Dwight C. Paulsen, Franklin, LA  
KC5JT, Hubert C. Cain, Albuquerque, NM

WA5KKJ, Metz L. Shatley, Sherman, TX  
K5KLN, Edward J. Hebert, Metairie, LA  
W5PKZ, Walter P. Shuler, Alvarado, TX  
WB5VBA, Albert C. Engard, Jr., Abilene, TX  
W6BTM, Denzil L. Scott, Pasadena, CA  
W6BUL, Robert H. Knighten, Strathmore, CA  
WA6HXX, Ernest E. Carlson, Willis, CA  
W6MUU, Wilson J. Cox, Sr., Alameda, CA  
KA6QIK, Nelson A. Gray, Upland, CA  
K6QOF, Harry A. Smith, Castro Valley, CA  
WB6RUL, Geoffrey Wingate, Sacramento, CA  
WB6TYX, Wayne Burns, Yorba Linda, CA  
K16Y, Richard E. Hall, Northridge, CA  
WA6YCF, V. Wayne Kenaston, Redwood City, CA  
W6ZES, Ezra C. Krauss, Tehachapi, CA  
W6ZOA, Lester L. Skoll, San Diego, CA  
W7CNB, Donald T. Elliott, Prosser, WA  
KA7DRY, Fred W. D. Welham, Scottsdale, AZ  
W7EO, Herman T. Louis, Dayton, OR  
\*W7KMG, Frederick Baltzy, Jr., Sequim, WA  
W7LE, Harold A. Farmer, Laramie, WY  
W7LTD, John M. Court, Sequim, WA  
WA7NOO, Towner R. Dalzell, Seattle, WA  
KA7NSV, William B. "Scotty" Ashenhurst, Caldwell, ID  
W7QNI, Paul A. Wolf, Redmond, OR  
WB7SDL, Royce A. Carl, LaVerkin, UT  
KC7WJ, Cecil L. Willis, Sheridan, OR  
\*K7WY, Gordon L. Olson, Laramie, WY  
W8AVC, Charles H. Staley, Zanesville, OH  
W8BHC, Edward A. Baumel, South Euclid, OH  
W8DPQ, Jackson W. Slygh, Beckley, WV  
W8DSO, Jack R. Wagner, Ferndale, MI  
K8EXG, Robert S. Czachorski, Grand Rapids, MI  
W8GUP, Doran G. McCreery, Mineral City, OH  
WA8EJ, William H. Burns, Washington Court House, OH  
WD8IMY, John R. Staat, South Haven, MI  
\*W8MZS, Saunders R. Jones, Detroit, MI  
WA8NOO, David A. Rutherford, Attica, MI  
WD8QCL, Thomas A. Yost, Pleasantville, OH  
K8RZL, Frances E. Porter, Dayton, OH  
W8SWF, George O. St. Charles, Dearborn, MI  
WD9AJV, Joseph E. Engle, Indianapolis, IN

W9AOL, Walter J. Rabe, Elmhurst, IL  
W9ASO, Paul Halmbacher, Milwaukee, WI  
W9BDL, Kendall M. North, Chicago, IL  
WA9CCH, Harold Y. Lawyer, Fort Wayne, IN  
W9CSQ, Raymond Zaneck, Kenosha, WI  
WA9KOA, Frank J. Bailey, McHenry, IL  
WA9KTX, Kenneth Langley, Bloomington, IN  
W9LUS, Clarence W. Read, Wayne, IN  
W9NZQ, Raymond F. Anderson, Mosinee, WI  
W9WKM, Homer M. Barners, Culver, IN  
WB0FHD, Norman M. Weber, Westfield, IA  
W0IRE, David E. Snider, Otterville, MO  
W0IU, Clayton E. Donaldson, St. Louis, MO  
WB0LIV, Roland R. Robinson, Canon City, CO  
W0LYJ, Raymond G. Green, Englewood, CO  
W0PEO, Rex F. Bishop, Cedar Rapids, IA  
W0REM, Percy R. Parker, Des Moines, IA  
W0TSN, Goodwin L. Dosland, Moorhead, MN  
VE1BJS, John Maher, Lake Charlotte, NS  
VE1CCH, Wilfred E. Skidmore, Bridgewater, NS  
VE1GB, Esther G. Roberts, Margaree Valley, NS  
VE2UL, Albert Theriault, Sherbrooke, PQ  
VE3JR, John Reid Bain, Toronto, ON  
VE3QW, Earl S. Strickney, Waterloo, ON  
VE4OK, Claud Roy Hargrave, Winnipeg, MB  
VE4UP, Frank R. Perkins, Brandon, MB  
VE6PG, Colin H. Heseltine, High River, AB

\*Life Member, ARRL

In order to avoid unfortunate errors in the Silent Keys column, reports of Silent Keys will henceforth be confirmed through acknowledgment only to the family of the deceased. Thus, those who report a Silent Key will not necessarily receive an acknowledgment from Hq.

Note: All Silent Key reports sent to Hq must include the name, address and call sign of the reporter as well as the name, address and call of the Silent Key in order to be listed in the column. Please allow several months for the listing to appear in QST.

## 50 Years Ago

June 1933

□ The Editor opines that while spark transmitters may have been more glamorous c.w. thoroughly outshines it in efficiency of communication. The narrow-band aspect permits reasonable DX even in summer, formerly impossible with heavy static.

□ Messrs. Keefer and Grant, engineers at WDRC, easily worked each other over 10 miles distance with duplex portables they built using type 30 tubes (1-W input). Each encased unit weighs 23 pounds, including all batteries.

□ George Grammer points out that even though an amplifier is neutralized component similarities in input and output circuits can create an unintentional tuned-plate, tuned-grid oscillator — and on an undesired frequency. He shows us how to identify and remedy this problem of parasitics.

□ "If successful, we want to make it an annual affair," is the understated prophecy of Communications Manager F. E. Handy in announcing the first ARRL Field Day. Only stations specifically licensed for portable operation may take part in this one.

□ On the favorite subject of antennas, WIEDY unravels the mysteries of "traveling" and "standing" waves, and then applies his principles to design a feed line for W1N's "80-meter" antenna, limited to 90 feet length for space reasons.

□ A "universal" tube checker built by W1CDB needs only four sockets, despite their being more than 100 types of receiving and low-power transmitting tubes on the market.

□ A new 25Z5 rectifier has been introduced to facilitate transformerless power supplies. Not par-

ticularly economical for amateurs, however, because we still need as big or bigger a smoothing choke, a major expense on its own.

□ Answering many questions from single-signal enthusiasts, James Lamb shows how an "outrigger" quartz filter can be added to a commercial receiver to achieve improved selectivity performance.

□ Jim also describes a breakthrough in crystal oscillator stability and increased harmonic output (for ease in doubling) after two years of lab experimentation. With the xtal connected between grid and cathode of a tetrode, and the tuned circuit between cathode and ground, the unit acts like a low-mu triode "driving" a high-mu tetrode amplifier. Hail to the "tri-tet."

□ The 1932 Sweepstakes, nine days in duration, brought logs from 532 participants whose scores totaled 1,885,718 points. W9GCX worked 63 of the possible 69 sections. Increased participation is possibly due to more free time from Depression-caused unemployment.

## 25 Years Ago

June 1958

□ FCC and military proposals for the 1959 world radio conference in Geneva are now released. They include provision for every present amateur frequency assignment. The Editor hopes this will temper some of the dire rumors floating around the phone bands.

□ W6BGK of the San Bernardino Microwave Society provides details of their 3500-Mc. polaplexer, made from beer cans (empties). Addition of a parabolic reflector permits DX beyond a few hundred feet. Radar

detection (Doppler) is also possible.

□ Sensing from correspondence and convention sessions that directional couplers are still not generally understood, W1DX attempts "one easy lesson" to point out a number of practical uses we may be overlooking, while putting too much emphasis on such things as "output indicators and conversation pieces."

□ To assist the rockbound Novice in "finding a better 'ole'" in the band, W1ICP recounts simple methods for grinding the quartz slabs to a desired frequency.

□ The multiband filter sideband transmitter built by W6TEU so impressed QST's editorial staff that they devoted 10 full pages of description and pictures for our benefit. Features include bandswitching, VOX, c.w. and a.m. as well, and sideband selection without carrier shift.

□ Los Angeles hams have considerable enthusiasm for hidden-transmitter events, and are using 75 meters for weekend daytime hunts instead of 10 because of reduced multipath reception.

□ K2TFV's surreptitious but successful use of an indoor antenna in a restricted-space apartment led him to suggest a new WLP award — "Without Landlord's Permission."

□ A review of the new Cosmophone features its dual-frequency system for transmitting and receiving.

□ W8QFH uses a pair of 2N278 switching transistors in a sort of flip-flop circuit to produce 500 V at 225 mls from a 12-V source for portable operation. The days of the PE-103 are numbered.

□ The Frankford Radio Club nosed out arch rival Potomac Valley R.C. in last year's Sweepstakes — 5.0 to 4.3 million club points.

□ K9GFV replaced his quad spreaders with Fiberglas fishing pole telescoping sections, solving the problem of bamboo deterioration.

□ Leo Young, W3WV, received the Navy's Distinguished Civilian Service Award for his outstanding contributions and pioneering in radio communication and radar. — W1RW

### A 1152- to 2304-MHz Doubler

The doubler described in this month's column is probably about the easiest and cheapest way to produce a 2304-MHz signal. It may not have high efficiency or high power output, and it certainly isn't state-of-the-art engineering, but it does provide a quick-and-easy way to get a 2304-MHz signal if you have a source of 1152-MHz drive. The diode used as the multiplier is a 1N914, which is intended for use as a switching diode rather than as a multiplier diode. Its one redeeming feature as a multiplier diode is its price — around 10 cents!

The use of this diode as a multiplier is not new. The 1983 ARRL *Radio Amateur's Handbook* (p. 7-25) describes a 432- to 1296-MHz tripler also using the 1N914 as a multiplier diode (I have used this tripler to make S 9 contacts at over 20 miles). The design of the 2304-MHz doubler is based on one appearing in the RSGB *VHF/UHF Manual*.

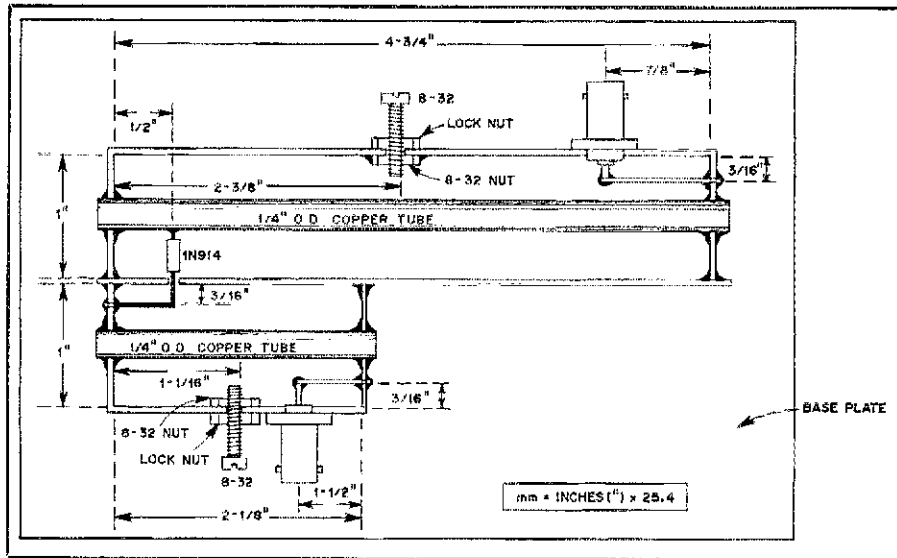
#### Construction

The doubler consists of two 1/2-wavelength lines coupled via the multiplier diode and capacitively tuned by screws at their midpoint. The 1/2-wavelength lines are made of 1/4-in.-diameter copper tube running axially down the center of 1-in.-square troughs. The simplest way to construct the doubler is to take three 1-in.-wide brass strips, one 6.75 in. long, one 5 in. long and one 4.125 in. long. The first strip is used to form the 1152-MHz trough by bending a 1-in. length at each end through 90°. These 1-in. sections form the ends of the trough and a 1/4-in. hole is drilled in the center of each for the 1/4-in. copper tube to pass through (see figure). The second brass strip (5 in.) forms the common wall of the troughs, as shown in the figure. A small hole must be drilled about 5/8 in. in from one end and 1/2 in. in from the edge to allow the lead from the multiplier diode to pass through as shown. The third strip is used to form the 2304-MHz trough by bending a 1-in. length at each end through 90°. These 1-in. lengths form the ends of the trough, and again a 1/4-in. hole is drilled in the center of the 1-in. sections to allow the 1/4-in. copper tube to pass through. The tuning screws are installed halfway along the troughs and halfway up the wall (1/2 in.). A clearance hole is drilled in the trough wall, and a nut is soldered to the inside. A lock nut should be used on the outside of the trough to fix its position after tuning.

When the 1/4-in. copper tube, tuning screws and input and output sockets have been installed, the parts can be assembled as shown in the figure. They should be soldered together to form a double trough, and soldered down to a base plate, which forms the bottom wall of the troughs. If all the joints were soldered inside and out, I see no reason why this doubler could not also be made from double-sided pc board.

#### Use

The doubler can best be tuned up by feeding



This doubler provides a quick-and-easy way to transmit on 2304 MHz. The diode can be placed in either direction.

an 1152-MHz signal to the input via an SWR indicator (see *The New Frontier*, Nov. 1980 *QST*) and tuning the input for minimum SWR. The output tuning should be adjusted for maximum power out at 2304 MHz. If you don't have a power meter, tune for maximum signal on a loosely coupled 2304-MHz receiver. If you don't have an SWR indicator for 1152 MHz, tune the input for maximum output power at 2304 MHz. Even if you are fortunate enough to have lots of 1152-MHz drive, you don't need to worry much about burning out the 10-cent multiplier diode. If it burns out, replace it! Things should certainly be okay up to about 1 W of drive. It has been reported that S 9 signals have been received from such a doubler at a distance of about 5 miles using a 4-ft dish and about 1 W of drive.

It is probably worth noting here that although all 1N914s are much the same when used for their intended purpose they may not be the same when used as microwave multipliers. If you want to maximize output, it would be well worth trying a number of different diodes from different manufacturers to see which work best. It is probable that Schottky barrier mixer-type diodes (e.g., HP 5082-2835) would also work as multipliers. Experimentation is the essence of Amateur Radio, so try a few different diodes and see what happens!

For those looking for a 1152-MHz source, a 384- to 1152-MHz diode tripler by G4MBS is described in the RSGB *Microwave Newsletter*, No. 02/83. It uses a BXY27 diode and gives about 1.2 W out for 2 W in. This design is a modification of that in the RSGB *VHF/UHF Manual*. A low-power, 1152-MHz source is described by WA2GFP in December 1980 *Ham Radio*, p. 52. A 384-MHz source is described in *QST*, Feb. 1983, p. 28.

The doubler can also be used, though rather crudely, to generate a 2304-MHz signal from 144-MHz drive. Output power is extremely low, but enough for receiver alignment. Input power at 144 MHz should be applied via an attenuator pad (10 dB) since there will be no input match. It will be possible to tune the output to harmonics other than 2304 MHz, so a calibrated receiver is needed to identify the correct harmonic output.

## Strays

#### QST congratulates...

□ Marvin R. Weatherly, KL7NU, of Anchorage, Alaska, on being appointed to the Federal-State Joint Board, an agency that decides how the plant costs and expenses of a telephone company will be divided between the state and federal regulatory jurisdictions.

□ former Hudson Division Director Stan Zak, K2SJO, on being reelected to the Board of Trustees in the newly created village of Rye Brook, New York.

□ ARRL Technical Advisor Harold R. Richman, W4CIZ, of Annandale, Virginia, on receiving the IEEE Northern Virginia Section Award.

#### I would like to get in touch with...

□ any active amateur/marine service radio operators. Norman H. Dreschel, WA3KEY, P.O. Box 498, Quakertown, PA 18951.

\*103 Division Ave., Millington, NJ 07946

## A Problem We Can Solve

Much has been written in this column and elsewhere about the upcoming launch of the Phase IIIB satellite. Most regard it as a boon to Amateur Radio. However, a concern has been expressed in a recent letter to this conductor by W9ZIH, who is an accomplished vhf'er and ATV enthusiast. I feel it appropriate, at this time, just prior to the planned launch, to air Ron's views and provide background on why things are as they are, as well as suggest what might be done to minimize any difficulties that may develop.

W9ZIH foresees a problem brewing when Phase IIIB becomes operational, noting that ATV has long used frequencies in the 436- to 439.25-MHz frequency range. He also notes another potential incompatibility in the 23-cm band. Ron contends that "the satellite people have completely ignored ATV's use of these frequencies."

The fact is that the frequencies on which amateur satellites are permitted to operate, both uplinks and downlinks, are established by international agreements among governments. Those who design and build amateur satellites have no option other than to adhere to the assignments implemented in those agreements. As early as 1971, the "satellite people" attempted to obtain a 70-cm assignment near 432 MHz. Their rationale was that, since only the 430- to 440-MHz portion of the band is available on anything approaching a worldwide basis and because it was perceived that many satellite users would come from the ranks of the "serious" vhf/uhf operators who were already well-established at 432 MHz, this would be the best place in the band for satellite operation. This choice was also

driven by the knowledge that ATV was using the upper portion of the 430-to-440 range in many areas of this country and elsewhere. Evidence of the clear intent of the "satellite people" is the fact that 432.125 to 432.175 MHz was chosen for the uplink of AMSAT-OSCAR 7.

Nevertheless, hopes of using this part of the band for future satellites were dashed by the 1971 ITU WARC, which dealt with frequency allocations for all space radio services. The Amateur Satellite Service, established at that conference, was given only 435 to 438 MHz, plus the use of all bands through 146 MHz (and 24.0-24.05 GHz) allocated on an exclusive worldwide basis to amateurs. Despite not receiving the exact 70-cm allocation we wanted, we were fortunate both to receive one at all and to have it be designated for both uplinks and downlinks. Amateur satellites designed after the allocations established at the 1971 conference went into effect did employ the new 70-cm assignment. The downlink for the Mode J transponder on AMSAT-OSCAR 8 and one of the beacons on UoSAT-OSCAR 9 are both near 435 MHz. This same 435- to 438-MHz assignment was reaffirmed at WARC in 1979, and an uplink-only assignment at 1260 to 1270 MHz was added, as were a number of other allocations in the higher microwave bands. In no case did the "satellite people" get everything they wanted but, considering the complicated and crowded nature of the world of international frequency allocations, they fared pretty well.

W9ZIH's concern for difficulties between satellite users and ATV operators may be well founded, but this conductor believes that with cooperation and the use of good engineering

practices by both groups there is no reason we in the U.S. cannot overcome any problems that may arise. The rest of the world, where the amateur 70-cm band is only 10 MHz wide, faces a greater challenge than we do. Even our VE neighbors just north of the border now have only 430-450 MHz.

Specific technical and administrative approaches aimed at achieving "peaceful coexistence" are certain to be featured in *QST* and other amateur journals in the months to come. Revising band plans is one approach that merits consideration. The VUAC and VRAC are the groups to take the lead on that. Certainly, they should solicit the views of active ATVers. The use of single-sideband or vestigial sideband is one technical approach that might be studied by the ATV community. ATV transmitters operating in either of these modes at 439.25 MHz should present little interference to satellite users. Both ATVers and satellite users should tend in the direction of minimum transmitter power and maximum antenna gain. The smaller beamwidths should help a great deal to minimize interference, especially when satellite antennas will be aimed upward most of the time. The old adage about using no more power than necessary to accomplish communication certainly applies here. It has always been the watchword in amateur satellite work.

Other ideas will certainly be offered to help us get along with one another. I will be happy to air them in this column, space permitting. Amateur Radio has faced greater challenges than this over the years. If it does turn out to be a significant problem, I am confident that we can handle it as well.

## ON THE BANDS

**6 Meters** — The Southern states continue to experience good F<sub>2</sub> openings to South America as this is being written in mid April. And from another corner of the world, the VKs and ZLs have been having good luck working each other during their mornings. Cycle 21 dies hard. KC2TX/5 San Antonio characterizes March 27 as a particularly good day, producing a four-hour opening beginning about 1830Z. Spencer says that a number of LUs were in, along with OA8V and a most welcome new station and country, ZP5XDW in Paraguay. A week earlier, that station had been sent a Swan 250 by WB4OSN, and he has been making good use of it since. Doug has worked a number of U.S. stations already and has become quite intrigued with 6 meters. It looks as if we may have another convert. Speaking of converts, we certainly have one in AK5D. He picked up a 6-meter rig at a recent hamfest, took it home and immediately started working LUs. Talk about beginner's luck!

With Sporadic E season upon us, it's appropriate to review some of the things we can do to make it more productive and enjoyable for all of us. Most important is to keep the part of the band between 50.1 and 50.125 free for DX operation. The DX window concept works well on 160 meters. There is no reason it cannot be equally useful here. There is a difference, of course. On 160, U.S. and Canadian stations do not transmit in the window, but instead use split frequency to work the DX. That's not really applicable on 6

because many rigs have no or limited offset capability. But we can still work DX stations in the window and move out for domestic QSOs. The best policy is to use the area around the domestic calling frequency, 50.2 MHz, when working stations within this country and Canada.

There should be lots of DX to work in the window this year. In addition to the activity we are all familiar with in the Caribbean and northern South America, a number of DXpeditions are scheduled for mid to late June. W6JKV is making plans to visit Cocos Island, TI9. Operations from 6Y5 and HR are planned by K6MYC and K6HCP. W3OTC expects to go to FG7, and K1FJM promises to be on from somewhere outside the U.S. KA3BUJ says that he may be in 8R1 again for a couple of weeks in June, this time with about 400 W. Add to these such regulars as OA8V, now active on ssb, and Paraguay (represented for the first time in years by ZP5XDW), along with a number of LUs, CEs and CX8BE, and long-haul E, could be very interesting indeed. South Americans have been worked during summer seasons over the past few years, so it could happen again this year. But, if the part of the band in which these stations are sure to be active is clobbered by several S9 plus 20-dB signals, no one will have much chance to hear them.

Another exciting possibility for DX contacts lies across the North Atlantic. There are now 40 stations in the U.K. permitted to operate after Band 1 TV stations close down each evening. With Daylight Savings (or, as they call it, Summer Time), that means 2300Z, 7 P.M. Eastern Time on this side. We all remember how many times we have had propagation to Gibraltar during recent summers. There is no reason this shouldn't apply to the British Isles as well. But, we must have clear frequencies if anyone is to hear what are

almost certain to be quite weak signals from across the pond. It would be a good idea if those with split-frequency capability, when calling blind for Gs on ssb, would do so above 50.125 and listen down. On cw, just below 50.1 would be a good spot.

In a recent letter, G3COJ says that he has already worked 22 of the 40 stations who have permits. Of these, 17 were Gs, three GWs, and one each GM and GJ. Another who has been taking advantage of the new operating privilege is G4IJE. According to the 4-2-70 column in the April issue of *Radio Communication*, Peter has been running m.s. tests with GM3WOJ and, via crossband 6 to 2 meters, with several stations on the Continent. Using this arrangement, he has so far worked DJ5MS, OK1OA and CT1WW, with other tests underway.

A number of people have asked for an up-to-date list of 6-meter beacons. As long as, I have compiled such a list, along with beacons on the other bands about which I have received information. Unfortunately, column space does not permit me to publish the list at this time, but I will forward a copy to anyone sending an s.a.s.e.

**2 Meters** — Those tales of the southern latitudes where transequatorial propagation holds sway are certainly tantalizing to us DX-starved inhabitants of the 30s and 40s. KP4EOR sends along a list of 2-meter TE contacts made over the past fall and winter. For David, the 1982/83 TE season began on September 6, 1982 when he worked LU7DZ on 144.150. KP4EOR was not running the kilowatt with which he broke the ice between San Juan and Argentina in February 1978. Currently, he has just 80-W output. But that's plenty to make lots of good contacts with southern South America. Between September 6 and December 13, DX

\*Send reports to Bill Tynan, W3XO, P.O. Box 117, Burtonsville, MD 20866, or call 301-384-6736 to record late-breaking information.

was reported on 32 evenings, always around 0000Z, with no signals noted after 0230Z. Then, beginning again January 13 and lasting until March 17, there were 18 evenings on which the path was open. Signal levels ranged from barely detectable to S9 plus 20 dB. Stations worked by KP4EOR over these months include LU5 7DZ 7DJZ 4AEK 9AS 8DJE 2DBJ 6DBE 5AW 6DZG 2BG 2AIK 1DXY/A 3EEC SERJ and 7EMJ, and CX8BE. In addition, David reports that LU8YYO, well-known to 6-meter operators, who is located about 750 miles southwest of Buenos Aires, has also been trying his luck. Victor's 2-meter station consists of a 160-W solid-state amplifier and two 14-element Boomers fed with 1/2-inch hardline. So far he has worked YV3BND and YV3OJL, as well as PJ3AS. Attempts at a two-way between KP4EOR and LU8YYO were continuing when David's report was written. If they don't make it this spring, you can bet they'll be at it again next fall. It will be interesting to see if 2-meter TE contacts continue to be made as solar activity declines.

After seven years as editor of the very fine *SWOT Bulletin*, Len Hoops, KC5IJ, is stepping down to devote full time to being National Net Manager for the 2-meter ssb activity-promoting organization. The new editor will be Jim Young, K9RII. Material for

publication may be sent to him at East Court St., Hennepin, IL 61327.

KE5C writes that, because of space problems at home, he will probably have to give up vhf operation soon. But, he hopes to work the final two states needed for 2-meter W5 before he does. In addition to KH6, John lacks Oregon and is looking for m.s. skeds with that state during Perseids. Those willing to try may contact him at 4110 Ermine Trail, Temple, TX 76501.

**1-1/4 Meters** — W5NZS Oklahoma City reports that he and K5SW are the only Oklahoma stations active on 1-1/4 ssb/cw at this time. Garry runs a VE3CRU modified Microwave Modules transverter and a Lunar amplifier to a homebrew quagi. Living only four miles from a Channel 13 TV station doesn't help, but he is enjoying the band nevertheless. Another with inverse TVI problems is K1PXE, Milford, Connecticut. Pete solved his with a cavity filter. His transmitter also employs the ubiquitous VE3CRU-modified British import driving a KLM solid-state amplifier, but K1PXE uses an ARR converter and preamp for receive. VE3DSS, a long-time 220 hooster, reports from Toronto that he had good luck during the aurora of March 12 working W9SR Indiana, W1VD Connecticut, W1JR Massachusetts and

K9IMM Wisconsin. The last was state number 13 for Dana.

**70 and 23 Cm** — W9ZIH near Chicago reports that his 23-cm setup now includes an eight-tube amplifier using water cooling that produces 500 W. The antenna consists of four 32-element loop Yagis. A tower-mounted GaAs FET preamp is to be added soon. Ron keeps regular Thursday evening skeds with W8OHU, W9TFY, K8DW and W8BKC, and his state total now stands at 15. He lists others in his area regularly active on 23 cm as K9UIF, WA9CGZ, WA9JFM, W9AAG, W9MDL, W8YIO and K8WW. VE3DSS is also an enthusiastic 23-cm operator. Dana's rig puts out 2 W through 7/8-inch hardline to a 45-element loop Yagi. With this setup, he regularly works WA2HQL across the lake from Toronto with S9 plus 40-dB signals.

The W8OHU 432 News for February through April lists three beacons: VE1SMU Nova Scotia 432.950 and WA4PGI near Roanoke, Virginia, and WA8ONQ Middletown, Ohio, both on 432.075. The News, which lists schedules and chronicles openings, is a must for anyone interested in terrestrial work on 70 cm, as is the 432 and Up EME News, put out by K2UYH for moonbouncers.

### 50-MHz DX Standings

DXCC countries based on information received as of March 16, 1983. Space limitations dictate that continental U.S. and lower-tier Canadian stations with fewer than 15 countries, except those who claim WAC, not be listed. Crossband totals listed are those not duplicated by 6-meter two-ways. Credit has not been given for contacts made with stations known not to be authorized 50-MHz operation; otherwise, countries are those listed in latest ARRL DXCC Country List. Totals are those worked by individual, or club, stations at a single location or at multiple locations within a radius of 150 miles.

1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
JA4MBMT	74	71	0	0	WB2WSV†	45	42	2	2	W2VO†	35	28	0	0	K1FJM/4	28	22	7	6	KC4KK	18	14	0	0
KH6IAA	71	68	0	0	WA8ONK†	45	41	7	7	K4GOK	34	34	13	12	N7AGM†	28	22	1	1	N6AJU	18	13	0	0
LU3EXT	68	60	0	0	WA7EPUT	45	41	1	1	K6QXY	34	34	0	0	N4VC	27	27	1	0	WB9OPD	17	16	1	0
VE1YX†	67	67	22	21	JA2GHT	44	42	0	0	N7DB	34	34	0	0	VK2BA	27	27	0	0	KB7Q	17	16	0	0
W5VY†	67	63	11	9	WA6PEVT	44	41	3	3	K0TLM†	34	33	5	4	WA5QCP	27	27	0	0	VK4AYX	17	14	0	0
K8WKZ†	66	66	17	16	WA5HNK†	44	38	14	14	WA1CRE	34	33	5	4	K0QJT	27	25	0	0	HK4EB	17	13	0	0
JA1RUJ†	65	65	0	0	WA1OUB	43	43	16	12	KA1DHO	34	31	13	6	KA7XS	27	23	0	0	W7IDZ	16	16	0	0
JA1VOK†	63	59	0	0	AE3TT	43	42	14	14	KA0ETET	34	31	0	0	KC2TX/5	27	16	0	0	K0GJ	16	15	5	2
ZD8TC†	62	62	10	—	JA3EGE	43	41	0	0	WA1ZUH	34	30	11	7	N2ASC	26	26	3	3	W0PKN	16	12	1	1
K5FFT	61	58	3	3	K0GJXT	43	40	—	—	WD2AFH	34	28	4	0	K9XY†	26	22	0	0	W8SMD	16	11	5	5
W2IDZ†	59	59	12	11	K4CKST	43	39	18	13	WA5VJB	34	27	1	1	WA9DYT	26	22	0	0	WA0FO	16	—	0	0
JA5HTP†	59	56	0	0	W5DZF/4	43	22	4	0	N5DDT	34	25	1	1	KC3EP	26	22	0	0	O8BCW	16	—	0	0
W8XJ	59	—	—	—	K5CM	43	—	0	0	K6JYOT	34	22	0	0	K0SE†	26	21	2	2	K0WMM	15	15	1	1
W5FF†	58	54	2	2	KA0AYN†	42	41	0	0	W2LT	34	20	9	0	NP2AE	26	21	0	0	WB4WXE	15	15	0	0
WA7JTM†	58	54	1	1	WB2CZB†	42	40	14	8	ZL1MQ	33	32	0	0	KA1GDZ	26	13	15	3	VK3AQR	15	14	0	0
WD4Y8†	57	56	16	8	KG6DX	42	40	0	0	WA7GCS	33	32	0	0	WA2YWP	26	13	4	2	VK3AVI	15	14	0	0
LU9AEA	57	56	0	0	W2MPKT	42	38	12	6	W0JRT	33	31	0	0	VE3EVW	26	6	13	7	W6BXM	15	13	0	0
WA8LXJ†	57	53	18	18	KG6JDX†	42	38	0	0	WA1AYS	33	30	15	14	N9ANOT	25	25	0	0	8P6CX	15	11	2	1
JA2DDN†	57	53	0	0	KH6FLD	42	35	0	0	KA4AOK	33	30	11	6	K1LPS	25	22	4	0	KL7JAI	13	11	0	0
WA5YX†	57	49	10	8	W3BWU	41	40	11	11	KA1A	33	29	0	0	JF3TDC	25	22	0	0	VK3NM	13	11	0	0
VE1BNN†	57	—	—	—	K1FWFT	41	40	18	10	W3OTC	33	26	0	0	W0RGUT	25	21	3	3	E1W	13††	—	—	—
W4OO†	56	51	0	0	K3QMX†	41	39	12	9	N6RZ	33	24	1	1	VE5JO	25	20	2	2	WA0LHK†	12	12	2	1
W3XOT	56	50	15	8	W1JRT	41	39	7	4	AE9MT	33	23	11	1	N8AXA†	25	19	5	4	V99WB	12	11	4	1
K1ZFE†	55	55	5	5	WB5CHWT	41	37	7	4	K8GSS	32	32	0	0	K9Y4L	25	13	0	0	W1QXX	9	—	—	—
W8CMS	55	50	11	7	W5KRHT	41	37	3	3	K2OVS	32	30	12	9	K0SFH†	24	23	1	1	KP4	12	10	0	0
W6BJT	55	50	2	2	JG3AOD†	41	37	0	0	W2CNS†	32	30	10	5	JM1LCW	24	17	0	0	G4BPY†	11††	11	34	30
LU3DCA	54	53	0	0	K7ICW	41	34	1	1	W8BGIY	32	30	9	7	K9SM	23	12	5	5	J6LOV	11	9	2	2
WB7OHF†	54	52	0	0	WA0CSLT	41	15	6	4	AD1CT	32	31	0	0	WA9DYV†	23	22	1	1	JN1DQO	11	5	0	0
N6AJ†	54	51	1	0	VP2VGR†	41	—	—	—	KS4JT	32	31	0	0	WA5OLT	23	17	5	5	KL7WE	10	10	0	0
WA6BYA†	54	51	0	0	K4VPK†	40	39	7	7	WB8PAT†	32	30	11	8	WB2TMD	23	17	5	2	KL7JH	10	10	0	0
N3AH†	54	48	13	11	K6KLY	40	39	0	0	K12KR	32	29	0	0	HC8VHF†	23	—	4	—	KL7IKV	10	10	0	0
LU7DZ†	54	48	0	0	W2RWT	40	39	0	0	WB8KAY†	32	27	0	0	O8AV	23	—	0	0	ZD7BW	10	0	0	0
K8EFS†	53	51	18	15	XE1GE	40	37	1	1	WB2QLP/4	32	26	5	4	W7KNT	22	22	0	0	5Z2DH	10	—	0	0
W7KMA†	53	51	1	1	W5HNT	40	35	0	0	W5NKG	32	26	2	1	WB0RJR	22	19	4	2	XE2BC	10	—	0	0
JE1TGT†	53	49	0	0	VP2MO	40	34	0	0	VP2MJ	32	21	1	1	W9NAW	22	19	2	2	WB4WXE/	9	8	0	0
JA2ODM†	53	48	0	0	WB6KBZ†	40	29	1	0	K4LFF	32	21	0	0	W7HAH	22	19	0	0	KL7	9	8	0	0
WB8BK†	52	52	16	15	N5KW	40	—	0	0	N6VI	31	30	0	0	WB2QLP	22	18	5	4	KL7MHM	8	8	0	0
JA6AG†	52	50	0	0	K8UNV†	39	39	2	1	WA5EQK	31	29	6	6	KA1YQ	22	17	7	1	VP2VDM	8	6	0	0
WA4CKD†	52	49	20	18	WA3DMF	39	38	17	16	VE3DSS†	31	28	13	7	VK2DDG	22	17	3	0	AL7C	7	7	0	0
WA4UAS†	52	48	0	0	K1DA†	31	28	7	5	K1DAP	31	28	7	5	PY2TTV†	22	15	0	0	8P6MH	6	6	4	1
W0SFT	51	51	0	0	WB6BMB†	39	34	0	0	W1GXT	31	27	13	2	KA5FLE†	22	14	0	0	G4JCC	6††	4††	29	24
WA2BPE†	50	50	14	6	LU8BF	38	38	0	0	K6PHE	31	27	0	0	KA1GIY	22	12	2	1	VK2ZDI	2	2	0	0
K5ZMS†	50	50	2	0	JA1NVG	38	38	0	0	WB6NMT	31	26	2	1	HC3YIA	22	12	0	0	SM7BAE	1	1	5	3
K5SW†	50	49	10	10	WB8YFE†	38	37	5	5	VE1RC	31	26	0	0	JE1MD/HCS	22	—	2	—	G5KWT	—	—	35	—
WB4QSN†	50	49	8	6	KS2T	38	36	0	0	W2BN	31	24	4	1	N7EJ	21	21	0	0	G4JCC	—	—	32	—
W6SMT†	50	48	1	—	N7AKBT	38	34	1	1	W1SC/7	31	14	2	1	WA4TJW	21	21	0	0	SM6PU	0	0	23	10
PY2XB†	50	47	2	1	W1AIM†	38	33	3	0	LU8LD	31	16	0	0	KA0CDN	21	21	0	0	G3COJ	—	—	20	—
WB7TOV†	50	47	0	0	VE3ASO†	38	31	0	0	WB2MAL	30	29	9	7	KJ3F	21	20	0	0	G4IDE	—	—	18	—
N6CT†	50	44	1	1	K0TLM†	37	35	6	5	WB0PKH†	30	29	6	5	WB6CTQ	21	19	0	0	DJ2RE	0	0	14	9
WA6JRA†	50	18	3	1	JA7QVI	37	35	0	0	WA5UFH†	30	28	0	0	K6ZMW	21	18	0	0	G4GLT	—	—	13	—
W3JO	49	48	10	4	K2YOF	37	32	15	14	N4CD	30	27	12	8	N16E	21	16	0	0	G3PWK	—	—	12	—
WA9AHZ†	48	48	14	13	K7GGJ	37	28	0	0	K6JZK	30	27	0	0	K1HTV/3	21	15	17	3	DK6JL	0	0	11	4
KA1BRD†	48	46	0	0	N9CEX†	36	35	6	6	N4TL	30	25	3	3	9Y4JW	21	12	1	1	SV1DH	0	0	10	—
W5UWB†	48	38	6	4	WD2AKA	36	34	9	6	JG3RGG†	30	22	0	0	N4MM	20	20	0	0	GM4WOJ	—	—	9	—
W1QXQ	47	47	14	12	N5WM†	36	34	6	2	K3ICH/4	30	22	0	0	JG3JLC	20	19	0	0	CT2EE	0	0	5	2
JF3KQA	47	47	0	0	WA0SBZ†	36	33	3	2	K4ROM	29	27	5	5	KD4HP	20	18	4	2	QZ9QV	0	0	5	1
WA1UQC†	47	45	16	3	K4QXX	36	33	0	0	K8RZB†	29	26	8	3	K2JF	20	17	5	5	G3VZJ	0	0	4	4
K4KUJ†	47	43	0	0	K6AYN†	36	33	0	0	K8OAX	29	26	0	0	W8COI	20	17	2	2	G3PLP	0	0	4	2
W4WHK	47	39	15</																					

## Field Day and the Bomb Squad

Field Day is a test of radio equipment in the great outdoors. It provides unequaled training for any disaster situation. It's exciting, it's fun. The Bomb Squad is tuned up for Field Day weekend. In fact, they would be tuned up and ready if it occurred in any month throughout the year. How? They practice!

They call themselves the Bomb Squad, but their goal is far more constructive than destructive. They are the "Best of Mt. Baldy," a group brought together via the Mt. Baldy repeater in Southern California. Three years ago, repeater members began talk of organizing a winter Field Day activity. Their plan was to meet the needs of hams wanting to organize for emergencies under less competitive circumstances than those during Field Day in June. Families would be included, and it was to be a ham event that would be exciting for nonhams and hams alike. The 20 families participating this past winter attests to their success.

The group chose the weekend of the YL/OM Contest, which is in February, as the date for their winter activity. Their aim was to encourage YL participation in the June Field Day. Multiple transmitters, four towers, a portable repeater and



Laurie McKeown, N6HKZ, in the Bomb Squad's "MASH" type tent during the 1983 YL/OM Contest (photo by KE6XU)

emergency power were set up at the American Trails Woodchuck Campground near Temecula, California (about 100 miles southeast of Los Angeles). They even included a microcomputer to test "in the field" as a log dupe sheet aid. Previous organizational meetings had been held in order to structure the hardware for the event — not the operating. Once equipment was set up,

operating was left to the participants' needs and interests at the time. No one was bound to a schedule; the object was to foster fun and togetherness. Following the contest workout, everyone enjoyed a potluck dinner, family style.

Such activities have provided training that enables the Bomb Squad to efficiently assist with communications during the Rose Bowl parade and at other events. This year's parade found 109 radio amateurs involved with parade communications. They expect a far greater responsibility during the upcoming Olympics in 1984. They are prepared.

The licensed participants during their winter tune-up, YL/OM weekend, included K6AYR, KD6CY, NB6D, KE6ET, N6G DY, WB6GGL, N6GUX, W6GVR, KB6HK, N6HKZ, WA6HVI, N6HVN, N6HVM, WB6JKW, KA6KJS, W6KZT, WB6NAG, WB6NBP, KA6OSU, N6UK, N6UU, KE6XU and WA6ZQC.

There is no doubt that their mission to encourage more YL participation in this month's Field Day was accomplished. Gary Andary, N6UU, who kindly reported this February event, expects many YLs from the Bomb Squad to again be calling "CQ Field Day" on June 25.

## MARCIA OSBORN, KA1GBS

Marcia Osborn, KA1GBS, of Concord, Massachusetts, has been Net Manager for NENN (New England Novice Net) since last November. The success of operations under her tutelage is well-proven, with the net averaging 13 check-ins every evening — a goodly number for any traffic net.

NENN was started in the late '60s or early '70s by the late W1ALP. K1PNB and WA1ZAZ carried on his efforts. In 1977, N1GQ became manager, followed by WB1CPF in 1979. Pam Costa, WB1GQO, wife of N1GQ, followed in 1981 until asking Marcia to take over last fall. There are 50 to 60 stations on the roster who check in from time to time at 2315 UTC on 3.720 MHz. The net meets daily. This net is a Novice training net. Anyone is welcome to QNI.

Marcia's interest in Amateur Radio, which goes back many years, was prompted by a cousin becoming a ham at age 12. Her interest lay dormant until 1974, when her son, age 13, took a course in Morse code in summer school. The course was taught by a ham who encouraged students to get their licenses. Her son got his ticket that fall. His interest was a spark for Marcia, but it wasn't until 1980 that she gathered courage to take the examination. She passed the Novice exam and wished she hadn't waited so long. Her first year on the air found Marcia DXing and ragchewing. Her son's interest in traffic handling soon found her listening to NENN and Eastern Massachusetts-Rhode Island Slow Speed net (EMRISS). She listened often, learned net procedure and acquired a feel for how a net was run. One night, when the net control station called for QNI, Marcia nervously jumped in. She has been enjoying it ever since.

Marcia had no idea how to manage a net when asked to accept the job last fall. Pam, WB1GQO, assured her help whenever possible, as did several net members. She is glad that she accepted, as she has found it to be a great pleasure. The many nice people in the net are a joy to work with. At least three regular check-ins are also YLs: Anne Marie Wilson, KA1JAN; Sherrie Bicknell, WB1HFJ; and Pam Costa, WB1GQO.

After several months on Novice nets, Marcia's urge to check into the EMRI cw and phone nets provided the motivation to upgrade to General class in May of 1982. Shaky the first time, she has learned from a few mistakes and now feels comfortable running either net periodically.

If you have felt a little nervous about giving traffic handling a try, Marcia's approach is well worth con-



Marcia Osborn, KA1GBS, NENN net manager

sidering. Listen a few nights, see how a net operates, then give it a whirl. The pleasure that Marcia has derived from trying it could also be yours.

## VERLINE FERRIS, K18V

It's not too late to adopt a DX YL as a member of the Young Ladies Radio League. The YL to contact is Verline Ferris, K18V, 308 East Harry, Hazel Park, MI 48030. Why adopt a DX YL? Money exchanges between countries can make it difficult for DX YLs to become members in any other way. Dues for the year (starting March 1) are \$6 plus \$2.50 for surface mail. Adoptees presently number 190. The number increases each year. Verline not only welcomes letters, she answers them. This is her second year as DX Adoptee Chairman. She couples this with many activities.

Originally, Verline had no intention of becoming a ham. When her mother lost her sight, she listened a great deal to hams on 160 meters on her a-m broadcast radio and decided it would be nice to join them. Verline attended Ford Tin Lizzy radio classes in 1964 to take notes for her mother. The result: Verline became WN8QPN at age 15. Her mother became WN8SYZ (now WA8SYZ) soon after. Verline upgraded to Technician, WA8QPN, in 1966. She met Don Ferris, WB8JYX, at a Hazel Park radio club meeting in 1973; they were married in August with Father Joe, WB8NGW (now I2JNX), performing the ceremony. She became interested in the radio activities of her OM and decided it was upgrade time. She passed her General class in January 1979 and Advanced in January 1980, and went all the way for her Extra in October the same year. The hardest part was getting used to



Ethel Smith, K4LMB (left) and Verline Ferris, K18V, at the Dayton Convention last year.

being K18V, after having been WA8QPN for so long.

Verline was a letter carrier in Detroit for nine years, until six years ago, when the Ferrises' daughter Laura was born. She and Don now own an Amateur Radio store, Ferris Radio. Extra activities? It's a breathtaking list! Last year, she taught Amateur Radio classes for Adult Education in Rochester, Michigan; Novice, General and Advanced classes at the Hazel Park ARC; and classes at the Hoover School — all producing an impressive ratio of new hams.

She is Trustee of the Hazel Park ARC, WB8JYX, and a member of the Catalpa ARC, the South Eastern Michigan ARA, the YLISB, the TASYLS, the Buckeye Belles, the Hazel Park ARC and the Marac-Mobile ARAC (County Hunters Club). She never misses the November Sweepstakes or Field Day. She is running for offices in both the YLRL and the TASYLS. Would you believe she is also a candidate for the School Board in her area, with the election taking place as this goes to press?

Verline is a doer. It's YLRL's good fortune to have her as DX Adoptee Chairman. It's ham radio's good fortune to have her in its ranks.



\*Country Club Dr., Monson, MA 01057

# Coming Conventions

By Marjorie C. Tenney,\* WB1FSN

June 3-5 Oregon State, Seaside	August 20-21 Alabama State, Huntsville
June 3-5 Texas State, Dallas	September 2-4 Southwestern Division Anaheim, CA
June 4-5 Kansas State, Salina	September 23-25 Dakota Division, Sioux Falls, SD
June 5 Illinois State, Princeton	September 25 Great Lakes Division, Cleveland, OH
July 2-3 West Virginia State, Weston	October 22-23 Tennessee State, Chattanooga
July 8-10 Northwestern Division, Spokane, WA	November 26-27 Florida State, Clearwater
July 10 Indiana State, Indianapolis	
July 29-31 Oklahoma State, Oklahoma City	
August 5-7 Rocky Mountain Division, Jackson, WY	<b>ARRL NATIONAL CONVENTIONS</b>
August 13-14 Delta Division, Shreveport, LA	October 7-9, 1983 Houston, Texas
August 19-21 Pacific Division, Reno	July 20-22, 1984 New York, New York
	September 27-29, 1985 Louisville, Kentucky

## WEST VIRGINIA STATE CONVENTION July 2-3, Jackson's Mill (Weston)

The 25th Annual ARRL West Virginia State Convention, sponsored by the West Virginia State Amateur Radio Council, will be held July 2-3 at the Jackson's Mill 4-H Camp, Weston, just off I-79. The convention features ARRL, technical, net, repeater, MARS and DX forums; a flea market; an equipment auction; a pizza party; and much more.

Dormitory-style lodging and meals are available at the Camp, and some camping space is also available. Talk-in will be on .52 and 3990. This convention is a family affair, and there will be activities for children and nonham family members. For registration or convention tickets, contact Sue Goodwin, 103 Cleveland Ave., Nitro, WV 25143.

## NORTHWESTERN DIVISION CONVENTION

### July 8-10, Spokane, WA

Spokane is hosting *Northwest '83* in our 40,000-square-foot Convention Center, located on the former site of the Expo '74 World's Fair. Along with a large flea-market swap, there will be a wide variety of technical seminars about popular and current subjects, including antennas, computers, vhf/EME, TVRO, traffic handling, RTTY, and other topics. WA7YFM will display an extensive Tube Bank collection, along with the antique radios of W7EEN and K7WQ. There will

also be programs for nonhams, including the Ladies' Luncheon and style show in Spokane's newest lodging facility. A number of commercial displays by dealers and manufacturers of antennas, towers, computers, radio gear and a variety of electronic accessories will be featured.

DX will be a very desirable part of *Northwest '83*, including a DX forum with W3AZD from ARRL Hq. A DX breakfast will be hosted by W7PHO, with a slide presentation of a DXpedition to China by K7LAY and W7EA. "Amateur Radio and the Sister City" is a program started by K7AOZ, former Northwestern Division Vice Director and now a Silent Key. Sister City involvement will include the presence of DJ6TJ from Lubeck, Germany, and JA3CZY from Nishinomia, Japan, both League members, who will be representing Spokane's two sister cities.

Another highlight of *Northwest '83* will be our banquet, featuring guest speaker Roy Neal, K6DUE, of NBC News. Following the banquet will be the first ceremony of the Royal Order of the Wouff Hong in the Spokane area. Pins and certificates will be awarded.

W7IDZ and W7DUX will host the QCWA luncheon, and W7CZA is in charge of on-site church services Sunday morning. League President Vic Clark, W4KFC, will be present for the ARRL Forum, and a Sections Forum will be headed by WA7RWK for all Section Managers and those hams holding official ARRL appointments in all five sections of the division, including parts of Canada. We also expect quite a contingency from Canada, and we want to involve as many elected and appointed League titles as possible.

For registration and lodging information, contact Kyle Pugh, KA7CSP, P.O. Box 3933, Spokane, WA 99220. If beautiful scenery and outdoor sports appeal to you, plan your vacation in the Spokane area while attending *Northwest '83*.

\*Convention/Travel Coordinator, ARRL

# Hamfest Calendar

**British Columbia:** The Maple Ridge ARC is hosting Hamfest '83 July 2-3, at the Maple Ridge Fairgrounds, 30 miles east of Vancouver on Hwy. 7. Registration fees: hams, \$5; others over 12, \$2 (20% off for pre-registration). Food, displays, swap and shop, bunny hunts, programs for women and children. Lots of camper space (some with hydro). Talk-in on 20/80 and 34/94. For registration info, contact Bob Houghton, VE7BZH, Box 292, Maple Ridge, BC V2X 7G2.

**California:** The Satellite ARC will hold its 1983 Santa Maria Amateur Radio Swap FEST and BBQ at the Union Oil Company New Love Picnic Grounds, south of Santa Maria off U.S. 101, on June 19, from 10 A.M. until 4 P.M. Tickets: adults, \$7.50; children 6 to 12, \$3.50; children under 6 free. Swap tables are \$2.50 for 2- x 6-ft area. Admission for Swap FEST is free. Talk-in on 34/94. For tickets and information, write to Santa Maria Swap FEST, P.O. Box 2616, Orcutt, CA 93455.

**Georgia:** The Atlanta HamFest 1983, sponsored by the Atlanta RC, Inc., will be June 18-19 at a great new location, the Atlanta Civic Center. We now have available over 70,000 square feet of air-conditioned area for exhibitors and meetings. Outdoor flea market space is more than double its previous size, and reservations may be made in advance. Advance registration is \$5, and \$6 at the door. Hours are 8 A.M. to 5 P.M. on Saturday and 8 A.M. to 3:30 P.M. on Sunday. Talk-in on 22/82. All information requests should be made to the Atlanta Radio Club, Inc., P.O. Box 77171, Atlanta, GA 30357, or call Jack Bolton, WA4PNY at 404-394-4296 (home) or 404-237-1577 (office).

**Georgia:** John Ross ARC Trade Fest and Flea Market, sponsored by the John Ross ARC, will be held July 9-10 at the Rossville Civic Center, Rossville. Center will be open to exhibitors July 8, 5-10 P.M., for setup. Free admission; tables are \$6 per day, \$9 both days. For further information, contact Murle Winans, tel. 615-867-7739, or write to Rossville ARC, P.O. Box 853, Rossville, GA 30741. We are looking forward to seeing "y'all" in July.

**Idaho:** The Treasure Valley ARA is having its hamfest on June 18 in Payette. Games, swap tables, women's activities, family fun and a banquet. Pre-registration is \$5. Send an s.a.s.e. for more information to P.O. Box 790, Payette, ID 83661.

**Illinois:** The Six Meter Club of Chicago will sponsor its 26th annual hamfest on Sunday, June 12, at Santa Fe Park, 91st and Wolf Rd., Willow Springs, southwest of Chicago, starting at 6 A.M. Advances registration is \$2; at the gate \$3. Large swapper's row. Many other goodies, picnic grounds, displays in the pavilion, refreshments, AFMARS meeting. Talk-in on 37/97 or 52. Advance tickets from Val Hellwig, K9ZWW, 3420 South 60th Ct., Cicero, IL 60650.

**Indiana:** The Lake County (Indiana) ARC will hold its 11th annual "Dad's Day" hamfest on June 19 at the Lake County Fairgrounds, Industrial Arts Bldg., in Crown Point. Hamfest will be held indoors, starting at 8 A.M. Tickets are \$2.50. Talk-in on 84/24 and 52. For further information, contact Denny Tokarz, KA9FCG, 6930 Lindbergh, Hammond, IN 46323.

**Kentucky:** The 1st annual Bowling Green Swapfest will be held at the Jaycee Pavilion, Morgantown Rd., off U.S. 231, Bowling Green, June 11, 8 A.M. to 4 P.M. Vendor space opens at 7:30 A.M. Sponsored by the Kentucky Colonel ARC, Inc. Indoor air-conditioned vendor space \$1. Outside vendor space available. Donation is \$2.50 in advance, \$3 at the door. For information or advance tickets, contact Jack Wilson, WA4SAC, 451 Skyline Trailer Park, Bowling Green, KY 42101, or Ed Schwab, KA4REF, 154 6-1/2 Chestnut St., Bowling Green, KY 42101. Proceeds will go for emergency communications equipment. Please enclose an s.a.s.e. Talk-in on 25/85 and 52 simplex.

**Maine:** The Mid-Coast Repeater, Inc., annual hamfest and family picnic will be held at Warren on June 12. Talk-in on 146.985 or 52. Art Adolphsen, K1VVT, Union, ME 04862, chairman.

**Maryland:** The Frederick Hamfest, sponsored by the Frederick ARS, will be held on June 19 at the Frederick Fairgrounds, Frederick. Hours: commercial, 6 A.M.; general admission, 8 A.M. to 4 P.M. Admission is \$3 (\$2 additional for tailgaters); Women and children admitted free. Inside tables available. Demonstrations,

exhibits, food and drink. Talk-in on 52 and local repeaters. For further information, contact Vernon Simmons, KA3CVD, 7301 Pin Oak Dr., Middletown, MD 21769, tel. 301-473-8111 or 301-371-5735.

**Massachusetts:** The Northern Berkshire ARC flea market will be held on June 5 at the American Legion Pavilion, North St., Rte. 9 Dalton. Admission is \$1; women and children free. Tables free on a first-come basis. Tailgating is free. Refreshments for sale by the Dalton American Legion. Please observe town parking regulations. Talk-in on 31/91.

**Michigan:** The Big Rapids Area ARC presents the Inflation Buster Swap, held on Saturday, June 18, from 8 A.M. to 4 P.M., at the Big Rapids Roben-Hood Airport. Free admission. Sellers \$1; bring your own tables or trunk sales. Talk-in on 04/64 and 52 simplex. Contact: Jeff Barstow, WD8DLK, 12630 Wilson Rd., Rodney, MI 49342, tel. 616-796-3815 (days).

**Michigan:** The Monroe Hamfest, sponsored by the Monroe County Radio Communications Assn., will be held on Sunday, June 12, at the Monroe County Community College, 1555 South Raisinville Rd., Monroe. Doors open at 6 A.M. for vendors, general admission hours are 8 A.M. to 3 P.M. Donation of \$2 in advance, \$3 at the door. Tables are 50¢ a foot. Free trunk sales on paved parking area. Famous QLF contest, which awards an attractive certificate to all participants. ARRL and FCC tables. Free table to clubs and repeater groups; free auction service. Full cafeteria service. Large indoor flea market, commercial distributors, craft tables. Talk-in on 52 simplex. For tickets, table reservations or exhibitor information, contact Leroy Keck, KA8LAR, 4773 Blue Bush Rd., Monroe, MI 48161, tel. 313-242-5589, or Bill Lester, tel. 313-654-2978.

**Michigan:** The Midland Hamfest sponsored by the Central Michigan ARA will be held at the National Guard Armory, Airport Rd., Midland, on Saturday, June 11, from 8 A.M. to 2 P.M. Admission is \$3. Overnight parking available on Friday night at the Fairgrounds for \$5. Lunch on site; easy access from U.S. 10 using Eastman Rd. exit. Talk-in on 07/67. For further information, contact Larry D. Crook, NBCCD, 3117 Sharon Rd., Midland, MI 48640, tel. 517-631-6849.

**Montana:** June 18-19 marks the 25th annual Northeastern Montana Amateur Radio Hamfest/Picnic, held at James Kipp State Park, south of Malta. Potluck on Sunday noon. Talk-in on 19/79. For further information, contact Orlie Linn, K7OZU, tel. 406-527-3206.

**New Jersey:** The Jersey Shore Chaverim ARC is sponsoring their second hamfest and electronic flea market on June 12 at the Jewish Community Center in Deal. Vendors and buyers from the tri-state area in a 3000-sq.-ft. area. For further information, contact Jersey Shore Hamfest, P.O. Box 192, West Long Branch, NJ 07764.

**New Jersey:** The Raritan Valley RC will hold its 12th annual hamfest on Saturday, June 18, at Columbia Park, Dunellen. Gates open at 8:30 A.M. Sellers spots are \$3 each; no tables supplied; lookers \$2 donation. Food and drink available at refreshment stand. Advance tickets may be purchased from any club member. Talk-in on 025/625 and 52 simplex. Further information may be obtained by calling Bob, KB2EF, or Mary, WA2JWS, at 201-369-7038 between 10 A.M. and 10 P.M.

**New York:** The Hall of Science ARC annual indoor/outdoor (rain or shine) hamfest will be held on Sunday, June 12, 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 Skyline ARC ham flea market will be held on Saturday, June 18, from 9 A.M. to 5 P.M., at the Cortland County Fairgrounds, Cortland (right off I-81 at Exit 12, midway between Syracuse and Binghamton). Indoor-outdoor flea market, rain or shine. Donation \$2 per person. Under cover tables \$3 each, reserved. Talk-in on 52 simplex. For reservations, contact Elmer Fuller, K2LFB, 129 Chelsea Twins, Cortland, NY 13045.

**Ohio:** The Champaign Logan ARC, Inc. annual hamfest and flea market will be held on Sunday, June 12, at the Logan County Fairgrounds in Bellefontaine. Gates open at 7 A.M. EDST. Tickets are \$1.50 in advance, \$2 at the door. Tables are \$3 in advance. Contact Michael DeVault, KU8I, 7157 Road 158, East Liberty, OH 43319, for information, tickets or tables. Talk-in and information on CLARC/HI Point Repeater, W8EBG, 147.60/00.

**Ohio:** The 16th annual Goodyear ARC Akron Hamfest will be held Sunday, June 12, at Wingfoot Lake Park, from 10 A.M. to 5 P.M. Park is near U.S. 224 and SR 43 east of Akron. Gate opens at 7 A.M. for flea market and exhibitor setup. Family admission \$2.50 in advance, \$3 at the gate. Flea market \$2 per space. Pavillion \$5 per table. Free parking, with picnic area and refreshments available. Talk-in on 04/64.

For advance tickets and/or reservations, send s.a.s.e. to Don Rodgers, WA8SXJ, 161 S. Hawkins Ave., Akron, OH 44313, tel. 216-864-3665.

**Ohio:** The 3rd annual Columbus Hamfest sponsored by the Battelle ARC will be held at Battelle Columbus Labs, Columbus, on June 18, from 9 A.M. to 3:30 P.M. Admission is \$1 per person; \$2 per selling space. Talk-in on 75/15. For further information, contact Bill Welch, W8LLU, tel. 614-261-7053 or Kevin Schreiber, WA8OHI, tel. 614-891-2205.

**Ohio:** The Lancaster and Fairfield County ARC will hold its annual Father's Day Hamfest on Sunday, June 19, at the Fairfield County Fairgrounds, Lancaster, from 8 A.M. to 4 P.M. Admission is \$2 in advance and \$3 at the gate. Food available, plenty of free parking, tables under cover. Talk-in on 03/63 and 52 simplex. For additional information, write to Box 3, Lancaster, OH 43130.

**Ontario:** The Ninth Annual Ontario Hamfest sponsored by the Burlington ARC will be held on Saturday, July 9, at Milton Fairgrounds. For further information, write to Burlington Amateur Radio Club, Inc., P.O. Box 836, Burlington, ON L7R 3Y7.

**Pennsylvania:** The Milton ARC will hold their 12th annual hamfest on Sunday, June 12, rain or shine, at the Winfield Fire Co. grounds on Rte. 15, south of Lewisburg and 8 miles south of Exit 30 on I-80. Hours will be 8 A.M. to 5 P.M. Please note that this is a location change from last year. More covered spaces available. Registration \$3; women and children free. Flea market, auction and contests. Talk-in on 37/97 and 025/625. For further details, call or write to Ken Hering, WA3IJU, RFD 1, Box 381, Allenwood, PA 17810, tel. 717-538-9168.

**Pennsylvania:** The Murgas ARC (K3YTLL) will sponsor the annual Wilkes-Barre Hamfest at the Kingston 109th Armory, Market St., Kingston (across the river from Wilkes-Barre), on Sunday, June 19. Setup only at 6 A.M.; general admission at 8 A.M. Admission is \$3; women and children free. Tailgating \$1 extra per space. Tables and commercial power available. Rain or shine, indoor and outdoor tailgating. New location. Talk-in on 01/61, 28/88 224.66 and 52 simplex. For further information, write to Hamfest Committee, P.O. Box 1094, Wilkes-Barre, PA 18703, tel. 717-779-3882.

**Pennsylvania:** The Annual Firecracker Hamfest, sponsored by the Harrisburg RAC, will be held Monday, July 4, at the Shellsville VFW picnic grounds, Exit 27 off I-81, north of Harrisburg. Follow signs at Exit 27, 2 miles to Shellsville. Talk-in on 16/76 and 52 simplex. Admission is \$3; women and children free. Tailgating, no charge. For additional details and table reservations, contact KA3HZW, 131 Livingston St., Swatara, PA 17113, tel. 717-939-4957.

**Texas:** The YL International Single Sidebander's (YL ISSB) 1983 Convention will be held in Dallas June

16-19. Activities planned include the DX Roundup; Minnie, KA0ALX, will have slides of her recent trip to Japan; and Carl, W5JMM/SU, will present slides from his work in Egypt. The Systems Awards Banquet will be a barbecue party on Saturday night. Pre-convention activities will begin June 13. Golfing, fishing and side trips are planned to fill in hours between ham radio activities. Details from Joe, W5UJO, or Mary Parsons, KC5UO, 1639 Evergreen Dr., Mesquite, TX 75149. Please send business-size s.a.s.e. with 40-cents postage.

**West Virginia:** The Tri-State ARA will sponsor their 21st Tri-State Hamfest at the Huntington Mall, located in Ona, 6 miles east of Huntington, on I-64 or Rte. 60 East, on June 12, from 9 A.M. to 4 P.M. Admission is \$5. Flea market, commercial dealers, contests, ARRL booth. Talk-in on 76/16. Area hotels and motels available. Closest motel is Gateway Holiday Inn, 6007 Rte. 60 East, tel. 304-736-9874; call 304-523-0381 or 304-525-7111 for more information.

**West Virginia:** The 1983 MARAC Convention Committee invites you to "Do the Charleston" July 6-10 at the Charleston House Holiday Inn, Charleston. Something for everyone. Saturday night, the annual MARAC awards will include an award to County Hunter of the Year. For convention package, send s.a.s.e. to K0AYO, Bob Dyson, RFD 1, Box 230-M, DeSoto, KS 66018.

**Wisconsin:** The South Milwaukee ARC will hold its annual swapfest on Saturday, July 9, at its usual place, the American Legion Post 434, 9327 South Shepard Ave., Oak Creek, WI 53154. Activities begin at 7 A.M. and will run to 5 P.M. Parking, picnic area, refreshments on grounds. Free overnight camping available. Admission is \$3 per person and includes a "Happy Hour" with free beverages. Talk-in on 34/94. More details, including a local map, may be obtained by writing to South Milwaukee ARC, Inc., P.O. Box 102, South Milwaukee, WI 53172-0102.

**Wisconsin:** The Annual Sheboygan County ARC Lakeshore Swap Fest and Brat Fry will be held on July 16 at the Wislon Town Hall, South of Sheboygan, from 10 A.M. to 4 P.M. There will be a public auction. Tables are free, and camping is available at Terry Andre State Park. For flyer and other information, call 414-457-3203 or write to P.O. Box 895, Sheboygan, WI 53081.

[Note: Sponsors of large gatherings should check with the League Headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.]

[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 blngo.]

# In Training

Conducted By Steve PINK,\* KF1Y

## COMPUTERS IN TRAINING

In recent years, small computers have found their way into all facets of life. Certainly, radio amateurs have found many applications: automatic logging, contest operations, repeater control, cw and RTTY, to name a few. The use of modems with small computers has also opened access to larger mainframe computer systems that provide high-speed "number crunching" and access to large data bases.

From a training point of view, computers offer several interesting possibilities. One of the simplest applications is a Morse code generator. Programs are easily written that produce random code groups and send preprogrammed text or characters from a keyboard. But what about more sophisticated learning programs? Computer-aided-instruction (CAI) offers many exciting options.

CAI can provide personalized, interactive and effectively paced programs for learning. How the computer teaches, however, is entirely dependent on how it is programmed. Indeed, several pitfalls must be avoided. Poor teaching methods have existed for years and are not unique to CAI. Learning can be fun and should be exciting and challenging, but nevertheless the emphasis should be on learning.

So, how does one create a program that is an effective

learning tool? First, let's define some of the things we don't want in our program. Obviously, the program should not "crash" if it gets an improper input. Also, the program should not be abusive to the student, run too fast or too slow, or consist merely of seemingly endless, boring drills.

What a CAI program should include is an easy start-up routine and simple responses from the student. The program should hold the student's interest and have the ability to change the level of difficulty, depending on the student's ability. The program should provide the correct answer when necessary and be able to adjust to the student's rate of learning.

In addition to these criteria for a successful CAI program, what format should we use and what material should we cover? Question-and-answer programs are easy to write. They are helpful for review, can cover many different topics and can be structured for a specific age group or class of license. Nonetheless, this type of program does not make full use of the computer's ability to interact with the student. You end up with a little more than a \$2 Q & A book for which you need at least a \$200 system to run!

Tutorial programs that generate problems, contain several levels of difficulty and require the student to think about his or her responses are very exciting. These programs can cover subjects like Ohm's Law, the power law, impedance calculations and circuit design problems. Programs that make use of common Amateur Radio equations are effective because they not

only teach the ideas but allow the student to become familiar with the equations. This is important because the student can concentrate on ideas and not get lost in the mechanics. Granted, the mechanics are important, too, but they should not obscure the concepts. It is important to note also that CAI programs should not be so "cute" that the ideas are lost in the format. While looking through QST recently, I found several utility routines, but only one CAI review program. Many of the popular computer magazines, however, contain advertisements for all sorts of CAI programs, and frequently include articles with them. These programs are not directed at Amateur Radio, but at general communication skills.

So, where are the CAI programs for Amateur Radio? I'm sure there are instructors who are writing programs for code practice. Now it is time to develop programs that are more involved. We'd like to see some that work with the electrical principles and mathematical relationships found at the Novice and General levels, and programs that construct practical circuits with block diagrams, or design simple antenna systems.

By now we hope you're convinced that there is a place for computers in training. If you find this type of programming interesting, we would like to hear from you. You may have new ideas or need help to get started. Everyone in Amateur Radio instruction will benefit from innovative programs designed for Amateur Radio training. — Jonathan Towle, WB1DNL, ARRL Assistant Training Manager

\*ARRL Training Program Manager

## SOME OF YOUR QUESTIONS ANSWERED

### Q. What is an SSC?

A. An SSC (Special Service Club) is an ARRL-affiliated club that has met specific qualifications and is recognized as a special club in a local area. These clubs are the few that do a bit more than their neighbors in public relations, emergency communications activities, training, technical advancement of club members, operating activities and other miscellaneous activities.

### Q. What is an affiliated club?

A. An affiliated club is an organized, noncommercial Amateur Radio group or society with kindred aims and purposes of the ARRL. In addition, it has at least 51% League membership, completes an application and is approved by the Board of Directors. The Club and Training Department has records of all ARRL-affiliated clubs from the past 60 years. If you want to determine the status of your club, write to the Club and Training Department, ARRL Headquarters, and we will let you know if your records are current. If your club is not in our files, we will send you information on the affiliation procedure.

### Q. How does my club become an SSC?

A. The first step is determining if the club is already affiliated. (All actively affiliated clubs have received information about the SSC program.) Any local-area club has the option of becoming a Special Service Club. This is not an elite group in which only a few may become members. It is a group of clubs that are active in all areas of Amateur Radio and are models for other area clubs. These clubs provide greater support for local efforts on behalf of Amateur Radio and, in particular, give those working at the local level greater involvement in League activity. Size is not a criterion; a club with as few as 20 members can become an SSC. An SSC could be a group of smaller clubs joined together to become a more effective council of clubs, active in all areas of Amateur Radio.

### Q. What is an ACC?

A. Your ACC (Affiliated Club Coordinator) is the person who works with your affiliated club to help determine if all SSC qualifications have been met. You and your ACC discuss the areas your club is involved in and decide whether your programs are sufficient or need to be expanded. The areas of activity are listed in "You and Your Special Service Club" (Dec. 1982 QST, pp. 62-64).

Here are some suggested activities that your club

may work on — activities for your Special Service Club or active club.

### RFI Committees

Leon Fletcher, N6HYK describes one activity his club is involved in that could work well as a miscellaneous activity for a Special Service Club.

"You hams sure stick together!" That was the closing comment of a neighbor after the RFI Committee of the Naval Postgraduate School Amateur Radio Club in Monterey, California, completed an investigation of complaints of a new ham causing RFI.

"But our committee is much more than just hams backing up hams," stated the club's president, Bill Webb, NK6H. "We want to eliminate all the RFI we can. And we want to make sure none of our members cause interference which might give other hams a bad name."

Complaints started when Leon earned his General license and moved from cw to phone operation. "As I told the RFI committee," Leon states, "I did everything the books said and other hams had suggested to eliminate the interference. I then showed my neighbors pages 24 and 25 from the ARRL Operating Manual. I marked every point in red to emphasize all I had done, including writing letters to the manufacturers of the equipment getting the RFI."

Each of the four members of the RFI Committee was chosen to provide specific assistance.

- Bill Webb, NK6H, the club president, made the first contact with Leon's neighbors to obtain their cooperation with the committee.

- Tim Wheelis, KQ6V, a school teacher and a specialist in electronic design, headed the technical analysis of the station. Having similar equipment, Tim also checked to make sure the newly licensed ham was operating his station correctly.

- Karl Kauffman, NI6H, engineer for TV station KMST, backed up technical measurements and led the inspection of the antenna system.

- Conley Smith, K6DYX, professor emeritus of electrical engineering at the U.S. Naval Postgraduate School, provided expert testimony based on his extensive career in electronics.

Also present to assist the committee was Paul Herschaft, KQ6G, who had taught the Novice class in which Leon had earned his first license. Paul's contributions focused on tips on how to handle the "delicate contacts" with the complainers.

After 70 minutes of inspecting, measuring and observing using a dip meter, portable radios and other gear, the committee announced, "The station is free of spurious emissions." Bill Webb then received permission from Leon's neighbor to let the committee inspect the TV being interfered with.

Telephone communication was set up and, at the committee's direction, a brief series of Vs were sent on cw. In less than a minute the committee found a faulty connection between the TV and the cable system. The neighbor was shown that the interference could be

eliminated when the set was correctly connected. The neighbor promised to call a technician to correct the trouble "first thing in the morning."

There is an important moral to this tale: Although hams face this problem repeatedly, it emphasizes the value of a fast-acting, well-organized, skilled committee for every ham club in America.

### Antennas

The Cimarron Amateur Radio Club, a young club in Fairview, Oklahoma, is rapidly becoming known in ham circles as a "live wire." In an area where many members are isolated, their 2-meter repeater on the cable TV tower has molded a viable and disciplined net capable of any public or amateur service needed. They work closely with the Great Plains Amateur Radio Club of Woodward, which operated a Radar and Weather Net particularly for tornado warnings in the spring, and with the Civil Defense groups.

One of their chief pleasures, however, comes in their parties. Most hams are familiar with the antenna party — a first cousin to the pioneer custom of community "barn-raising." One of the most recent parties was held for Harry Watts, KC5OU, of Vici, Oklahoma. Harry is special to hams in the area, not only because he has overcome handicaps that would stop many people, but also because he has become a workhorse of the traffic nets. Harry has been blind for many years and lost the fingers of his left hand in an encounter with a table saw. The fact that he is 75 years old has not slowed him down. None of this has prevented Harry from getting his Extra ticket or from being one of the most active participants in the weather nets, hf traffic nets, and 2-meter general service nets of the area. Harry works in the Air Force MARS net and has received awards and commendations for emergency traffic and phone patches that he has participated in since becoming a Novice in 1970. A work party that assists other hams in need or older hams who cannot do the work themselves is an activity that any Special Service Club would find both satisfying and worthwhile.

Either of the activities mentioned, or along with other areas of involvement that your ACC approves (antenna work parties or RFI committees), may be sufficient for your club to meet the SSC requirements and still continue the good work of your club.

Whatever types of activities your club decides to use to become a Special Service Club should be worthy of its members. Talk to your ACC and decide if your program is fully developed enough or if it needs more work. (If you do not know the name of your ACC, contact your Section Manager listed in QST on page 8.)

### SSC KUDOS

Congratulations to the Owensboro (Kentucky) Amateur Club and the Rochester (New York) Amateur Radio Association on earning Special Service Club status.

\*Club Program Manager

## Strays



Bob King, KA9GNY, of Baraboo, Wisconsin, a retired railroad telegrapher, decided his sounders were too big. So, he handcrafted this one, and it works! (K9ZZ photo)

### NO BARK, BUT A LOT OF BYTE

□ The Nippon Electric Company in Tokyo said it has developed a new magnetic memory concept that will make it possible to store 1 billion bits of information on a single chip. A spokesman said a memory using the new concept would require no mechanically driven memory mechanism. Company officials said commercial production will begin in three or four years. — Reuters news service

### I would like to get in touch with...

□ a representative of a school or other nonprofit organization to whom I would donate more than 400 copies of QST (1940-1975). Donald Miller, W2MQB, 517 Accabonac Hwy., East Hampton, NY 11937.

□ anyone who has information on a 10-6 meter linear amplifier, SSB 600, built by Kris, Inc., of Cedarburg,

Wisconsin. Tom Darga, KA8GBB, 35775 Schmid Dr., New Baltimore, MI 48047.

□ any amateurs in Oregon who are interested in establishing a 144-MHz meteor-scatter sked during the August Perseids. John Dvoracek, KE5C, 4110 Ermine Trail, Temple, TX 76501.

□ any amateurs who were aboard LST 1088 Navy Asiatic Pacific in 1945-46, especially radiomen. Sterling W. Farrenkopf, KA1EID, Box 413, South Yarmouth, MA 02664.

### QST congratulates...

□ Wayne J. Ensor, KA3IFQ, of Salisbury, Maryland, on his appointment as the American Red Cross Chesapeake Division's first Volunteer Consultant for Disaster Communications.



## Recognition of Amateur Radio Capabilities

It's not a new story. Over a foot of rain in a short period. Result? Floods. Thus, the capabilities and skills of radio amateurs have again been put to the test — this time in Louisiana. The spring rains of 1983 cut off communication in New Orleans to the outside world. Unusual in this episode is that radio amateurs played a role in the restoration of commercial communications circuits. This was recognized and encouraged by the FCC engineer-in-charge in Kansas City, who issued a waiver to permit Amateur Radio operators to engage in handling traffic to restore commercial lines.

Prior to the Louisiana floods, this very concept was tested by simulation in February. The Long Lines switching center for American Telephone and Telegraph in Dranesville, Virginia, underwent a simulated outage of its long-haul facilities to the Northeast region. After exhausting a prioritized procedures checklist, the operations supervisor executed the last resort: Call predesignated radio amateurs in the local area. Within minutes, he was in direct communications via 80-meter phonepatch to the Cheshire, Connecticut, switching center. Vital information was exchanged to facilitate rerouting by alternate facilities. Within minutes, the AT & T long-haul trunks had been reconstituted. Sound commercial? Perhaps so, but the reality is that vital communications of all sorts (which can even affect national security) are sent over the twisted pair. Keeping those trunks open can be a life-and-death situation. And Amateur Radio can play a vital role in keeping the information flowing during times of disaster.

Because this test was orchestrated under the aegis of the National Communications System, radio amateur capabilities have received recognition at the very highest levels of government. NCS, a confederation of federal agencies, is established by Presidential Memorandum. One of its responsibilities is to administer a restoration priority system to assure that available telecommunications resources meet the most critical requirements for conditions ranging from normal to a national emergency. It is that very recognition of our capabilities as amateurs that has led to discussion to effect an official memorandum of understanding between NCS and ARRL.

An increased awareness of radio amateur capabilities has also been fostered by ARRL's active participation as a member of NVOAD (National Volunteer Organizations Active in Disaster). This has increased amateur visibility before the volunteer sector, which has become so much in vogue under the New Federalism. NVOAD coordinates the volunteer efforts of its 23 member agencies — which counts the American Red Cross and the Salvation Army among its members. ARRL and radio amateurs have continued to accelerate their presence amongst these agencies by grass-roots participation at regional conferences. Seminars are scheduled this year in northern California and Texas — activities in which ARRL will be

represented. (A scheduled April seminar in Mississippi was literally "washed out.") It's this increased recognition of Amateur Radio that enhances the image of our hobby and provides more customers for our communications skills.

Amateurs annually put on a test demonstration of our communications skills during the Simulated Emergency Test. It is through participation in this event that we can truly highlight Amateur Radio as an emergency communications service to the public and served agencies. Results of the 1982 test can be found elsewhere in this issue.

There's more. ARRL will be present for the first time at the national convention of Associated Public Safety Communications Officers (APCO), to be held in Salt Lake City in August. Steve Smith, WA4VWV, will make a formal Amateur Radio presentation and enter into discussion to promote a working agreement between APCO and ARRL. Meanwhile, the ARRL Board has authorized that we seek similar agreement with the Federal Emergency

Management Agency (FEMA), all of which puts our capabilities into the official public eye. And let's not forget ARRL's longtime friendly association with the American Red Cross to again be manifest by ARRL participation in ARC's national convention in Atlanta this August (thanks to WA4ABY and his capable crew).

All of this effort is for naught unless it is translated into grass-roots action. ARRL relies on its vast local volunteer force for implementation. Headquarters functions as a facilitator by interfacing our officials, such as SMs, SECs and STMs, with the proper counterparts in served agencies. Also, much cross pollination is done directly at the state or local level. With this kind of groundwork accomplished in advance, we can increase recognition of Amateur Radio among those who have communications needs. It's symbiotic. These agencies need us, and we want to help. Now that we've all been "introduced," the rest is easy, for we are indeed the experts in meeting communications requirements of every sort.

### W1AW Schedule

April 24 — October 30, 1983

W1AW code practice and bulletin transmissions are sent on the following schedule:

UTC	MTWThFSn = Days of Week	Dy = Daily
Slow Code Practice	MWF: 0200, 1300 2300; TThSSn: 2000; Sn: 0200	
Fast Code Practice	MWF: 2000; TTh: 0200, 1300; TThSSn: 2300; S: 0200	
Cw Bulletins	Dy: 0000, 0300, 2100; MTWThF: 1400	
RTTY Bulletins	Dy: 0100, 0400, 2200; MTWThF: 1500	
Voice Bulletins	Dy: 0130, 0430	
EDT	MWF: 9 A.M., 7 P.M.; TThSSn: 4 P.M., 10 P.M.	
Slow Code Practice	MWF: 4 P.M., 10 P.M.; TTh: 9 A.M.; TThSSn: 7 P.M.	
Fast Code Practice	Dy: 5 P.M., 8 P.M., 11 P.M.; MTWThF: 10 A.M.	
Cw Bulletins	Dy: 6 P.M., 9 P.M., 12 P.M.; MTWThF: 11 A.M.	
RTTY Bulletins	Dy: 9:30 P.M., 12:30 A.M.	
Voice Bulletins		
CDT	MWF: 8 A.M., 6 P.M.; TThSSn: 3 P.M., 9 P.M.	
Slow Code Practice	MWF: 3 P.M., 9 P.M.; TTh: 8 A.M.; TThSSn: 6 P.M.	
Fast Code Practice	Dy: 4 P.M., 7 P.M., 10 P.M.; MTWThF: 9 A.M.	
Cw Bulletins	Dy: 5 P.M., 8 P.M., 11 P.M.; MTWThF: 10 A.M.	
RTTY Bulletins	Dy: 8:30 P.M., 11:30 P.M.	
Voice Bulletins		
PDT	MWF: 6 A.M., 4 P.M.; TThSSn: 1 P.M., 7 P.M.	
Slow Code Practice	MWF: 1 P.M., 7 P.M.; TTh: 6 A.M.; TThSSn: 4 P.M.	
Fast Code Practice	Dy: 2 P.M., 5 P.M., 8 P.M.; MTWThF: 7 A.M.	
Cw Bulletins	Dy: 3 P.M., 6 P.M., 9 P.M.; MTWThF: 8 A.M.	
RTTY Bulletins	Dy: 6:30 P.M., 9:30 P.M.	
Voice Bulletins		

Code practice and cw bulletin frequencies: 1.818, 3.58, 7.08, 14.07, 21.08, 28.08, 50.08, 147.555 MHz.

RTTY bulletin frequencies: 3.625, 7.095, 14.095, 21.095, 28.095, 147.555 MHz.

Voice bulletin frequencies: 1.89, 3.99, 7.29, 14.29, 21.39, 28.59, 50.19, 147.555 MHz.

Slow code practice is at 5, 7-1/2, 10, 13 and 15 wpm.

Fast code practice is at 35, 30, 25, 20, 15, 13 and 10 wpm.

On Monday, Wednesday and Friday, 1300 through 2100 UTC, transmissions are beamed to Europe on 14, 21 and 28 MHz.

Code practice texts are from QST, and the source of each practice is given at the beginning of each practice and at the beginning of alternate speeds. For example, "Text is from February 1983 QST, pages 9 and 84" indicates that the main text is from the article on page 9 and the mixed number/letter groups at the end of each speed are from the contest scores on page 84.

On Fridays, UTC, a DX bulletin replaces the regular bulletin transmissions.

Cw bulletins are sent at 18 wpm; Teletype bulletins are sent at 60 wpm with 170-Hz shift, then repeated on 110-baud ASCII.

Experimental transmissions on AMTOR, FEC mode, may follow RTTY/ASCII transmissions, with details given at the beginning of the RTTY/ASCII transmissions.

W1AW is open for visitors Monday through Friday from 7:30 A.M. to 1 A.M. EDT and on Saturday and Sunday from 3:30 P.M. to 1 A.M. EDT. If you desire to operate W1AW, be sure to bring a copy of your license with you. W1AW is available for operation by visitors between 1 and 4 P.M. Monday through Friday.

In a communications emergency, monitor W1AW for special bulletins as follows: voice on the hour, RTTY at 15 minutes past the hour, and cw on the half hour.

W1AW will be closed on May 30, July 4 and September 5.

Station staff: Chief Operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Charles Chadwick, K8AXL; Bruce Kampe, WA1POI.

\*Communications Manager, ARRL

## MIDNIGHT SPECIAL RESULTS

The Midnight Special held January 30 was the second Special to specify no amplifiers — barefoot only. The contest was held for one hour each on 40 and 80 cw, and judging from the results, lots of QSOs are possible using barefoot power. The top scores from each call area are listed below. Complete results have been sent to all participants sending an s.a.s.e. to Hq. The listings indicate call, score, 40-meter QSOs, 80-meter QSOs and state. — *Bill Jennings, K1WJ*

VE3KK	50-21-29-ON
VE3FMW	42-14-28-ON
W1WEF	124-62-62-CT
W1KFF	97-41-56-CT
K2AU (N1EE, opr)	119-54-65-NY
KC2FV	107-49-58-NJ
KA2KVZ	105-49-56-NY
K3FD	120-44-76-PA
N3KZ (KH6CP, opr)	76-29-47-PA
NA4K	149-72-77-TN
NW4P	102-39-63-KY
K5MM	171-88-83-TX
W5JW	150-89-61-NM
K9MK	134-75-69-TX
K9LA	123-68-55-TX
K5KV	108-69-39-LA
N5DDO	106-52-54-TX
W8UE	105-54-51-CA

A16E	86-44-42-CA
A17B	145-96-49-OR
KU7Y	73-39-35-ID
KW8N	139-56-83-OH
WD8AUB	127-50-77-OH
KD8G	107-46-61-WV
K9KM	141-73-68-IL
W9YB (N9NB, opr)	139-77-62-IN
K9GDF	137-71-66-WI
KB9S	110-60-50-WI
WA0DEL	99-50-49-MN
K10F	69-32-37-MN

W2RQ	27,738-414-67- 6-NNJ
N0EBM	25,200-400-63-10-CO
A100	22,178-338-66- 9-MO

<b>CW</b>	
K7NHV	52,059-777-67-10-ID
N6TR	46,368-672-69-10-SB
K5TA	46,299-671-69-10-NM
N6RO	46,221-651-71-10-EB
K6LL	45,359-677-67-10-AZ
W2RQ	44,019-657-67-10-NNJ
N6BT (WA6VEF, opr)	43,677-633-69-10-SCV
W1WEF	41,052-622-66-10-CT
A16V (WA6OTU, opr)	38,994-582-67-10-SV
N4ZZ	37,180-572-65-10-TN
K1XA	36,432-552-66-10-CT
KA1R	35,840-560-64-10-EMA
K4XS	35,443-529-67-10-NFL
N1EE	33,768-536-63-10-NLI
W8LNO	32,320-505-64-10-OH
K4AMC	32,320-505-64-10-TN
W2AZO	31,930-515-62-10-ENY
KB1W	29,421-467-63-10-WMA
N4SA	29,295-465-63- 8-NFL
A100	27,389-449-61-10-MO
W9NEC	26,350-425-62-10-IL
K3TM	25,680-428-60-10-MDC
KB5UL	22,620-390-58-10-STX
KC2FV	22,550-410-55-10-NNJ
KN5H	20,313-333-61- 7-STX

## JANUARY ARRL QSO PARTY

The following are the top scorers from the January 1983 ARRL QSO Parties. Scores list call, score, QSOs, multiplier, hours operated, ARRL section.

### Phone

K6LL	68,586-966-71-10-AZ
N2IC	58,995-855-69-10-CO
W5JW	56,871-801-71-10-NM
W1WEF	40,104-657-72- 8-CT
KA1R	39,984-580-68-10-EMA
WB8JBM (WD8IJP, opr)	39,334-554-71-10-OH
KC6JH	33,500-500-67-10-OH
N6NF	33,258-482-69-10-SCV
WA4VWV	30,705-445-69- 9-IA

## Strays



Amateur Radio has taken to the classroom at Fontana (California) High School, where students in a three-year program called Communications Lab are learning basic electronics and the Morse code as an incentive to obtaining their Amateur Radio and commercial licenses. Run primarily on solar power, club station WB6HJJ is energy independent and ready to assist in any emergency. (Jim Dunn photo, tnx WA6DVK)

## KEEP THE PAST AT YOUR FINGERTIPS

□ Are you one of those hams who has amassed many souvenirs of Amateur Radio over a period of time? You know, items of sentimental or historical value like rare QSLs, certificates and photos of equipment and Field Days past that you have put away for safekeeping but can't readily find when you want to view them. Well, a scrapbook may be of some help to you. It

preserves the various items from fading in the sunlight and keeps all your treasures in one location, from which they can be retrieved easily and shown to other hams or used to spark nonhams' interest in the hobby.

Starting your own scrapbook is a simple matter. I chose one of the old-style photo albums with coarse paper pages, to which I glued picture corners to hold the items in place. In the margins, I wrote dates, anecdotes and other things that I feared time might erase from my

memory. Another approach would be to use photo albums that have clear plastic pages with adhesive backing that holds items secure in the book. It is more difficult to write on this surface, but notes written on separate sheets of paper can be inserted in the book.

Why not start yours today? Then, someday, when you are "Elmering" to some newcomer, you can say with certainty, "I remember back when..." — *Joseph Esposito, Jr., K2YJL, Nicholasville, Kentucky*

## DRINKING AND RFT'ING

□ Last December, the Virginia Attorney General's office recommended that the state police stop using their breathalyzer machines, after the manufacturer of the devices raised questions about the machines' susceptibility to rf energy. The machines in question are four models manufactured by Smith & Wesson, which notified state officials that rf interference could cause major inaccuracies in test results. A spokesman said the attorney general's office had no evidence that any results in Virginia were incorrect, but that the temporary action was a matter of caution. — *excerpted from the Washington Post, Dec. 25, 1982; tnx W3ABC* [At presstime, a spokesman for the attorney general said the action is still in effect and that a "protocol" is being developed to test the machines. — Ed.]

## JOHN STANLEY SURBER, W9NZZ

□ J. Stanley Surber, W9NZZ, of Peru, Indiana, became a Silent Key on December 26, 1982. He was 75. A prolific traffic handler on 20 meters in the '50s, Stan received the General Electric Edison Radio Amateur Award in 1953 for outstanding public service. He provided the only regular communications link with home for hundreds of service personnel at Arctic weather stations, managing to pass traffic on 353 days that year.

# Special Events

Conducted By Mark J. Wilson,\* AA2Z

**Helen, Georgia:** Southern Piedmont ARC will operate WD4NHW during the 10th annual Helen-to-the-Atlantic-Ocean hot air balloon race. Operation during the day and early evening hours June 2 to 4 around 7.200 and 3.865.

**Fairview, Kentucky:** Pennyroyal ARS members will operate from 1500 to 2400Z June 4 during the annual Jefferson Davis QSO Party at Jefferson Davis Memorial Park. Frequencies: phone — 3.940 7.260 14.310 21.410 28.610; cw — 3.730.

**Grand Marais, Manitoba:** Manitoba DX Group will operate CY4CAT during Catfishpedition/83 on June 7 and 8. Frequencies: phone — 7.200 14.250; cw — 7.100 14.075 21.150.

**Rippey, Iowa:** W0MLY will be active from 1400 to 0000Z June 10 and 11 during the annual Bell Tower Festival and National Corn Throwing Contest. Operation in the lower 10 kHz of the General Class bands.

**Madison, Ohio:** Wireless Institute of Northern Ohio will operate K080 during Ohio Wine Week. Operation from 2300Z June 11 to 0300Z June 12 on 3.900 and 7.235, and from 1500 to 2000Z June 12 on 7.235 and 21.360.

**Rondout, Illinois:** Libertyville and Mundelein ARS will operate W9HOQ near the site of the largest train robbery in U.S. history from 0000 to 2400Z June 11.

\*Assistant Communications Manager, ARRL

Operation 15 kHz up from lower 40, 20 and 15-meter General class band edges, and 21.135.

**Galesburg, Illinois:** Knox County ARC will operate W9GFD from 1300 to 2200Z June 11 during Galesburg Railroad Days. Frequencies: 7.235 14.335 21.375 28.630.

**Utica, Michigan:** Macomb Emergency Communications Assn. will operate KA8KTV to commemorate Michigan tornado season from 1300Z June 11 until 2100Z June 12. Frequencies: phone — upper portion of 80, 40 and 15-meter General class bands; RTTY — 14.080.

**North Platte, Nebraska:** North Platte ARC and Lincoln County ARES will operate W0CXH on June 11 and 12 during the Nebraskaland Days celebrations in Buffalo Bill Cody's home town. Frequencies: phone — 7.250 14.290 21.400; cw — 7.140 21.140.

**Bemidji, Minnesota:** Bemidji ARC will operate WB0HJ from 1600Z June 11 until 2300Z June 12 to commemorate Paul Bunyan and Babe, the blue ox. Operation 10 kHz up from lower 80- to 10-meter General class phone-band edges, and 20 kHz inside Novice bands.

**Gonzales, Louisiana:** Ascension ARC will operate WASXZ from 1200Z June 11 until 0400Z June 12 during the 16th annual Jambly Festival. Operation around 14.235 during the day and 80- and 40-meter phone at night.

**Stone City, Iowa:** Jones County ARC will operate KA0BPS from the Grant Wood Art Festival from 1300

to 1800Z June 12. Operation around 3.980 and 14.280.

**Spivey's Corner, North Carolina:** Cape Fear ARS will operate WB4YZF from 1300 to 2100Z June 18 from the 15th annual National Hollerlin' Contest. Operation on 7.235.

**Canon City, Colorado:** Royal Gorge ARC will operate N0BIB from the world's highest suspension bridge from 1700 to 0002Z June 18. Frequencies: phone — 7.250 14.300 21.375; cw 7.125 21.150.

**Mansfield, Ohio:** Intercity ARC will operate W8WE from 0000Z June 18 to 2400Z June 26 to celebrate 50 continuous years as a club. Operation 30 kHz up from lower Novice and General class band edges.

**Richmond, Indiana:** Whitewater Valley ARC will operate KC9RI June 20 to 24 during the Richmond Rose Festival. Operation 10 kHz up from lower General class band edges.

**Hobbs, New Mexico:** State Line ARC will operate W5SSZ from June 21 to July 11 during the World Soaring Competition. Operation 2200 to 0400Z weekdays and 1200 to 0400Z weekends. Frequencies: phone — 20 kHz up from lower 80- to 10-meter General class band edges; cw — 80- to 10-meter Novice bands.

**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 July 15 to make the September issue.

NE-1

# Amateur Satellite Program News

Conducted By Bernie Glassmeyer,\* W9KDR

## PHASE IIIB LAUNCH: ALL SYSTEMS "GO"!

AMSAT's launch team is at the ESA (European Space Agency) site in French Guiana preparing the Phase IIIB satellite for launch. Reports from the launch team are very favorable. The AMSAT-DL crew prepared the spacecraft earlier than necessary for shipment, and the spacecraft arrived in Guiana in excellent condition, with no problems whatsoever.

Live launch information will be sent via the AMSAT Launch Information Net Service (ALINS). WIAW, one of the ALINS stations, will transmit the information live on all scheduled voice frequencies. Worldwide coverage is planned, and amateurs should not have any difficulty monitoring the launch as it happens. At prestime, we learned that the previously scheduled June 3, 1983 launch has been delayed one to six weeks.

The June 2, 1983 Teleconference Radio Net (TRN), scheduled for 7:30 P.M. CDT, will announce the latest Phase IIIB launch activities. Late-breaking news prior to launch will also be sent on the regularly scheduled AMSAT nets and WIAW bulletins. Recommended reading while the countdown continues are the satellite articles in April (pp. 49-52) and May (pp. 48-51) QST.

## NASA Okays Ham-in-Space Proposal

Space Shuttle astronaut Owen Garriott, W5LFL, will communicate with radio amateurs on Earth from the orbiting STS-9 mission. The official AMSAT/ARRL press release, dated April 16, 1983, follows.

"Victor C. Clark (amateur call letters W4KFC), President of the American Radio Relay League (ARRL), and Dr. Thomas A. Clark (amateur call letters W3FWI), President of the Radio Amateur Satellite Corporation (AMSAT), today announced acceptance by the National Aeronautics and Space Administration (NASA) of a proposal submitted by their two organizations to include an Amateur Radio station aboard an upcoming shuttle mission. They said that in giving its go-ahead, NASA's Associate Administrator for manned space flight, General James Abrahamson, has designated the STS-9/Spacelab flight, to be flown this

fall, as the mission on which the Amateur Radio equipment will be carried.

"The space agency's approval is based on a number of conditions which both ARRL and AMSAT find acceptable. Among them are that the use of the Amateur Radio equipment aboard the shuttle shall not interfere with its planned mission. Operations shall be carried out on a non-interference basis during the shuttle crew's 'Free Time.' It is also understood that a special Amateur Radio transmitter and receiver will be furnished by the Amateur Radio community at no cost to NASA.

"The primary mission of STS-9 is to carry the joint U.S.-European Spacelab aloft in the shuttle's cargo bay. This particular mission was selected for the amateur operation because it includes in its crew Dr. Owen Garriott (amateur call letters W5LFL), who will serve as the operator of the spaceborne ham radio station. Dr. Garriott has been an active radio amateur for many years and is eagerly awaiting the chance to pursue his hobby from space. He commented that Amateur Radio has been important in developing his own professional skills and those of many others around the world involved in technical professions. He is especially pleased that NASA has given the nod for the operation as he feels that it will be instrumental in bringing the space program home to many people in this country and the rest of the world. He notes that the orbital track to be taken on the STS-9 missions makes it especially suitable for communicating with a large number of amateurs as it extends farther north and south than did earlier space shuttle missions.

"ARRL President Vic Clark expressed his great pleasure at the NASA decision. He said that the League represents the radio amateurs of this country and, through its affiliation with the International Amateur Radio Union (IARU), those of many countries throughout the rest of the world. Thus, the ARRL is extremely happy to play a key role in this worthwhile endeavor. The joint ARRL/AMSAT proposal approved this week by NASA calls for the ARRL to furnish the special Amateur Radio equipment for use on the shuttle. The ARRL will also organize and coach earthbound amateurs in techniques and procedures for rapid and effective communication with the orbiting astronaut. This will be done through the pages of the League's monthly journal, QST, which reaches some one hundred and fifty thousand licensed amateurs, and

its affiliated clubs throughout the U.S., Canada and the rest of the world.

"Dr. Tom Clark, President of AMSAT, was also enthusiastic about the impending amateur operation from space. He noted that AMSAT is responsible for selecting appropriate frequencies and operating modes for the 'Ham in Space' operation and made many of the initial contacts with NASA officials which preceded submission of the proposal. Dr. Clark noted that AMSAT is an international organization devoted to promoting amateur space involvement. Since its birth in 1969, AMSAT has been responsible for the successful orbiting of five 'OSCAR' (Orbiting Satellite Carrying Amateur Radio) satellites, all of which were launched as secondary 'Piggyback' payloads on NASA missions. The newest OSCAR built by AMSAT, designed to provide worldwide communication among radio amateurs, is now poised for launch on a European Ariane flight in June.

"Another key organization involved in putting an amateur station aboard the shuttle is the Johnson Space Center Amateur Radio Club. This group, known by the Amateur Radio call letters, W5RRR, numbers among its members many experts well-versed in testing and preparing equipment for manned space missions. Members of this club are charged with a number of tasks to insure that the ham equipment used on the shuttle will function properly and will not disrupt other vital spacecraft functions. Included in these tasks are the adaptation of an existing shuttle antenna design for use on the internationally recognized "two meter" Amateur Radio frequencies.

"With the flight of STS-9 this fall, Amateur Radio will continue its long history of service. Amateur Radio will provide for the first time in the history of 'man-in-space' an opportunity for the general public to communicate directly with an astronaut in orbit. It is expected that tens of thousands of individuals, including elementary and secondary students, citizens of developing countries and the 'man on the street,' will experience the excitement of hearing the words come from space 'CQ from W5LFL aboard the Space Shuttle.'"

This release was first made public by NBC's Roy Neal, K6DUE, and ARRL President Vic Clark, W4KFC, at the ARRL Midwest Division Convention in Sioux City, Iowa, on April 18. ARRL and Roy Neal are making a video production that will focus on the STS-9 flight, Owen Garriott, computer hobbyists and

\*OSCAR Program Manager, ARRL

Amateur Radio. The production is planned for release by ARRL through its Club and Training Film Library in early September.

### Satellite Listening Post

The times and dates (Central North America Time Zone, not UTC) shown below are approximate. During these weekend periods, you can listen to amateur communication on the 10-meter downlinks between 29.300 and 29.500 MHz.

June 4-5 — 5:30-8:30 A.M. and 5:15-8:00 P.M.  
June 11-12 — 6:00-8:00 A.M. and 4:30-6:30 P.M.

June 18-19 — 4:00-6:15 A.M. and 4:00-6:00 P.M.  
June 25-26 — 4:20-5:30 A.M. and 2:50-4:00 P.M.

### Monthly Listings

□ *ASR* (Amateur Satellite Report) is available for \$18 (\$25 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 OSCARlocator package (satellite plotters and details) is now available for \$7 U.S., \$8 elsewhere.

# Contest Corral

## A Roundup of Upcoming Operating Events

Conducted By Mark J. Wilson,\* AA2Z

### JUNE

#### 4-5

New York QSO Party, May *QST*, page 82.

#### 7

**WIAW Qualifying Run**, 10-40 wpm, at 0200Z June 8 (10 P.M. EDT June 7). 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 (if any) and complete mailing address. A large s.a.s.e. will help expedite your award/endorsement.

#### 11-12

**ARRL June VHF QSO Party**, May *QST*, page 87.

**World Communications Year RTTY Contest**, May *QST*, page 82.

**World Wide South America Contest**, May *QST*, page 82.

#### 18-19

**All Asian DX Contest**, phone, sponsored by the Japan Amateur Radio League, from 0000Z June 18 until 2400Z June 19. Cw contest August 27-28, 160 through 10 meters. Entry classes: single op, single band; single op, multiband; multiop, multiband. W/VE call cq AA. No crossband QSOs. Single ops may have only one transmitted signal at any given time. Multiops may have a maximum of one signal per band. Exchange signal report and a two-digit number denoting operator's age. YL stations may send oo. Count 1 point per QSO with Asian stations on 7 to 28 MHz; 2 points on 3.5 MHz; and 3 points on 1.9 MHz. Multiply by the number of different Asian prefixes (WPX rules) worked per band. Note: only JDI stations on Ogasawara count for Asia; contacts with KA stations do not count. Use separate logs for each band. Mark multipliers the first time worked. Provide a complete summary. JARL Asian Countries List: A4 A5 A6 A7 A9 AP BV BY CR9 EP HL/HM HS HZ JA-JR JDI JT JY OD S2 TA UA9-0 UD6 UF6 UG6 UH8 UJ8 UJ8 UL7 UM8 VS6 8Q VU XU XV 3W XW XZ YA YI YK ZC4/5B4 1S 4S 4W 4X/4Z 7O 9K 9M2 9N 9V and Abu Aji. Enclose s.a.e. and IRC for results. Mail logs to arrive by Sept. 30 (Nov. 30 for cw) to JARL, P.O. Box 377, Tokyo Central, Japan.

**Summer SMIRK Party**, sponsored by the Six-Meter International Radio Klub, from 0000Z June 17 until 2400Z June 19. 50 MHz only. No crossband or one-way QSOs. Single operator only. Exchange SMIRK number and QTH (ARRL section for U.S. stations; country or province name for others). Count 2 points for each QSO with a SMIRK member, 1 point for non-SMIRK QSOs. Multipliers are as follows: ARRL sections in the 48 contiguous states; KH6 and KL7; Washington, DC; VE provinces; foreign states, provinces, prefectures or countries. Entries *must* be submitted on official forms, available for s.a.s.e. from sponsor. Mail logs by July 11 to Spencer Ritchie, K2CTX, 5122 Sagamore, San Antonio, TX 78242.

**9-Land CW Contest**, sponsored by the Joliet ARS, from 1700Z June 18 until 1700Z June 19. Everyone works everyone. Work stations once per band. Entry classes: single op, single transmitter; multiop, single transmitter; multiop portable, one or two transmitters. Exchange serial number and QTH (state for W stations; province for VE stations; country name for others). Suggested frequencies: 1.805 3.560 3.725 7.060 7.125 14.060 21.060 21.125 28.060 28.125. Count 2 points per 9-Land QSO (IL/IN/WI), 1 point for others. Multiply by total states/provinces/countries worked. Take one additional bonus multiplier for each group for 20 9-Land stations worked. Mail logs by July 23 (include large s.a.s.e. for results) to Paula Franke, WB9TBU, P.O. Box 873, Beecher, IL 60401.

#### 21

**WIAW Qualifying Run**, 10-35 wpm, at 1300Z (9 A.M. EDT) June 21. See June 7 listing for more details.

#### 25-26

**ARRL Field Day**, May *QST*, page 86.

### JULY

#### 2-3

**A. Volta RTTY DX Contest**, sponsored by the SSB and RTTY Club of Como and the Associazione Radioamatori Italiani, from 1200Z July 2 until 1200Z July 3. 80 to 10 meters. Entry classes: single op; multiop, single transmitter; SWL. Work stations once per band. Exchange signal report, serial number and zone number. QSOs within the same country do not count. Points for other QSOs are determined from exchange table available from sponsor. QSOs with different continents on 3.5 and 28 MHz are worth double. Multiply QSO points by sum of DXCC countries and W/VE/VK call areas worked per band. Count one additional multiplier for working the same "country" on at least four bands. Mail logs to be received by Sept. 10 to Francesco Di Michele, I2DMI, P.O. Box 55, I-22063 Cantu, Italy.

**Six Meter Invitational Net Activity Day**, sponsored by the Colorado S.I.N., from 1400Z July 2 until 0400Z July 3. 50 MHz only. Exchange signal report, state and name. S.I.N. members also send membership number. QSOs with S.I.N. members count 2 points each; others count 1 point. Multiply by number of states for final score. Mail logs within 30 days to W0ETT, P.O. Box 6602, Denver, CO 80206.

**Venezuelan World Wide Contest**, phone, sponsored by the Radio Club Venezolano, from 0000Z July 2 until 2400Z July 3. 80 to 10 meters. Entry classes: single op, single band; single op, multiband; multiop, single transmitter; multiop, multi-transmitter. Exchange signal report and serial number. Count 2 points per QSO. Contacts between stations in the same country count for multiplier credit but not for QSO points. Multiply by total DXCC countries, W/K and YV call areas worked per band. Mail logs by Aug. 15 (Sept. 15 for cw) and include IRCS for results to RCV, P.O. Box 2285, Caracas 1010-A, Venezuela.

#### 6

**West Coast Qualifying Run**, 10-35 wpm, at 0400Z July 7 (9 P.M. PDT July 6). W6OWP prime,

W6ZRJ alternate. Frequencies are approximately 3590/7090 kHz. See June 7 listing for more details.

#### 9-10

**IARU Radiosport Championship**, May *QST*, page 88.

#### 13

**WIAW Qualifying Run**, 35-10 wpm, at 0200Z July 14 (10 P.M. EDT July 13). See June 7 listing for more details.

#### 16-17

**SSTV DX Contest**, sponsored by *A5 Magazine*. Contact Mike Stone, WB0QCD, P.O. Box H, Lowden, IA 52255-0408, for details.

#### 20

**WIAW Qualifying Run**

#### 23-24

**ARRL Midnight Special**

#### 30-31

**Venezuelan World Wide Contest**, cw. See July 2-3 listing.

**County Hunters Contest**, cw.

### AUGUST

#### 6-7

**ARRL UHF Contest**

### SEPTEMBER

#### 10-11

**ARRL September VHF QSO Party**

### Standard Contest Guidelines

- 1) Make sure your log details the date, time, band, call sign and complete exchange sent and received, for each QSO claimed for contest credit.
- 2) Your summary sheet should indicate your score, including how you figured it, and a declaration that you followed FCC/DOC regulations and the contest rules. Your name, call sign and complete address should be typed or printed in block letters.
- 3) Crossband, crossmode and repeater contacts are usually not permitted. Contacts with the same station on different bands are usually permitted.
- 4) Your log should be checked carefully for duplicate QSOs and, if more than 200 QSOs are made, dupe sheets should be included with your entry.
- 5) Your log may be considered a checklog or disqualified if it is incomplete or if too many errors are detected by the contest committee.
- 6) Avoid standard net frequencies.
- 7) International contests generally offer awards to top scorers from each U.S. call area and each country; state QSO parties to each state/province.
- 8) Your summary sheet should include the following statement: "I have observed all competition rules as well as all regulations established for Amateur Radio in my country." The declaration should be signed and dated.

\*Assistant Communications Manager, ARRL.

## The St. Louis Flood

When the Great Flood of December '82 ravaged St. Louis, the city's radio amateurs were ready for any communications emergency. They had received training in severe-weather reporting and radio message handling. They had learned how to operate under strict net discipline while providing public service communications for road rallies, charity walks and marathons, civic events and simulated disasters. And they had gained actual experience in handling emergency communications during paralyzing snowstorms.

On December 2, when the first signs of trouble appeared in St. Louis, ARRL Emergency Coordinator John Martin, KBØEA, activated the 2-meter severe-weather network, which is controlled through an underground Emergency Operations Center linked to the police, the National Weather Service and the American Red Cross. Martin took action when unseasonably warm air entered the St. Louis area and collided with cold air to create high winds and a steady rainfall that continued for four days. Before ending, the winds and rain left 22 people dead, forced 30,000 people from their homes and caused \$250 million in damages throughout Missouri and Illinois.

During the night of December 2, the colliding air masses formed a tornado that ripped through New Baden, Illinois, a town of 2500 people about 30 miles east of St. Louis. The twister killed two people, flattened 70 house trailers and blew off the roof from an apartment building. Illinois hams activated emergency networks to handle disaster traffic.

Later that same night, tornado winds whipped through a mobile-home park at St. Charles, Missouri, 10 miles northwest of St. Louis. The high winds demolished 40 house trailers, damaged 25 other mobile homes and sent 39 people to hospitals for treatment of minor injuries. Hams in St. Charles County used 2-meter repeater networks to assist authorities in disaster-relief activities.

During the next three days, the heavy rains began swelling rivers in the St. Louis area — including the Mississippi, Missouri and Illinois Rivers north of the city and the Meramec and Bourbeuse Rivers to the south and southwest.

### A PRELUDE TO SPRING

Mother Nature certainly reemphasized her awesome power the week of February 20 — just one week after the National Weather Service proclaimed "National Severe Weather Preparedness Week." On February 22, at least eight tornado "hooks" were seen during a 2-1/2 hour period in Morgan County, Alabama, but none touched down and no serious damage was reported. A tornado did touch down in Cullman County around 2:15 P.M., flattening the Hanceville Church of God and heavily damaging a nearby service station and shops, causing about \$125,000 damage. Another touch-down occurred in Albertville, in Marshall County, damaging 12 to 15 homes and causing two minor injuries before skipping to a mobile-home park where it leveled 11 homes and injured six people and caused damage in excess of \$300,000.

The ARES/RACES unit of the Morgan County Civil Defense Office was activated at approximately 2 P.M. by Spencer Browning, W4PKA, under the direction of Howard Proctor, Civil Defense Director/Coordinator

The Mississippi, fed by the Missouri and Illinois Rivers, rose about 10 feet above flood stage at St. Louis, but presented no serious danger because the Gateway City is protected by levees and floodgates. North of the city, however, the Mississippi caused flood damage and forced the evacuation of residents from four river communities.

The major damage occurred in the Meramec River valley to the south and southwest of St. Louis as the river headed toward a level 25 feet above flood stage, unable to drain off into the already flooded Mississippi. Flood waters from the rapidly rising Meramec forced the evacuation of residents from eight low-lying Missouri communities.

From the very beginning of the flood emergency in the Meramec River valley, hams began handling emergency messages. For more than a week, they kept 2-meter repeaters busy as they provided primary communications from American Red Cross Headquarters in midtown St. Louis to command posts in the stricken communities, and to Red Cross vans and Salvation Army vehicles transporting food, clothing, medicine, blankets, heaters and other relief supplies to distribution centers.

Amateurs operated portable and hand-held transceivers from flooded-out police headquarters and fire stations, relief centers, overnight shelters and nursing homes. And they traveled aboard boats that evacuated stranded residents and pets from the top floors and rooftops of flooded homes.

The hams also handled message traffic for the U.S. Coast Guard and the National Guard. At Times Beach, Missouri, 2-meter autopatch operated by three ham clubs was the only telephone service into or out of the community for three days. Police and sheriff's deputies had to rely on the autopatch to send messages from Times Beach to the St. Louis County Government Center in Clayton, Missouri.

Missouri and Illinois hams also provided emergency communications for police authorities and Red Cross workers when flooding occurred on the Mississippi River at Ste. Genevieve and Cape Girardeau, Missouri, and farther west at

Poplar Bluff and Piedmont, Missouri. Dave Lattan, WD9EBQ, ARRL Section Manager for Illinois, reports that 27 hams took part in the communications efforts. Lattan, who is also Communications and Engineering Consultant for the Red Cross, spent eight days at Cape Girardeau during the communications emergency.

In addition, Missouri and Illinois hams activated networks on the high-frequency bands to handle health-and-welfare messages into and out of flooded communities. Much of the message traffic was relayed on 75-meter single-sideband nets.

Some St. Louis-area hams remained at home and assisted in the communications effort. They monitored the frequencies in use, made direct telephone calls when necessary, ran numerous errands and scheduled ham volunteers to maintain communications from the stricken areas around the clock. Some 50 St. Louis area hams took part in the week-long operation at the flood sites and at their homes.

The floodwaters receded a few days before Christmas, but life became more complicated for the 3000 residents of Times Beach when federal agencies advised them to stay away from their homes because of unsafe levels of dioxin contamination in their community. The federal agencies moved in house trailers to provide temporary shelter for the displaced Times Beach residents.

Despite their tragic problems, the flood victims in Times Beach and other communities are making plans for the future. Their attitude was summed up by Missouri Governor Christopher S. Bond when he toured the disaster areas.

"The spirit of the people who've suffered devastating losses is remarkably good," said the governor. And he added, "Everybody is working hard to take care of their needs."

Among those dedicated civic-minded people who helped to take care of the flood victims' needs from the very beginning are the radio amateurs — the hams who proved once again that they can get the message through when all other means fail! — *John J. Waidmann, WØVDU, ARRL Public Information Assistant*

for Morgan County. With vivid lightning, torrential rain and ominous wall clouds dancing around, the Decatur Radio Amateur Club ARES/RACES unit logged 33 members on station to assist in the emergency. Two official civil defense messages were handled with untold advisories being passed to the local civil defense officials, using the Decatur repeater W4ATD, 146.40/00 MHz, and the National Weather Service in Huntsville, utilizing the Huntsville repeater operating on 146.34/94 MHz.

The National Weather Service advised the Morgan County Civil Defense office at approximately 5 P.M. that most of the heavy cells were east of their county and that they could be released from service but should remain on a standby status, as potentially more severe weather was west of the Alabama/Mississippi state line and could move into the area later. The north Alabama area remained in a tornado-watch condition until 9 P.M. This severe weather did not materialize, however, and the tornado watch was later canceled by the National Weather Service for all north Alabama counties.

It is our sincere desire that emergencies of this kind or any other kind will never occur. However, if and when they do, the people of Morgan County and sur-

rounding areas can rest assured that we are prepared to meet the challenge and to assist them in their time of need. — *H. R. Propst, W4MOI, EC Morgan County, Alabama*

### HAMS SAVE CRITICAL MINUTES

While running with their 2-meter HTs in the Third Annual Walk/Jog/Run/Wheel for your Heart 5K/10K Race on February 20 in Whittier, California, Walt (N6CIT) and Tom (W6ORG) came upon a 54-year-old runner at the 0.9-mile point who had just collapsed in full cardiac arrest. A call was immediately made to Dave, KE6FW, the net control station of the East Whittier ARC, who along with 11 other members was providing communications for the event. Dave remembered that he saw the LA County Paramedic Squad truck pull up to the emergency entrance at the Presbyterian Intercommunity Hospital across the parking lot, and ran over to give them the victim's location.

Total time was about eight minutes from the time of the collapse to the arrival of the paramedics. Luckily, among the runners were people experienced in CPR who kept the man alive. Information sent by hams on

\*Deputy Communications Manager, ARRL

the location and that CPR was in progress was credited with saving minutes that might have made the difference. At it was, it took five shocks to get the heart back into sinus rhythm. The last word is that the runner is out of intensive care and in therapy, with no apparent damage from the heart stoppage.

This actual emergency taught some valuable lessons to those involved in public service work. Quite understandably, many hams go into providing communications for events with the idea of using their radios for building a repeater or with a special gadget foremost in their mind, rather than thinking out a sound operational plan to communicate necessary information to those who need it. For instance, a station on the net should be assigned to be with a paramedic or first-aid unit for immediate dispatch, and to get follow-up information from the emergency site. If this isn't practical, at least have a station next to a telephone to make an immediate call. Locate stations where they are most useful for the event, and in sufficient numbers to observe and report significant happenings to the right people rather than just convenience to antenna sites, ac power, etc.

In other words, talk to the event officials and find out their needs first, then supply the people and equipment to do the job, rather than the other way around. It was lucky for the victim that two hams thought it would be interesting to monitor on their hand-held transceivers as they ran the race, and that the NCS remembered seeing the paramedic truck go by. The location was out of sight of the closest fixed-station's position, and word from passing runners would not have reached them for a few precious minutes. Also, there were no telephones, messengers or race officials at the net-control van, which KE6FW left wide open to run to where he thought the paramedics would be. It would not be a bad idea to encourage the field stations to take a CPR class at the local Red Cross or adult school. As learned from this race, minutes can mean life or death. — Tom O'Hara, W0RG

## PUBLIC SERVICE DIARY

Indianapolis, Indiana — January 26. A feed-line rupture caused a chemical storage tank to spill several thousand gallons of sulphuric and muriatic acid in the far-eastern side of the city. About 2500 residents and local employees had to be evacuated from the area. The American Red Cross requested communications services from local hams while the Red Cross set up emergency shelters for the evacuees. Initial communications were established over the K9LPW repeater. During the afternoon, the Red Cross and Amateur Radio Club members coordinated on-the-air operational details until the Red Cross officials determined that the emergency was under control. (W9UMH, SM Indiana)

## AMATEUR RADIO EMERGENCY SERVICE REPORTS

Ouachita Parish, Louisiana — December 29, 1982-January 7, 1983. Flooding throughout the parish forced the evacuation of several areas. Civil defense and other local agencies started moving out residents to shelters set up by the Red Cross and the Salvation Army. The ARES established a Skywarn net on vhf so that reports could be funneled directly to the National Weather Service. During the next several days, the ARES net control operators worked 24-hour shifts without relief while field communicators not only worked the radios, but also filled and placed sandbags. During the 12-day ordeal, 57 Amateur Radio operators donated hundreds of hours of on- and off-the-air time to the flood emergency. (AC5R, SEC Louisiana)

North Adams, Massachusetts — March 18-19. A call from North Adams Civil Air Patrol was received by WB1HH, WMass Section Emergency Coordinator, to activate the Western Massachusetts Emergency Net and to get as many amateurs with portable and hand-held equipment to the North Adams Airport CAP Headquarters to aid in a search-and-rescue effort for a downed aircraft in the Mount Greylock Reservation. The initial station was in place at 1610, and additional operators with hand-held radios were assembled at CAP Headquarters from Berkshire County, Massachusetts and Bennington County, Vermont. By 1730, there were 38 amateurs at the disposal of the CAP and the Massachusetts State Police. Communications equipment which was used in the communications room of CAP Headquarters from 1730 on the 18th until 0500 on the 19th was ARES-supplied, as our equipment is able to transceive on the high-band CAP frequencies.

Communications via the 146.31/91 Mt. Greylock repeater were never interrupted by loss of signal from the weakest hand-held station. Several amateurs were assigned to accompany CAP direction-finding groups to aid in communications of vectors of the airplanes emergency-beacon transmitter back to the CAP Headquarters. Another team of amateurs accompanied state

police to the summit of Mt. Greylock and established communications for the police via the Mt. Greylock repeater to the CAP/MSP Command Post at Harriman Airport.

CAP requested that unassigned Amateur Radio operators could secure, but asked them to remain on standby by monitoring the 31/91 repeater and to leave their telephone numbers for call back. Amateur direction-finding equipment (infra-red, Doppler, loop and Yagi frequency-sensitive voltmeter combination) was available from 1800 on. State police continued the search effort on foot between Mt. Prospect and Mt. Williams in the Greylock Reservation as the CAP continued the direction-finding techniques until 0500 on the 19th when the search was called off.

Amateur communications were reestablished and put on standby, as the amateurs awaited orders from either the state police or CAP. Amateur Radio direction-finding equipment was utilized starting at 0900. The fog was very thick at the elevation of the crash site throughout the entire search period, which prevented helicopters and other search aircraft from participating in the search.

The crash scene was found by a team of CAP members who were finally able to ascend Mt. Williams to take a bearing as the fog thinned, and then worked their way down to about 500 feet from the summit, where the wreckage was sighted. Amateur Radio support continued until 1600, when we were released. (WB1HH, SEC Western Massachusetts/MCDA Radio Officer — Berkshire/Franklin)

Breezy Point, Minnesota — April 9, KY0X broke a conversation on the Brainerd 2-meter repeater, K0MZHR, at 3:15 P.M. and announced that there was a 4-year-old child thought to be lost in the woods near the child's home. He also stated that the sheriff had requested help from the local amateurs to provide search personnel and backup communications. Crow Wing County EC KC0YG and Assistant EC WB0CZZ heard the call and told KY0X that they would assist immediately.

When the hams arrived at the scene, the officials in charge of the search were contacted and details concerning the child were given out over the repeater. Search parties were organized, and a communications center was set up at the scene. After about two hours of searching, a child matching the description was reported wandering about 1-1/2 miles from the child's home. KY0X, the child's father and the sheriff proceeded to the area and found the scared and confused, but unharmed child. (KC0YG, EC Crow Wing Co.)

## COMMUNICATIONS SERVICE OF THE MONTH

Easter morning dawned overcast and grey in Denver, Colorado, except for a small area in the rail yards under Interstate 25 at the highway intersection known as the "mousetrap," where a yellowish brown cloud was slowly rising into the otherwise colorless sky. A switching accident in the yard had gouged a large hole in the end of a tanker car, and 20,000 gallons of nitric acid was forming a hazardous pool from which toxic gas was in danger of being spread across the city by the unpredictable spring breezes. As the cloud alternately rose and fell, high-voltage transformers shorted and blew up, adding more fireworks and color to the cloud.

Fire departments quickly determined the strength of the acid as the rubber boots and clothing were dissolved. Local hospitals were alerted and washdown stations became a common sight around the perimeter of the spill. Meanwhile, the Denver Emergency Operating Center (EOC) was being manned by the regular agency staff, and by the time most city residents were preparing for sunrise church services, the city officials had generated a plan for evacuating a 500-block area of the city.

While the hazardous-materials personnel worked on a means to neutralize the spill, the EOC staff notified the Mile High Chapter of the Red Cross to prepare shelter for the evacuees and to coordinate support from the various church groups for volunteer assistance. The city bus service was notified of the plan to evacuate the area around the spill, and by nature of a previous agreement with the city, would provide transportation for the evacuees to the various shelters.

As the Red Cross geared up for the opening of shelters and for organizing the necessary volunteers and materials, the phones of the ARES Emergency Coordinators around the metro area began to ring. Visions of Easter egg hunts with the kids quickly changed to hurried preparations for communications support and initiation of the member call-up list in the various ARES districts. Denver City was quickly mobilized, with Mile High Red Cross ARES station W0TX coordinating the initial evacuation and shelter organization with Denver County EC WB0ZZR on the WR0AMJ repeater (147.93/33).

The regular session of the Eastern Slope ARES Information Net was due to start at 8:30 A.M. on the WD0GQL repeater, when that machine's service failed, forcing the net to convene on the back-up WA0YGU 28/88 repeater. As the net progressed, WD0DRM, EC for District 10, volunteered to take net control, which freed the DEC for phone duty.

Not long after the net got under way, Arapahoe County EC WB0TUB got a call from the Arapahoe Red Cross to supply communications from a high school to be used as a shelter for evacuees. WB0TUB then activated District 22 ARES on the WA0YGU repeater (146.04/64), for communications support back to the Red Cross. Shortly before midday, the evacuation was completed with more than 5000 people being registered at the shelters around the metro area.

After a number of railroad cars were determined to contain soda ash, plans were made to unload the ash in piles along the side of the spill area, after which a large snow blower would blow the 700 tons of material onto the spill, neutralizing it. The information was passed to shelters that the operation was successful, and that evacuees could probably return to their homes within 2 or 3 hours. Although snow had started falling and the wind had picked up, there were no adverse effects from the neutralizing soda ash. By early afternoon, the "all clear" was given and evacuees were allowed to return to their homes using either city-provided bus transportation or their own vehicles. — F. Dale Williams, K3PUR, SEC Colorado

## ARRL SECTION EMERGENCY COORDINATOR REPORTS

For March, 38 SEC reports were received, denoting a total ARES membership of 22,086. Sections reporting were: AL, AK, AB, AZ, CO, ENY, IN, IA, KS, KY, ME, MI, MN, MO, NE, NH, NJ, NC, NF, NTX, OH, OK, ON, PAC, SDG, SJV, SC, SD, SFL, STX, TN, VA, WV, WMA, WNY, WPA W1 and WY.

## NATIONAL TRAFFIC SYSTEM

An EAN c/2 certificate went to "ECN Iron Man" VE3HTL. Also, certificates went to 2RN c/2 — W2AHV, KA2BHR, N2CER, KA2FBF, WB2EAG, KA2FFC, WA2FJJ, WA2HEB, KB2HM, WB2IDS, WB2IQJ, WA2JPB, WA2KOJ, AH2M, W2MLC, WB2OWO, W2RQ, WA2SPL, KF2T, WB2TDN, W2TZO, K2USA, WB2VUK, K2VX, W2KD, N2XJ and WB2ZJF; RN5 c/2 — N4FQD, KC4GS, WD5FCE, WD4IUI, WA5IUI, WA5LHL, WA5WBG, N5RN, N5GZQ, KD5KQ and N5DFO; RN6 c/4 — K6AGD and K6UYK; TWN c/2 — W5KMF, W7KCM, KB7FE, KB0Z, N0CXI, K0TTV, W0EJD, W0HXB, WB0MTA, WA0OYI, WB0NHA, WA7WQE, WA0YNP, KA0JNP, W0M2T, NDST, WD5ESV, N7DBU, KC7KC and KD7EY.

## March Reports

	1	2	3	4	5	6	7
<b>Cycle Two Area Nets</b>							
EAN	31	1298	41.9	905	96.2		
CAN	31	1002	32.3	620	100.0		
PAN*	62	917	14.8	467	100.0		
<b>Region Nets</b>							
1RN	61	457	7.5	362	95.9	100.0	
2RN	62	544	8.8	421	92.9	100.0	
3RN	31	267	8.6	539	98.4	100.0	
4RN	62	1072	17.3	537	94.9	100.0	
RN5	62	652	10.5	383	96.6	100.0	
RN6	60	641	10.7	425	93.3	100.0	
RN7						100.0	
8RN	62	451	7.3	390	98.4	100.0	
9RN	62	404	6.5	274	100.0	100.0	
TEN	31	593	19.1	563	93.5	100.0	
ECN						83.9	
TWN	62	253	4.1	279	67.1	100.0	
<b>TCC</b>							
TCC Eastern	107 <sup>1</sup>	666					
TCC Central	87 <sup>1</sup>	449					
TCC Pacific	119 <sup>1</sup>	1189					
<b>Cycle Four Area Nets</b>							
EAN	31	1980	63.9	1510	96.2		
CAN	31	1102	35.6	1162	99.5		
PAN	31	1187	38.3	1246	96.4		
<b>Region Nets</b>							
1RN	62	846	13.6	549	97.0	100.0	
2RN	93	723	7.8	529	97.1	90.3	
3RN						96.8	
4RN						100.0	
RN5						98.4	
RN6	62	891	14.4	604	100.0	100.0	
RN7	62	596	9.6	635	97.8	100.0	
8RN	59	498	7.2	446	91.0	90.3	

9RN	62	518	8.4	.457	99.6	100.0
TEN	62	364	5.9	.401	83.3	100.0
ECN	62	391	6.3	.510	93.5	100.0
TWN	60	378	6.3	.366	80.0	95.2

**TCC**

TCC Eastern	136 <sup>1</sup>	490
TCC Central	55 <sup>1</sup>	415
TCC Pacific	114 <sup>1</sup>	850

Sections <sup>2</sup>	7687	35,513	4.6
Summary	9043	56,408	6.2
Record	12,111	54,333	18.1

\* PAN operates both cycles one and two.  
<sup>1</sup>TCC functions not counted as net sessions.

<sup>2</sup>Section and local nets reporting (280): APSN ATN (AB), AENB AEND AENH AENK AENY AENZ ATNM CASN CATMN ECAN MCENS (AL), ACN AEN HARC (AZ), SWN (AZ/NM), BCEN (BC), NCTN NCN SCN/V SVTN (CA), DEPN DTN KCCN SEN (DE), BEN DEN ENMC FAST FMNS FMTN FPON FFTN GN NFPN PBTN PEN PRVAN QFN QFNS SEFTN SPARC SVTN SWFTN TPTN (FL), CGVHFN GCN GSN GSSBN GTN (GA), CIAN GLAN I75PN ITEN PCAN PMN TLCN (IA), ILN ITN (IL), ION ITN QIN (IN), CSTN KMWN KPN KSNB KWN QKS QKS-SS (KS), 3ARES 4ARES 5ARES 11ARES BARES CCEN KEN KNTN KRN KSN KTN KYN KYPON MKPN PAEWTN TSTMN WTN (KY), C12MN EMRI EMRIPN EMISS EM2MN HHTN NEEPNI RIEM2MN (MA/RI), MEPN MMN MTN WRIN (MB), AEN CMEN MPSPN PTN SGN SPNS (ME), MACS MITN MNN QMN UPN (MI), MNAMWAXN MSN MSPN MSSN PICO PTN SGN SPNS (MN), CJAN CMEN HBN IFRN MEOVM MON MOSSN MTTN PHD RRSN SARN STAN (MO), APN (MR/FR), KZFN MN MSN (MT), BVARES CCN EN2MN MARES MNARES VCN NOHN NMPN NSN NEON NE75N NE180N PV2MN SBARES (NE), CFARS CMN CNCTN JFK M2MEN RARS THEN (NC), CN CSN (NC/SC), ASFM ASPR NHH (NH), JSARS MCM NJM NJN NJPN OBTNN TCETN (NJ), NSN (NV), CDRN CNYTN EPN HVN NCVHFTN NLI NLIPN NYPPON NYS NYS/M OCTEN SCVHFTN SDN STAR WDN (NY), ALERT BARF BN BNR BRTN BSSBN COARES LCNWOARES LNCTN NEON O6MN OSN OSSBN OSSN RARA TATN VVN (OH), NON NWOSN OCWA OFON OLZ ONON OPEN OTWIN STN (OK), BSN MPARES ORARES OSN PDXARES PTN SOARES WCN (OR), D3ARES D5ESN EPA EPAEPTN NWP42MTN PFN PTTN WP42MTN WPA WP4PTN PTN (PA), WQUVAN (PQ), GPD2MN L22MN SCNTN SCSSBN YC2MN (SC), SDEN SDN SDTIN SDWN (SD), TNWN TNPN TNVN T8RN (TN), BARCN DFV HATN TEX TSN TTN (TX), BUN CUN UCN (UT), STARES SVEN VLN VN V8BN VSN VTN WAARC (VA), VTN (VT), EWTN NTN NW5SB P8T6 SCARES WARTS WSN (WA), WVARN WVN WWSB WVNN (WV).

1 -- NET		
2 -- SESSIONS	5 -- RATE	
3 -- TRAFFIC	6 -- % REP.	
4 -- AVERAGE	7 -- % REP. TO AREA NET	

**Public Service Honor Roll  
March 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.

502	KFBJ	N3COY	W5WZ
W8ZWL	105	KA2BHR	N8ATP
255	W5DTR	AG9G	KK1E
K7VW	89	W4LXB	KA5AZK
208	NG4J	W7LG	AK2E
K5CXP	K1TM	W5GTZ	74
177	K2CQQ	NP4D	WB4TZR
122AKZ	104	88	KB3FW
175	WB2RHHU	WB4WII	K8JDI
W2AHV	N16A	KT6A	W8ZWL
160	N4FQD	KB4OZ	N4PL
K4SCL	103	AA4AT	W3VR
158	WB1GXZ	KA4MTX	WF4X
WD8LRT	WB0TED	KA4GUS	WA2SPL
157	W4GPL	AK1E	K8NCV
WD4COL	KA4SAA	87	W1E0F
147	102	W2BIW	W0MZI
WB7WOW	WA7GQQ	VE3BDM	N16A
143	W9JLJ	KB3UD	KB0MB
KM9B	N5AMK	KA2EJG	WA4JDH
142	N2CER	K4IWW	WB8WKQ
KA1GBS	N1BJW	K1JHA	N8DTZ
141	101	86	KA1GBS
N6AWH	WB2ZJF	W4CKS	WB7TQF
134	WA4YUQ	KA4AJR	N2CER
WF4Y	WA1TBY	NT4S	W5TFB
K8OZ	VE3FGU	W2ZQJ	K6UYK
131	N1BGW	N5TC	KT8A
WF4X	K8OZ	KB2KW	VE3HTL
KB5EK	100	KA9HPQ	N3ADU
129	VE2EDO	K5UPN	W7VSE
WA4EIC	K4VW	84	WB5YDD
126	KD6T	W7LNE	WD8MIO
N8DZT	AG2R	N6GIW	W0FRG
124	WA4CCK	KE6NO	WA1TBY
KC9CJ	VD8MIO	KA8IAF	71
123	AK1W	83	WB2TWO
WA5RVV	98	WB5MMI	N4UF
119	KR4V	WA4LXP	N2BLX
WA4PFK	W6NTN	W2PKY	N1AJJ
KA3DLY	K7GXZ	KA3GJT	80
K2ZM	97	KA1AVU	WD4HBP
117	WA0TFC	82	WB3FKP
WB6QBZ	N8EES	WA2ARC	N2DPN
W9YCV	KB0MB	W7TGU	69
K4JST	KA4GFU	W1TN	WD9FRI
W1E0F	KA4BCM	KD9K	WD8KBW
116	96	KD5FR	K4WJR
WB2MCO	WD9ESZ	81	WB7OEX
115	WB8MTD	KV5X	N3CJP
WB7TQF	WA3WYV	KB5UL	AL7W
114	W7VSE	80	AC3N
WB2EAG	W2AET	WB8SYA	68
WA4JDH	VE3HTL	WB9HOX	WA5QFD
113	N8DSU	W1PUO	VE3WM
WB8WKQ	89	W1KK	KB2WI
AF8V	94	KN3B	70
111	WA2KOJ	KG9B	70
KC8OO	KB4WT	79	WD4HBP
KA5KRI	93	WB5LBR	W8GMT
110	WD4AWN	KU4W	KA8MEB
WB4WYG	W7GHT	KA1EPO	KK1A
WA4QXT	W5KLV	KA8ARP	WD8LRT
109	N4PL	78	N1CLJ
WB2QWO	KA5HDT	WB2VUK	KE4DA
108	K8KQJ	K4ZN	KB5EK
W9DM	K2VX	N3CCK	K0JAN (Feb.)
WB0YH	K0DKM	KF7R	100
107	92	KC3DW	Multioperator station:
WB2RBA	W7DJG	KA8ICB	WD4IO
WA7LGN	N2XJ	64	122
VE3DPO	K57I	WB4NTW	1 -- CALL
K2CTF	KA8CPS	K5ZG	2 -- ORIG.
91	107	IMRA	3 -- RCVD.
WB3KUZ	KB5W	Mission Trail	4 -- SENT
WA2HEB	K4ZK	New England Novice	5 -- DLVD.
WA2FJZ	K2IT	North American SSB Traffic	6 -- TOTAL
K2ZVI	106	Vermont Sideband	
106	WD4CNQ	West Coast Slow Speed	
WD4MTA	W2MTA	20-Meter I5SB	
W4ANK	W4ANK	75-Meter I5SB	
WD4ALY	N7AFZ	7290 Traffic	

61	60	48	43
W9TLU	WD4BSC	N8EPG/T	KA2DQA/T
W2TZO	WA6ZUD	N5EZM/T	42
VE3GOL	WA4JTE	46	K1LQQT
W4FMZ	WA8SCP	KA9MFV/N	
N3ADU	KD5GM	44	41
KCSSF	WA1VRL	KA9OBP/N	KA9NOT/N
KB7FE	50		
K1NAN	KA4BBA/T		

**Brass Pounders League  
March 1983**

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	668	960	1349	89	3066
W8SHN	272	344	691	14	1321
W9JLJ	3	601	528	1	1133
W8ZWL	0	630	0	449	1079
N4PL	122	329	436	39	926
W3VR	201	295	384	26	906
WF4X	7	431	417	38	893
WA2SPL	13	369	442	34	858
K8NCV	27	389	408	8	832
W1E0F	5	301	492	21	819
W0MZI	0	430	26	311	767
N16A	110	314	326	11	761
KB0MB	155	231	346	26	761
WA4JDH	0	394	346	8	748
WB8WKQ	1	354	355	17	727
N8DTZ	210	120	300	42	672
KA1GBS	3	317	279	41	640
WB7TQF	128	178	306	21	633
N2CER	1	349	281	1	632
W5TFB	1	314	299	4	618
K6UYK	112	262	228	14	616
KT8A	4	361	241	9	615
VE3HTL	0	286	304	4	594
N3ADU	0	300	278	2	580
W7VSE	0	295	270	4	569
WB5YDD	9	266	250	16	548
WD8MIO	81	214	228	15	538
W0FRG	38	221	259	6	524
WA1TBY	1	244	266	5	516

BPL for 100 or more originations plus deliveries:

KA4OAA	220
W8DUV	198
KA4TTS	182
KH8B	146
K0JAN	145
N5DFO	140
K5CXP	127
KA8MEB	119
KK1A	111
WD8LRT	110
N1CLJ	107
KE4DA	104
KB5EK	100
K0JAN (Feb.)	100

Multioperator station:

WD4IO	122
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1 -- CALL	4 -- SENT
2 -- ORIG.	5 -- DLVD.
3 -- RCVD.	6 -- TOTAL

**Transcontinental Corps**

1	2	3	4	5
<b>Cycle Two</b>				
TCC Eastern	110	97.3	1326	666
TCC Central	93	93.5	898	449
TCC Pacific	149	89.9	1189	1938
Summary	352	93.6	3413	3053
<b>Cycle Four</b>				
TCC Eastern	149	91.3	1893	940
TCC Central	62	88.7	820	415
TCC Pacific	124	91.9	1694	850
Summary	335	90.7	4407	2205

1 -- AREA	4 -- TRAFFIC
2 -- FUNCTIONS	5 -- OUT-OF-NET TRAFFIC
3 -- % SUCCESSFUL	

**TCC Roster**

The TCC Roster (March) Cycle Two — Eastern Area (N2CER, Director) — AA5AT N3ADU N1BHH N2CER K1E1C WA2FJJ VE3GOL WB3GZU KO2H WA2HEB WB1HIH VE3HTL KB3LF WA4LJI WD8LRT AH2M WB8WV WB4PNI W1QYY W2RQ KB3UD AF8V AK1W WB8WKQ N2XJ W1XX WB8YDZ, Central Area (W9JLJ, Director) — N5AMH N5AMK K5BNH N5BT N5CRU W5CTZ N5DFO W0FRG W4LJ W9JLJ K5KUN W5KLV KD5KQ KA4AMZY W9NXG KA4SAA KB5TC WB9WGD WF4X WB5YDD, Pacific Area (W0HXB, Director) — N16A KT6A N0ACW N7AFZ VE6CHK N7CSP N0CXI KU6D W7DZX W0EJD W7GHT N6GIW K6HAP W0ZHX KM6I W5JOV KB0MB WB8MTA WB7NHR K7OVK K6OWA WA7OYI KF7R ND5T W7TGU WB7TQF KV5U K6UYK W7VSE WB7WOW WA7WQE KM7Z, Cycle Four — Eastern Area (W2CS, Director) — W3ATQ VE3AWE W3BBN K13C WA4CCK W2CS VE3CYR WB2EAG W1EWF K1EIR W2FR WD4FTK W2GKZ VE3GOL WB3GZU KO2H KN1K N4KB K2KIR K8KQJ AH2M WB8MTD N1NH K8OZ W8PMJ WB4PNI W3QP W1QYY K3RZR WA2SPL KA1MT W4QF VE1WF WB8WKQ W2XD N8XX N2YL K4ZK, Central Area (W5GHP, Director) — W0AM W9CYX K0EZ K5GM W0HI W5LQ W5RB N5TC W5TFB K5TL WB9UYU KB5W KB9X W4ZJY, Pacific Area (K0DJ, Director) — AD8A W08AIT W7AK KN7B K0BN K0QD K0DJ W7DZX W6EOT W7EP W7GHT WA7GQ Q0HXB K7KSA W7LCF W7LYA WB7NHR KA0NLI W00GH WA7TEH W7VSE W6VZT VE6ZK.

**Independent Nets (March 1983)**

1	2	3	4
Amateur Radio Telegraph Society	31	544	283
Central Gulf Coast Hurricane Clearing House	31	290	2746
Early Bird	31	154	363
Empire Slow Speed	31	933	346
Golden Bear	31	63	493
Hit and Bounce Traffic	31	255	1989
IMRA	27	700	1458
Mission Trail	31	193	1245
New England Novice	31	94	310
North American SSB Traffic	27	189	272
Vermont Sideband	31	166	
West Coast Slow Speed	31	106	451
20-Meter I5SB	27	1317	535
75-Meter I5SB	31	579	1289
7290 Traffic	50	683	3676

1 -- NET	3 -- TRAFFIC
2 -- SESSIONS	4 -- CHECK-INS

# Results, 1982 Simulated Emergency Test

By Robert Halprin,\* K1XA and Jim Clary,\*\* WB9IHH

Each October, the Simulated Emergency Test is held to determine whether public service oriented radio amateurs can "stay the course" amidst simulated catastrophes that would give even Indiana Jones pause. While the cadres of the League's Field Organization are out in force, a big plus in the SET's favor is that every ham can get involved in the fun. If you are new to the game, but would like to participate, please contact your ARRL Section Manager (page 8, this issue), who will be glad to fill you in on the important activities of the ARRL Field Organization and how you can play a role. (Things happen not just during SET, but 365 days a year.)

There are four guiding objectives of the ARRL Simulated Emergency Test: (1) to test the capability of local amateur communications organizations (primarily the League's Amateur Radio Emergency Service) to function under emergency conditions; (2) to test the ability of nets (primarily the ARRL National Traffic System) to function under overload conditions; (3) to demonstrate to served agencies (Red Cross, government civil preparedness, Salvation Army, and so on), to the public and to the news media the value of Amateur Radio as an emergency communications service; and (4) to provide operator training and experience in emergency communications practices. Leaders of SET activities submit written reports to ARRL Headquarters, and a statistical summary of these reports appears in this write-up.

To show how these defined SET objectives were implemented, we will share with you — as we did last year — some of the excellent scenarios that were received from Field Organization leaders.

## Dateline — Missouri

Members of the Cole County ARES program responded to the SET call-up on Saturday morning, October 16, and were told that a major storm had just passed through central Missouri, spawning a large tornado that had struck a penitentiary, causing injuries to a large number of the prison's inmates and employees. ARES members were asked by the Cole County Sheriff to survey the entire county immediately to determine the extent of damage to the civilian population. Before they were through, 27 towns and unincorporated communities had been surveyed for (simulated) tornado damage, 26 officials contacted throughout Cole, Callaway and Osage Counties, 43 messages were sent via 2 meters and hf via the National Traffic System,

\*Deputy Communications Manager, ARRL  
\*\*Communications Assistant, ARRL



This is the W3PM SET operation from the emergency operations center at the Monroe County Courthouse, Stroudsburg, Pennsylvania. From left to right are N3BGL, KB3TS, WA3KAD, W3URL, S. Crane. (WB3AMY photo)

three local hospitals had been alerted, and a message was sent via 2-meter autopatch to the Red Cross regional blood center asking for a blood inventory from hospitals throughout the state. Teamwork displayed by ARES members taking part was the key to the outstanding success of the SET. — KA6CSJ, EC Cole County

## Dateline — Michigan

During the early morning of October 16, Garden City in Wayne County was hit by a massive (simulated) ice storm. By 7 A.M. local time, the streets and lawns were laden with as much as 1-1/2 inch thick ice in some areas. Overhead wires and tree limbs were completely covered with a heavy coat of ice, and the snapping of branches from the weight of the ice could be heard everywhere throughout the area. The flashing of electrical wires seemed to light up the skies of the breaking dawn.

The sounds of sirens awakened W8PSX, Wayne County Amateur Radio Net Manager, who tried to call the police department by

telephone, but was unable to obtain a response. There was no doubt that an emergency situation existed. He called W8JEJ, the EC, and WB8RQO, the Wayne County Public Service Manager; WB8RQO was asked to activate Amateur Radio communications from police headquarters. W8PSX then went on the air with battery power and proceeded to direct Wayne County Emergency Communications operations at 7:18 A.M. local time. — W8JEJ, EC Wayne County

## Dateline — Indiana

The response to our SET this year by the various agencies served was gratifying. In addition, the interest and participation of local amateurs within my jurisdiction was better than 1981 and is encouraging. It should be noted that much work is being done by the amateurs in Clark County to prepare for any emergency in which ARES can be of service.

Another large project with many man-hours involved is a direct vhf calling tree net via a





Radio amateurs in Sacramento Valley were very active in the SET; among them were K6GUC (seated) and KL7JQ. (N6WR photo)



Lanny Ellis, K0EZ, is the District Emergency Coordinator for Southeast Kansas. (photo courtesy W0KLL)

2-meter repeater located at the Clark County Memorial Hospital in Jeffersonville. Through the efforts of K9WG, our ARES group is always available for any emergency in the event communications within or without the hospital are lost. At least two drills per year are held at the hospital, with one being a "surprise" or unannounced drill. During these drills, the local fire, police and ambulance services are all provided communications via Amateur Radio. In addition, each doctor on the staff of about 80 is contacted by amateurs and advised of the drill. — W9TDL, EC Clark County

#### Dateline — Texas

For the fourth consecutive year, the San Antonio Repeater Organization provided communications for the Las Colonias de San Antonio Marathon, in conjunction with the SET. The course starts at the intersection of Broadway and Hildebrand on the near north side of San Antonio and stretches 26.2 miles through the city streets. There were 1200+ entrants in this year's marathon. Amateurs were stationed at the starting line and at each of the 11 water and aid stations along the course. The SARO 96/36 repeater, K5SUZ/R, once again provided coverage of the entire course. As they have been

in the past, marathon officials were enthusiastic in their expressions of gratitude to the Amateur Radio community and complimentary in describing the professional manner in which communications were handled. From the Amateur Radio operator's standpoint, the marathon provides a worthwhile public service activity, as well as gives area hams an opportunity to experience a controlled communications net from a portable location, such as might be expected in an emergency, testing both their equipment and their operating skills. — WA5RNV, EC Bexar County, and WD5BKO

#### NCS Radiograms

Each ARRL section was asked to send a radiogram message to the Duty Officer at the National Communications System in Arlington, Virginia, briefly summarizing SET activities in the section. The National Communications System is a confederation of U.S. government agencies established to restore communications in the event of a national emergency (for more information on NCS, see Sept. 1982 QST, p. 81). The following sections sent a confirmation copy of their NCS radiogram to ARRL Headquarters, and are recognized below for their participation:

Section	League Official Signing Message
Delaware	W3PQ
Eastern Pennsylvania	WA3PZO
Georgia	WB4HXE
Minnesota	KN6J
Northern Florida	WF4X
Ohio	AB8P
Oklahoma	W5RBC
East Bay	W6LKE
Sacramento Valley	N6AUB
Santa Barbara	W6POU

#### The 100%-Durable SET Article

Now that we've described some of the many effective and creative communications exercises that occur around SET time, we'd like to — just for fun — take a look at the other side of the public service coin; that is, how *not* to conduct the SET!

With tongue firmly in cheek, we present herewith a generic-style SET article as a public service to amateurs throughout the Field Organization who are called upon to author unique SET summaries year after year. The article below is succinct, exactly 12 sentences in length (numbered 1-12 in the order that they should appear), with a choice of four ways to

complete each of the 12 sentences. Inasmuch as there are four choices, we calculate that you now have enough material for the next 16,777,216 Simulated Emergency Tests! In short, the 100%-Durable SET Article! Feel free to mix and match the combinations — or add your own — to enhance localism.

The lighter side of the SET that follows is presented with extreme gratitude (and apologies) to Jim Cain, K1TN, who originated this concept in "The DX Bulletin's All-Purpose DX News Story," published in the January 17, 1983, issue of *The DX Bulletin* (P.O. Box 873, Vernon, CT 06066).

- 1) This year's emergency scenario in our county was a simulated
  - a) outbreak of swine flu
  - b) sneak attack from the Bulgarian West Indies
  - c) "Ozzie and Harriet" film festival
  - d) Battle of the Network Stars
- 2) Each Emergency Coordinator in the section was given a sealed envelope, to be opened only after SET weekend officially started, containing instructions to
  - a) send a package via Federal Express
  - b) throw something off the Tallahatchee Bridge
  - c) perform a lobotomy
  - d) make a human sacrifice
- 3) Not all of our local Amateur Radio Emergency Service (ARES) members were available because
  - a) the weather was too good
  - b) the weather was too bad
  - c) of the DXpedition to the Dry Tortugas
  - d) they couldn't get a weather report
- 4) Our activities were slightly hampered because our Section Emergency Coordinator was called away
  - a) on active duty in Micronesia
  - b) to the Presley mansion in Nashville
  - c) on a hunting trip to the South Pole
  - d) to serve time for tax evasion
- 5) Unexpectedly during the SET, we were called upon to supply back-up communications for
  - a) the Wayne Newton Fan Club
  - b) The A Team
  - c) the United States Football League
  - d) A Flock of Seagulls
- 6) After handling all of this traffic, our ARES members were
  - a) three sheets to the wind
  - b) ready for the codeless license
  - c) in an altered state
  - d) collecting grid squares
- 7) Our relationship with local civil preparedness officials is very cooperative and cordial because
  - a) they like our brand of scotch
  - b) they like our colorful armbands
  - c) we fill a void when they are on a coffee break
  - d) we out-jargoned them
- 8) Because of this, the local civil preparedness director was kind enough to give us permission to use
  - a) the county jail for our next luau
  - b) EOC survival crackers as hors d'oeuvres for our next luau
  - c) hardhats for our next antenna-raising party
  - d) an underground ICBM silo for our next Field Day
- 9) Amateur Radio received very favorable publicity in the local media, primarily because of the efforts of our group's public relations expert
  - a) Wolfman Jack
  - b) Lee Iacocca
  - c) Ed McMahon
  - d) Lou Grant
- 10) As a result of his efforts, our ARES organization was publicly praised by high-level government officials and VIPs such as
  - a) Phyllis George
  - b) Tom Carvel
  - c) Abbott and Costello
  - d) Darth Vader
- 11) Although our ARES net operated in an efficient manner, there is always room for improvement. For example, next year we should
  - a) avoid the all-you-can-eat anchovy dinner the night before
  - b) avoid conducting repeater activities during the Teleconference Net
  - c) get written permission to use tear-gas canisters
  - d) avoid committing human-rights violations
- 12) For those of you who haven't joined the ARES yet, but are interested in participating in upcoming ARES activities, volunteers are needed to supply communications
  - a) during the NBA draft
  - b) during the filming of *Saturday Night Fever* — Part 2
  - c) during an instructional seminar for DX list-takers
  - d) during the 1994 Summer Olympics in Siberia

#### NTS/Net SET Summary

	1982	1981
Nets reporting	259	235
States/Provinces reporting	44	47
NTS affiliation or liaison	189	202
Number of messages handled	20,001	17,271
Number of amateurs participating	8070	7755
Number of emergency-powered stations	2878	2545
Total number of points	55,682	50,948
Top state	Florida	Florida

#### ARES/Local Activity SET Summary

	1982	1981
Reports submitted	361	333
ARRL sections active	60	61
Number of amateurs participating	6723	6911
Number of emergency-powered stations	4437	4557
Number of emergency-powered repeaters	269	301
Total number of points	73,726	69,756
Top section	Ohio	Ohio



# Results, 36th ARRL VHF Sweepstakes

By Mark J. Wilson,\* AA2Z

As you read this, you're probably basking in the warmth of early summer. Perhaps you're looking ahead to the June VHF QSO Party in a few weeks. Maybe you've already gone hill-topping with your portable rig to check out a prime site. Undoubtedly, you've worked a new grid square or two on E<sub>s</sub> or aurora. Just as the hf operators tone down their activities during the summer months, the vhf operators pour it on. Summer is *the* time of year for vhf aficionados.

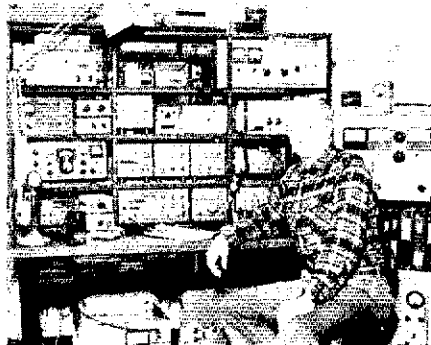
Now think back. Back to January 15 and 16. What were you doing that weekend? Chances are that you were one of 950 official entrants in the 1983 VHF Sweepstakes, and that you were going like mad racking up the QSOs during the contest. In the Northeast, anyway, the snow storm that blanketed the area seems to have encouraged people to stay home and operate.

In all, six new division records were set this year. The VE3LNX crew doubled the old 1979 VE1DXA Canadian multiop record with an excellent showing on six bands. Both the single op and multiop Atlantic Division records fell, with WA3AXV upping his own 1981 record by about 10,000 points and WA2OMY/3 smashing the 1981 W3KKN record by 23,000 points. In the Central Division, single op K9RO's fine effort netted him a new record about 2 kilopoints above his 1980 score. Out in the Midwest Division, the crew at NØIS added about 2 kilopoints to KØVUY's 1976 record — an excellent achievement from that part of the country in January. Finally, W1VD and friends took the WA1RWU New England record, set just last year, and upped the ante by close to 40,000 points.

Propagation wasn't outstanding for the contest. It hardly ever is in January. The good auroras and F-layer openings that occasionally occur that time of year seem to miss the contest by a week or two. Scatter was fair-to-middlin' this year, a welcome relief after last year's pitiful conditions.

The good conditions and high activity levels worked to produce some good scores. The bottom of this year's Top Ten for both single ops and multiops is about 10,000 points higher than last year's. WA3AXV came out on top of the single-op competition with another record-breaking score. Ron has made the top three in this contest since 1977. Second is WA2DPU, who also finished second in 1982 and 1981. Maybe next year, Bill? And in third place is another familiar call sign, W3HQT, last year's top man. All of the top single-op scores are from NNJ, SNJ or EPA.

In the multiop class, this year's contest played host to intense competition between W1VD and WA1RWU. On a band-by-band basis, their scores are virtually identical, with only a few QSOs difference between them. Both groups are to be commended for outstanding efforts. Good things seem to come in "threes," as K8II dominated multiop in 1977, '78 and '79, and WA1RWU dominated the class in '80, '81 and



Carl, WØRGU, used this well-appointed station to win the Minnesota section again this year. A winter ice storm two weeks before the contest did in the antenna system, but all was repaired in time for the festivities.

'82. What will happen next year? The next four scores in the multiop class are interesting in that they all come from the Atlantic Division and they all broke the old Atlantic Division record. Congratulations to WA2OMY, W3KKN, K2AA and WB3CZG for fine efforts.

Among the affiliated-club entries that help make this contest so popular, the Mt. Airy VHF RC (Pack Rats) won the Unlimited Category and reaffirmed their right to continue their 22-year reign as top vhf club. It's no wonder, as seven of the top single ops and four of the top multiops are 'Rats. It's also encouraging to see both

## Top Ten

Single Operator		Multioperator	
WA3AXV	91,494	W1VD	128,616
WA2DPU	74,910	WA1RWU	117,990
W3HQT	56,384	WA2OMY	75,040
WB2WIK	51,712	W3KKN	63,808
N2ASC	51,018	K2AA	59,136
K2MLB	50,260	WB3CZG	56,480
WA3LBI	46,500	W2SZ/2	53,580
W3HFY	43,200	AC3T	49,080
WA3NUP	41,496	W3ZD	44,268
W2EIF	41,040	WB2RVX	41,850

## Division Leaders

Single Op	Division	Multiop
VE3CRU	Canadian	VE3LNX†
WA3AXV†	Atlantic	WA2OMY†
K9RO†	Central	WB9NNTL
WØRGU	Dakota	KCØP
W5RCI	Delta	N4VC
WD6ISK	Great Lakes	KC8AB
WB2WIK	Hudson	W2SZ/2
WØRWH	Midwest	NØIS†
K1EM	New England	W1VD†
WA6NHB/7	Northwestern	K7ND
K6GSS	Pacific	N6EEK
WD4MUO	Roanoke	N8CMH
WA6LSH	Rocky Mountain	KØBJ
WB4NMA	Southeastern	N8BPB/4
WBØDTA/6	Southwestern	KE5IU
N5KW	West Gulf	K5LZO
JA1RJU	DX	—

†denotes new division record

Rochester clubs (NY and MN) hanging in there and generating massive amounts of local vhf interest.

## Affiliated-Club Competition

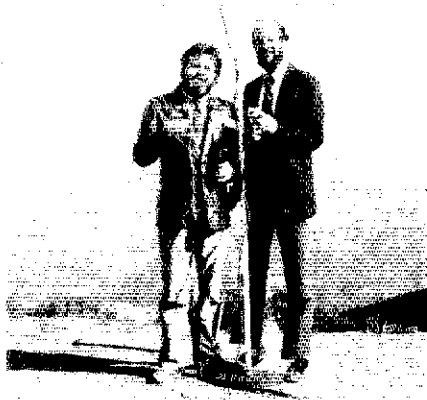
Club Name	Score	Entries	Single-Op Winner
<b>Unlimited Category</b>			
Mt. Airy VHF Radio Club	1,324,882	62	WA3AXV
Rochester VHF Group (NY)	748,896	143	WA2WWL
Rochester ARC (MN)	46,718	57	WØRGU
<b>Medium Category</b>			
Hampden Co. RA	280,576	39	KA1APR
South Jersey RA	238,030	20	WA2KOK
Ramapo Mountain ARC	236,096	19	K2MLB
Warminster ARC	222,598	30	WB3KNU
West Jersey Radio Amateurs	118,780	24	KX2W
Potomac Area VHF Society	112,714	12	W3IP
Murphy's Marauders	44,872	5	K1EM
Six Meter Club of Chicago	27,460	15	WA8FJH
Mobile Sixers RC	26,532	13	WA3JMM
<b>Local Category</b>			
Delaware Valley VHF Society	182,522	9	K3HP
Suburban ARC	169,640	9	WA3LBI
Splitrock ARA	107,700	10	WB2WIK
Dutchess Co. VHF Society	90,752	10	WA2TIF
A.W.A.R.E. (DE)	78,176	5	WB3LGC
Raritan Bay Radio Amateurs	59,232	3	WA2CWA
Mt. Tom Repeater Assn.	48,044	10	K1ZJH
Woodbridge Wireless	42,308	6	K4HWG
Toronto VHF Society	35,288	3	VE3CRU
Wellfleet ARS	32,584	5	W1GCI
Long Island Mobile ARC	30,406	3	WA2FUZ
Chicago Suburban Radio Assn.	20,548	9	N9DKO
Penn Wireless Assn.	19,692	4	WB3JHX
Drumlins ARC	18,958	6	WB2QKO
Keystone VHF Club	18,464	5	W2DGZ
Gloucester Co. ARC	17,508	4	WA2PFC
University of Mass. ARA	12,930	5	WB1FSV
IBM Owego ARC	11,016	3	K2QR
Granite State ARA	9674	5	AC1J
Fox River Radio League	3436	3	K9BQL

\*Assistant Communications Manager, ARRL

The Medium Category was again led by the Hampden Co. RA of western Massachusetts and Connecticut. They were, in turn, followed rather closely by the South Jersey RA, the Ramapo Mountain ARC and the Warminster ARC.

In the Local Category, the Delaware Valley VHF Society took home the gavel again this year by a big margin. A new club, the Toronto VHF Society (VE3ONT), promises increased activity from Ontario in the future.

Congratulations to all of the clubs submitting scores, and thank you for promoting vhf activity and contest activity.



"Here's mud in yer eye" from the "Gentleman Contesters" at N6AJC, somewhere in the Santa Ynez Mountains. N6CFO is on the left, and KD6JY on the right. WB6RIJ is taking the photo, but we trust he is also suitably attired.



Red, WB3LNZ, is one of the operators from eastern Pennsylvania who helped the Delaware Valley VHF Society win the gavel for the local-club category in the club competition.

### Single Operator Call Area Leaders — QSOs per Band

Call	50	144	220	432	1296 +
K1EM	157	239	26	15	—
WA2DPU	187	434	88	120	24
WA3AXV	159	416	108	113	36
WD4MUO	74	173	—	27	—
N5KW	65	75	5	13	1
K6GSS	76	217	45	50	11
WA6NHB/7	56	149	—	21	—
WD8ISK	104	138	—	11	—
K9RO	123	231	—	—	—
W8RGU	26	103	5	17	—
VE3CRU	45	126	16	31	11
JA1RJU	1	—	—	—	—

### Multipoperator Call Area Leaders — QSOs per Band

Call	50	144	220	432	1296 +
W1VD	378	604	70	128	3
K2AA	210	364	66	109	—
WA2OMY/3	214	394	114	92	13
W4BFB	42	154	4	—	—
K5LZO	40	50	—	5	—
KE6IU	24	88	30	9	—
K7ND	54	90	18	18	1
KC8AB	183	233	—	—	—
WB9NTL	55	130	8	12	—
N0IS	63	129	—	18	—
VE3LNX	85	188	23	46	11



The WA1RWU group photo commemorates a nationwide second-place multiop finish and a job well done. In the back row (l-r) are WA1QVK, K1FO, K1TOL, AK4L, and WA1RWU. Up front (l-r) are WB1CAC and K1WHS. The site is, once again, the 2000-foot summit of October Mountain in western Massachusetts.



### SOAPBOX

Heavy snows made the road to our planned mountain-top location impossible, so we decided to go to the flatlands and make South Carolina a little less rare (W4BFB). After spending over six months building a 220 transverter, I finally made my first QSO one hour into the contest (K8DIO). The wood stove in the shack (located in a 120-year-old barn) performed well against the outside wind and snow and +10° F temperatures (K8ZES/2). The final antenna couple to this madness is 15, plus low-band trap dipole (K6GSS). Spent more time operating my snow blower than my rig! (WA1TBV). Worked on antennas in snow storm until 1910Z Saturday. Murphy came home to roost; the 2-meter amp that had worked flawlessly for six months before the contest blew a tube (N8CMH). Poor conditions were a mixed blessing. The antennas froze south on Friday afternoon, so we would have been out of luck for aurora. Probably deserve the alligator award; we heard many weak signals calling, but couldn't get them beamed in (VE2CJA). It was a fine contest — my best ever — but the competition from the "big guns" was really intense (K2MLB). These contests are so much fun that you guys should run them every month. This way, all mental institutions could set up club stations (WA2CWA). Worked KC6A in LAX with 20 W on 432. I figure the distance is about 300 miles through the

mountains (K3ZAP/7). Picked up about 25 grid squares (W8CAP). Lost 432 preamp during contact with W1JR — think Joe jinxed me, Hi! Long live GaAs FETs? (W1RIL). The 6-meter dipole at 20 feet worked fine, but the band was dead for most of the contest (WD8DJR). I'm not sure which was worse, the propagation or the case of pneumonia I had during the contest (WA4ZLA). Let's adopt the grid system for use as multipliers, add scoring multipliers for low power operation, and remove fm operation from 144 and 432 MHz (WB8JSP). Saturday night I went down off the windy, freezing mountain, but left the antennas up and ready for the morning. Early Sunday morning, I returned to find the Forest Service ranger dismantling my antennas. He assumed I had abandoned the site (K6LMN). Rough conditions. Not much activity, S8 noise level on 6 and 2. Couldn't pull the weak ones in; must have missed 200 QSOs! Sorry, guys — we tried (KC8AB). Special thanks to W7YOZ, who not only lent me his IC-551D on pre-contest Friday, but also spent contest Saturday home-brewing a 6-meter cw rig so he could work me on all five bands (KK7B). The Jr. Boomer in the attic was about 3 inches off the floor (KR2Q). Too bad the big aurora on Jan. 9 didn't wait another week for the contest (KF3Y). Used the YL's call as a birth-

day present to her. She was sure surprised! (N6EEK). Had been on 2-meter ssb about a week before the contest. Looking forward to June (WD8OXE). Worked 53 QSOs/11 multipliers on 6 meters with 1/2-W output and a 7-element quad up 20 feet. Guess what I'm trying to say is, "Look what can be done amongst the kilowatts!" (WA2TPU). One advantage of scanning all frequencies was finding a pilot training center instructing ultra-light pilots bootlegging illegally on the 2-meter band. The conversations got pretty interesting when it came time to land! (WA5VJB). This VHF SS was the best one that I have experienced in 13 years of operating! (VE3DSS). Developed a severe case of laryngitis — had to do lots of cw! Great to hear all the 220-and-above activity (W1JR).

### FEEDBACK

Please refer to June 1982 QST, page 83, for the following corrections to the results of the 35th ARRL VHF Sweepstakes. In Eastern Massachusetts, WB1FUB should be shown as the section leader. K1FWF's actual score should have been 14,900 points. In Georgia, W4VO should have been listed as multipoperator (WB4AEH and WA4TPJ ops.), making them the section winner and Division leader.

### Scores

Call, score, QSOs, multiplier, 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).

I	W1PV	20,250-289-17- ABCDE	KA1FCR	9360-195-14- AB	KA1EJR	5980-130-13- B	WA1GTP	7664-16-17- AB
	W1RX	16,530-256-19- ABCD	WA1ZRY	9120-190-14- AB	KA1G11	5600-116-10- ABD	W1BBI	1938-51-9- A
	WB1BS	13,716-214-17- B	KALTR	8844-201-12- B	W1WVY	6028-106-9- B	K1WVY	984-31-7- B
Connecticut	K1V/H	12,650-253-15- AB	WA1LOU	8832-184-14- B	KA1G1Y	3948-94-11- A	W4KDR	478-17-2- AB
	N1QK (KALEG1, ops)		W1FAJ	6994-123-12- ABCD	KM1P	3720-91-10- B	W1VJ (+K1JX, KALGD, WA1STO)	
	K1EH	12,096-224-17- AB	K1VHI	6600-150-17- B	K1TBP	3520-80-17- B		178,616-1181-16- ABCD1
	R1PKX	10,776-173-21- A	R1ZZ	6528-126-14- ABC	K1GK	3072-64-14- B	KA1BXB (+K1GX, WB1PVE)	
		W1VRS	9550-197-15- B	WA1EBL	6072-127-13- ABD	AB1U	7604-67-11- B	36,040-439-24- ABCDE

KIMUJ (Wals DCP, HVM, RV, opr.) 1, 2, 70-198-13- ABCD	W1P0D (KAL1PO, WAI1FCD, opr.) 9522-207-13- B	K1TQ 11,728-294-12- ABD W2KBR 11,400-293-10- ABCD K2SOS 12,920-323-10- AB W2RHO 12,550-246-15- ABD K2CJ 12,400-220-15- ABD K2RZ 11,000-220-15- ABD W2ZAMJ 10,560-240-17- AB N2RF 9,552-199-14- AB	KAZNHQ 4008-167-2- B WAZ21C 4008-167-2- B N2TW 3978-153-3- AB K2RHK 3976-151-3- AB W2Z1W 3816-140-3- B W2YCM 3840-140-2- B KAZBNJ 3744-144-3- AB K2MZY 3744-78-14- AB W2Z2FS 3672-153-2- ABCD W2JC 3614-139-3- B W2Z1TH 3600-108-5- ABCD WAZ2MFY 3636-144-2- B K2JJA 3134-139-2- B K2JUR 3288-137-2- AB KAZMBR 3050-175-3- B KAZKDA 3274-120-3- BC WAZ2SK 3212-146-1- B K2YK 3072-178-2- B K2ZME 3068-118-3- AB K2Z1W 3052-109-4- AB WAZ2KDR 1042-117-3- AB W2R2HJ 3024-126-2- B K2BZY 2948-126-1- BC W2ZQK 2880-120-2- B N2DK 2856-103-2- BD KAZ2PT 2832-118-2- B W2P1T 2828-118-2- B K2ZAW 2772-126-1- B WAZ2YM 2754-81-7- AB W2S1CD 2736-91-2- ABD N2AER 2716-97-4- AB W2ZDPT 2616-109-2- AB WAZ2BD 2592-108-2- AB K2Z1M 2582-118-3- B WAZ2ZO 2482-73-7- A K2Z1X 2472-103-2- B KAZ2MS 2464-109-1- BC WAZ2SU 2400-100-2- B K2ZTN 2398-109-1- B KAZ2BK 2376-99-2- AB W2Z1R 2362-106-1- B KAZ2BD 2304-96-2- B KAZ2IR 2280-95-2- B W2Z 2256-94-2- B W2R2PI 2244-102-1- B WAZ2TP 2226-53-1- B N2B1L 2200-104-1- B W2R2RQ 2200-50-12- A KAZ2EC 2184-91-2- B W2Z1DQ 2178-99-1- B W2ZSZM 2160-90-2- B K2ZT 2156-93-1- B K2R1U 2128-56-9- B WAZ2LX 2104-64-14- B K2P2E 2072-58-7- B W2R2RQ 1872-78-4- AB K2ZNC 1870-85-1- B W2Z1Y 1848-84-1- B WAZ2EM 1848-54-1- ABCD KAZ2LE 1826-83-1- B K2ZPE 1716-66-1- B K2Z1M 1712-71-2- B K2Z1B 1672-46-1- B N2R2BC 1650-75-1- B WAZ2CH 1650-75-1- B WAZ2IH 1608-67-2- B KAZ2YU 1400-75-3- ABC WAZ2A 1400-60-2- B W2Z2JY 1430-65-1- AB KAZ2LW 1410-47-2- B W2Z1Y 1342-41-1- BU KAZ2LR 1340-42-1- B K2Z1C 1200-50-2- B W2Z1Y 1200-50-2- AB W2Z1W (KAZ2KFV, opr.) 1166-53-1- B W2DUC 1152-48-2- AB KAZ2X 1122-51-1- B N2R2B 1120-50-1- B KAZ2PS 1012-29-1- BD N2AL 1012-46-1- B WAZ2LH 924-42-1- B K2D1Y 880-40-1- B W2VZ 850-25-2- B WAZ2RQ 836-38-1- B K2Z1Y 814-37-1- B K2Z1M 616-28-1- B W2Z1C 550-25-1- B W2Z1M 550-25-1- B KAZ2Q 528-22-2- AB WAZ2LD (K2LAW, opr.) 528-24-1- B WAZ2JY 528-24-1- B WAZ2Y 504-22-1- AB W2Z1C 484-22-1- B W2Z1M 472-3-2- B W2Z1K 444-2-1- B WAZ2PM (WAZ2TM) 30,450-469-19- ABCDE WAZ2KM (WAZ2TM) 17,168-323-16- ABD N2ZK (*KAZ2SK, KX21, WAZ2 LAQ, SHN, W2Z2RN) 16,002-343-11- ABD W2Z1NH (*W2X, JSU, OD) WAZ2PRH 4292-202-13- B W2Z1T (Multiop) 2337-233-7- ABCD W2Z1GN (KAZ2 B1B, OHQ, WAZ2FO, opr.) 8676-241-8- AB WAZ2AA (*ABZ, KAZ2HRS, W2S COL, D1T, W2Z1JSR, TCU) 315-10- AB N2ONE (*WAZ2ML) 7520-235-6- AB W2Z1E (*KAZ2S, OJZ, CQC, K2ZSD) 6800-152-10- B W2Z1PT (K2B, WAZ2RQ, opr.) 5376-153-3- ABD K2Z1D (KAZ2 M2S, DRS, FH, W2Z1HX, opr.) 2736-104-2- ABD	ACCT (*W2HBS) 49,080-707-10- ABCD	Eastern Pennsylvania WAZ2XV 91,494-832-29- ABCDEF W2R1T 56,384-400-22- ABCDEF WAZ2L1 46,500-591-21- ABCD W2R1Y 43,200-542-70- ABCDE WAZ2RQ 41,496-567-16- ABCDEF K2R1Y 37,480-529-19- ABCD K2R1H 37,440-513-14- ABCDE K2R1P 37,422-546-17- ABCDE WAZ2YU 37,237-559-16- ABCDE W2R2J3 34,320-629-20- ABD WAZ2JY 33,488-614-16- ABCDEF W2R2JY 32,700-678-15- ABCDE WAZ2AJ 32,117-521-4- ABCD WAZ2L1 31,552-398-19- ABC W2R1T 31,266-474-17- ABCD K2LX (WAZ2KP, opr.) 29,736-307-18- ABC W2R1M 26,676-337-16- ABCD W2R1K 26,592-476-14- ABCD K2ZSS 24,589-329-19- ABCD W2C 23,352-617-11- ABCD WAZ2PL 23,128-440-18- ABCD K2R1P 22,800-369-14- ABCDE N2ZAD 22,736-359-18- ABD K2J1Z 20,930-358-13- ABC K2ZS 20,790-332-17- BD W2R1M 20,740-328-19- ABCD WAZ2LQ 20,362-395-13- ABCD WAZ2AJ 18,648-310-11- ABC K2R1E 18,356-353-16- AB W2R2LZ 17,904-352-14- ABC K2R1M 16,464-340-11- ABC K2YX 16,412-397-12- ABC K2R1T 15,776-248-9- ABCD WAZ2LQ 14,862-309-6- AB K2R1H 13,944-266-11- ABCD N2ET 13,746-237-19- B W2R2JH 13,120-272-10- BC K2R1Y 12,677-264-14- B K2R1B 12,116-211-16- BD N2AD 11,000-217-1- ABC K2R1C 11,968-301-7- ABC K2R1K 11,840-235-10- BC WAZ2YU 11,760-197-18- ABCD W2R1K 11,400-226-10- ABC K2R1M 10,548-247-8- ABCD K2R1S 10,200-242-7- ABCD WAZ2LQ 10,132-216-6- AB KAZ2CB 9880-190-16- B K2R1M 9786-311-11- B K2R1K 9724-221-12- B W2Z1L 9600-200-14- B K2ZV 9412-185-8- BCD WAZ2B1 9416-181-12- BCD K2R1B 9176-163-11- ABC N2ICE 9196-180-12- BC W2R1K 9016-183-8- BC WAZ2JY 8862-211-11- AB K2R1H 8738-163-11- ABC K2R1L 7056-126-18- AB KAZ2FB 7040-176-10- B K2R1B 6864-209-6- AB W2Z1C 6240-116-5- ABCDE K2R1Y 6240-108-19- P WAZ2LW 6000-151-5- ABC K2R1L 5980-187-3- ABC KAZ2BA 5852-133-12- B W2R1K 5776-117-12- B WAZ2LX 5666-118-9- BC WAZ2M 5484-96-12- B WAZ2JM 5174-140-3- ABC WAZ2AA 5124-183-4- B KAZ2FR 5076-116-8- ABC KAZ2LQ 5040-102-10- BC W2R1K 4800-107-6- B WAZ2D 4928-176-4- B WAZ2M 4896-142-7- ABC K2R1E 4650-112-5- BC N2C1H 4522-119-9- B WAZ2TE 4476-86-3- C W2R1ND 4376-86-3- B KAZ2JY 4212-81-16- B K2R1S 3940-95-11- B W2R1NK 3850-77-15- B N2C1Y 3630-121-5- B K2R1M 3600-150-2- B WAZ2TF 3586-90-3- B N2C1C 3567-137-6- B WAZ2YU 3520-106-6- ABC K2R1P 3302-108-3- BC K2D1M 3060-87-5- ABD WAZ2J1 3048-85-2- BC KAZ2HC 2940-87-5- BC N2R1H 2700-90-3- AB WAZ2LQ 2700-69-8- B K2R1J 2688-112-2- B AAZB 2678-103-3- B WAZ2LMT 2584-68-9- A WAZ2Y 2490-70-5- ABC W2DZ 2200-52-10- BD K2R1C 2100-81-3- C WAZ2L 2106-11-2- B WAZ2NF/3 1968-41-2- C K2R1J 1960-70-4- B WAZ2WAK 1952-59-6- BC W2Z1D 1900-50-9- B WAZ2SR 1898-445-7- ABC L2JC 1880-43-2- B K2R1M 1848-99-2- BC K2R1S/1M 1728-36-2- C W2R1K 1638-63-3- B KAZ2B 1240-31-0- B K2R1C 1196-46-3- B KAZ2PT 1040-40-3- B WAZ2RQ 1032-90-3- B W2Z1Q 1020-78-7- ABD W2R2JC 780-30-3- B W2R1D 744-31-2- B W2Z1P 672-28-2- AB K2R1R 572-22-3- B K2R1K 364-14-1- B KAZ2R 312-13-2- B W2R1E 264-1-2- B WAZ2JA 216-9-2- A WAZ2JM 208-8-3- A WAZ2JY 192-8-2- A
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# Results, 1983 Novice Roundup

By Bill Jennings,\* K1WJ

Andre Genereux, KA1INL, offers the following observations on the Novice Roundup:

“Attention, Novices and Technicians! It's time to get ready to enter *your* contest, the Novice Roundup. There's no other contest like it.

“That introduction to the Novice Roundup article in the January issue of *QST* was enticing enough to warrant a closer look. After reading the article, I decided I would give it a try. After all, I was a Novice with absolutely no experience in the world of contesting, and with my General class exam date fast approaching, this would hopefully be the last time I would be eligible to compete in the NR. With this in mind, I carefully weighed all the 'pros and cons' of entering the contest.

“First, on the 'con' side, I was not familiar with contest operation, but this appeared no big hurdle as a lot of other participants would be in the same situation. Second, I am into QRP operating. My rig puts out a solid 2 W. This seemed a more formidable obstacle. Third, since I'm an apartment dweller, my antenna is limited to a 'zig-zag' dipole in my attic. The 'cons' were starting to add up! Finally, there was a 30-hour time limit in the contest. Oh well!

“On the 'pro' side, it seemed like the NR would be a lot of fun. Period.

“I set as my goal the 200 QSOs needed for the certificate of participation. This seemed reasonable, as I knew I would never be able to compete against the 'big guns' who ran 100 W and more (Hi).

“Finally, January 29 arrived and the NR was underway. The first day went well, and I found 29 QSOs and 18 multipliers in my log. The second day went even better, as I logged five DX QSOs, including a DL, an ON and a G station within 30 minutes — an auspicious start. As the week progressed, the ionization layers were not cooperating and the bands deteriorated steadily. A couple of bright spots were my QSOs with DH0FAJ/HB and ZS6ADH — 'new' countries toward my DXCC. I even picked up a few new states toward my WAS award.

“By the next to the last day, I was at slightly over the 100 QSO mark and my original 200 QSO goal seemed to be drifting further away. I was counting on the last couple of days of the NR to be the most productive, but my favorite bands, 40 and 15 meters, did not want to cooperate. It was now a battle of QSB, QRM and QR-BABY, as I have a wonderful three-month-old son who does not yet fully appreciate the adventures of an Amateur Radio avocation.

“I finished the Novice Roundup with the following: 35 ARRL Sections, including three 'new' states toward my WAS; five DX countries, including three new ones toward my DXCC; one empty bottle of antacid; one slightly peeved but understanding XYL; and a score of 4680 points in the contest.

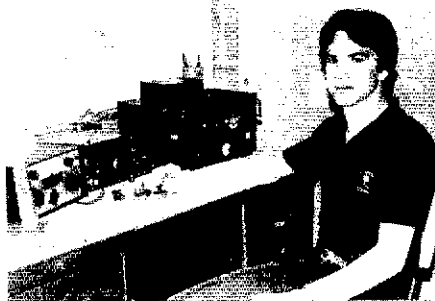
“I'll also pass along a few hints for the potential QRP contester:

1) Try to answer the 'CQs' of the stronger stations.

\*Communications Assistant, ARRL



Mr. "Big" in NR '83 is Gerardo, WP4CEQ, the top scorer in this year's contest.



Jason, KA8QHB, net control for the West Virginia Novice Net, took time out from his traffic-handling chores to turn in the no. four score from WVA.

2) Call 'CQ' sparingly, as the QRP signal seems to dissolve under the mass of higher-power signals.

3) Have patience. It really is a virtue, especially to the QRP'er.

“In summary, the Novice Roundup was all that the *QST* article predicted it would be. It was fun, frustrating and a learning experience. All in all, a once-in-a-lifetime event.”

## A Healthy Turnout

The mail here at the ARRL Contest Desk following the 1983 running of the Novice Roundup brought us logs and comments from 323 Novices and Technicians, along with 70 non-Novice and check-log entries, for a healthy total of 393 entries. It's good to see this respectable level of active participation in the NR.

Aside from Andy, KA1INL, who has expressed so well his thoughts as a first-time contester, we find an equally eloquent spokesman for the non-Novice NR participant in ARRL President Vic Clark, W4KFC. Vic is a long-time contester, who, by the way, placed high among the non-Novice entrants in the first Novice Roundup in 1952. He has eagerly looked forward to his annual participation in nearly every NR since. This year, W4KFC sent a QSL card and letter for each and every QSO he made in the NR. In analyzing the responses to his QSLs and

## Top Ten

Novice		Technician	
WP4CEQ/N	81,600	KA7KDUJ/T	33,000
KA8ONA/N	63,933	WB8NFY/ST	29,054
KA8QGF/N	43,836	KA4RXK/T	28,944
KA2KGD/N	40,827	KA8GCC/T	24,219
KA5IFE/N	40,014	N4FLP/T	22,736
KA9KKD/N	38,520	KA7LPP/T	22,701
KA8JBK/N	38,433	KA4ZIX/T	19,880
KA7HBK/N	36,855	KA4ZNJ/T	17,984
KA1IUI/N	34,732	N4FOP/T	16,320
KB4DOV/N	33,900	WD8NHN/T	16,030

from his active participation in the contest, Vic sums up his impressions of the newcomers in Amateur Radio.

“It is always a special pleasure to take part in the annual Novice Roundup and help welcome newcomers to Amateur Radio. . . particularly active newcomers, such as are to be found in the NR each year. Glad to see more Technicians taking part, too. My impression is that 1983 has produced an unusually promising group of new amateurs; information from QSLs already received this year tells me that ages ranged from nine years into the seventies and that there are a growing number of YLs entering Amateur Radio. Welcome all, to a constructive and rewarding lifetime public service hobby! — 73, Vic, W4KFC”

Certificates are scheduled to hit the mails on the 15th of June.

Do your Novice or Technician friends a favor; tell them about the Novice Roundup. They'll be glad you did.

CU in NR '84.

## SOAPBOX

Still don't know what's more difficult — trying to copy a faint signal or trying to keep the kids from destroying the house while I'm on the rig (KA9VNU). The end of the contest left me with only three states to work for WAS. I managed to work more DX stations in one morning in the contest than I'd heard in all my time on the air up to that point (KA9NAH). This was my first Novice Roundup in 10 years, and what a blast it was. The last time I participated was in 1973, when I was 16 years old and had the call WN9CIB. Back then, I had to use a 75-W transmitter that was crystal controlled. . . Had some "fun" with my exchange. Imagine trying to send "599 in In" and watch the confusion (KA9IOH). During the contest I became much more at ease about contacting people on the radio, and I think that my code speed even came up a little (KA8PAO). I had my best luck on 40 meters, and now that I know who operates when, I will have a better idea of which bands and what times to operate next time (KA8AVA). Night work on 40 meters leaves your ears and nerves in disarray and daytime on 15 meters had its share of "jammers." But isn't that what a test is all about — working under adverse conditions. . . With each new section worked, I trembled with sheer delight, just like it was my first QSO (KA6WXM). I caught a lot of static noise from local factories during the contest. Also there were three storm weather systems that passed over our area during the contest, bringing even higher static levels — sometimes to 20 or 30 dB over S9 (KA9LAO). Worked my first DX during the contest (KA8NUQ). Since I had only been on the air for less than a month, the NR more than tripled my total number of contacts. All my contest work was done with a homebrewed "double bazooka" antenna from the 1974 *Radio Amateur's Handbook* (N6HPL). I would like to see people send "true" signal reports. I find it hard to believe that my 2- to 3-W output are 599 (all the time) beyond 200 miles (KA2JLC). I learned a lot about contesting and decided that I'm too old to engage in it seriously (KA5MFN). [You're never too old to enjoy the NR, Roland. Besides, you weren't the oldest NR '83 participant by several years. Good job. — Ed.]

# Score Listings

Score listings indicate call sign, score, number of QSOs, multipliers (number of ARRL Sections + DXCC countries) and total hours.

State	Call Sign	Score	QSOs	Mults	Hours
1	RA3JGM/N	9551-213	41	29	West India
Connecticut	KAL10X/N	24,734-288	83	28	
Eastern Massachusetts	KAL1TJ/N	27,840-323	80	26	
Maine	KAL1TU/N	34,732-437	76	30	
New Hampshire	KAL1JG/N	1925-27	25	10	
Rhode Island	KAL1JF/N	950	38	25	27
Vermont	KAL1DH/N	314	37	27	9
Western Massachusetts	WB1EYL/T	12,376-771	56	19	
2	Eastern New York	KA2JKA/N	24,090-310	74	26
N.Y.C. & Long Island	KA2PWH/N	9225-190	45	30	
Northern New Jersey	KA2MKD/N	24,984-337	72	23	
Southern New Jersey	KA2KGD/N	40,827-629	91	30	
Western New York	KA2KGR/N	33,110-451	70	10	
3	Delaware	KA31QI/T	11,286-198	57	30
Eastern Pennsylvania	KA3OSX/N	19,815-221	55	19	
4	Alabama	KB4DDG/N	18,239-299	61	28
Georgia	KA6OTQ/T	12,210-712	53	27	
Kentucky	KB4DQV/N	33,900-452	75	30	
Northern Florida	KA6YLV/N	21,960-160	61	27	
South Carolina	KA6LIV/N	10,273-121	64	22	
Southern Florida	KA6QZJ/N	18,475-255	67	10	
5	Delaware	KA31QI/T	11,286-198	57	30
Eastern Pennsylvania	KA3OSX/N	19,815-221	55	19	
6	East Bay	KA6VSN/N	14,238-226	63	29
Los Angeles	KA6NPD/N	12,566-186	61	30	
North Carolina	KA6YLV/N	21,960-160	61	27	
Orange	KA6NPD/N	12,566-186	61	30	
San Francisco	KA6WJK/T	33,400-700	67	12	
7	Alaska	KA7LPP/T	22,401-329	69	30
Arizona	KA7OGE/N	9108-198	46	15	
Arkansas	KA7HBR/N	36,855-410	81	29	
California	KA7NFW/T	11,130-210	53	30	
Colorado	KA7EJY/N	10,098-187	54	30	
Connecticut	KA7NFW/T	11,130-210	53	30	
Florida	KA7EJY/N	10,098-187	54	30	
Georgia	KA7EJY/N	10,098-187	54	30	
Illinois	KA7EJY/N	10,098-187	54	30	
Indiana	KA7EJY/N	10,098-187	54	30	
Iowa	KA7EJY/N	10,098-187	54	30	
Kansas	KA7EJY/N	10,098-187	54	30	
Michigan	KA7EJY/N	10,098-187	54	30	
Minnesota	KA7EJY/N	10,098-187	54	30	
Missouri	KA7EJY/N	10,098-187	54	30	
Montana	KA7EJY/N	10,098-187	54	30	
Nebraska	KA7EJY/N	10,098-187	54	30	
Nevada	KA7EJY/N	10,098-187	54	30	
New Hampshire	KA7EJY/N	10,098-187	54	30	
New Jersey	KA7EJY/N	10,098-187	54	30	
New Mexico	KA7EJY/N	10,098-187	54	30	
New York	KA7EJY/N	10,098-187	54	30	
North Carolina	KA7EJY/N	10,098-187	54	30	
North Dakota	KA7EJY/N	10,098-187	54	30	
Ohio	KA7EJY/N	10,098-187	54	30	
Oklahoma	KA7EJY/N	10,098-187	54	30	
Oregon	KA7EJY/N	10,098-187	54	30	
Pennsylvania	KA7EJY/N	10,098-187	54	30	
Rhode Island	KA7EJY/N	10,098-187	54	30	
South Carolina	KA7EJY/N	10,098-187	54	30	
South Dakota	KA7EJY/N	10,098-187	54	30	
Tennessee	KA7EJY/N	10,098-187	54	30	
Texas	KA7EJY/N	10,098-187	54	30	
Utah	KA7EJY/N	10,098-187	54	30	
Vermont	KA7EJY/N	10,098-187	54	30	
Virginia	KA7EJY/N	10,098-187	54	30	
Washington	KA7EJY/N	10,098-187	54	30	
West Virginia	KA7EJY/N	10,098-187	54	30	
Wisconsin	KA7EJY/N	10,098-187	54	30	
Wyoming	KA7EJY/N	10,098-187	54	30	





# Section News

Coordinated by Jim Clary, WB9IHH

## The ARRL Field Organization Forum

### CANADIAN DIVISION

**ALBERTA:** SM, E. Roy Ellis, VE6XC — SM/SEC: VE6XC, ASM: VE6AMM, ST/MN: (ASP & ATN)VE6C, VE6ABC, VE6AGH, VE6AVV, VE6VF, VE6AMM, VE6AHC, VE6ABC, VE6AL, VE6FO. Plan to attend annual Red Deer picnic 17-19 June at the Benito Fairgrounds. CARA will run a first class FD operation from the site where the Boy Scout World Jamboree is to be held in July. Other clubs and individuals are encouraged to run an event of their own to see how well prepared we are in emergency situations. The Waterton Hamfest planning continues to roll along. Congrats to the Hat Ham club who have established the best working communications system with local authorities in the province. Traffic: VE6CHK 289, VE6ABC 19, VE6QN 2, VE6CAA 2.

**BRITISH COLUMBIA:** SM, H. E. Savage, VE7FB — BCEN, 3650 kHz, 0300Z NM VE7CSI and Asst. NM VE7BN reports net 33 new checkins. QNI 315, QTC 469. BC Public Service Corp Net, 3655 kHz at 2100Z VE7VC NM reports high 198, low 98, total 4342. VE7AXH seriously ill in hospital, and VE7AGL is in hospital. VE7ARR has challenged the members of Vancouver ARC to work all the states and provinces they can in one month. VE7EAL War 2 Havard he made force landing into the salt chuck, VE7VGB at school learning how to fly the Boeing 767. Traffic: VE7BN1 103, VE7CDR 79, VE7ZK 78, VE7EDN 48, VE7FB 45, VE7EDN 16, VE7BZ 8.

**MANITOBA:** SM, Peter Guenther, VE4PG — ASM: AJE, STM: RO, OO: JK. NMs: ACX TE VJ HW NM. Fractured hip has put yours truly out of action for a month now. Things are healing nicely. VE4FK has just returned from the British Isles. MTR QNI 178, QTC 79, sess. 3. WRIN QNI 292, QTC nil, sess. 9. MFPN QNI 1094, QTC 32, sess. 31. MNN QNI 481, QTC 30, sess. 31. Traffic: VE4AJE 43, VE4ACX 41, VE4RO 38, VE4EJ 30, VE4JA 17, VE4AAD 15, VE4O0 15, VE4EN 7, VE4AAJ 6, VE4ID 5, VE4AP 4, VE4DS 4, VE4FP 3, VE4E 2, VE4CF 2, VE4L 2, VE4NO 2, VE4CR 1, VE4NM 1, VE4TR 1, VE4TL 1, VE4XN 1.

**MARITIME/NEWFOUNDLAND:** SM, D. R. Welling, VE1WF — ASM: VO1FG, NMs: VO1JUN, VE1WR, VE1EI has resigned as SEC. Urgently need volunteer to take the SEC appointment. The OBS program is nearly filled now. If your area does not have anyone reading CHRL bulletins on nets, please advise the SM who will attempt find volunteer. VE1ASJ advises that the CHRL Outgoing Bureau slowly picking up. All members are reminded they can forward their QSL cards via the bureau. Hopefully will be able to visit clubs in Newfoundland next fall. Hope to see lots of activity from section on Field Day. APN: QNI 177, QTC 93, sess. 31, time 401 minutes. Traffic: VE1WF 330, VE1XF 102, VE1XO 50, VE1LOR 29, VE1BKM 13, VO1AW 6.

**ONTARIO:** SM, Larry Thivierge, VE3GT — SEC: VE3GV, STM: VE3GFN, VE3CAB of the CTV Area advises that owing to the success of the March ARRL Teleconference Radio Net on rpt VE3GFR the June 2 Net will be broadcast on 2100Z on 21 June. In addition to VE3GFR there will transmit uplink to the new VE3ULR net which will enable the following rpters to carry the net: VE3MTR VE3ZAP VE3DRW VE3OD VE3TR. Other rpt groups wishing to use the feed from VE3ULR for future nets must first contact VE3CAB. The CARTG RTTY DX contest of last October enticed more Canadian stations to participate than ever before. The new TRC-24 is available at long last from DOC. Although dated April 1, examinations will not be based on this syllabus until next year. The 24th All-Asian DX Contest sponsored by the JARRL to enhance the activity between Asian and non-Asian stations is June 18-19 for those on August 27-28 for cw. I regret to announce that E3DJJ, VE3QV will be becoming Silent Keys. VE3QV was the oldest amateur in the Waterloo area. There are reports of a new club forming in the Wallaceburg area with VE3DTR as president and VE2BSM as secretary. Owing to a lack of good facilities and competition for available dates, the Barrie ARC have disbanded their hamfest plans for the future and dissolved the hamfest committee. VE3FXT and VE3DAZ, using the call GW3WNE will be active on 21.245 MHz from Wales promoting and celebrating the "Festival of Castles" as they operate from various castles during the 700th anniversary of the building of many of these castles. VE3KXA and VE3ACY are now VE7s. Port Colborne is celebrating its 150th anniversary and incorporation while Renfrew celebrates its 125th. Special activities will be taking place both locations, new OBS appointees are: VE3AR VE3CDS VE3FOI. Your FD group earns 100 bonus points for a message to your SM during this month's annual FD. Traffic: VE3HTL 594, VE3KK 259, VE3CYR 126, VE3JSM 122, VE3GOL 114, VE3DPO 112, VE3FGU 110, VE3GT 107, VE3KCZ 88, VE3HGJ 72, VE3BDM 71, VE3KXB 62, VE3WJ 58, VE3GFN 57, VE3AJN 52, VE3AAE 41, VE3BZ 37, VE3BVG 36, VE3EWD 36, VE3VW 33, VE3WM 31, VE3EHL 12, VE3EFX 8. (Feb.) VE3AAE 80.

**QUEBEC:** SM, Harold Moreau, VE2BP — SEC: VE2DEA, STM: VE2EDO, NMs: VE2EDO VE2FSA. It seems that many clubs and stations are ready for the big day, Field Day; our section will be well represented. Your SM will be operating station VE2QST. VE2BNN is now VE2GT. Congrats to VE2AG for DXCC. With regret, I have to report VE2UL as Silent Key. SARA have fine programs at meetings, also a nice new letter edited by N3DCK. Congrats to SARA upgrades KA3HAE and KA3JYB. Thanks

### ATLANTIC DIVISION

**DELAWARE:** SM, Harold K. Low, WA3WY — STM: W3DKX, SEC: W3PQ, PSHR: WA3WY K3JL. The 224.36 Over The Hill Gang and the Old Buzzards clubs are co-sponsoring a family picnic June 18. For info, write Box 426, New Castle, DE 19720. SARA have fine programs at meetings, also a nice new letter edited by N3DCK. Congrats to SARA upgrades KA3HAE and KA3JYB. Thanks

to N3CGH, am now getting DARC news in time for column. DARC's WB3EQU has arranged programs on computers. KARC had WB3ABC as speaker at April meeting. Very informative and interesting, and was well attended. DTTN: QNI 419, QTC 41 in 23 sess. DEPN QNI 60, QTC 4 in 4 sess. KARC QNI 34 in 4 sess. SEN QNI 46, QTC 8 in 5 sess. Traffic: WB3UD 98, WA3WY 52, W3QQ 49, W3DKX 22, K3JL 15, WA3PWT 13, K3ZXP 6, W3WD 2.

**EASTERN PENNSYLVANIA:** SM, Karl W. Pfeil, W3VA — ACC: KB3NE, SEC: WA3PZO, SGL: N3CJP, STM: KB3LF, DEC: AA3C K3QX KB3QW KB3UD N3BFL N3CJP W3EEK.

Net	Freq.	Time	QNI	QTC	Sess.
EPAEPTN	3910	6 P.M. Dy	593	183	31
EDC	3610	7:30 P.M. Dy	437	153	59
PTTN	3810	3:30 P.M. Dy	269	76	31
PFN	3558	5 P.M. Dy	300	269	31

Local and vhf nets reporting (QNI/QTC/sess): D3ARES 159/114; CARCEN 46/3/5; CUMCARSN 54/14/5. New appts: N3CJP to State Govt, Liaison (SGL); K3FW to ORS. Congrats. PSHR: AA3C KA3DLY KA3EJG KA3GUT KB3FV KB3UD N3CJP N3COY W3VA W3B3FK W3BKUZ W3B3FYT. OO reports: W3FA W3KEK. OBS reports: KA3EJG W3AVJ W3GL W3VA W3A3ENE. Congrats to WB3HNK on his appt to ARRL VHF Awards Manager on his appt to ARRL VHF Awards Manager for this area. W3ABC, Atlantic Div. Director, presented 50-year plaque to York AR for its affiliation with ARRL. AA3C reports EDC planning a computer file for October. Congrats to K3IL for working all the countries on the current ARRL DXCC list. PTTN welcomes K3F3 N3CSE and WB3CLW. N3DCE and N3BLT upgraded to A. KA3EJZ to Tech. KA3KUC new Novice in Lakesville. WB3FYT sporting new IC-3AT. K3YD working hard for DXCC with 42 new ones since Jan. N3COY reports PSHR for first time; welcome aboard. WB3FYT reports all tlc totals from atomic power plant drill with ARES. Members of the D3ARES and Luzerne Co. ARES nets did FB job during the Berwick atomic power plant drill. FEMA officials were well satisfied with the results. Nice going, gang. KB3LF now located in Ackermanville and is on the nets with a FB sig. N3CJP now SGL for the section. Any info or questions should now be sent to him. I still have openings for OO/RFI Coordinator, Tech Coordinator, Public Information Officer, and Bulletin Manager. Anyone interested in any of these appts contact this office. Watch for date and place for EPA section picnic this summer. Traffic: KB3UD 181, W3JPF 145, KA3DLY 130, KB3FV 130, WB3KPE 130, WA3WQP 127, N3CD 110, W3VA 82, WB3KJZ 73, N3COY 71, W3DP 71, WB3FYT 60, WA3EHD 57, KB3LF 53, KA3GJT 44, KE3U 44, KA3IME 42, W3TVM 41, WB3FKP 36, N3CJP 32, KA3EJG 31, N3AKG 28, W3AQN 26, N3AW 24, K3QXC 18, W3ADE 17, N3BFL 16, W3AVJ 12, W3CL 12, WA3OKA 8, W3FA 7, N3CMC 4, KA3FUL 4, AF3Z 3, AA3C 2, N3BHF 1, K3YD 1.

**MARYLAND DISTRICT OF COLUMBIA:** SM, Karl R. Medrow, W3FA — Especially for ECs: Renew your contact with old gods and others you provide communications for. A recent MEM CDA Communications Workshop had many of us out of date and not on their lists! SEC WA3TAI is QRL overtime and trying to get that 20-meter 5-el beam up. K3OMN/Cumberland, KC3DW/Hagerstown, AARC/Anne Arundel Co. report their net activity along with the broader coverage nets WR PON/WB3BFK, MDC PON/W3OYV, MFPN/WB2GZU, and MDD/W3PQ. The QNI average of about 2D indicates good local coverage. Congrats to you all. W3ZNV is Calvert's ARES man. KB3WL has snow when the rest of us have rain. KC3D had a good time in the DY test. K3HFG and KA3CDD added to their DXCC totals. W3CDD enjoyed the WA3A dinner as did W3FVZ and many many others. W3JPT is back from Geneva Mobile WARC, and is WAS no. 80 via satellite; congrats. OO KA3R got a nice compliment from one he tried to help! That's a good feeling. WB3KJT finds too little time for nets and too much job. KC3AV has the Maryland Slow Net meeting nightly at 1930 local time on 3717 kHz. This is the place to start. KC3Y is on many nets. KJ3E since his trip west is more than a little behind in his chores. W3UT is back in full swing on MDD. PVRC gave a 5 Meg award to WARW K2PLF N4MO W3GN N2FB K7SV K3DI KA1GD K2BA and N3AM. Congrats. WA3EOP sent a few messages. W3LDD discovers TVI with a new balun. W3JL covers Balto-Annapolis corridor. W3DQJ has not enjoyed the computer lately. W3JG has worked up a good RACES-ARES system in Baltimore and surrounding counties. KA3JID and K3JF use 40-meter dipoles on 80 meters. The Frederick ARC has N3AGM, pres.; W3JUT, v.p.; W3KQV, secy.; W3FWD, tres.; W3FDA, training officer. The Columbia Area has teams for monitoring and reporting radiation levels or other disaster events. W3WOI/K3CJU, WA3VLO/W3CCV, W3WRU/N3AC, N3AFN/WA3ZWX and W3EBB/N3CCW, participated in a recent test with WB3IDR and WA1QAA as net controls. Traffic: KC3DW 266, W3FA 193, KC3Y 94, W3UT 55, K3JF 43, KB3VL 42, KA3EYV 36, WB3BFK 33, W3FVZ 31, W3YV 24, KJ3E 21, W3DD 19, W3ZNV 16, W3LDD 14, WA3VPL 10, K3OMN 5, WA3EOP 6, WB3KJT 6, KB3NL 2, KC3D 2.

**SOUTHERN NEW JERSEY:** SM, Edward E. Wood, N2CER — SEC: W2HOB, STM: WA2HEB, SGL: W2XQ, SM: WB2BWL. Owing to the pressures of the real world, the administration of SNJ ARES had lost its momentum over the course of the past year, but your SEC is back at the helm, trying to re-establish working programs in certain counties. He is actively recruiting ECs for the counties of ATLANTIC, CAMDEN, OCEAN and SALEM where the leadership position has been vacant. These counties all had good ARES programs at one time, but they too have lost momentum since the resignation of the EC there. ARE YOU INTERESTED? Requirements are League membership and being a resident of the county for which you wish to become EC. Also, you will need administrative experience as well as the need to make a commitment for job that doesn't pay except in knowing that you have organized a program which will help communities in need of communications assistance in time of disaster. To become a member of the ARES team, contact the EC in your county, the SEC, W2HOB, or the SM, N2CER. Traf-

fic: N2CER 632, WB2ZJF 316, WA2HEB 162, KC2TM 67, KC2FB 59, WB2PX 55, WB2JCE 32, W2IU 30, KY2T 29, KM2E 27, KAZANJ 21, W2BN 3.

**WESTERN NEW YORK:** SM, William W. Thompson, W2MTA — SEC: W2BCH, STM: W2ZQJ, ASM: W2GLF, DEC: WA2AI KA2BHR WB3CJUF W2GJ (acting) WB2NAD

Net	Freq.	Time/Day	QNI	GSP	QND
NARASEN	7515	0930/Sn	91	0	4
NYS/1*	3677	1000/Dy	277	153	30
Mike Farad	3925	1300/M-S	263	73	27
THIN	3913	1600/Sn	51	—	4
NYPON*	3913	1700/Dy	712	335	31
NYSPTN*	3925	1800/Dy	690	83	31
ESS	3590	1800/Dy	493	63	31
Lewis Co	4303	1800/Sn	38	—	5
OCTEN*	3494	1830/Dy	641	87	31
O Net	3191	1830/Dy	482	22	31
STARVE*	9939	1830/Dy	52	12	30
WDNE*	0464	1830/Dy	636	153	31
Blue Line	9333	1900/Dy	304	9	20
NYS/A*	3677	1900/Dy	587	319	32
SLVARES	3191	1930/Sn	40	—	4
JCARCN	1070	2000/Dy	489	11	31
OARCN	2585	2000/W	95	0	5
VHF THIN	0464	2000/Tu	72	—	5
WNYEON	3955	2000/3Sn	(ARES)		
BRVN	055/655	2100/Dy	382	9	31
CNYTN*	90/30	2115/Dy	449	103	31
STAR/L	325/925	2130/Dy	64	19	24
WDNL*	0464	2130/Dy	657	124	31
NYS/5*	3677	2200/Dy	484	329	31
Erie-Niag	3191	1200/1500			

\*NTS. Blue Line (Feb) 219-4-28; thanks to Greater Adirondack RA and Tupper Lake C of C for assist with new rpt equipment. Hamfests: Rome June 5, Cortland June 18, Batavia July 10, Trumansburg Aug 27, Hamburg Sept. 10. Novice crop growing in Fulton, Oswego, Rochester and Syracuse areas — thanks to all of you Elmers and Elmas. New club officers: Salt City-K2PZ KB2DM KA2GMT KB2G; Utica ARC-WA2AZA WB2BIN WB2JNV WA2LEZ; Liverpool ARC-WA2MQM W2GLM KA2MKV WA2FWM; PSHR: WA2ET KA2BHR N2BLX KA2DQV WA2FJJ W2GJ WB2JDS WA2KOL W2MTA W2CWO KC2CO WB2RBA KC2SW W2ZQJ. Reports: OO KA2CC (OES) KA2LHO K2OC, (OBS) W2GLH K2KWK. COMMS: Saint Patrick's Day Parade Syracuse-WA2PUU. Phase IIIB launch now sked for 3 June; the Old Timer at RAGS suggests a trans lunar followup for improved EME work. Traffic: W2MTA 351, WA2ET 334, WB2OWO 294, WB2IDS 292, WA2FJJ 274, WB2QJX 209, KC2QO 141, W2FR 140, KA2BHR 127, W2ZQJ 117, WB2RBA 89, N2BLX 88.

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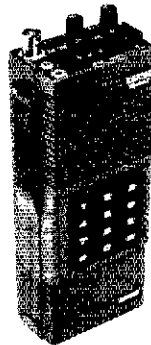
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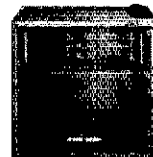
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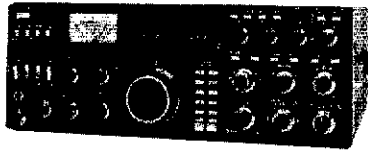
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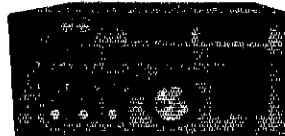
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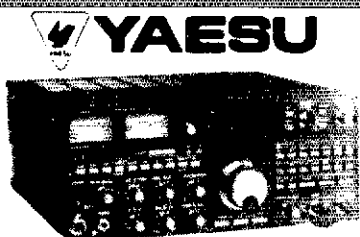
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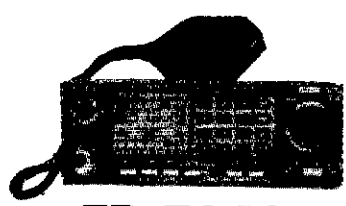
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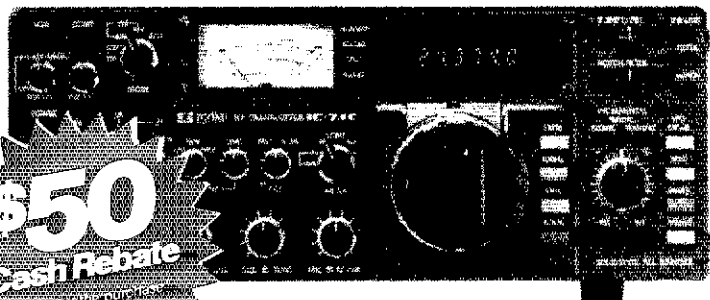
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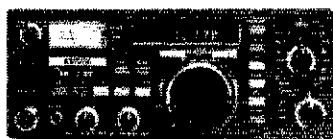
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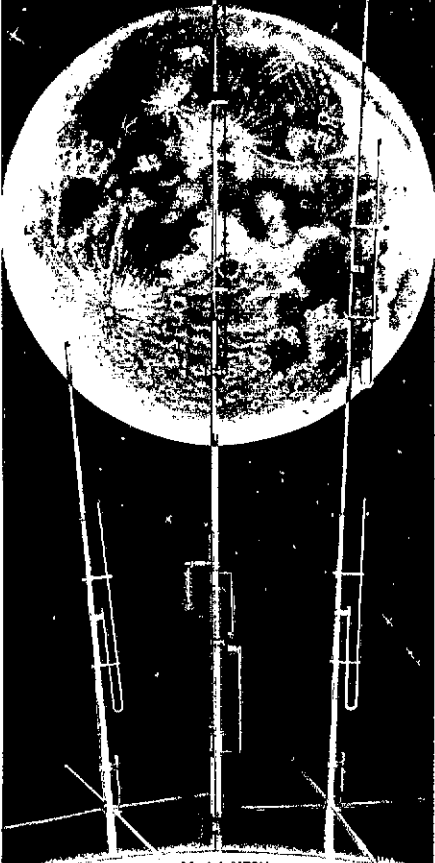


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Model HF6V-Completely automatic bandswitching 80 through 10 plus 30 meters. Outperforms all 4- and 5-band "trap" verticals of comparable size. Thousands in use worldwide since December '81! 160 meter option available now; retrofit kits for remaining WARC bands coming soon. Height: 26 ft/7.8 meters; guying not required in most installations.

Model 2MVCV "Trombone"™ —omnidirectional collinear gain vertical for 2 meters having the same gain as "double-5/8λ" types, but the patented "trombone" phasing section allows the radiator to remain unbroken by insulators for maximum strength in high winds. No coils "plumber's delight" construction and adjustable gamma match for complete D.C. grounding and lowest possible SWR. Height: 9.8 ft/2.98 meters.

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VE2FMO 79, KC2SW 66, WA2NPQ 59, KG2D 53, WA2KQJ 52, K2GXT 46, KB3RG 45, KA2DQA 41, KC2XD 41, KU2N 38, W2GJ 31, KA2DBD 21, W2HYM 20, AF2K 20, K2RN 20, N2DZD 19, W2PFE 18, W2PFD 17, N2ARD 16, N2ABA 12, W2OEP 11, WA2RXO 12, W2BCUF 6, K2CV 5, WA2AIV 4, K2QR 4, K2VR 2. (Feb.) W2PHQ 19, K2ZJ 4.

WESTERN PENNSYLVANIA: SM, Otto L. Schuler, K3SM6 — SEC: AB3Q, STM: AC3N, OOIRFI Coord: KN3B, ACC: N3EE, PIO: W3CEW, SGL: W3OKN.

Net	QNI	QTC	Sess.	kHz	T/D
WPACW	403	197	31	3585	7:00 P/D
WPAPT	684	165	31	3983	6:15 P/D
WPA2MTN	478	78	31	148,28/68	8:00 P/D
NWPA2MTN				148,04/64	9:00 P/D

I regret to announce that WB3JIE is a Silent Key. The Crawford ARS has a notice net on 3.745 MHz daily at 8:30 P.M. KF3F is the NM, New Novices are KAs KNN KNL KJP KSV KST KSY KSX KQC. New Generals N3BQ KA3HSV & KA3FFM, New Advanced KC3FI (was KA3JY). Congrats to all, new calls: KD3GO was N3CKC, KD3GK was KA3JY, Club officers 1983-84 Irwin AARA: W3CUW, pres.; W3LHG, v.p.; AF3W, secy.; K3KGY, treas.; K3GHD, com dir. Nittany ARC: K3CM, pres.; W3LOU, v.p.; W3CXR, secy.; W3FAU, treas.; W3NEM, trustee; K3BIE, membership; KA3DBU N3BMV WA3FC, directors. Horsehoe ARC: KA3FC, pres.; N3CBD, v.p.; WA3VUP, secy./treas. N3BQI W3APQ W3LOU, act. comm.; W3SEFQ, editor. All applications for appointments should be sent to the staff member in charge of the area you wish to be active in, i.e. ORS to the STM, E.C. to the SEC or DEC, OOs to the OOIRFI, etc. ORS, OOs & OES are available to all who can give the time needed to the appointment. Traffic: N3ADU 680, AC3N 208, K3CR 169, W3OKN 93, W3EKG 85, KN3B 62, N3CKQ 58, N3FM 54, WA3QNT 54, W3RUL 48, K3NPW 46, K3SMB 46, W3IQD 43, W3MML 30, W3NGO 30, W3MKZ 21, K3BGG 18, W3VAV 15, W3HBE 14, K3HCT 14, K3BNV 13, K3VQY 12, KA3HDL 10, K3LTV 10, W3TNN 9, K3YDH 8, W3KUN 7, W3TTS 7, N3KB 6, K3BL 5, K3TUA 5, KF3V 5, W3LOD 1. (March) N3WS 15.

## CENTRAL DIVISION

ILLINOIS: SM, David E. Lattan, WD9EBQ — SEC: W9QBH, STM: K89X, OOIRFI: K9MX, BM: K9ZDN, PIO: WD9EED, ASM: K9ORP.

Net	Freq	Time(s)	QNI	QTC	Sess.
ILN	3690	0030/0400 Dy	588	221	62
IPN	3915	2230 Dy x-Sn	947	136	31
NCPN	3915	1300 Dy	502	81	27
NCPN	7270	1815 Dy	188	85	27
ITN	3705	0100 Dy	307	271	31
IEN	3940	1500 Sn	119	3	4
IARES	3915	2230 1 + 3 Sn	40	0	2

9RND 100%: W9HOT W9NXG W9HLX KB9MR W9SODN W9B9XB W9WGD, CAND 100%: W9HOT W9NXG W9WGD W9B9VN, W9VEY/Mem had 53 QNI and 10 QTC in 4 sss. KB9MR reports that the CENOIS Novice class has graduated the following new hams: KA9S OPF PAB OWL OVM PAI PDP PPH PBI and CXK, with KA9PAB and KA9PDP having already upgraded. Congrats to the new hams, and to teachers KA9BYB and KD8D. Many IL ECs have reported drills and training programs aimed at cooperation with the National Weather Service SKYWARN program in preparation for the 1983 severe weather season. The Illinois Statewide Tornado drill was held on March 1 at 10 A.M., and by 11 A.M. 179 amateurs had reported their participation to SEC W9QBH via 2 meters and 3915 kHz. Of those reporting, 120 were trained as severe weather spotters. While raw numbers of reports are down this year, this may be the result of more careful tabulation to avoid duplication as many hams check into more than one net. In past years many have been counted more than once in terms of statewide participation. This year's report indicates the ever increasing commitment of ARES members in terms of NWS training. Reports of Mar 1 activity were received from the following EC/NCSs: K9BBG W9QJB W9ZKD W9SSTX N9AOP W9TULZ KA9JGN KA9JMG W9N9PC W9B9CA W9HLX W9VXN KB9MR W9CWE W9SSP. Several Indiana counties falling into the Chicago NWS warning responsibility area also checked into IL nets. WD9BBI reports that Bolingbrook ARS will again be providing communications for the May 1983 March of Dimes Walk-a-Thon. This marks BARS 5th year of participation in this event. After long absence at school for his employer, OOIRFI coord K9JH will be returning to IL; welcome back! Past month's columns have been crowded and we have neglected to congratulate some recent appointees. Relatively new ECs include: KB9MR K9CI W9VO W9YUN KC9GT WA9MID WD9HQW N9AZZ. Recent ORS appointees are: W9HLX W9HOT W9TLU N9DIX K9EHP W9OK WD9IBH WA9MID. Lots of these gents have been carrying the mail for quite some time! Thanks for taking the time to become an appointee and WELCOME ABOARD!! Here we go again! Hams in Schaumburg report that the zoning board there has passed a new ordinance that is quite unreasonable. WE MUST PUT A STOP TO SUCH LOCKS! Support the support of clubs in places like Schaumburg and Bolingbrook to overturn legislation that is unfavorable to Amateur Radio and often in conflict with Federal law. Financial support of these efforts is important, BUT SO IS YOUR INVOLVEMENT IN PUBLIC SERVICE! It is only through continued public service that we can prove to local officials and to the public at large that we are worth the spectrum that we now command. GET INVOLVED and STAY INVOLVED!! Traffic: W9NXG 267, W9B9UEA 185, KB9X 185, KC9MO 183, W9HOT 181, W9UJ 171, KA9EGW 108, W9K 101, KA9NVO 93, KD9K 86, W9HLX 85, W9TLU 59, KB9MR 46, K9AZ 45, KA9S 43, KA9SIE 43, KN9BAM 38, K9QEW 31, K9BYE 27, W9BIB 25, W9TNN 21, WD9BBI 16, W9KR 16, N9DIX 10, W9SSP 8, WA9SRUM 8, KA9OZJ 7, KA9NB 6, WD9CJB 6, W9BRLX 4.

INDIANA: SM, Bruce Woodward, W9UMH — SEC: W9BZQE, STM: W9UJ, SOCC: K9JG, SGL: W9BVS, SFC: NSWB, ACC: K9TUS, SCC: W9DBR, STC: W9ADB, PIO: K9DVI, SDCX: N9MM, BM: K9TA, NMS: ITN-W9QY; QIN-K9J; ICN-K9CZ; VHF-W9SPMT; IWN-N9BHT.

Net	Freq	Time/UTC/Daily	QNI	QTC	QTR	Sess.
ITN	3910	1330/2300	2190	286	1681	62
QIN	3856	1430/0100/0400	808	347	1865	93
ICN	3708	0100	120	68	642	31
IPN	3910	2130	1297	83	1025	31
IWN	3910	1310	2918		535	31

Hoosier vhf nets. QNI 7184, QTC 268, QTR 8987, bulleting 144 for 27 nets. D9RN 100% 404 messages in 1476 minutes. In stns K9GCS W9UJ W9URQ KGAR. Appts: ORS-W9LSE; DEC for Benton, Warren, Fountain, White, Carol, Tippacan, Montgomery, Clinton, Fulton, Cass, Miami, Wadon, etc. New Co-ops: EC for Case Co. EC for Rush Co. N9DGO; EC for LaPorte Co. N9CLV; EC for Cass Co. N9AIR; OOIRFI-W9NDDV W9URS W9B9TOW K9KPC. Silent Keys: WD9EKR W9GQ. Our primary phone net frequency is 3910. This is also our primary statewide

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WARC BAND WITH  
A3 OR A4

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

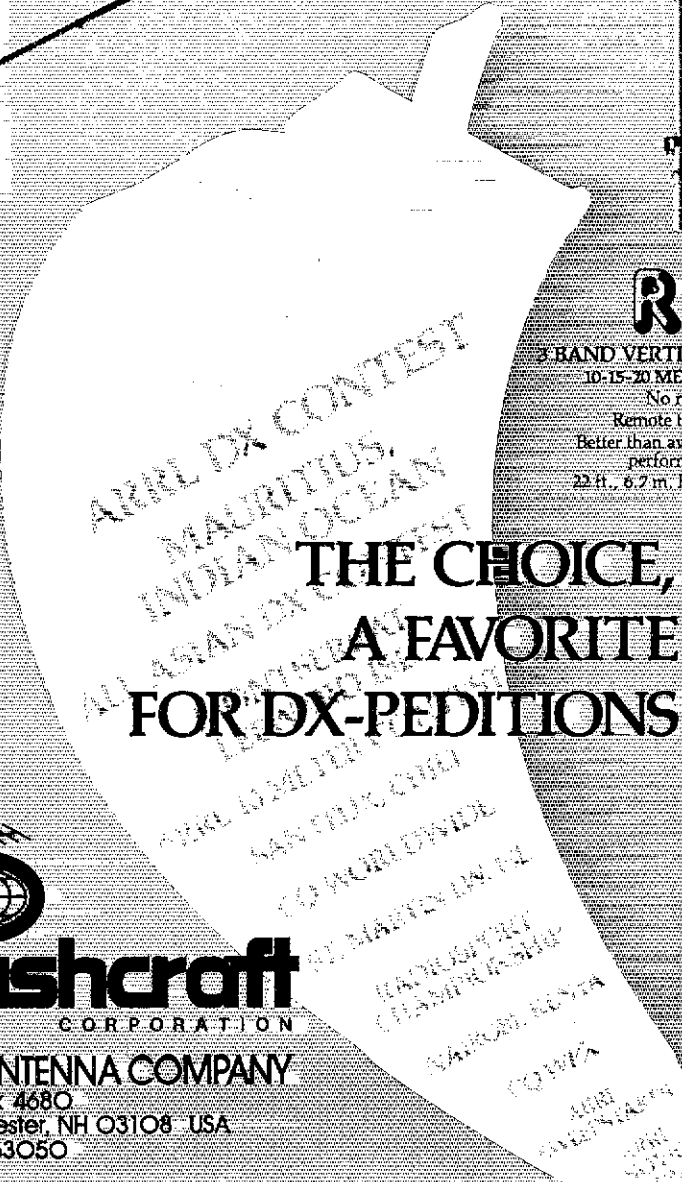
**A4**  
Broadband, excellent gain and f/b ratio, 2 kw power rating, direct 50  $\Omega$  feed, boom 18 ft., 5.48 m., longest element 32 ft., 9.7m., weight 37 lbs., 16.8 kg., turn radius 18 ft., 5.48 m., mast dia. 1 1/4" to 2 in., 3.18 to 5.08 cm., material 6063-T832 seamless aluminum.



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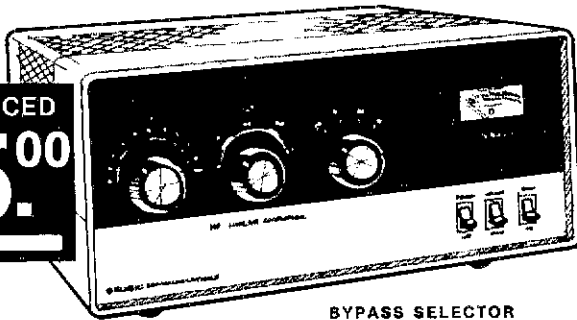
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80, 40, 20 and 15 meters. 10 Meter band available on export models if requested

**Power Input**  
1500 Watts PEP on SSB, 1000 Watts DC on CW

**Cooling**  
Heavy duty fan for cool, efficient operation

**FEATURES**

- ✓ Built-in 115/230V, 50/60 Hz Power Supply
- ✓ Tuned input to operate with solid state transceivers
- ✓ Bypass selection switching to standby

**BYPASS SELECTOR**  
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100 Watts for full output

**Dimensions**  
6.37" (162 mm) H x 14.63" (372 mm) W x 13.45" (342 mm) D

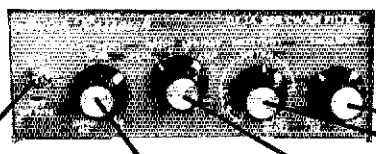
**Weight**  
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## THE AUTEK "QRM ELIMINATOR"



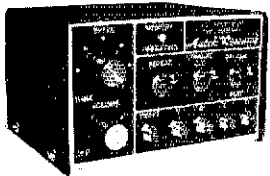
**Model QF-1A**  
**For SSB & CW**  
**\$73.00** (Includes AC supply)

- 115 VAC supply built-in. Filter by-passed when off.
- Auxiliary Notch rejects 80 to 11,000 Hz! Covers signals other notches can't touch.
- Four main filter modes for any QRM situation.
- Continuously variable main selectivity (to an incredible 20 Hz!)
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AUTEK pioneered the ACTIVE AUDIO FILTER back in 1972. Today, we're still the engineering leader. Our new QF-1A is the latest example. It's INFINITELY VARIABLE. You vary selectivity 100:1 and frequency over the entire usable audio range. This lets you reject whistles with dual notches (to 70 dB), or reject SSB hiss and splatter with a fully adjustable lowpass plus aux. notch. Imagine what the NARROWEST CW FILTER MADE will do to QRM! HP rejects low frequencies. Skirts exceed 80 dB 1 watt speaker amp.

Built-in 115 VAC supply. 6 1/2 x 5 1/2". Two-tone grey styling. Even latest rigs include only a fraction of the QF-1A selectivity. Yet it hooks up in minutes to ANY rig—Yaesu, Kenwood, Drake, Swan, Atlas, Tempo, Heath, Collins, Ten-Tec, etc. Just plug it into your phone jack and connect speaker, or phones to the output. Join the thousands of owners who now hear stations they couldn't copy without a QF-1A! It really works!

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emergency frequency, and as such should be monitored during severe weather and used as much as possible at all times. Congrats to the Huntington Co. ARS for their donation of ARRL literature to the Huntington Public Library. I am not sure of any other clubs doing this. Congrats to N9DTG for her Tech, and to K59L for Extra. Congrats to K99Q new president Porter Co. ARC. Congratulations to K59L for his Extra. CAND reports 1002 messages in 31 sessions. D9RN 100% IN stns W9JUU W9URQ. 9RN QNI 468, QTC 518, QTR 1133 minutes in 62 sess. IN 100% IN stns N9AI W9EI N9ZJ K9J9 W9JUU W9ACF W9QLW W9BRT19 W9B9YU K9WV1. Several CoAs have reported the 148.895 + K9RNC rpt for conduct totally foreign to Amateur Radio. Informal traffic is an important part of any phone net, and although formal traffic must come first, one must not put restrictions on informals. WB9DFD's article in the MAARC EXCITER is the kind of thing I like to see. I hope it turned the Muncie Club on. They are great. The Fort Wayne RC is the first SSC for Indiana, having been approved by K9TUS W9UMH & W9PRN. Congrats. Traffic: W9JUU 1133, W9B9YU 265, KM9B 159, W9EI 150, W9URQ 146, W9QJW 93, W9ACF 77, KA9CIU 69, K9WVW 52, W9JZY 48, W9AI 48, K9GTA 36, W9SHH 35, W9DHI 44, K9J 43, W9UMH 42, K9JZY 39, W9PRN 38, W9PM 36, K9DCX 34, K9CEB 31, W9B9MIK 25, KA9FFO 24, K9SNR 21, N9CQS 19, K9KTB 19, W9AOKK 11, W9DKP 10, K9ET 10, W99ET 10, W99OZZ 9, W9LJU & W9ZGC 8, W99CIV 7, W9AJNC 6, W9OZJ 6, W9RTH 6, W99DWD 5, W9XO 5, K9FW 4, W9BDP 3, W99ART 2, W99U1 2, W99AJ 1, N9DHX 1, K9OUP 1.

**WISCONSIN:** SM, Roy A. Pedersen, K9FHI — SEC: W9OAK. STM: K9UTQ. BWN 3984 1200Z QNI 1316, QTC 1459 W99YYP. BEN 3985 1800Z QNI 701, QTC 243, W99ESM, W9BN 3985 2300Z QNI 1039, QTC 388 K9UTQ, WNN 3723 0000Z WNI 208, QTC 67 KA9HPQ, WSSN 3645 0030Z QNI 195, QTC 50 KC9CJ, WIN-E 3662 0100Z QNI 299, QTC 134 W9YCV, WIN-L 3662 0400Z QNI 219, QTC 112, K9LJU, XPO 3925 1831Z QNI 335, QTC 22 W99GYF, N9VTN 341.94 0030Z QNI 444, QTC 43 W99YYP, Gr. Bay 72.12 Thurs. 0245Z QNI 40, QTC 2 W99NRK, WCWTV 31.91 0030Z QNI 520, QTC 42 N9AJG, Effective April 1, K9AI will assume duties as Sec. of W9BN. Flambeau ARC participated in Logjam cross country race and Musherama sled dog race, with many compliments of a job well done. KA9OV5, YL of KA9IRE, has Novice. KA9HPQ & W9B9WHP have taken up cross country skiing. W99CIV is now KF4SO, W9RF has 50-year certificate from QCWA. WA9SSH is back in Stevens Point. New Novice Madison area KA9PEA. Regret to report W9N2Q, N9BPP & XYL, and XYL of W9JZG as Silent Keys. Jefferson swapfest was well attended despite the wx. Congrats to W9IDG for being ham for 50 years. New Novice Hayward area KA9OXS, W99PWN is now K9J9I, and has 300 endorsement on ARRL DXCC, placed on CQ-DX Honor Roll. BPL to KA9CPA, K9VAL has DXCC CW and 25 wpm code proficiency from ARRL. W99CIV has 25 wpm code proficiency. KA9ODE has Tech. KA9LER has Advanced. Congrats to W9ZM on being at or near the top of all three DXCC Honor Rolls. KA9NKO has General. KA9GYD is Life Member. Traffic: KA9CPA 2801, W9YCV 316, W9CXY 268, K9GDF 224, KC9CJ 208, WA9WYS 191, W99YYP 181, K9FHI 190, W9DND 165, KC9KQ 147, KA9HPQ 122, W9CBE 111, K9UTQ 101, W9UCL 98, W9LDO 88, K9AKG 83, K9BB 75, N9APT 72, KA9BHL 71, N9AUG 70, A99G 69, W99ICH 69, K9SAO 62, W99JSW 56, W9SO 54, W99RF1 53, W99EM 52, W99NRK 52, KA9KILZ 50, KA9OBP 38, KC9MX 33, K9HDF 33, N99CX 31, K9J 31, W99GYF 30, W99WV 29, KA9MY 19, W99CIV 28, W99NG 28, W99ESM 24, KA9GYD 22, W99JGA 22, W99JG 21, K99OJ 19, N9BYK 16, K99P 16, KA9NKO 14, KA9NOT 14, KA9ODJ 14, W99U 12, N9CP 10, KA9IHR 9, KA9BHK 6, (Feb.) W9CXY 257, W9AZTY 28 K9JPS 11, (Jan.) N99CX 22.

## DAKOTA DIVISION

**MINNESOTA:** SM, Helen Haynes, W99HOX — SEC: KN9J. STM: KD9CL. Hello to all of you! This is my first opportunity to greet you since being appointed STM. I ask you to bear with me as I become adjusted to my new responsibilities. My best wishes go to AD9S, whom I hope to continue working with as a member of the Paul Bunyan Wireless Assn. Congrats to NBCLS KB9RZ W9UJH K9LSE and K99ER on their section appointments, as well as to KN9J who will continue as SEC. Congrats also to K99RF on his upgrade to Extra and to KY9X (ex-N9DUQ). A new season of hamfest and other activities are now underway. The biggie is the amateur fair in St. Paul on June 4th. W99SYO has established a UHF rpt that is remote control linked to the 146.01/81 rpt on Mile Lacs Lake. It operates at 447.05/442.05 MHz, and is located in Forest Lake. Coverage of the UHF rpt is limited at this time. Our hopes for a speedy recovery go to W9DFX; we miss you on the wx net. CQ in St. Paul June 4th.

Net	Mgr.	Time	Freq.	QNI	QTC
MSN/I	W9DM	6:30P	3685	283	129
MSN/2	KA9EP	10:00P	3686	252	57
MSN/3	W99XU	7:00P	3710		
MSN/4	W99JUX	1:05P	3929	697	73
MSPN/E	K9AT	5:30P	3929	1145	215
MNAMWXNT	WA9ONE	8:15P	3929	586	432
PICO	W9HZU	Daily	3925	2929	276

Traffic: KB9MB 761, W99ESZ 413, WA9TF 386, KA9JUX 244, W99UJ 229, KA9EP 214, W99HOX 188, KA9ARP 168, K9TU 155, K9DCI 138, W99RW 130, W99DM 128, NBCLS 117, W99CGM 102, WA9ONE 93, K9CSE 62, W99UKJ 57, K99RF 54, W99DD 50, W99AHO 44, K99GJ 44, W99UW 32, N9JP 30, N9DUQ 23, W99MFR 11, K99RF 9, K99BD 9, W99BRS 7, KA9MJZ 7, KA9JQ 6, KA9ODJ 4, K99RW 4, K99YG 3.

**NORTH DAKOTA:** SM, Dean R. Summers, K92C — Three Rivers ARC (Wahpeton-Breckenridge) New officers: KC9UM, pres.; W99GJY, v.p.; W99QHC, secy./treas. Club meets every 3rd Thursday, 0130Z at Richland-Wahpeton Law Enforcement Center. New harmonic - W99SHD and XYL, W99DAF hospitalized in March. State Line ARC (SW corner) new officers for '83: KC9BS, secy.; KA9BOA, v.p.; W99DAF, pres. Welcome to W99EB (just moved to N.D. and looking to put up a 2M rpt. Teddy R. Treadwell ARC going to start newsletter. W99DAJ says Kildeer Mt. 04/84 will be back up soon. Goose River Net: 4 sess./89 QNI. Data: 27 sess./281 QNI/32 QTC. Get ready for tornado season. SKYWARN, Traffic: W99CO 65, KA9FSM 64.

**SOUTH DAKOTA:** SM, Frederic Stephan, K99OO — ASM: W99KJZ. Our big VHF contest this month will excite many participants. Pick the highest elevation in the Black Hills if you wish to be the top scoring station. Upgrades now are KA9LPW KA9JJO to General class, and KA9KXG KA9LPV and KA9KOO to Technician class. Fine work and congrats. ARES wx spotter training in special areas of South Dakota quite successful. SD Emergency Net meets every Sunday at 8:00 A.M. MDT at 3960. NTS liaisons were W99KJZ K9FRE K99OO W99KWX W99HJ and K99AF. SD



WHEN ONLY THE BEST IS GOOD ENOUGH



# TERMINALL

for ATARI

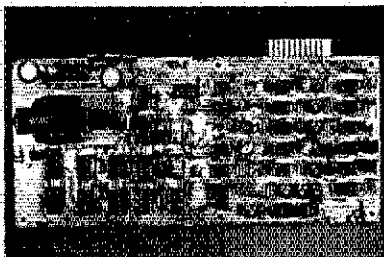
TERMINALL T4 is a hardware and software system that converts your Atari 400, 800 or 1200 personal computer into a state of the art communications terminal. TERMINALL features simple connections to your computer and radio plus sophisticated and reliable software.

### New on Atari Version

- **Cursor Editing** - use the cursor keys to compose, overwrite, delete or insert any text to be transmitted, any preprogrammed message, or any received text.
- **Color Displays** - on a color TV or color monitor.
- **Disk Save and Retrieve** received text or any preprogrammed message. Files are compatible with most word processors including Text Wizard\*.
- **Backup copy** saves all user selectable options as defaults - such as callsign, modes, messages, etc.

### 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



### NO COMPROMISE HARDWARE

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.

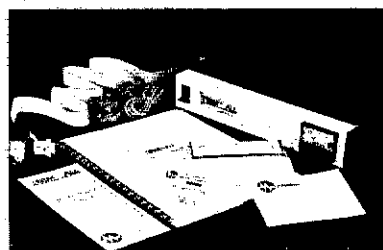
You will be on the air, receiving and transmitting in any mode, in minutes. As we said, TERMINALL is simple.

### 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



### MORE FOR YOUR MONEY

uses either the panel meter or scope outputs for easy tuning. Copy the weak ones. Copy the noisy ones. Copy the fading ones.

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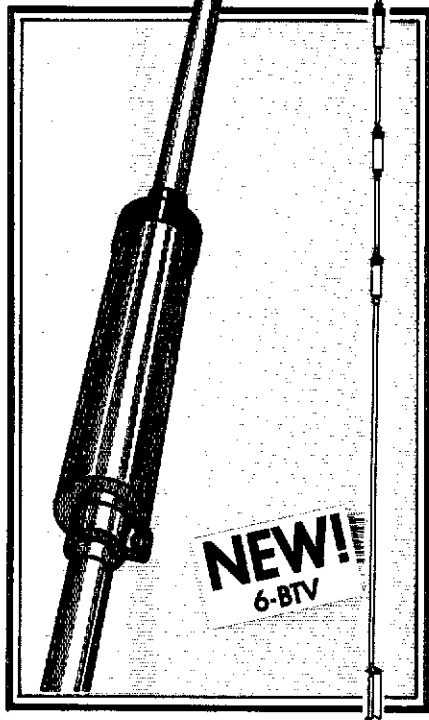
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### DELTA DIVISION

**ARKANSAS:** SCM, Dale Temple, W5RXU — This is my last monthly report as Arkansas SCM. Congratulations to Joel, W5BGF, on his election as Arkansas Section Manager; to N5BPU on his appointment as Arkansas SEC; and to the others W5BGF will appoint in the next few weeks. I appreciate the support W5BGF gave me as SEC and the support of all the net managers. The Little Rock hamfest was a rousing success, and much credit goes to both N8BVV and his wife, KA5OJL. Thanks to all who have helped with the weather nets and traffic. Specifically, I want to publicly thank my wife, KA5LTS, for the long hours of help and the time not spent with her. Mockingbird Net 31, Razorback Net 59, OZK 22, Ark. Phone Net 38, Traffic: W5QFU 68, W5DFCE 48, W4AZJ 43, W5UM 36, K5BLB 30, W5KL 8, W5UAU 7.

**LOUISIANA:** SM, John Meyer, N5JM-ASCM; KC5SF, STM: W5GHP. "April showers bring May flowers" was not true in the B.R.-N.O.-Florida Parish areas where severe flooding took place again this year. However, Amateur Radio preparedness was good and communications went smoothly. Bye to ACSB, our SEC whose work has moved him to FL. He did well in a tough job and even had time to handle the W5GHP tied the knot on March 28th; best wishes to him and his XYL, Anna. The new officers at the MTRC are: K5HAN, proxy; KA5OJA, proxy; KA5EZO, secy.; W5IOE, treas.; K05WZ KA5PUM KA5CSI K5HTZ N5AZA, board mbrs. Special Olympics in B.R. is around the corner. Contact N5ADF if you would like to help. Congrats to N5BYM, proxy of LARC, whose smooth work with the hamfest netted him "Ham of the Yr" plus breathing room till next March! Field Day is here so get rigs, tents and bug spray ready.

Net	Freq. (kHz)	Time	Mgr.
LAN	3615	Daily 7 & 10 P.M.	KC5SF
LTN	3910	Daily 6:30 P.M.	N5ANH
LSN	3703	M-F 7:30 P.M.	W5C0WK
LRN	3587.5	Sun 6:30 P.M.	W5GHP
LEN	3910	Mon. 8 P.M.	Open
CCTN	146.0161	M-F 6:45 P.M.	GNOARC
Traffic:	KA5HDT 172, K5TL 172, W5GHP 169, W5LO 147, KD5XB 121, KC5SF 87, W5BLBR 43, W5VMY 43, K5WOD 25, W5TVV 9, N5BFW 7.		

**MISSISSIPPI:** SM, Paul Kemp, KW5T — SEC: N5DDV, STM: K55W, VHF Coord: NF5Q. This will be my final column as SM for Mississippi. Good luck to all. Congrats to upgrades KB9TN now Extra with new call NF5Q, KA4OOR now General. The problem of too much water was with us again this month. Many thanks to all who helped to provide communications and handle traffic during the flood conditions in and around Hattisburg and Columbia. NF5Q has a fine up to date listing of all vhf repeaters in the state. If you would like one, contact him. Congrats to KA5AGD on the arrival of his 2nd harmonic. MTN (K5OAP) sess. 31, QNI 181, QTC 51, CAEN (KA5AGD) sess. 4, QNI 99, QTC 1. Traffic: N5AMK 384, K5OAF 274, N5RN 110, K5TS 69, W5LSG 8.

**TENNESSEE:** SM, John C. Brown, N04Q — ACC: WA4GLS, SEC: K4TKQ, SGL: W4WHN, STM: K4VOL, TC: W4HHK. It is with great pleasure that the appointment of Paul M. Wilson, W4HHK, as the Tennessee Section Technical Coordinator. He has many qualifications, one of which is much work on CW operations. His background will be a great asset in this appointed area. Give him a call. This month we have a couple more events that will need to be noted such as the Humboldt hamfest and national Field Day. So get out the old Field Day gear and generators and make sure they are ready to go with big scores. Take some pictures for Hq. use, especially when the YLs do the job. Got a note of another club, Memphis Radio Relay Club, requesting ARRL affiliation. Welcome to the ranks fellows. Just a reminder that the TN Council of Amateur Radio Clubs will be holding it's annual meeting at the Crossville hamfest, July 9 & 10. Clubs need to elect or appoint their representatives to attend the meeting as changes are being planned to the constitution and by-laws. The changes should be presented to be voted on for adoption at the meeting on the 10th. Section vhf net traffic: LF-sess. 88, QNI 3534, QTC 176; VHF-sess. 78, QNI, 2042, QTC 600. TN CW-sess. 54, QNI 320, QTC 113; RTTY-sess. 28, QNI 158, QTC 10. TSN Honor Roll: W4ZJY (now net manager), W4DDK, K4UJZ, K44UJZ, K4AURN, K44ZNU, NG4J and WA4UE. Good work fellows and gals. Traffic: NG4J 221, W4ZJY 156, W4MRD 146, K4MOA 99, K4WQ 96, W4DDK 85, K4WOP 52, K4BSG 28, W4PFP 18, W4GYT 17, W4PMP 16, W44TB 16, W4DPI 15, N44W 14, K4AMC 13, K4EOL 12, N44S 12, W4TTY 12, K4ALS 10, K4UMW 9, W4PSN 7, K4IV 6, W4AHKU 4, W4EWR 2.

### GREAT LAKES DIVISION

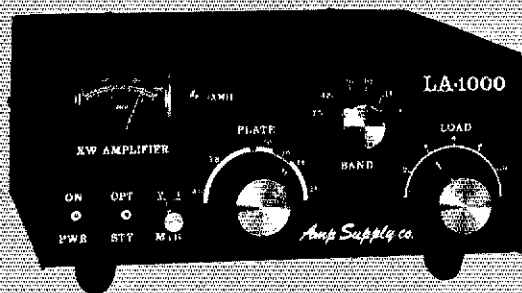
**KENTUCKY:** SM, Ann Sloan, KA4GFU — STM: KA4BCM, K4UJZ, QTC: KRN/611/25, MKPN/087136, KTN/1971125, KTN/375125, KYN/211511, KYN/240155, KEN/1374; BARES/10412; BARETS/10412; CCE/487; PONI/4811; PAEWTN/29511; TSTMN/49511; WTE/5113; 3ARE/588; 4ARES/785; 5ARES/555; 11ARES/481. Reports: QO-N4GD/6, OBS-WA4AGH, PSRR: KA4SAA WA4YFU KA4BCM KA4GFU KA4MTX KB4OZ KC4WN KD4TY WD4BC WA4JTE. Section appts: W4OYI-ACC: WA4AGH OBS/Mgr: N4GD-OO: K4JW-TC. W4RHZ new KY Colonel. RTTY net mgr K4YZU. CW nets need QNI. World Reports?? WA4YPO reports 41 hrs 41 min of nets in Mar. WA4AVV mgr KYPON for 18 yrs. CAND, D9RN, 9RN 100% Bowling Green Sweepst. June 11, 8 A.M.-4P.M. CDT. Traffic: K44SAA 238, W4ARW 183, K4UN 139, WD4YI 135, K2AG 133, WA4JTE 117, KA4GFU 117, KA4BCM 96, WA4YPO 86, KB4OZ 80, W4RHZ 57, N4GD 56, K4MHI 54, W4VQV 50, K4MZY 49, K4SKV 45, W4AEBN 34, W4APC 32, WD4BC 32, KA4MTX 29, W4BZDU 26, W4PKX 24, W44IF 23, KD4TY 18, W44AV 16, W44AGH 15, W44UN 13, KD4SN 13, WD4CJQ 12, W44AJ 12, K44MBF 9, WD4CQF 7, WD4IYH 7, W44NDG 7, K44YV 7, WD4IXS 3, W44NH0 3, KU4A 2, NW4P 2.

**MICHIGAN:** SM, James R. Seely, W8BMD — ASM: WA8DHB, SEC: WA8EFK, STM: WD8RHU, OO/RFI Coord:

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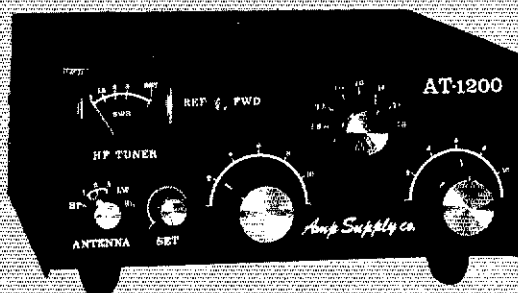
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price sheet and  
Order Form.

K8JH, ACC: K8SB, PIO: WA8PIL, SGL: N8CNY, TC: W8BBGY, BM: K2BV, Join the MI ARES net, Sn, 3932, 1730, and the Traffic Workshop, Sn, 3953, 1600 (times local), 3932, 1610, 1730, 1800, 1900, 2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, 2800, 2900, 3000, 3100, 3200, 3300, 3400, 3500, 3600, 3700, 3800, 3900, 4000, 4100, 4200, 4300, 4400, 4500, 4600, 4700, 4800, 4900, 5000, 5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000, 6100, 6200, 6300, 6400, 6500, 6600, 6700, 6800, 6900, 7000, 7100, 7200, 7300, 7400, 7500, 7600, 7700, 7800, 7900, 8000, 8100, 8200, 8300, 8400, 8500, 8600, 8700, 8800, 8900, 9000, 9100, 9200, 9300, 9400, 9500, 9600, 9700, 9800, 9900, 10000.

OHIO: SM, Allan L. Severson, AB8P — ASM: W8MOK, SEC: K8AM, STM: K8OZ, NMS: WA8UJW, N8DSU, WA8DYX, W8EK, WA8GMT, KF8J, W8KFN, W8BYTD.

Net	QNI	QTC	Sess.	Time(local)	Freq.
BN	424	282	62	6:45/10 P.M.	3.577
BNR	342	119	31	6:00 P.M.	3.605
BSSN	327	229	59	9:45 A.M.J	3.927

QNN	QSS	QSSN	QSSM	Time	Freq.
---	---	---	---	6:30 P.M.	3.708
OSN	373	183	31	8:10 P.M.	3.577
OSSBN	2566	992	93	10:30 A.M.J	3.9725

OSSN	QSS	QSSM	Time	Freq.	
233	70	31	6:45 A.M.	3.577	
O6MN	426	28	31	9:00 P.M.	50.160

Once again, I'd like to thank all the tremendously active club newsletter editors in Ohio who have put my name on their mailing lists. This section can boast of some amazingly excellent newsletters, such as those of DARA, LEARA, NCARS, TSAC and Findlay. (I know I'll regret naming a few and omitting many just as outstanding.) However, for pure, unadulterated fun to our members' activities and other personal affairs, W8BK's *Buckeye Burr* (official newsletter of the Buckeye Belles) has to take the gold ring. If you can track down a Buckeye Belle (no real problem, as they're everywhere), ask her for a recent copy of the *Buckeye Burr* and learn. While I certainly don't lack for informative, interesting reading, there are some very fine newsletters in this section that I do not receive. Please ask your editors to put me on their mailing list, if I'm not on it now. Plans for this year's Great Lakes Division Convention, scheduled for Cleveland on September 25th are taking shape. Hope you're scheduling time for this no-miss affair. Appts: to EC: W8DYW, Lucas Co.; W8MVE, Seneca Co.; K8OYQ, Allen Co. Incidentally if you know that your county does not have an EC, and you or someone you know is interested, please let me or K8AN know. We know that K8AN is Amateur Radio's Renaissance Man, but even he appreciates help on some matters.

Local Nets	QNI	QTC	Sess.
ALERT	40	3	4
BARF	167	80	28
BRTN	262	220	31
COARES	133	16	4
Loran Co.	77	18	14
LCNWO	542	123	30
Medina Co.	334	65	31
NEON	108	40	23
NCTW	20	16	8
RARA	71	1	4
TATN	250	92	31
TSRAC	1190	130	44
VWCEN	32	5	4

Traffic: K8NCV 832, W8BMO 538, W8BKFN 409, K8OZ 364, K8AMEB 357, W8GMT 327, W8GZK 315, N8DSU 285, N8EMR 265, W8PMJ 253, K8JDI 223, K8YUW 198, KF8J 190, N8EES 144, A8BJ 134, K8IAF 127, W8JGW 122, W8KRW 111, K8AN 101, W8EK 98, W8SKP 93, K8BNF 90, N8AKS 87, W8JBJ 83, W8BKQ 76, K8ICB 67, K8GGG 65, K8TVG 65, W8BDM 64, N8EBS 63, W8BSS 60, N8UPD 57, N8CJU 52, W8BYT 52, N8AEH 49, N8JR 44, W8SIC 43, K8HJZ 42, W8BHH 40, W8MOK 39, W8BRGP 36, W8BHD 35, K8DL 33, W8FUP 33, W8TXV 31, W8CDA 29, W8BNEC 29, W8BRZG 29, K8EM 27, W8BDYX 25, W8BODV 25, W8TP 24, K8W8X 24, K8NLQ 21, K8BDJZ 20, K8BIUK 20, W8MVE 20, W8BNHV 20, N8CJS 19, K8GJV 19, W8EJAJ 18, K8BJV 18, W8BRGS 18, W8AWM 16, W8BML 15, K8BJ 14, K8V80 14, N8CW 13, W8BHL 12, W8SRC 12, W8ZID 12, W8BKK 11, W8R 11, K8CKY 8, N8CGM 8, K8ALNA 8, W8BQYT 7, W8BVOA 7, K8BCKY 6, K8VOY 6, N8AJU 5, W8DHD 5, W8BKWD 5, W8BYIS 5, W8DYF 4, W8BNT 4, W8OQL 4, W8BRUO 4, K8CMR 2. (Feb.) W8WEG 140, W8BRZG 19.

**HUDSON DIVISION**  
EASTERN NEW YORK: SM, Paul S. Vydarony, W82VUK



# MICROLOG AIR-1

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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!

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Note: VIC-20 is a trademark of Commodore Electronics, Ltd.

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Others claim more gain for their antennas than the IsoPole™ antennas, but none can beat the IsoPole for HONEST on-the-horizon omni-directional gain unless you are willing to spend at least THREE TIMES AS MUCH!!! The IsoPole is easiest of ALL competitive models to assemble, has a weather protected, factory-tuned matching network, (no more aggravating SWR variations with weather changes), uses all stainless steel hardware, and is designed to withstand severe icing and wind conditions. The IsoPole antenna is UPS shippable without the standard 10 foot 1 1/4 inch TV mast. You can buy the mast from your local ham dealer, hardware store, or Radio Shack™ store for less than the shipping costs of a single mast. When good strong, low cost 10 foot sections of mast are so easily available, why compromise by using several shorter pieces that have to be joined together?

For more details, please write for our latest catalog or visit your favorite dealer.

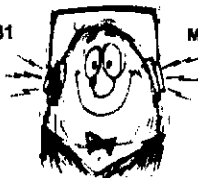
Prices and Specifications subject to change without notice or obligation.

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<b>AEA</b>					
CP-1 New Computer Interface.....	.....	call			
MBA-RO Reader.....	\$259.00				
MBA-RC Rcv/Code Conv. Xmt.....	\$385.00				
MM-2 MorseMatic Ultimate Keyer.....	\$149.00				
CK-2 Contest Memory Keyer.....	\$125.00				
KT-2 Keyer/Trainer.....	\$99.00				
BT-1 Trainer.....	\$72.00				
Hot Rod Antenna.....	\$17.95				
<b>ALLIANCE</b>					
HD73 (10.7 sq. ft.) Rotator.....	\$99.00				
U-100 Small Rotator.....	\$45.00				
<b>ASTRON</b>					
RS24 5-7 Amp Power Supply.....	\$49.00				
RS12A 9-12 Amp Power Supply.....	\$69.00				
RS20A 16-20 Amp Power Supply.....	\$89.00				
RS20M 16-20 Amp w/meter.....	\$109.00				
RS35A 25-35 Amp.....	\$135.00				
RS35M 25-35 Amp w/meter.....	\$149.00				
RS50A 37-50 Amp.....	\$199.00				
RS50M 37-50 Amp w/meter.....	\$225.00				
<b>AZEN</b>					
PCS 4000 2M Xcvr.....	\$280.00				
PCS 300 Handheld.....	\$275.00				
<b>BEW</b>					
Folded Dipole 80-10 Meter.....	\$135.00				
<b>BENCHER</b>					
BY-1 Paddle/BY-2 Chrome.....	\$36.00/\$45.00				
ZA-1 A Balun.....	\$6.50				
<b>BUTTERNUT</b>					
HF6V 80-10 Meter vertical.....	\$119.00				
<b>CUSHCRAFT</b>					
A3 Tribander 3 EL.....	\$179.00				
A4 Tribander 4 EL.....	\$225.00				
214FB Boomer 14 EL FM.....	\$69.00				
32-19 Super Boomer 19 EL 2M.....	\$83.00				
ARX-2B Ringo Ranger II 2M.....	\$39.00				
<b>DAIWA</b>					
CN-520 1.8-80 MHz SWR/Pwr Mtr.....	\$63.00				
CN-620B 1.8-150 MHz SWR/Pwr Mtr.....	\$110.00				
<b>DRAKE</b>					
TR7A Xcvr.....	\$1,375.00				
R7A Receiver.....	\$1,349.00				
TR5 Xcvr.....	\$675.00				
12 Inch Green Monitor.....	\$139.00				
<b>ENCComm (SANTEC)</b>					
ST-144/P.....	\$275.00				
ST-440/P.....	\$308.00				
ST-220/P.....	\$299.00				
<b>HAL</b>					
DS3100/MPT/ST6000.....	\$2,825.00				
<b>HY-GAIN</b>					
TH7 DXS 7EL Tribander.....	\$375.00				
TH5 MK2S 5EL Tribander.....	\$319.00				
V2S 2 Meter Vertical.....	\$9.00				
Horn IV 15 sq. ft. Rotator.....	\$195.00				
T2X 20 sq. ft. Rotator.....	\$249.00				
<b>ICOM</b>					
R70 General Coverage Receiver.....	\$629.00				
740 Xcvr.....	\$950.00				
730 Xcvr.....	\$649.00				
2AT 2M Handheld.....	\$215.00				
3AT14AT Handhelds.....	\$235.00				
25A new display & mic.....	\$305.00				
25H 45W Mobile.....	\$349.00				
290H 2M All Mode.....	\$479.00				
251A 2M All Mode.....	\$575.00				
<b>KLM</b>					
KT34A 4EL Triband Beam.....	\$305.00				
KT34XA 6EL Triband Beam.....	\$465.00				
144-148-13LBA 2M Long Boomer.....	\$79.00				
<b>KANTRONICS</b>					
The Fantastic Interface for CW, RTTY, ASCII Only \$150!					
<b>LARSEN</b>					
NLA-150-MM 5/8 Wave 2M Mag. Mt.....	\$39.00				
<b>MFJ</b>					
989 3KW Roller Inductor Tuner.....	\$280.00				
941C Tuner.....	\$81.00				
900 Tuner.....	\$45.00				
313 VHF Conv for HT.....	\$6.00				
<b>MIRAGE</b>					
B108.....	\$150.00				
B1016.....	\$239.00				
B3016.....	\$205.00				
<b>ROHN</b>					
25G.....	\$42.00				
<b>SHURE</b>					
444D Desk Mic.....	\$50.00				
414A Hand Mic.....	\$8.00				
<b>TEN-TEC</b>					
Corsair Fantastic Rig.....	\$1,029.00				
Digital Argosy.....	\$539.00				
239 2KW Tuner.....	\$250.00				
<b>TOKYO HY-POWER</b>					
HL30V 25W Amp.....	\$63.00				
HL32V 80W Amp.....	\$139.00				
HL160V 160W Amp.....	\$289.00				
HC200 Tuner.....	\$89.00				
HC2000 2KW Tuner.....	\$289.00				

Send SASE for Our New & Used Equipment List  
Prices are FOB Evansville

SEC: KB2KW, STM: WA2SPL, ACC & SC: N2BFG, BM: WB2EAG.

Net	Time/Day	Freq.	NM
EPN	2200Z	3.902	AG2X
ESS	2200Z	3.590	W2WSS
NYS	2300/0200Z	3.677	N2APB
NYS/M	1400Z M-S	7.077	WB2EAG
NYS/M	1400Z	3.677	WB2EAG
NYPON	2100Z	3.913	WA2KOJ
NYSPTEN	2200Z	3.925	KA2Q
NYS RATT	2230Z	3.625	W2DCD
CDN	2230Z	146.34/94	WB2ZCM
HVN	2330Z S-S-M	144.535/135	N2BDW
HVN	2330Z T-F	146.34/94	N2BDW
SDN	0130Z	147.36/05	K2VJ
SCRN	0000Z	147.735/135	K2VJ

CLUB NEWS: Albany Area has been very busy with many public service activities, even several on same day. Westchester Area had W2CUZ and K2LCU speak on early days of radio; demonstrated a working spark gap transmitter! Westchester ECA has W2TFM speak on satellite communications, the most current technology. Let's all get out and help with public service activities! Don't forget staff meeting-July 17. Congrats to WA2KOJ, new NM for NYPON, BPL: WA2SPL, PSHR: K22M WB2MCO WB2EAG KA2E KC2TF, W2BIW KB2KW W2PKY WB2VUK KA2MPB, WA2MCO 330, W2ZM 231, W2BIW 139, W2PKY 138, KB2KW 133, AG2X 128, K2VJ 112, WA2JQL 101, WA2180 97, AK2E 94, KA2BP 84, WB2VUK 84, KC2TF 65, WB2OHR 46, WB2TWO 44, AA2Y 44, N2AWI 41, N2BFG 34, WB2SON 24, W2SWA 12, K2HNW 7, N2CSX 4.

NEW YORK CITY — LONG ISLAND: SM, John Smale, K2JZ — SEC: WA2KJ, STM: K2GCE, OO/RFI: WA2PMW, TC: W2JUP.

Net	Time/Day	Freq.	NM
NL CW*	3830	1900/2200	W2LWB
NL PN*	3928	1815	K52G
NCVHF	6:145/745	1930 M-F	K2AMT
SCVHF	4:77/5:37	2030 M-F	WA2ARC
BAVHF	6:07/67	2030 M-F	N2BQD
ESS	3590	1800	W2WSS
NYS	3577	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. Please welcome WA2PMW as the OO/RFI coordinator, and W2JUP as the Technical Coordinator. Please give them all the assistance you can to help get these programs going. N2DPN is now Wed. night NCS on BAVHF, and says that any NYC station with 2-meter capabilities is encouraged to check in and let us know you're out there. N2DPN will be thanks to W2BNA for the FB job he is doing with the net. Congrats to W2AHV, the winner of the 1982 Bill Shaw "WB2VEJ" Memorial Award. This award goes to a station in recognition of significant and dependable service to the ZRN net. K2JZ and K2TV joined the growing family of Vic 20 owners. In celebration of the 100th anniv. of the Brooklyn Bridge, the Brooklyn Bridge Chapter of 10-10 International has been formed. All are urged to QNI their 2 weekly nets at 1900 local on Fri and 1400 local on Sun. NCS is WB2COL. Cert. Mgr is N2DNY; freq is 28.850. (Note: Top award is the "Deed to the Brooklyn Bridge.") AH20 will be operating Maritime Mobile May 15 aboard the US's Empire State for NY Maritime College's training cruise. Radio Central's flea market will be Sunday May 7 at Ramble Island in Stony Brook; contact K2RFZ to get a good spot. K2GCE back home after being down in Texas for the better part of March. K2MT reports that the Nassau VHF Net in its first month had 207 QNI in 23 sessions with 50 messages passed. New members of Suffolk Co. ARC are N2DHC and KA2REQ. W2NXZ back from Fla. W2LWB is looking for a few more stations to QNI the cw net and help fill some of the NCS slots. Traffic: W2AHV 319, N2AKZ 217, W2TZO 120, WA2ARC 93, K2MT 88, W2GKZ 50, KA2FFC 36, K52G 27, W2DBQ 26, K2JZ 24, K2GCE 11. (Feb.) KA2FFC 30.

NORTHERN NEW JERSEY: SM, Curtis R. Williams, WDTR — SEC: WB2VUF, STM: W2XD, BM: N2BOP, ROC: W2CC, SGL: W2KB, PIO: WB2NQV, TC: AD7I, ACCS: KK2U, KY2S, NMS: W2CC, AG2R, N2BNB, KA2GSX, KA2HNQ, WB2IQJ, KY2D, N2XJ, W2PSU.

Net	Freq.	Time	Sess.	QNI	QSP
NJM	7083	1000 Dy	31	231	65
NJPN	3950	1800 Dy	35	507	221
		1800 Sun			
NJSN	3735	1830 Dy	31	228	50
NJNE	3695	1900 Dy	31	415	179
TCETN	147.255	1930 Dy	31	203	48
OBTTN	147.12	2000 Dy	31	498	101
NJNL	3695	2200 Dy	31	358	145
NJVN	49/49	2230 Dy	---	---	---
NJRTTY	147.51	Autostart			

NEW UPLINK NEWS NUMBER: 201-735-8550. The position of Affiliated Club Coordinator has now been filled by Jim Greer, KK2U, for the northern half and by Ken Hampton, KY2S, for the southern half of the section. Any ARRL Affiliated Club in NJ interested in becoming a Special Service Club should contact the ACC nearest you or your Section Manager (page 8 Q3). Remember reports should go to KB2WI, your new Section Manager effective July 1. A unique Amateur Radio news service is now available in the section, thanks to PIO WB2NQV and PIA WB2ZHP. Dial 201-735-8550 for details and the latest news. Congrats to WB2NQV on upgrading to General and to KA2MNC and WD2All on Technician. Division Director W2IHA and Vice Dir WA2DHF have been meeting with as many clubs as possible to set input on the no-code and other policy matters for the ARRL Board meeting. The Tri-County RA will hold their hamfest-flea market on June 5 reports Chairman KC2FS. The Cherryville RA reports the Flemington Hamfest was a big success. New officers for the Cherryville RA are: WB2LYC, pres.; N2BNA, sec.; KA2KBX, secy.; N2ASK, treas.; KJ2C AB8H W9NFD, board members. Contact WB2VUF, AF2L has received his WAZ certificate. N2BNB has a new job that may interfere with his net activities. The Jersey Shore Hamfest will be held June 12 reports W2GDS. The Raritan Valley RC Hamfest will be held June 18 per KB2EF. N2DXP reports the Knights Raiders VHF Club is active again and will be operating the June vhf contest. Congrats to N2DXP on being appointed an Official Bulletin Stn and to N2EBA on OPS. All expired and inactive appointments are cancelled after a notice is sent. The Sussex Co. ARC Hamfest will be held July 16 reports W2ZHI. N2DSY continues to promote packet radio and AD7I AMTOR type transmissions. TCETN needs more traffic and check-in reports NM KA2GSX, PSHR: N2XJ, W5DTR, AG2R, K2VX, KY2P, WB2GHN, W2XD, KA2GSX, N2DPN, KB2WI. Traffic: N2XJ

# NEW! Service and Diagnostic Department

Amp Supply is now offering complete amplifier repair service. For a total charge of **\$39.00** we will repair or diagnose the problem on any amateur amplifier. If it takes 10 minutes or 10 hours the Amp Supply service repair charge is **\$39.00**. The only additional charge will be parts needed for repair.

Home-brewers; take advantage of this same diagnostic

service on your projects. Send us your home-brew amplifier and for **\$39.00** we will explicitly instruct you (in writing) about any modification or redesign needed to bring your amp up to specs.

Units must be shipped prepaid to Amp Supply. After receipt, Amp Supply will respond in writing for authorization to proceed with repair.

## The ASP Halon Fire Extinguisher

The ASP Halon Fire Extinguisher, safely extinguishes all types of fires without leaving residue, is non-corrosive, 3 times as effective as CO<sub>2</sub>, and will not cause damage to sensitive electronic equipment, such as ham gear or computers. Halon 1301 was chosen by N.A.S.A. for its on-board extinguishing system on the Space Shuttle, and is

the only extinguisher required by the FAA on every commercial airliner in the U.S. Shouldn't you protect your investment with the safest fire extinguisher available for electronic equipment?

Car or bench size, 1 pound 4 oz.

2 year factory warranty ..... **\$29.50**

## Building An Amplifier?

<b>Electrolytic Capacitor</b>					
EC-125	125uf 500 volt DC	\$ 3.95	<b>Plate Chokes</b>		
<b>Diodes</b>			PC-811-1A	Use with 4x811A or Sweep tubes	\$ 6.25
D-3-A	High voltage supply diodes 1KV, 3A	\$ 1.00	PC-500-2A	Use with 3-500, 4-400 etc.	\$ 8.25
DZ-8.5-Z	Zener 8.2 volt 50 watt	\$ 5.50	PC-1000-2A	Use with 3-1000, 4-1000, 8777 etc.	\$10.00
<b>Switches</b>			<b>Filament Choke</b>		
SB-6	6 position 4 section 2KW PEP ceramic switch with tuned input switching voltage use with 3-500, 4-400, 572B	\$24.50	FC-30-A	30 amp choke on Ferrite Core	\$ 8.50
SB-5	5 position 1 section use with 811's or sweep tubes	\$ 9.50	<b>Plate Caps</b>		
BD-6	Planetary Ball Drive for variable caps 6:1 ratio 1/4 shaft	\$5.25	PC-500-1	Aluminum Heat Sink use with 3-500 etc.	\$ 5.50
<b>Tuned Input</b>			PC-811-1	Use with 811A, 572B	\$ 1.50
A11-6	Complete PC board tuned input board with 5 toroidal coils, 12 trimmer capacitors 6-DPDT relays and coax, fully assembled tuneable 1.8 - 30 mhz matches any amplifier 6 1/4" x 3 1/4", 12 VDC	\$79.50	PC-8877-1	Aluminum Heat Sink For 8874, 8875, 8877, 3-1000, 572, specity tube	\$ 7.50
<b>Tubes</b>			<b>Sockets</b>		
3-500Z	EIMAC	\$97.50	SC-500-1	Johnson 122-0275-001 use with 3-500, 4-400 etc.	\$14.50
811A		\$14.50	SC-811-1	Socket for 811A, 572B	\$ 1.00
572B		\$48.50	SC-1000-1	Socket 3-1000, 4-1000	\$35.00
3-1000Z	EIMAC	\$365.00	SAF-500	3-500 air flow socket	\$35.00
8877	EIMAC	\$455.00	SC-8877	8877 socket	\$14.50
813		\$40.00	TR-8877	8877 teflon tube ring	\$19.50
<b>Coils</b>			<b>Antenna change over relay 2KW</b>		
TIC-1	Toroidal tuned input coils specify frequency	\$ 2.00	RL-2P-1	2PDT 12VDC	\$ 5.25
FTC-1	Final Tank Coil for 3-500's, 4-400's, 8877, 572B etc 2KW 160-40 MTR	\$16.50	RL-3P-1	3PDT 12VDC	\$ 7.50
FTC-2	Tank Coil 20-10 MTR	\$5.50	<b>Meters</b>		
B&W 850 A, or 852	Tank Coil and Switch	\$72.00	M-1000-P	Dual scale 0-3000VDC, 0-1 amp w/shunt & voltage resistors	\$17.95
B&W3902-1	Cyclometer Counter - tuning for roller inductor or vacuum variable	\$44.50	M-2000-W	Dual scale wattmeter 0-200 watt 0-2000 watt	\$19.95
<b>VARIABLE CAPACITORS</b>			M-5000-VDC	5000-VDC Meter	\$19.95
<b>Plate</b>			M-500	0-500 MA	\$17.95
A-250-75	250pf 3.5-KV	\$26.50	M-1A	0-1 AMP	\$17.95
A-225-120	225pf 4.5-KV	\$28.50	M-2A	0-2 AMP	\$18.95
A-232-45	250pf 2.2-KV	\$23.50	M-3000	0-3000 volt DC	\$17.95
<b>Loading</b>			<b>Ceramic Loading &amp; Coupling Capacitors</b>		
A-1100-53	1100pf 3 section 1.2KW	\$12.25	CC-1000	1000pf 5KV	\$ 5.95
A-1000-32	1000pf 2.5KW	\$37.50	CC- 500	500pf 5KV	\$ 5.95
A-800-32	800pf 2.5KW	\$28.00	CC- 200	200pf 5KV	\$ 5.95
			CC- 100	100pf 5KV	\$ 5.95
			<b>Roller Inductor</b>		
			RI-28	28uh ceramic w/siler roller	\$39.50
			<b>Transformers - Filament</b>		
			X-5-15	5 VCT @ 15 Amp	\$24.50
			X-5-30	5 VCT @ 30 Amp	\$29.50
			X-6-16	6.3 VCT @ 16 Amp	\$24.50
			X-7.5-21	7.5 VCT @ 21 Amp	\$34.50
			X-10-15	10 VCT @ 15 Amp	\$29.50
			X-10-20	10 VCT @ 20 Amp	\$39.50
			X-20-15	20 VCT @ 15 Amp	\$49.50
			<b>Combination Plate, Filament, and Relay Control Voltage</b>		
			X-500	Single 3-500 amplifier XFMR	\$69.50
			X-500-2	Pair 3-500 amplifier XFMR	\$108.00
			X-811A	Four 811A amplifier XFMR	\$59.50
			X-572B	Four 572B amplifier XFMR	\$69.50
			X-6M16	Four Sweep tube amplifier XFMR	\$52.50
			X-8877	Single 8877 amplifier XFMR	\$172.00
			XH-4K	Ultimate Hypersil 4KW PEP Plate XFMR	\$230.00
			<b>Replacement Transformers</b>		
			Chipperton L		\$87.50
			GLA-1000, 1000B		\$57.50
			<b>Amplifier Power Supply</b>		
			APS-1	3000 volt power supply complete 3000 volt DC @ 1 Amp and 12 VDC @ 2 Amps - includes power transformer 117/234 AC 50/60 Hz, electrolytic capacitors, diodes, bleeder resistors, PC board. Completely assembled, chassis and cabinet not included	\$149.50
			<b>Amplifier kits available from Amp Supply:</b>		
			LK-811A	4 811A 10-80 Meter	\$ 299.50
			LK-572B	4 572B 10-160 Meter	\$ 399.50
			LK-300Z-2	2 3-500Z 10-160 Meter	\$ 444.50
			LK-8877	1 8877 10-160 Meter	\$1200.00
			LK-30M	4 6M16 30 Meter	\$ 199.50
			LK-1000Z	3 1000Z 10-80 Meter	\$1260.00
			Econo-Amp	4 6M16 any band-mono band specify frequency	\$ 200.00
				Kits include all necessary parts to build a linear, tuned input, metering, power supply and transformer. Cabinets and chassis sold separately.	

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214, AG2R 207, W2VQ 170, K2VX 154, W2XD 107, 2ALB 26, W2ZEP 58, KY2P 55, KB2WI 53, KA2GSX 51, WB2GHN 46, W5DTR 45, N2BNB 41, WB2KLF 37, N2DPN 20, AF2L 18, WA2FZJ 16, KX2L 15, W2CC 12, WB2QMP 11, N2EBA 6.

**MIDWEST DIVISION**

IOWA: SM, Bob McCaffrey, K0CY — SEC: WA4VWV. STM: K0GP. ACC: WB0QAM. TC: K0DAS. PIO: KB0ZP. BM: K0RIR. SGL: AK0Q. Many thanks to the Mason City and Fairfield clubs for their hospitality during my visits. Hats off to the 3900 Club for presenting a FE Midwest Convention. Congrats to the many new upgraders. N0BGA, K0KAM to KC-1ra; KA0KME N0DMW N0EHV WB0UOD to Advanced; N0EFL to General; KA0PGE KA0PGG KA0PGF to Tech. We need better support for ICN; let's see some old timers on this training net. NIARC worked with Red Cross during drills. Thanks to all who participated in Tornado Prep Week. Should have your FD plans ready now; send message to me. DM hamfest in August. RAGBRAI message relay to be held week of July 24th; need lots of help. New appts: EC-KD0BG WD0BBE K0EGA KA0MIM; O0-K00DB; O0S-N0BGG WB0BGV. Thanks to all for their help. There are appointments available for you. Let me hear from you, if you have read this far send me a "gram." Let me know what your "sunny" projects are. Send me your comments.

Net	Freq	Dy	UTC	QNI	QTC	Sess.
TLCN	3560	Dy	2330-0400	369	144	62
75M Phone	3970	M-S	2330-1730	2057	190	54
ICN	3713	TThs	0200	34	14	9

Traffic: WA0AUX 457, K0GP 118, W0YLS 115, W0SS 112, WD0FWB 111, N0EHV 65, W4JL 60, WD0HND 60, K0CY 41, KA0ADP 36, WB0JFF 36, K00SC 26, WB0AVW 25, WA4VWV 20, WB0CPR 21, KB00Z 19, W0PQ 13, KA0JUG 12, KE0Y 9, WD0DCF 2, K0ZQ 1.

KANSAS: SM, Robert M. Summers, K0BXF — SEC: W0KLL. STM: W0OYH. PIO: KC0GL. BM: K0JDD. NMS: KA0CUF WB0ZEN N0BDG. It is another sad duty when I relay to you the latest Silent Key, W0BLI, ol' man traffic for Kansas for years. A faithful cw traffic handler, he will long be remembered by a lot of us. Net traffic totals: QNO/QTC. K5BN 1450/157; KPN 893/34; KWN 1040/763; CSTN 2075/120; QK5 399/96; QK5-SS 41/18; KMWN 772/684. Several new appts forthcoming — K0EQH is going to replace EC SWL KS Zone 12. W0MYM is going to become replacement Net Mgr for QK5-SS. Have a taker for SGL, as soon as he gets back from the latest Net trip. Still looking for O0/RFI Coord and Tech. Coord. WARC has worked up a fine questionnaire for emergency communications. Am sure W0KLL received a copy. If any EC or DEC would like a copy, contact W0KLI or myself. W0NYG, EC for Zone 5B, Leavenworth, also has worked up a list of DO's and DON'Ts with reference to the storm season. The Pittsburg Rptr Org. will host annual Hamfest May 15 at Lincoln Park Rec Center. Don't forget the Kansas convention at Salina June 4 and 5. Understand the Concordia hamfest was cancelled for 1983. Traffic: W0PFC 624, WB0ZEN 484, W0H1 125, K0JL 103, W0OYH 97, W0FIR 84, W0FDJ 84, W0AM 44, W0CHJ 44, K0BXF 32, W0CMT 29, W0NYG 28, W0PB 26, N0BDG 25, W0KLL 10, KA0E 9, K0GSC 9, W0RBO 8.

MISSOURI: SM, Ben Smith, K0PCK — A new club has been organized in the Kansas City area. It is the Lee's Summit ARC. Anyone interested should contact N0ELU (ex-W0BFKY, W0S of officers for Jefferson Barracks ARC are: WA0DS, pres.; WB0BZP, v.p.; W0EAS, sec.; W0DEMS, treas. KTSY and I attended the Jefferson Barracks ARC Activity March 11, which we enjoyed very much. They had a reported attendance of 800-900. KA0DPN, Net Manager of the International Handicappers Net, reports the net observed its 25th anniversary in February. New appts go to WB0SET, OO, and to N0BLB, ORS & OES. Anyone interested in an appt should send me an application or contact me and I will send you an application to fill out and return. A100 received his ORS appt in January, entered the Jan. APRL QSO Party, and was top cw scorer in the tenth call area. The tri-county ARC recently purchased the complete ARRL publications, and donated them to the Moberly Library. I hope to hear of more clubs doing this. Participation in the state-wide tornado drill was very good this year. The St. Louis ARES Net had 60 QNI. Not bad for a drill on a weekday with the sun shining. The Cole Co. ARES toured the National Weather Service at Columbia Feb. 11. The tour was hosted by SEC WB0KUW and TA K4CHS. Under the leadership of N0DDZ, the Missouri Traffic and Training Net, which meets on 3.730 at 7:30, has gotten off to a great start. It is a good place for Novices to get some air time and net time experience.

Net	Sess.	QNI	QTC	Freq.
MOSSN	32	367	124	3.983
MEOWJ	3	486	2	3.983
MON/MON2	82	441	157	3.585
RRSN	30	414	22	146.19/79
IFRN	3	36	3	147.84/24
PNDN	4	81	4	146.43/7.03
STAN	4	254	1	2 meters
SARN	5	94	1	146.43/7.03
CMEN	5	117	1	146.16/76
CJCA	5	63	0	148.40/7.00
MTTN	27	183	22	3.730
HAMBT	37	524	43	7.280

Traffic: K0SI 160, K0PCK 140, K0DAS 135, W0BMA 96, K0B1 95, A100 91, K0CV 96, W0BYJ 69, W0UD 66, KTSY 63, K0DSQ 55, N0DDZ 51, WA0MAZ 30, K2ONP 26, WB0SSB 24, WA0KUJ 21, N0BLB 20, K0CJA 17, W0NUB 10.

NEBRASKA: SM, Reynolds Davis, K0GND — Summer finally! And, Field Day. Only Field Day QTH I've heard of is for the Pioneer ARC in Fremont who will be Rfing from the Gun Club. Nice to see that West Nebraska ARC is now incorporated! Congrats to W0NIK who has been net mgr of Western NE net for 29 yrs! Lots going on this month: Pine Ridge ARC hamfest-June 5; Lincoln ARC mtg-June 8; Akarben ARC mtg-June 10; Blue Valley ARC & Scottsbluff ARES on June 21; Pioneer ARC-June 24; and FIELD DAY the last weekend of June. Please forward info on your club mtgs and also programs so that they can be included in the Nebraska Section Bulletin, which can be heard during the Saturday session of the Nebraska 40-Meter Phone net (13002 @ 7285 kHz). The section bulletin is sent via RTTY on Saturday also @ 1715Z on 7085 kHz. Traffic: K0DKM 154, WB0TED 85, W0SGA 60, W0HOP 47, KA0BCB 42, W0KK 28, W0NIK 27, K0IFN 20, W0ZNI 20, K0GND 17, WA0BOK 14, KA0BWM 14, KA0EL 11, WA0SOP 11, WA0PCG 8, WA0OQ 6, W0BGR 6, KA0JLH 6, W0BGMQ 6, W0ERW 4, K0ODF 4, W0BQBM 2.

**NEW ENGLAND DIVISION**

CONNECTICUT: SM, Pete Kemp, KA1KD — SEC: K1WGO. STM: K1E1C. OO/RFI: KA1ML. SGL: K1AH. ACC: N1AZF. BM: WA1DWE. PIO: WB1AIU. TC: W1HAD.



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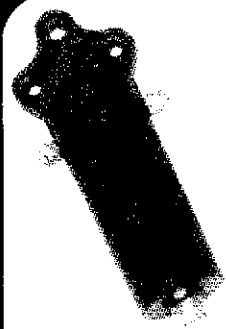
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Amateur Radio Today  
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Net	Freq.	Local/TIME	QTC	QNI	NM
CN	3640	1900/2200	247	307	K1EIR
CPN	3965	1800 Dy/ 1000 Sn	130	228	W10D

NVTN	28/88	2130	72	333	WA1ELA
WON	78/18	2030	81	436	WB1GXZ
RTN	13/73	2100	87	257	WB1ESJ

Upgrade: Extra KA1YR: Advanced KA1JST: General KA1JKC: PE N1CLV. Call Changes: KA1YR/KC00: KB1EP/KO10. WHICH is off to LU and for a two-month stay. K1DRR has a new voice. ECARA newsletter is looking for a name. New Tri-City ARC pres. is A11V. How would you like to help get the word out? WA1DWE is looking for ops who would like to serve the section in an OBS capacity. ECARA has a computerized bulletin board system, up and operating, on 147.57 simplex. For DX and orbit information, ARRL bulletins and much more, give it a try. Public service times are upon us, with the start of the summer season. A wide variety of road races, fireman's parades, fireworks displays, bike races, country fairs and a variety of other special events provide the opportunity for Amateur Radio to really show its capabilities. Ever wonder why you might not see your club's activities posted in this column? Think no longer; send a copy of your club's newsletter or information along to the SM for inclusion. Good luck to all stations participating in Field Day operations. This is a good chance to develop your emergency potential both individually and in group situations, as well as to have a good time. The FCC's No-Code license proposal has certainly caused a controversy in amateur circles. At the League's urging, an extension to replay to the NPRM was granted. Take advantage of this opportunity. Make your views known. 73. Traffic: WB1GXZ 308, WB2PJU 212, N1CLV 184, W1CFE 183, K1UJC 174, KA1BHT 157, K1AGE 129, K1EGE 125, WB1HH 125, WB1SJ 83, K1BYOL 55, W1BDN 45, KA1XG 43, K1EUW 20, W1CUB 10, W1QV 10.

**EASTERN MASSACHUSETTS:** SM, Rick Beebe, K1PAD — STM: WA1TBY. SEC: WA1BLG. ASM: K9HI.

Net	Mgr	Freq.	Time(loc)/Dy	QNI	QTC
EMRI	WA1LPM	3.658	1900/2200/Dy	552	415
EMRIPN	KA1GBS	3.959	1730/Dy	378	205
EMRPN	K1BZD	2.983	1830/Dy	492	155
NEMPN	K1BZD	3.845	0830/Dy	80	14
HHTN	KA1MI	04/84	2230/Dy	571	214
EMRIS	N1BHH	3.715	2030/Dy	94	38
C12MN	N1BYS	045/645	1930/Dy	280	100

I have been going to as many clubs recently as possible lately and getting some good input on your feelings about the no-code license proposal and the volunteer examiner program. The questionnaire in *New England Report* has also helped. But nothing I can do with all this data will be as good as your personal letters to the FCC. With the extension until June 28th, there is still plenty of time to get your thoughts into writing. The 20-meter phone band proposal by the ARRL has been accepted by the FCC. It gives more room to operate for everybody and can only help the congestion on our most crowded hf band. Remember not to fire up until the official date which is May 22. The Framingham club celebrated its 50th anniversary as an ARRL affiliated club with a gala dinner dance. Many original members were special guests and they even had an old movie of the original members and their stations from the 30s. The keeping of good records is an important thing to keep in mind for all clubs. Quantapowitt club had an interesting tech talk by an Alpha representative. K1RAK fielded antenna questions at the Massachusetts club meeting. Colonial club preparing for many upcoming public service activities. Middlesex newsletter had article by W1CE on how to make your TS-930 work with your linear on cw. Algonquin club had a successful flea market. North Andover CD mtr is up and on 222.92/224.52. N1AJJ gave a talk on traffic handling at the Greater Lawrence club. Norwood club had a successful flea market. Billerica club member K1OJH called for help on the Honeywell 1200 club rpt after a very serious accident on Rt. 128. His quick action may have helped save the life of one victim. Well done K1OJH, STM WA1TBY is putting out an interesting newsletter called the "Networks" for you traffic types, but he needs donating to keep it going. What say? Traffic: KA1GBS 640, WA1TBY 516, N1BHH 283, W1AF 228, N1BGW 208, KO1O 160, WB3FCO 128, KE1U 119, N1AJJ 111, N1BYS 98, KA1EPO 97, WA4STO 96, W1TDK 77, WB8TDA 68, K1BA 61, K1H1 56, W1CE 55, WA1DXI 52, K1BZD 45, K1GN 41, K1PAD 40, KA1MI 37, W1QLL 30, KA1DJV 30, WA1FNM 29, N1BUY 12, KA1KF 9, W1ZHC 9, KA1AMR 8, K1LCQ 7, W1MJ 7, KA1R 7, W1PUO 5.

**MAINE:** SM, Cliff Laverty, W1RWG — SEC: KL7JG/H. STM: AK1W. ACC: KA1EIV. DO/RFI: W1KX. SGL: K1NIT. PIO: KA1TJ. TC: K1YFY. The appointments have been completed with the appointment of Philip M. Young, W1JTH, as Bulletin Manager. Congrats to Handi-Ham Herb Merrill, KA1JSE, named Citizen of the Year by Brunswick Area C of C. ARRL affiliated hamfests scheduled July 30 at Cumberland; Sept 10-11 at Windsor. SM will be in Presque Isle Field Day. KK1A BPL with 110 originations. PSHR: N1BJW AK1W W1RWG WA1YNZ KA1AVU KA1GCW KL7JG K1NAN.

Net	Sess.	Check-Ins	Tfc
Pine Tree	54	341	222
Sea Gull	27	96	211
Can Maine	9	123	1
RACES	4	33	21
Arrostoak	5	55	0

Traffic: AK1W 355, K1NAN 135, KK1A 115, WB1BYR 102, N1BJW 95, W1RWG 89, KA1TJ 77, W1BMX 59, KA1AVU 50, W1JTH 45, N1BLZ 43, KL7JG 43, W1KX 37, WA1YNZ 23, KA1GCW 10, KA1AIF 17, WB1EIL 14, W1WCI 13, W1AHM 12, KA1BPJ 12, KA1ENL 12, W1GCB 12, WA1JHT 11, KA1ETL 10, N1BME 9, WA1ZJL 7, W1OTQ 6, KA1ENM 5, K1NIT 4, K1PV 4.

**NEW HAMPSHIRE:** SM, Robert C. Mitchell, W1NH — SEC: AK1E. ATM: W1TN. NMS: W1NH W1VTP K1IM. Nashua club installing equipment for International Listening Center in public library. K1IM now has a Triton IV. Director Sullivan, W1HHR, presented the Great Bay RC their 50-year ARRL affiliation award. WA1HJR has new IC3AT. KA1CXP back on the air. Chechire Co. EC W1EYR published their ARES disaster plan. W1UN now on DXCC honor roll. Now is the time to get everything ready for fall antenna work. Traffic: W1QY 215, N1NH 206, K1IM 194, W1TN 183, K1YMH 128, K1E 118, AK1E 107, W1MTP 90, W1MFX 83, KA1BJ 63, WA1E 45, W1CUE 43, WA1YZN 40, W1AKS 32, KA1FKM 26, N1BEW 21, WA1PEL 20, WB1CFP 17, K1UOX 15, K6UXO 15, K1ACL 12, N1ALM 9, N1BVI 7, K1POV 6, N1BSM 3, WA1HOB 2, K1NH 2. (Feb.) W1QY 188, WA3BZM 18, N1BEW 16, WA1HOB 14, N1BSM 8, KA1HP 5, N1BVI 4, KA1FFX 4, K1NH 3, KA1HRH 2.

**RHODE ISLAND:** SM, Gordon Fox, W1YNE — SEC: KA1EHR. STM: W1EOP. TC: AB1D. NM: WA1OSL reports

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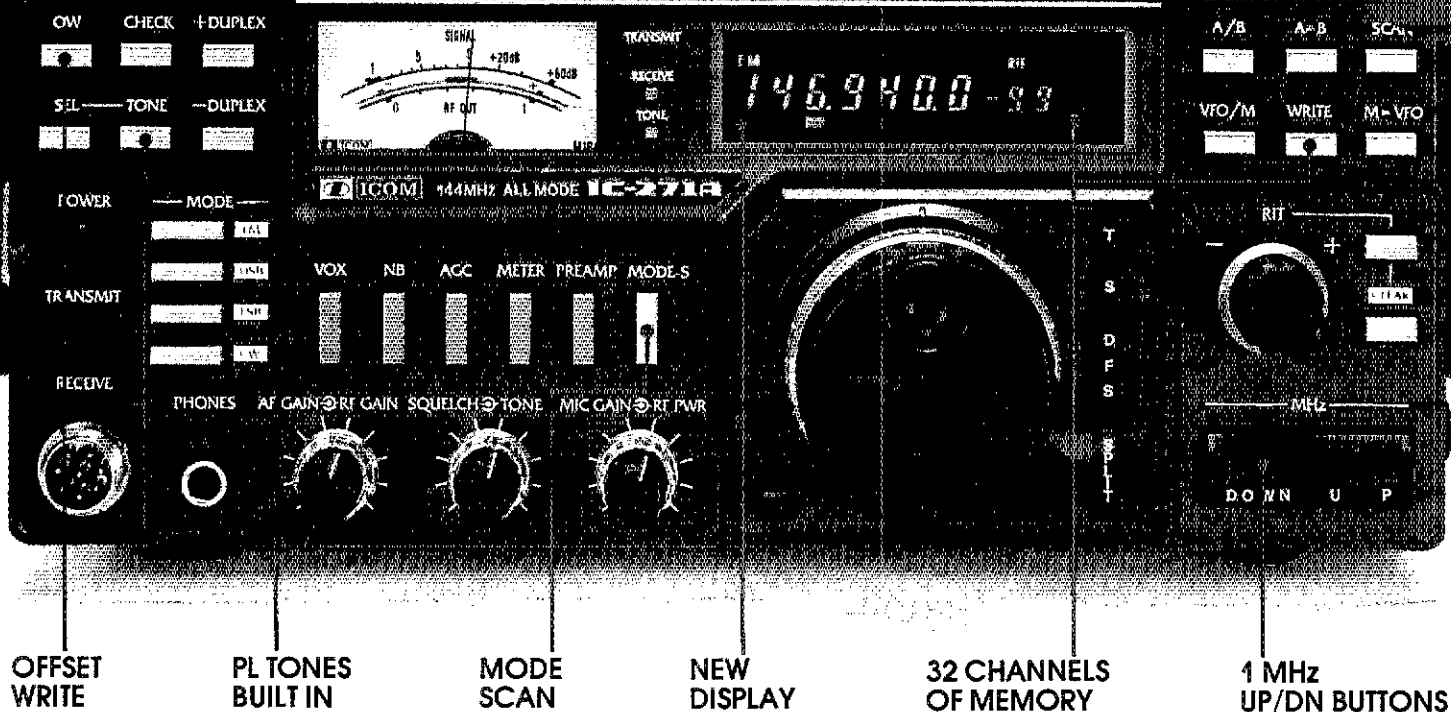
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ICOM presents the most advanced all mode, two meter base station available today... the IC-271A.

25 watts of power from 12 VDC or from 117 VAC with the optional internal power supply/32 full function memories/multimodes/subaudible tones/PLL locked to 10Hz/high visibility, multi-color fluorescent display/RIT readout/scanning/dual VFO's/new size.

**25 watts.** Now a 2 meter base station with 25 watts of power and an optional internal power supply. The IC-271A is a complete station.

### 32 full function memories.

Each memory holds frequency, offset, offset direction, mode, and subaudible tone. Frequency, tones and offset are selected by rotating the main tuning knob.

### Subaudible tones.

Subaudible tones are selected by rotating the main tuning knob and may be stored into memory.

### PLL locked to 10Hz.

Extremely low noise and a good signal-to-noise ratio PLL allow synthesizer lock to 10Hz.

### High visibility display.

ICOM's new high visibility, multi-color display gives easy to read

at-a-glance display of frequency, mode, offset, VFO in use, memory channel, and RIT offset direction and amount.

**Scanning.** The IC-271A can scan memories, programmable sections of the band, or modes. Mode-S scan is a mode scan and can be used to scan memories with a particular mode or to lock out frequencies continuously busy so that the receiver will not stop at that memory channel each time.

**Dual VFOs.** ICOM's dual VFO system is now even more versatile with the ability to transfer from memory to VFO. This allows frequencies from the tunable

memories to transfer directly into another memory without moving a VFO to the new frequency first.

**New size.** Only 1 1/4"W x 4 3/4"H x 10 3/4"D the IC-271A is styled to look good and engineered for ease of operation.

**Other features.** To make the IC-271A functional and easy to use, ICOM has incorporated many asked for features; UP/DN buttons, dial lock, switchable preamplifier, duplex check, all mode squelch, receive audio tone control, S meter, center meter, computer interface, and 7 year lithium battery memory backup.



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**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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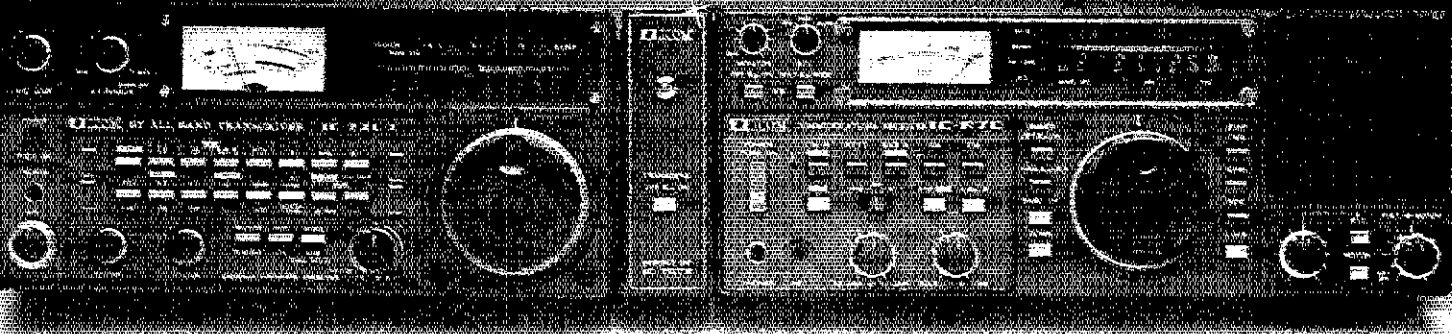
## The World System

ICOM America, Inc., 2112-116th Ave NE, Bellevue, WA 98004 (206)454-8155 / 3331 Towerwood Drive, Suite 307, Dallas, TX 75234 (214)620-27

All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions.

# IC-720A + IC-R70

The "plus" is the New IC-7072 Transceiver Unit



Now you can add ICOM's most versatile HF general coverage receiver to your IC-720(A). Combine the portability and operating convenience of the IC-720(A), with its long list of standard features...and the IC-R70, ICOM's latest general coverage receiver, into one transceiver by using the new IC-7072 transceiver unit.

Check the list of features that will be added to your IC-720(A) receiving system:

**Audio Monitor.** Monitor your own transmitted audio and check SSB audio quality/CW keying characteristics.

**Selectable AGC With Off Position.** Perfect for use with transverters.

**2 Position Noise Blanker.** Very effective, virtually eliminates impulse noise.

**500Hz CW Filter Standard.** 250Hz (FL63) optional 8-pole filter.

**3 Stage Preamp/Off (Direct)/Attenuator Control.** Controls input to ICOM's Direct Feed Mixer receiving system.

**Squelch Control.** Effective in all modes allowing only signals above a certain strength to be heard.

**Audio Tone Control.** For easier listening/less fatigue.

**Record Jack.** Allows connection of a tape recorder to record both sides of a QSO. Unaffected by the volume or monitor control. Also may be used to drive an RTTY decoder.

**Notch Filter.** Deep IF notch eliminates annoying heterodynes from interfering adjacent signals.

**Large Front Mount Speaker.** Full 3 watts of audio.

**Expanded Range Pass Band Tuning.** For greater adjacent signal rejection in the AM mode.

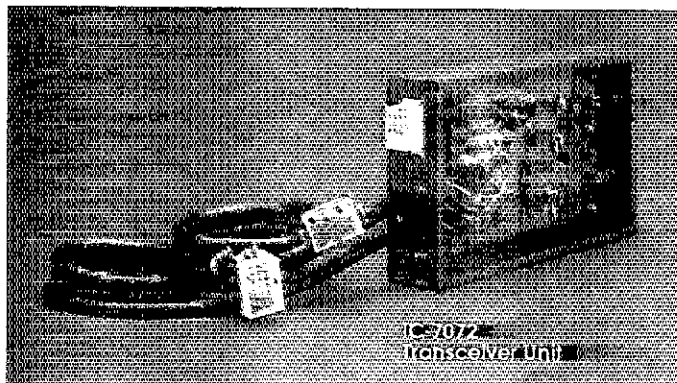
**Option for FM Reception.** Useful for 10 meter FM.

**Excellent, Clear Reception.** With the R70's advance receiving system with the first IF at 70MHz, and with the lowest synthesizer noise level available — better than receivers costing much more.

Bring all of these advanced features to your IC-720(A) shack with the R70 and the IC-7072 transceiver unit. The plug-in IC-7072 transceiver unit slaves the CPU of the IC-720(A) to the IC-R70 microprocessor. This allows the tuning knob and selector buttons of the IC-R70 to control the IC-720(A).

Included with the IC-7072 are cables for the mute line control on the IC-R70 and a coax line to patch the IC-720(A) antenna into the IC-R70. An accessory connector on the IC-7072 is provided for attachment of "ICOM System" accessories such as the IC-2KL linear amplifier or IC-A1500 automatic antenna tuner or both.

Now your base station can have the most advanced ham/general coverage receiver available and the crisp transmitted audio of the IC-720(A) with RF speech processor. And yet, the 12 volt operated IC-720(A) may be taken mobile or portable for the ultimate in a ham band transceiver...and you still have general coverage reception...at both places!



# ICOM

## The World System

# ICOM Handhelds

## 2 Meter, 220 or 440 MHz

**IC-2AT**  
2 meter

**IC-3AT**  
220 MHz

**IC-4AT**  
440 MHz

**IC-DC1**  
DC Regulator

**IC-BP2**  
Battery Pack

**IC-BP3**  
Battery Pack

**IC-BP4\***  
Battery Case

**IC-BC25U**  
AC Wall Charger

**IC-CPI**  
Cigarette Lighter Cord w/Fuse

**IC-ML1**  
12 VDC 144 MHz Booster

**Battery Charger**  
Determines Charge Rate)

**Battery Pack**  
10.8 VDC, 425 mA  
1.5 hr charge

**Leather Case**  
Available with or without cut out for "Touchtone" pad.

Battery Pack	Nominal Transceiver Power (watts)
BP2	1.0
BP3	1.5
BP5	2.3

**IC-DC1**  
DC Regulator  
12 VDC in/9.6 out  
(comes with DC cord—will not get power from BC30)

**IC-BP2**  
Battery Pack  
7.2 VDC 425 mA  
1.5 hr charge

**IC-BP3**  
Battery Pack  
8.4VDC 250 mA  
15 hr. charge

**IC-BP4\***  
Battery Case

**IC-BC25U**  
AC Wall Charger  
117 VAC in  
(for charging BP3 only)

**IC-CPI**  
Cigarette Lighter Cord w/Fuse  
(charges BP3/powers DC1)

**IC-ML1**  
12 VDC 144 MHz Booster  
10W out/12 VDC  
Comes with 5ft coax, BNC to PL-259

**Battery Charger**  
Determines Charge Rate)

**Battery Pack**  
10.8 VDC, 425 mA  
1.5 hr charge

**Leather Case**  
Available with or without cut out for "Touchtone" pad.

ICOM's reliable, field proven, handhelds have been the most popular handheld on the market. Here's a few reasons why:

**The Transceivers.** The IC-2AT features full coverage of the 2 meter ham band. The IC-3AT covers 220 to 224.99 MHz, and

the IC-4AT has 440 to 449.995 MHz. Each radio is only 2.6in x 1.4in x 6.5in in size. Excellent audio quality is provided by a quality speaker and an electret condenser microphone. All have 1.5 watt output and battery saving 0.15 watt low power. Touch Tone™ pad is

included (on "T" models).

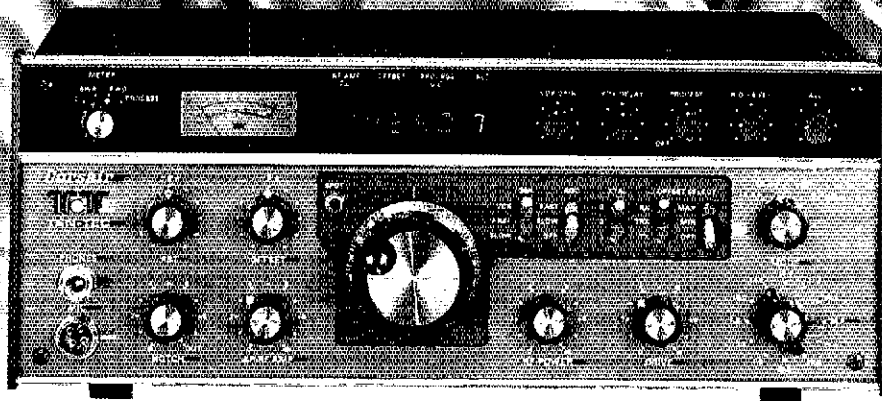
**Standard Equipment.** Each transceiver comes complete — ready to use — with BP3 rechargeable battery, AC wall charger, flexible antenna, earphone, wrist strap, and belt clip...all standard.

**The System.** Accessories for the handheld series are interchangeable between transceivers. Slide in removable battery packs allow quick changing of batteries. Batteries may be charged when removed from the transceiver.



# ICOM

## The World System



## **CLEANLINESS...** **a unique CORSAIR virtue**

Cleanliness in the TEN-TEC CORSAIR means unusual spectral purity of both received and transmitted signals.

In Receive mode, even with the r.f. preamp in operation, the 3rd order intercept (at 20 kHz tone spacing) is +5 dBm. With the preamplifier off, the 3rd order intercept rises to a superlative +18 dBm and remains constant even at 3 to 6 kHz away from the pass-band.

In Transmit mode, if you look at the output of the CORSAIR on a spectrum analyzer, you note an almost complete absence of phase noise—a phenomenon which plagues most PLL transceivers. At 20 kHz from the carrier, the generated phase noise in the CORSAIR is a spectacular -148 dBc/Hz, and at 1 kHz it is -132 dBc/Hz.\*

This breakthrough in circuit design, using proven crystal mixed oscillators with the latest USA solid state technology, is setting new standards of cleanliness and purity of signals. All of which means enhanced reception with less fatigue, lower noise floor, no overloading and more DX worked. And your signal will be a bit easier to read under adverse conditions. Compare.

Other virtues of the CORSAIR include:

- All solid state, broadband design
- All 9 hf bands
- Triple conversion receiver with 0.25  $\mu$ V sensitivity on all bands and better than 90 dB dynamic range
- Variable bandwidth plus Passband tuning
- Dual range, Triple mode, Offset tuning
- Variable Notch filter
- Built-in Speech Processor
- Built-in Noise Blanker
- 200 W input, 100% duty cycle
- Dual-speed QSK (full or semi)
- Many operating conveniences including headphone attenuator, cw signal spotter, 5-function meter, WWV reception, adjustable ALC threshold lighted status indicators, selectable AGC, adjustable pitch and volume of sidetone, complete interfacing.
- Full accessory line including remote VFO, keyers, microphones, power supplies, antenna tuners, ssb and cw filters.
- Reliable American manufacture and service, fully warranted.

See CORSAIR at your TEN-TEC dealer, or write for full details.  
TEN-TEC, Inc., Sevierville, TN 37862

*\*Specifications measured by independent laboratory*

# Introducing the **EXPLORER 14**<sup>TM</sup>

## HY-GAIN<sup>®</sup> Broadband

### Remarkably Compact, High Performance Tribander with Quad-Band Option

#### New Para-Sleeve Design

The Explorer 14 is a new antenna design we call PARA-SLEEVE which uses an "open-sleeve" dipole optimized for maximum bandwidth and directivity. Here is the concept. A central dipole, driven directly by the transmission line, has a 1/2 wave resonance on the lowest operating frequency. Two shorter sleeve elements, tightly coupled to the central dipole, modify its impedance to create a 1/2 wave resonance on the highest operating frequency. This para-sleeve system is expanded by the addition of 15 meter traps and 20 meter element tips. A revolutionary new concept for HF tribanders. So unique, we've applied for a patent.

#### Broadband Performance

The Explorer 14 will load solid state transceivers to maximum output with VSWR below 2:1, eliminating the need for an antenna tuner. You'll have edge to edge broadband performance on 20, 15 and 10 meters with gain and front-to-back ratio competitive to giant tribanders that cost twice as much or more. You'll be able to work stations you cannot even hear with a dipole antenna. And, the Explorer 14 handles maximum continuous legal power with a respectable safety margin.

#### Short Boom Save Space and Money

If your space or budget was too limited for a long boom tribander, chances are the Explorer 14 will fit both. The boom is only 14' (4.3 m) long and the turning radius requires only 17'3" (5.3 m). The compactness of the Explorer 14 reduces its overall weight and windload surface so you can mount it on a roof tripod, a mast or a tower. For example, the Hy-Gain CD-451 rotator and HG52 tower are a perfect match for the Explorer 14. This saves you the cost of an extra heavy-duty rotator or tower.

#### Superior Construction

The Explorer 14 includes passivated stainless steel hardware and heavy gauge, pre-formed element and mast brackets. High grade 6063-T832 thick wall swaged aluminum tubing is used throughout. A BN86 balun is included and a new Beta Multi-Match provides DC ground to reduce lightning hazard and precipitation static. It's a rugged, easily assembled antenna that survives winds to 100 mph (160 km/h).

#### Quad Band Option

You can add a fourth band, either 30 meters or 40 meters to the Explorer 14 with the QK-710 kit. A kit that attaches to the central dipole and is easily adjusted for either 30 meters (WARC) or 40 meters at minimal extra cost.



Lew McCoy, W1ICP is among the most authoritative writers in amateur radio. For over 30 years he served on the ARRL technical staff with his last position as assistant technical editor. Presently he is the technical editor for CQ magazine. Here is what he had to say about the Explorer 14:

"In my opinion, with Explorer 14, Hy-Gain produced a truly high gain, high performance antenna in a small package. The "para-sleeve" design provides the amateur a whole new ball game, particularly in the area of broadbanding. I was really surprised when I actually verified the gain, front-to-back and bandwidth during my recent visit to the Hy-Gain labs and antenna range in Lincoln, Nebraska. The Explorer 14 is a winner."

#### SPECIFICATIONS

Electrical	20M	15M	10M
	14.0-14.35	21.0-21.45	28.0-29.7
Frequencies of operation:			
Under 2:1 VSWR (MHz)			
Maximum F/B Ratio (dB)			
Maximum Power			
Lightning Protection			
Mechanical			
	Boom Length		14'1 1/2" (4.3 m)
	Turning Radius		17'3" (5.3 m)
	Net Weight		.43 lbs. (19.5 kg)
Wind Surface Area			7.5 sq. ft. (.69 m <sup>2</sup> )



# SPECIAL INTRODUCTORY OFFER\*

## SAVE \$472.40

Complete Antenna Rotator & Tower System  
**PLUS FREE DELIVERY.**

	Ham Net Price
Explorer 14 Tribander Antenna Ham net Price Includes BN-86 Balun and Beta Multi-Match	\$ 399.95
Hy-Gain CD-45II Rotator	164.95
Hy-Gain 52 foot (15.8 m) Crank-Up Tower Model HG52SS	1,095.00
Antenna Mast, 10 feet (3.5 m)	68.50
Three Coax Arms	39.00
<b>Total Ham Net Value</b>	<b>\$1,767.40</b>
<b>Special Introductory System*</b>	<b>\$1,295.00</b>
<b>YOU SAVE</b>	<b>\$ 472.40</b>

\*Any other Hy-Gain antenna, rotator or tower may be substituted at regular Ham net. Free Delivery is offered for shipping points within contiguous 48 United States only. Offer is extended through participating Telex/Hy-Gain Amateur products distributors only.

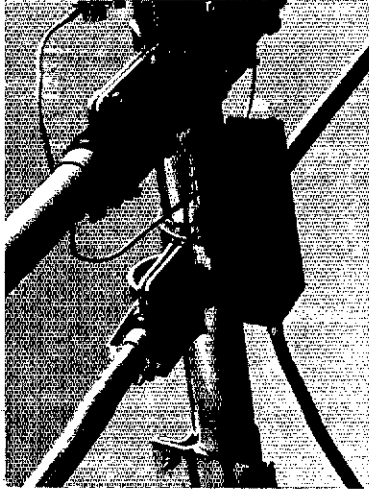
## ACT NOW! Offer Expires June 30, 1983.

# TELEX® *hy-gain*®

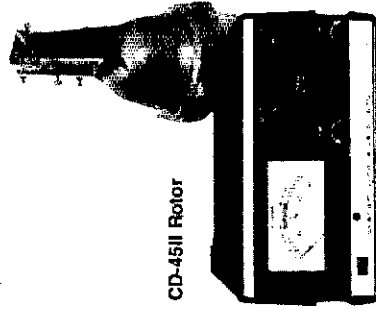
TELEX COMMUNICATIONS, INC.

9600 Alutch Ave. So., Minneapolis, MN 55420 U.S.A.

Europe: Le Bonaparte—Chêne 711, Centre Affaires Paris-Nord, 93153 Le Blanc-Mesnil, France.



Feed point and balun.

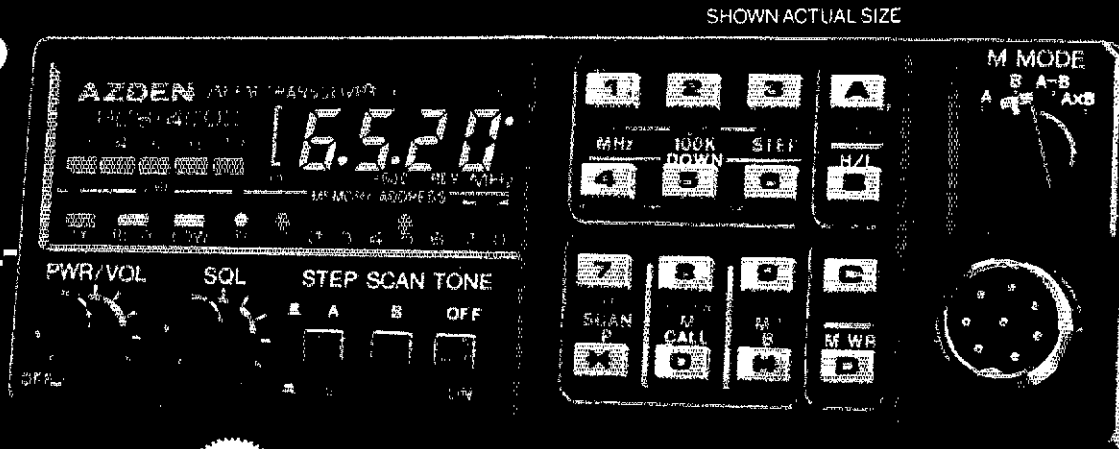


CD-45II Rotator

New!  
**AZDEN® PCS-4000**

Small - yet so Sophisticated...  
 so Advanced - there is  
**No Comparison**

**FEATURES SO  
 UNIQUE AND  
 OF SUCH  
 SUPERIOR  
 COMMERCIAL-  
 GRADE  
 QUALITY,  
 THAT...**



**IT CARRIES A 1 YEAR LIMITED WARRANTY!**

- **8 MHZ COVERAGE, CAP/MARS BUILT IN:** 142,000-149,995 MHz in selectable steps of 5 or 10 kHz. **COMPARE!**
- **TINY SIZE:** Only 2" H x 5.5" W x 6.8" D! **COMPARE!**
- **MICROCOMPUTER CONTROL:** At the forefront of technology!
- **UP TO 8 NON-STANDARD SPLITS:** Ultimate versatility for CAP/MARS. **COMPARE!**
- **16-CHANNEL MEMORY IN TWO 8-CHANNEL BANKS:** Retains frequency and standard offset.
- **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. 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 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.
- **PL TONE:** Optional PL tone unit allows access to PL repeaters. Deviation and tone frequency are fully adjustable.
- **TRUE FM:** Not phase modulation. Unsurpassed intelligibility and fidelity.
- **25 WATTS OUTPUT:** Also 5 watts low power for short-range communication and battery conservation. (Transmitter power is fully adjustable)
- **SUPERIOR RECEIVER:** Sensitivity is 0.2 uV for 20-dB quieting. Audio circuits are designed 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, built-in speaker, mobile mounting bracket, remote speaker jack, and all cords, plugs, fuses and hardware are included.
- **ACCESSORIES:** CS-6R 6-amp ac power supply, CS-AS remote speaker, and Communications Specialists SS-32 PL tone module.
- **ONE-YEAR LIMITED WARRANTY!**

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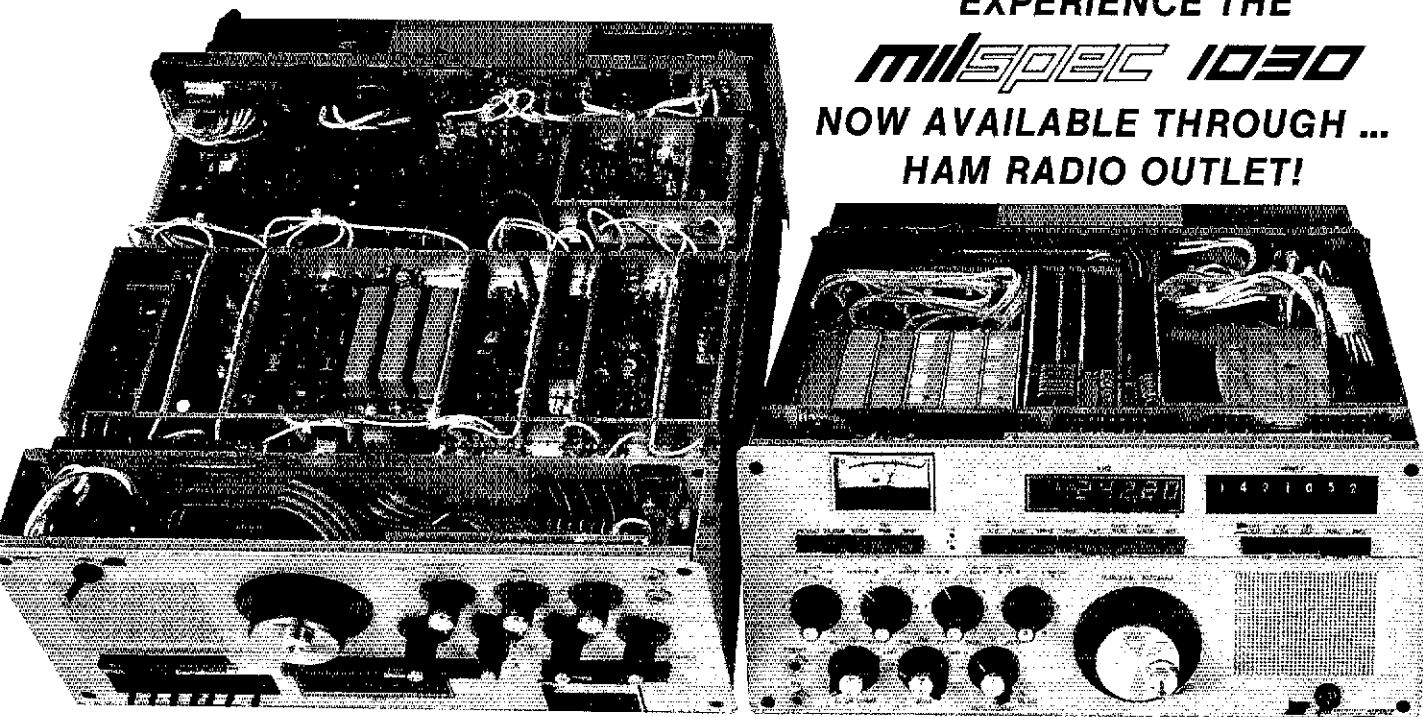
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# THE FIRST... FULLY SYNTHESIZED\* HF TRANSCEIVER.

EXPERIENCE THE  
*milspec 1030*  
NOW AVAILABLE THROUGH ...  
HAM RADIO OUTLET!



The Signal One Corporation continues its leadership with the introduction of the Milspec 1030, \*A NEW CONCEPT IN SYNTHESIZER TECHNOLOGY. COMBINING THE ENTIRE DIGITAL FREQUENCY CONTROL SYSTEM, INCLUDING PASSBAND TUNING AND BFO FREQUENCIES, WITH THE MAIN TUNING, FREQUENCY PRESET AND REMOTE COMPUTER CONTROL . . . we have achieved an ultra fast, real time frequency controlled, high performance, military grade, fully synthesized communications system that will out perform any HF transceiver ever offered in the amateur and commercial market.

## Featuring:

- **Fully Synthesized General Frequency Coverage:** 10 kHz — 30 MHz in 1kHz, 100 Hz or 10 Hz steps, tunable with encoder or thumbwheel preset, stability of 1 Hz/C°.
- **Lever Switch Frequency Pre-Set:** Provides instantaneous band change; sets to within 10 Hz; automatically returns to tuning A/B. The fastest and most convenient method of frequency entry and recall with additional digital display and memory, **TUNING C**, make this superior to keyboard systems.
- **New Synthesizer Technique:** 120 dB/Hz phase noise close to carrier; extensive GMOS circuitry used for improved spectral purity and great reduction of digital noise—a problem that plagues other HF transceivers causing unwanted mixing products—that insures weak signals will not be covered by internally generated noise due to adjacent strong signals.
- **Real Time Frequency Acquisition:** Not multiplexed; unique synthesizer design allows frequency jumps of 30 MHz in 10 milliseconds, useful in military surveillance applications that demand ultrarapid synthesizer switching.
- **Remote Control and Programmability:** Permits transceiver use in computer based communication systems (Optional interface req.)
- **Unequaled Receiver Dynamic Range and Front End Selectivity:** + 20 dBm, 3rd, order intercept point and .25 uV sensitivity offer the best immunity to strong signal overload currently available to the commercial and amateur market. Specially developed high level monolithic, double quad balanced mixers combined with low synthesizer phase noise and up-converter to 40.455 MHz 1st. I-F thru 8 pole Crystal Cross Mod. Filter with a ± 4 kHz bandwidth, designed for low intermodulation distortion products, makes this performance possible.
- **Synthesized Passband Tuning:** 1st and 2nd. I-F tune in 10 Hz steps over ± 5 kHz range with respect to 1st and 2nd. I-F filter passbands, a unique dual passband feature for maximum interference rejection. Controlled by tuning A/B.
- **Collins/Rockwell™ Mechanical Filters:** For maximum selectivity and ultimate rejection performance. Demanded in most military/commercial applications. 2.1 kHz (USB/LSB), each selected for optimum performance on SSB, cascaded with front end VHF 8 pole crystal filter, active I-F, notch filter, passband tuning and noise blanker deliver 16 pole, 1.4:1 performance (6/60 dB) and add up to the most powerful anti-DRM system available.
- **Noise Blanker:** Pre I-F blanker with adjustable threshold and 80 dB dynamic range, gating effectively placed in receiver RF path and triggered by pulsed noise such as over-the-horizon radar.
- **I-F Notch Filter:** Active 300 Hz notch in 2nd. I-F Adjustable ± 1.5 kHz with 40 db rejection. Receiver AGC not affected by notched signal.
- **High Power Transmit System:** Motorola® high power final amplifiers with 150 watt CW/SSB output or 200 watt option.



- **RF Speech Processing:** Clipped transmit RF signal is passed through mechanical and crystal filters for unequaled SSB talk power and elimination of unwanted intermodulation distortion products. This is a preferred process and considered superior to audio type processors.
- **OSK CW Full Break-In:** Vacuum relays and 200 Hz filter offer a superb full break in CW System.
- **Construction:** All circuit boards, including synthesizer modules, plug-in; ribbon cable interconnection and Minisert™ sockets for transistor and IC replacement insure ease in self servicing; military and computer grade components used exclusively.

## RECEIVER PERFORMANCE

- Sensitivity:** .25 uV (—118 dBm or better) for 10 dB S:N ratio at antenna input 1.6-30 MHz (2.1 kHz width in SSB).
- Selectivity:** 1st. I-F: 40.455 MHz ± 4kHz @ -6 dB, 1 dB ripple, 8 pole crystal filter.
- 2nd. I-F: 455 kHz mechanical filters, @ 3 dB.
- Standard:** USB 2.1 kHz CW2 375 Hz AM 5.8 kHz LSB 2.1 kHz CW2 200 Hz AFSK/LSB 300 Hz CW1 1.9 kHz (extra sleep skirts) (CF high tone pair)
- Mixers:** Specially developed, high-level, monolithic double balanced mixers with hot carrier diodes used in first and second mixer stages.
- Intermodulation Distortion:** (typical) 3rd. order input intercept point + 20 dBm for separated signals of 20 kHz; 2nd. order IMD is —80 dB.
- Cross Modulation:** Unmodulated wanted signal of 100 uV together with a modulated (30% at 1 kHz) unwanted signal of 100 mV spaced 30 kHz apart produces 10% Cross Mod.
- Blocking:** Attenuation of a wanted AF signal of 50 uV and caused by an unmodulated unwanted signal of 1V spaced 30 kHz apart then produces 3 dB blocking.
- IF and Rejection:** 80 dB
- Synthesizer Phase Noise:** Mean S/N ratio of 1st. L.O (typical, reference to 1 Hz bandwidth); 90 dB measurement 1 kHz from carrier; 135 dB measurement 20 kHz from carrier.

## TRANSMIT PERFORMANCE

- Power Amplifier:** Solid state, broadband 1.6 — 30 MHz 150 W or 200 W (high power option) CW/PEP output keystone all bands and modes. Automatic power curback under excessive VSWR conditions. Heavy duty Hypersil® transformer for exceptional regulation and power. For continuous full power "key down" operation, blower option required.
- Third Order Intermodulation Distortion:** 25 dB below each of two tones at full PEP output.
- Unwanted Signal Suppression:** Carrier: —50 dB min; undesired sidebands, 1 kHz —55 dB min; harmonic (all): —40 dB 10 log of mean power output; mixer products: —50 min.

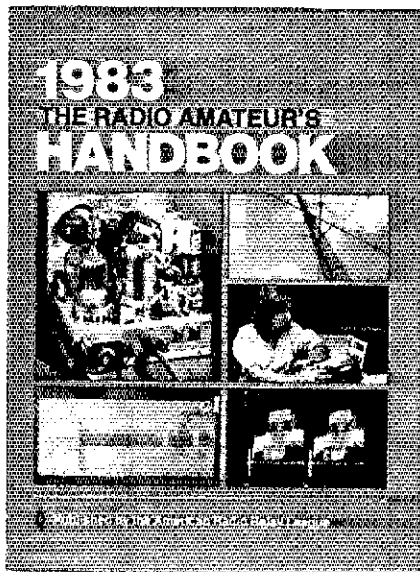
## GENERAL

- Frequency Coverage:** 10 kHz to 29.9999 MHz receive; 10 kHz to 1.6 MHz at reduced sensitivity; 1.6 to 29.9999 MHz transmit.
- Frequency Control:** Memory provides split tuning A/B — using opto-electrical shaft encoder tuning in increments of 1 kHz 100 Hz and 10 Hz (180 kHz, 18 kHz, and 1800 Hz/360° respectively), selectable with front panel push buttons. **Tuning C** — preset frequency settable to 10 Hz with front panel lever switch; frequency entered by set button, display and BCD registers updated.
- Memory:** — frequencies stored in any of 9 memories, recalled for Tuning A/B frequencies with read-push buttons, frequencies from Tuning A/B or C entered into memories with Auto Write or Write push button.
- Stability:** 1 ppm/month, 1 Hz/C°; 1 ppm after 15 min, warm-up at 25°C typical. For more demanding requirements, high stability reference oscillator option available — will meet military and commercial standards for specialized data transmissions.
- Modes:** USB, LSB, CW, AFSK, AM — receive USB, LSB, CW AFSK/LSB — transmit.
- Remote Computer Control:** via rear panel 60 pin connector 1 BCD (1-2-4-8) 12 V CMOS parallel command for:
  - A. Frequency / handshake
  - B. Mode deletion
  - C. Bandpass tuning
  - D. BFO tuning
- Power Supply:** Built-in heavy duty AC/DC supply. 115/230V ± 5%, 50 to 400 Hz, 12 to 15 VDC at 40 AMPS max., negative ground, 120 W max. in receive, 600W peak at full transmit input. Thermal and current overload protection.
- Size:** 16.2" wide; 7.8" high; 17.8" deep. **Weight:** 50 lbs. *Specifications are subject to change without notice or obligation. \*Introductory price — \$4995 00*

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The 1983 Edition of the *RADIO AMATEUR'S HANDBOOK* continues the tradition of presenting the most up-to-date concepts in radio frequency communications. The previous 58 editions can be found in the libraries of engineers, technicians, students and radio amateurs around the world.

Expanded emphasis is given to the use of Amateur Radio satellites including tracking programs. The builder will find a wealth of new construction projects. The following three pages show some of the material added to the new edition and a breakdown of the contents of each chapter.

Chapters included in this big 640-page edition are:

- Amateur Radio
- Electrical Laws and Circuits
- Radio Design Technique and Language
- Solid State Fundamentals
- AC-Operated Power Supplies
- HF Transmitting
- VHF and UHF Transmitting
- Receiving Systems
- VHF and UHF Receiving Techniques
- Mobile, Portable and Emergency Equipment
- Code Transmission
- Single Sideband
- Frequency Modulation and Repeaters
- Specialized Communications Systems
- Interference with Other Services
- Test Equipment and Measurements
- Construction Practices and Data Tables
- Wave Propagation
- Transmission Lines
- Antennas for High Frequency

Projects and topics added to the new Handbook include:

- Code Practice Oscillator
- QSK kW HF Linear Amplifier
- 250-Watt Linear Amplifier Covering 30-m Band
- Two-Tone Generator
- High-Performance ssb Speech Processor
- Simple Switching Regulator
- General-Purpose RTTY Demodulator
- 50-MHz Transmitting Converter
- 8-Band Communications Receiver
- Frequency Spectrum Chart
- Introduction to Packet Radio and Spread Spectrum
- New RFI Chart showing Frequency Relationships Between Amateur Bands (including WARC) and Other Services (including CATV)
- 10 GHz Gunnplexer, Communications
- New Antennas for vhf fm
- Updated Parts Supplier List

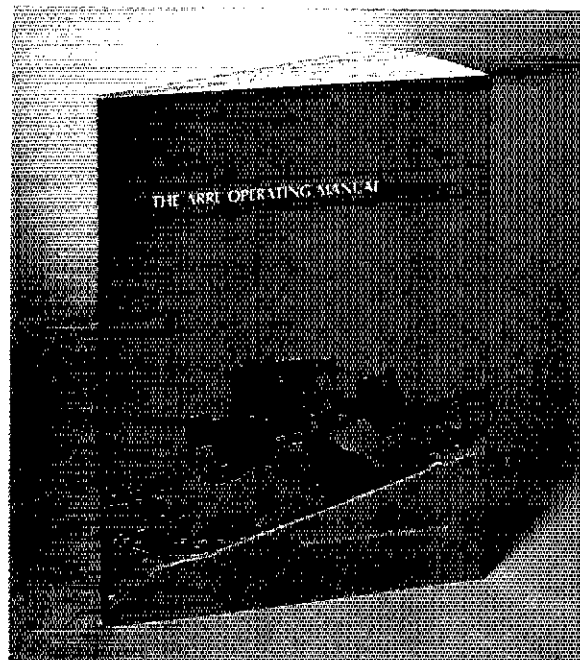
Paper Edition: \$12 in the U.S., \$13 in Canada, \$14.50 elsewhere. Cloth Edition: \$17.75 in the U.S., \$20.00 elsewhere.

## THE ARRL OPERATING MANUAL

We think that this is the finest book on Amateur Radio operating ever written, and the 1980 Edition is well on its way to becoming one of the ARRL's best sellers! Each chapter was written by an expert with extensive on-the-air experience in his or her field. You'll find dozens of useful charts and tables. All facets of operating are covered in a style which shows how fun and rewarding the Amateur Radio experience can be.

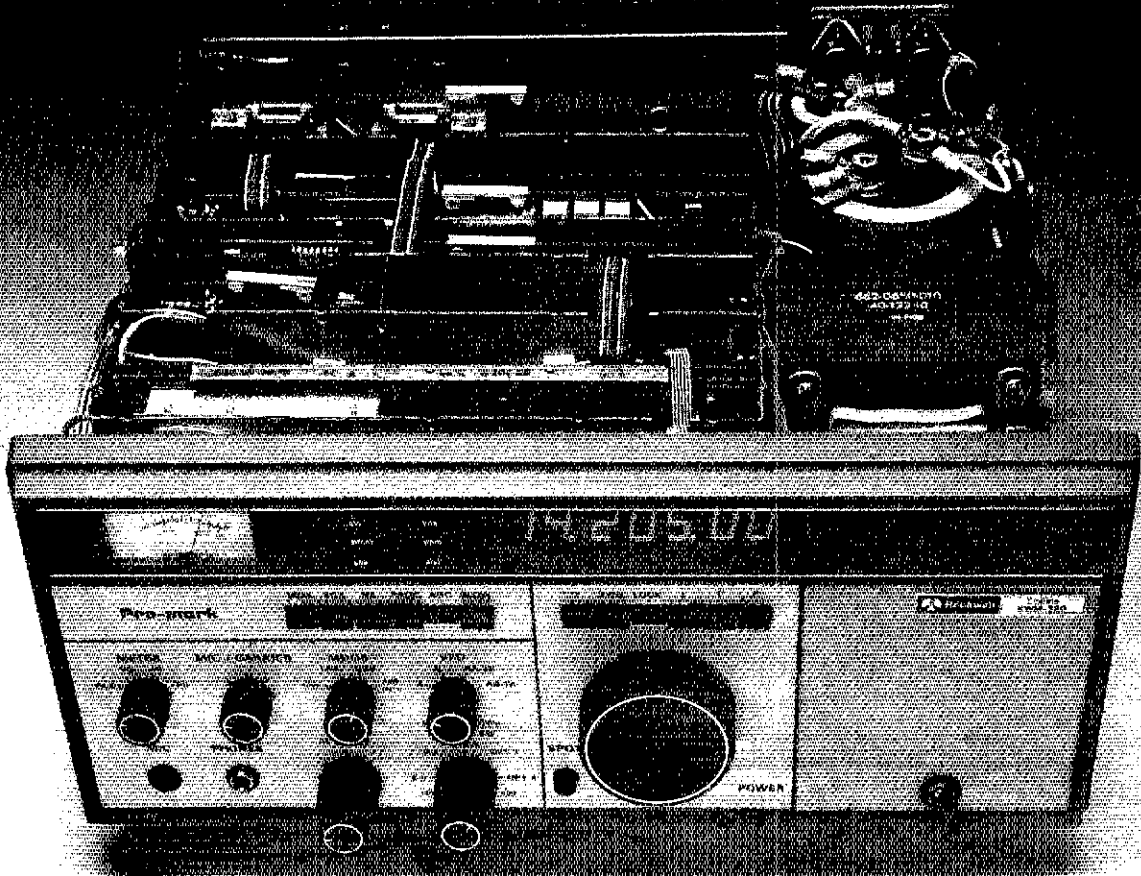
Chapters include: Basic Amateur Radio, Rules and Regs, Traffic Handling, Emergency Communications, DX and DXing, Contests, Awards Chasing, FM and Repeaters, VHF/UHF Operating, Satellites, Visual Communications, Microcomputers, and Shortwave Listening.

Contains these important references: 5BDXCC country check-off list with continents, ITU and CQ zones of each country, ARRL Numbered Radiograms, International Call Sign Allocations, Q Signals, CW Abbreviations, RST System, Beacon Frequencies, DX Operating Code, Spanish Phonetics plus much more!



The 1980 Edition is the first in the large (8-1/2 x 11) format and replaces the *Operating Guide* and the three previous editions of the old *Operating Manual*. **154 Pages, \$5.00 in the U.S., \$5.50 elsewhere**

# The real beauty of the Collins KWM-380 is behind the panel, not on it.



At Collins, we know serious amateurs won't settle for less than professional performance. So we build every KWM-380 to commercial rather than amateur standards. For example, our PC boards are connected by ribbon cables with gold-plated pinfield connectors. The boards themselves are all glass epoxy, and virtually

Once built, every KWM-380 undergoes 24-hour burn-in, then is aligned and tested to meet or exceed every spec on the data sheet. Which makes us very confident about warranting your KWM-380 for one full year.

The result is a radio with superior performance and lasting quality, not front-panel glitter. Frequency stability is just one example of its beauty: typically, drift is as low as 10-12 Hz per hour for normal ham shack environments. Other companies haven't matched our performance because they don't match our quality behind the panel.

Add some real beauty to your station. See the KWM-380 at your nearest authorized dealer. Collins Telecommunications Products Division, Defense Electronics Operations, Rockwell International, Cedar Rapids, IA 52498. Phone (319) 395-5963. Telex: 464-435.

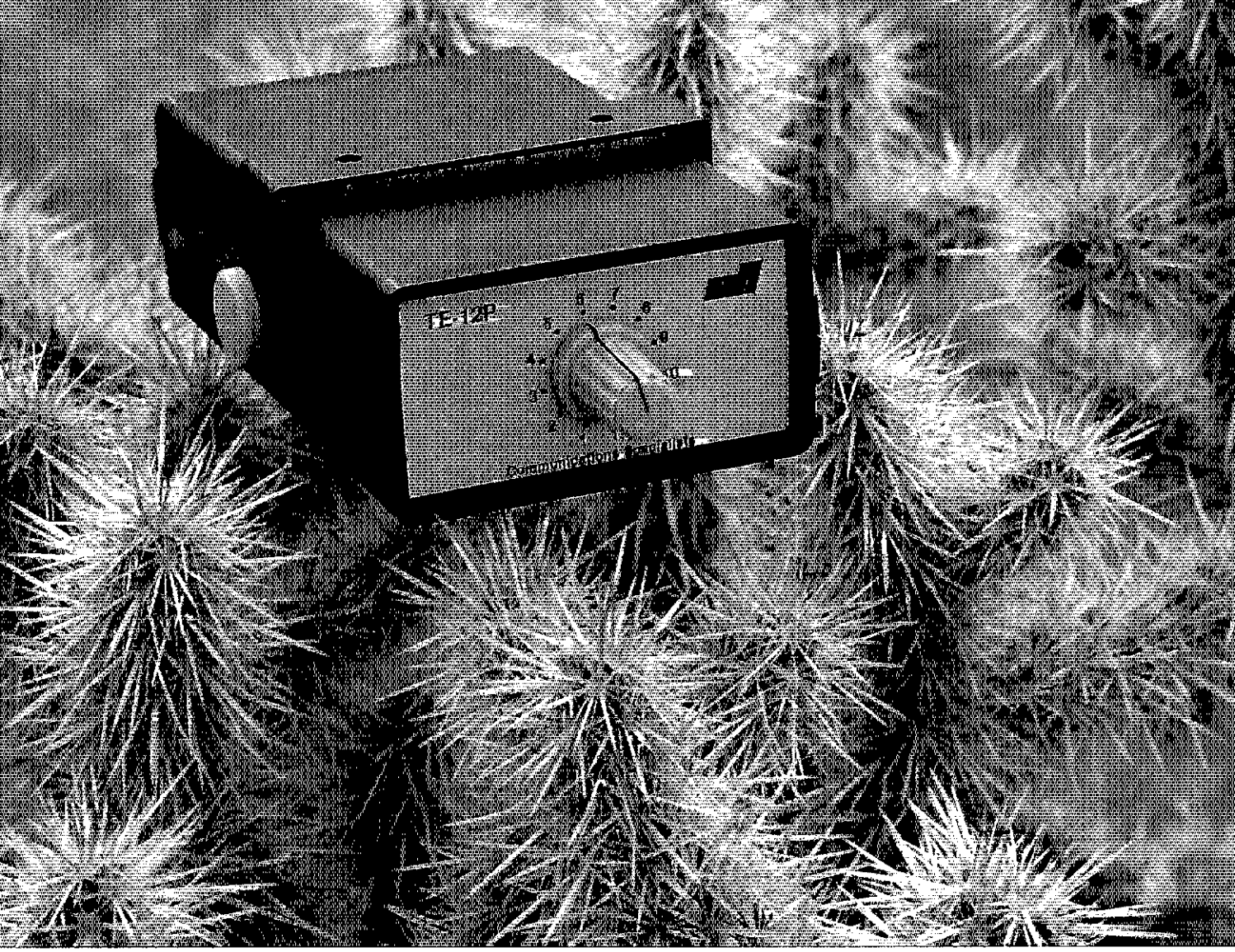


unaffected by temperature and humidity which cause intermittents in the more commonly used phenolic boards.



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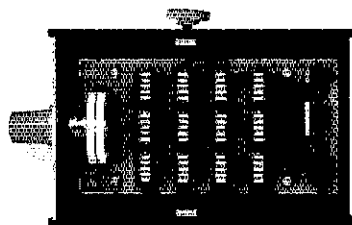
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71.9 XA	88.5 YB	107.2 1B	131.8 3B	162.2 5B	203.5 M1
74.4 WA	91.5 ZZ	110.9 2Z	136.5 4Z	167.9 6Z	
77.0 XB	94.8 ZA	114.8 2A	141.3 4A	173.8 6A	
79.7 SP	97.4 ZB	118.8 2B	146.2 4B	179.9 6B	
82.5 YZ	100.0 1Z	123.0 3Z	151.4 5Z	186.2 7Z	

- Frequency accuracy,  $\pm 1$  Hz maximum  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Frequencies to 250 Hz available on special order.
- Continuous tone

### TE-12PB

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600	697	1209	1600	1850	2150	2400
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2175	941	1633	1750	2000	2300	2550
2805			1800	2100	2350	

- Frequency accuracy,  $\pm 1$  Hz maximum  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Tone length approximately 300 ms. May be lengthened, shortened or eliminated by changing value of resistor

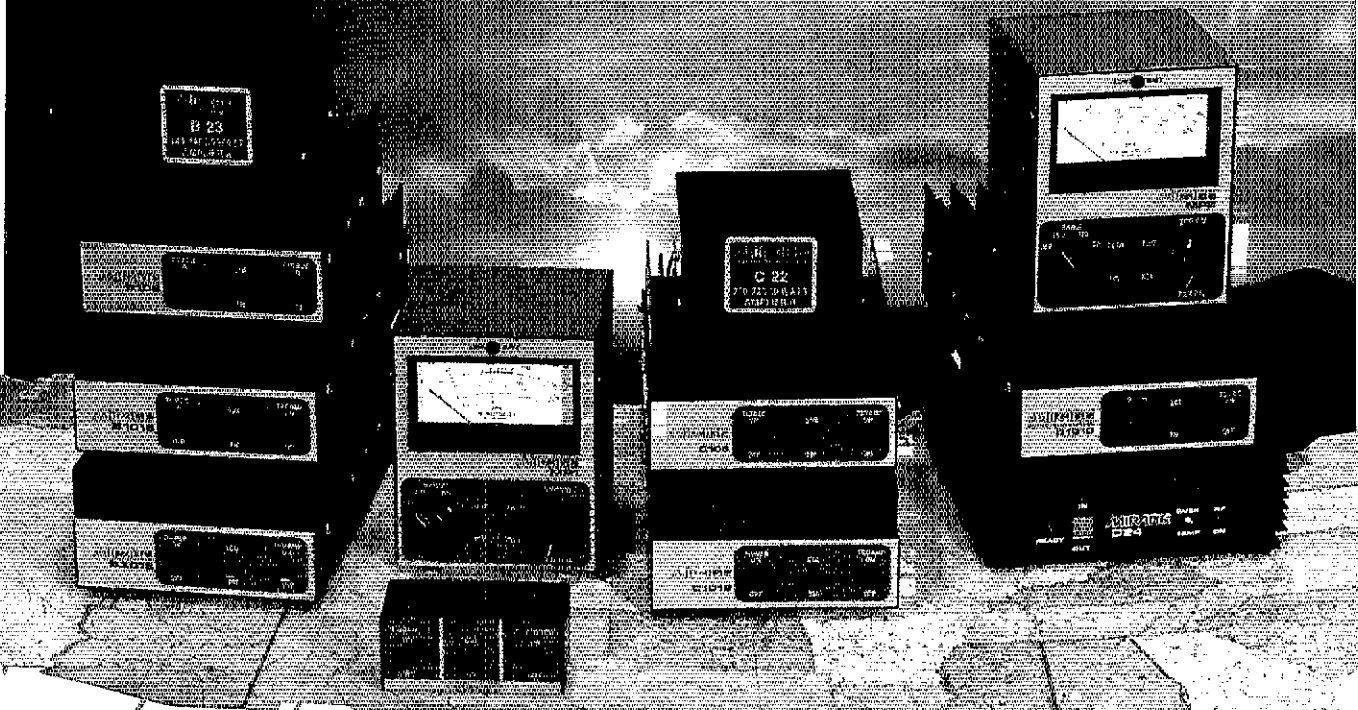
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- **CONTINUOUS DUTY RATED**—Full power 250 watt input operation on SSB and CW (same on SSTV and RTTY with optional FA7 fan).
- **FULL PASSBAND TUNING (PBT)** enhances use of high rejection 8-pole crystal filters.
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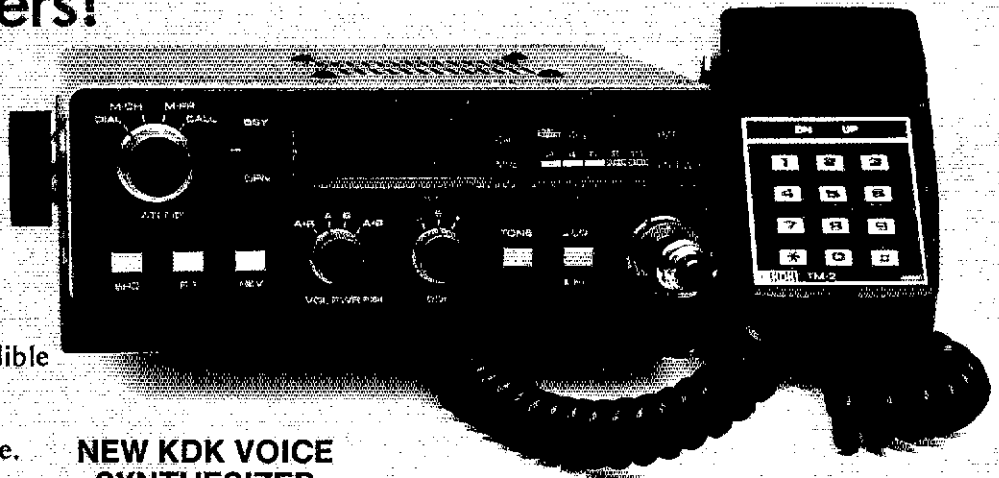
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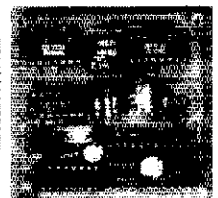
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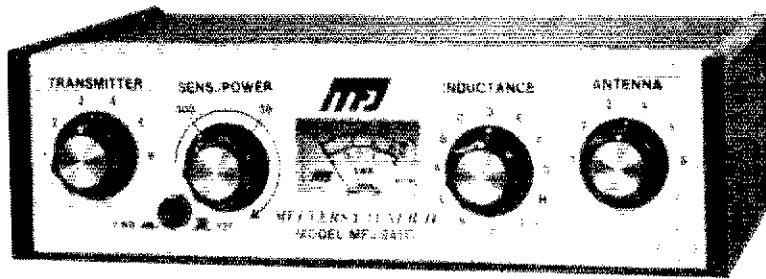
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# MFJ ANTENNA TUNERS 16 MODELS

## 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.



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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<sup>95</sup>** (+ \$4)

Matches coax, random wires 1.8-30 MHz.

Handles up to 200 watts output; efficient air-wound 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<sup>95</sup>** (+ \$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<sup>95</sup>** (+ \$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.

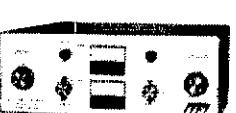
6 position antenna switch handles 2 coax lines (direct or through tuner), wire and balanced lines.

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<sup>95</sup>** (+ \$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<sup>95</sup>** (+ \$10)

New smaller size matches new smaller rigs -- only 10-3/4Wx4-1/2Hx14-7/8D".

3 KW PEP. 250 pf-6KV caps. Matches coax, balanced lines, random wires 1.8-30 MHz.

Roller inductor, 3-digit turns counter plus spinner knob for precise inductance control to get that SWR down.

Built-in 300 watt, 50 ohm dummy load.

Built-in 4:1 ferrite balun.

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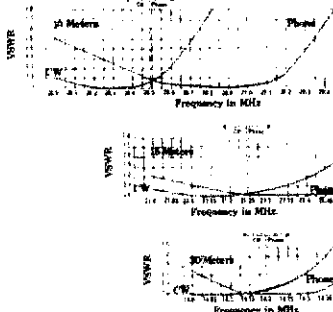
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RIEM2MTN 23 sessions, 252 QNI, 24 QTC. Upgrade KA1DRI to KOTX. Winner of RI QSO Party is WA1WIA with over 1300 QSOs. EBAWA is moving along with their new rpt. For info contact KA1EHR. The "Buffalo" rpt on 145.35 is really perking. WA1KWZ says that a formal organization is planned, and they are also investigating an auto-net. New stack at W1YNE. Skip in for a cup of coffee and a little ham talk. All welcome. Traffic: W1E0F 819, KA1EHR 36, WA1CSO 8, AE1S 6.

VERMONT: SM, Reed Garfield, WB1ABQ — STM: N1ARI. BM: AETT. Congrats to W1RNA as new PIO. Two new UHF rpters in Burlington area: W1KOD/R in Winooksi on 444.4/449.4 simul-link with 146.01/61, & K1VTR in Essex Jct. on 444.0/449.0 simul-link with 146.25/85. Mni tx to all who would Yankee Row drill. Hark Vt. Yankee drill in all. Sorry to report W1MR Silent Key. Vt. 75 & 8CNU. VTN 31/148/96 VSBN 31/588/186 GMN 27/416/33 VFMN 31/438/73 VCN 27/534/42 VFN 4/43/6 RFD 4/81/23 CVFMN 4/43/1

Traffic: K1BQB 177, W1KRV 135, WB1ABQ 92, N1C0B 73, N1ARI 70, W1OAK 58. (Feb.) KA1GID 6.

WESTERN MASSACHUSETTS: SM, William J. Hall, W1JWP — PIO: WA1MJE. SEC: WB1HJH. ACC: W1YI. 6TM: W1UD. The Mt. Greylock rpt got a real live chance to demonstrate its effectiveness in public service. In mid-March the CAP requested assistance in locating a downed aircraft in the Mt. Greylock reservation. The CAP rpt was of little use because of its inside antenna, whereas the K1FFK/R antenna was back on "the tower" providing good coverage. Amateur communications were provided to the CAP and state police. Later, amateur DF gear was pressed into service. The wreckage was located the second day on fog-enshrouded Mt. Williams. Participants included WA1PQ, KA1T, Traffic: KA1T 379, W1C0B 117, KB1WV 66, W1KK 79, KA1CDD 77, WB1HJH 77, W1PUD 60, W1JHC 59, K1JUV 42, W1JF 32, W1ZPB 27, WA1OPN 20, WA1MJE 3.

### NORTHWESTERN DIVISION

ALASKA: SM, Richard Henry, AL7O — SEC: KL7LQ. STM: KL7T. ACC: AL7AC. OOI/RFI: W6SJJ. TC: AL7L. By the time you read this I will have resigned as your SM. Owing to my extended stay in the Pacific Northwest and recent notification that I will be here even longer, I feel that you need a person in the SM position that can keep in closer contact than I am able to at this time. I have recommended AL7AC to assume my position and I hope you will give him the support you have given me. I appreciate your support and feel we accomplished quite a bit. I am looking forward to returning to Alaska and look forward to the opportunity of serving in some way at that time. KL7KWL/CLA back in Montana Creek. Welcome back! Traffic: KL7LA 112, AL7BR 24.

IDAHO: SM, Dennis Hall, K7KX — Early returns for Idaho QSO Party show W7LQ/WB7WZ with 1000 QSOs, W7GHT with 1326 QSOs and KB7X with 1833 QSOs. Thanks to those who participated. Join on the Party later. Dean Blegen, K7JL, has been appointed State Government Liaison; congrats. Treasure Valley RA hamfest is planned June 18th in Payette; plan to attend. What do you want to see in this column each month? Input would be appreciated.

Net	Freq.	Time	Sess.	QNI	QTC
FARM	3935	6 P.M. Dy	30	1768	35
CD	3990	7-10 A.M. M-F	23	786	14
IMN	3635	7 P.M. M-F	23	195	49

Traffic: W7GHT 215.

MONTANA: SM, Les Belyea, N7AIK — New officers for the Butte ARC include: WA7PZO, pres.; KB7QR, v.p.; KA7EFT, treas.; KW7I, secy. They and a host of others enjoyed an installation banquet at Walkerville. The Treasure State Chapter of the QCWA held their spring meeting in Helena with 30 in attendance. Members of the Libby ARC are now the communications arm of the local search & rescue team. They also have 2 new & low-band antennas installed at the sheriff's office. KE7X & KB7Q made an overnight camping trip to Flattop Mt. 10 miles south of Big Sky to test a proposed new rpt location. They said the test had good results, and 6 feet of snow makes a very good mattress for sleeping. The Bozeman Bunch (club) is going to take the Field Day exercise quite seriously; they purchased a 40M beam antenna for Field Day use. PSHR: WA7GQO W7TGU KF7R.

Net	Sess.	QNI	QTC	Mgr.
MTN	23	978	68	K7TQM
IMN	23	195	49	K7JUV
BSN	14	293	11	WB7UTJ
MSN		84		CB7SE

Traffic: W7TGU 209, KF7R 82, WA7GQO 34, W7LBK 25, N7AIK 24, WB7WVD 14, W7JMX 8.

OREGON: SM, William Shrader, W7QMU — STM: W7VSE. ACC: N7CFA. PIO: KC7YN. SGL: KA7KSL. ACC: WB7RJD. OOI/RFI: W7SCA/K7YK. Invitations: Howland & KA7FKI. Gen. N7DOB WA7RAC. SGL: KD7GE KA7GB6 KA7KB1 KA7AGN W7PTJ WB7VZQ/KD7GP. Extra: KA7GWZ N7CRP. N7DZR is the new Washington Co. Asst. EC. WB7VWX and KA7NPN, both Novices, were one and two in OTVARC "Rusty Key Contest." WDBEAW new DXCC from Keno. W7TC high score for Oregon in IARU Radioport contest. W7LNE back in full swing after December surgery. Lightship COLUMBIA gang have completed WAS with nearly 500 stateside QSOs and have 100 plus DX QSOs also. Rogue Valley ARC providing communications for the Peep Show Festival with "special events" station. K7DVA is now very active 10-10 and has 500 of World Award and W.P. award. W7XK met and was able to shake hands with Pres. Reagan during visit to Klamath Falls. WA7KSW/WB7AWO had a nice anniversary visit to KH6-land and visited many local hams while tanning in the sun. KD7GH is working hard with youngsters at Oakland school. His group has five tickets plus seven who are awaiting calls. Officers of Hoodview RA Assc. are: KA7AGH, pres.; W7JUV, v.p.; KA7HIO, secy.; KA7IUG, treas. Traffic: W7VSE 569, WA7LGN 153, W7ZB 150, K17Y 89, WB7OEX 79, KA7ELI 77, KA7AD 69, W7LNE 30, N7BGW 28, AL7W 24, W7DAN 23, K17X 5.

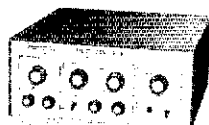
WASHINGTON: SM, Joe Winter, WA7RWK — ASM/BM: KD7G. SEC: K7SH. STM: W7GB. ACC: K7RS. TC: K7UU. PIO/SGL: W7CKZ. OOI/RFI Coord.: KB7WC.

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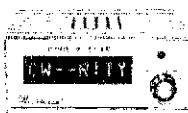
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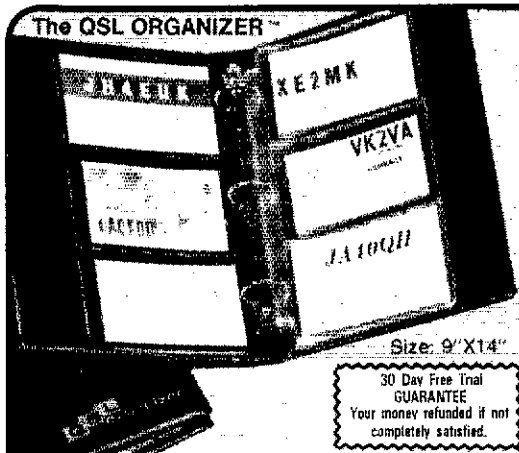
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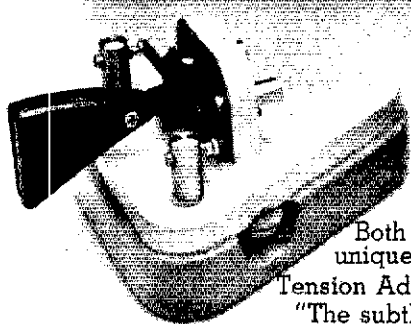
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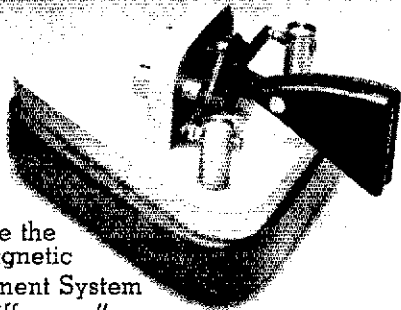
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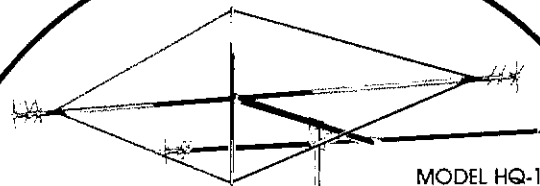
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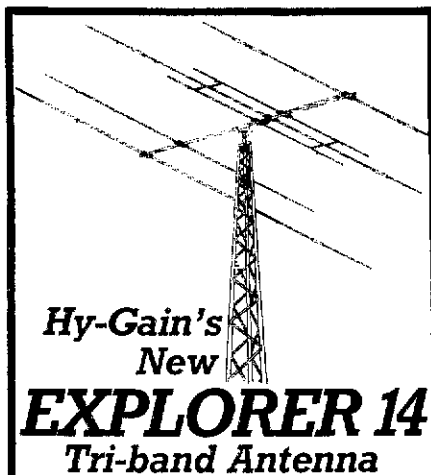
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The Mike & Kay Flea Market was well attended and successful. ARRL Counsel N3AKD gave an informative banquet talk on no-code volunteer lic. exams., etc. Thanks. Dir. Lewis W7QGP held steering comm. meeting during the event. Comm. mbrs. attending: V.D. W7JIE, DXAC W7WWW, PRAC WA7VEH, VUAC N7NWX, AD WB7WOW, VRAC K7CR, SMs Idaho K7KX, Wash WA7RWK, Mt. SM N7AIK was grounded in Salt Lake City. His asst. K8PFL filed in. Also attending ASM KD7G & KYL N7CDD, WA, PIO W7CKZ, W7JWJ & N3AKD. A Wash. St. Governor's Distinguished Volunteers Award for 1983 was presented to W7RGD for his 20 yrs. of pub. serv. to the Tacoma DES and WA. St. Dick and others honored at a spec. ceremony in the House of Reps and a reception at the Exec. Mansion. Congrats. The position of COORFI Coord. has been filled by Ronald R. Forkner, KB7WC, 911 S.E. 78th Ave., Vancouver 98664. I ask that you please assist him to keep on top of any RFI, TVI and OO problems that arise. This completes the Field appts listed in Apr. QST pg. 114. Congrats to K7CSZ as Ea. WA. ASEC. WA7LVX as DEC Dist 8, N7BGG as EC Ea. WA. Red Cross Lia. N7AFZ replaces W7IEU who resigned as ECAC mbr. Congrats. W7BBS re: Grant Co. REB. Will provide comms for 1st annual Paddlers Classic. A 13-mile canoe race on Moses Lake May 29. Sedro Woolley Hi Sch. senior KA7GFI accptd. appt. to Annapolis. Doug got his Ham lic. thru, K7JUH's electronics class at the sch. Mbrs. of Low. Col ARA operate W7DG7 at Triangle Shopping Ctr. and recvd excellent P.R. KA7HWE was in charge. Ten mbrs of Everett ARS and ten mbrs of Clark Co. ARC participated in the Co. River Girl Scout 1st Annual Council Project "GATHR" (Growing Aware Through Ham Radio). The Scouts exchanged 71st birthday greetings of Girl Scouts via ham radio. Field Day is June 25-26. Let's all get involved. Wenatchee, H.F. is June 3-4 at Rockwell Beach Dam. Attend "NORTHWEST 83" Conv. July 8-10. LEVY will head up party to work the Spokane LILIC PARADE May 21. Traffic: W7DXZ 654, WB7TOF 633, KS7I 354, WB7WOW 351, N7AFZ 261, N7DNG 177, K7GXZ 136, W7HNA 133, W7GB 118, N7ANE 110, W7LG 102, KR7E 87, N7AFY 83, K7CTP 65, WA7BDD 59, N7DDP 50, W7APS 33, W7DLP 30, WA7JEB 32, W7IEU 28, K7BFL 14, K7AJT 12, W7LUG 10, KATINX 8, K7OKL 6, N7CT 2, W7AIB 1. (Feb.) KR7E 10.

**PACIFIC DIVISION**

**EAST BAY:** SM, Bob Vallo, W6RGG — ASMs: W6ZF N6DHN VE2AQV/W6, SEC: W6LKE, STM: N6A made BPL again! He and W6VDM and K6AGD are regularly making PSHR. EBARC's club station, W6CUI, is now operational thanks to their members' hard work and donations of gear. Their member KA6ICI is now Advanced class. SBARA's "Turtle Net" meets on 7125 at 7:30 P.M. each Thurs. for those who wish to brush up on their cw. Sounds like fun! They also meet on 145.8 MHz at 8:30 P.M. each Wed. HARC had Asst. Prof. Charles Seeger from SF State as their speaker on "Search for Extra-terrestrial Intelligence". Their Novice class meeting twice a week and a Technician class by N6GWL is in the planning stages. MDARC's program featured a slide and talk show by WA6VEF on his recent trip to Peru where he operated as 4T4O. LARK's meeting was attended by VU2YUO, alias charter member WA6YOU. Interim president N6DVIY is now at the helm. Traffic: N6A 761, W6VDM 198, K6AGD 174, K6APW 119, W6B6UZ 33, W6B6OB 13, N6RO 2.

**NEVADA:** SM, William JD Marshall-Gratrix, KA7Q — STM: W7BS. Many recent upgrades in the last local FCC examination. FB, N7RH, whose hands are full with the WADG projects such as the Silver State Call Book, the proposed ham plate legislation, and in particular, full-scale brochure and application mailings for the ARRL Pacific Division Convention to be held this year at the Reno MGM Grand Hotel August 19 - 21, found time to erect a new antenna on his tower. WADG officers: N7RH, chairman; K6GTF, vice chairman; KD7DI, secy; N7DOD, treas; N7DFY, KBTW K7WV, directors; W7JEC, technical Convention Chairman K7W7V, W7BSY, asst.; N7EVO, secy./treas. 800-648-5080 for convention information. Major changes and new appointments under new section structure. Nevada Sagebrush Net meets weeknights 1930 PST on 3905 kHz. Traffic: W7BS 68.

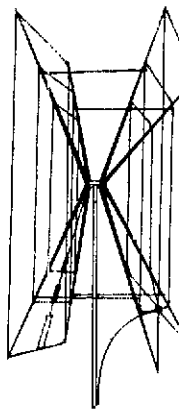
**PACIFIC:** SM, Army Curtis, AH6P — STM: KH6HJ, SEC: KH6B, ECs: Hawaii-AH6K; Kauai-KH6S; Maui-KH6H; Oahu-KH6NP; Guam-KG6JKV. Aloha and hafa adai to all of the Pacific. Five members of West Hawaii ARS gave a fine demonstration of Amateur Radio to Girl Scouts and their parents at the Kilohana Scout Camp. Seventeen Maui amateurs provided comms for the Maui Marathon on March 6. ARRL V.P. WBWJ and KYL joined a BIARC picnic at Kapoho while enroute to IARU meeting in Japan. Three Hilo amateurs active in annual Papaikou-Pepeekeo walk/run. KB6TQ now AH6EQ. KH6WV new call at Pearl Harbor. And then there are those who build beautiful new 75-meter antennas and try to tune up on 401! Traffic: KH6B 293, KH6HJ 76, KH6S 34, KH6H 16, W6ORS 2.

**SACRAMENTO VALLEY:** SM, Norman Wilson, N6JV — SEC: N6AUB. ASM: K6GT. Congrats to K6NO N6EPG and WAZUD on making PSHR. The first Sacramento Valley section meeting held in Yuba City was attended by representatives of the North Hills RC, RAMS, Sacto. AHC, Shasta-Cascade ARS, Sacto, Skywam, Yuba-Sutter ARC, S.J. VHF Net, Amador Co. ARC, El Dorado ARC, Yolo Co. ARS, Oroville ARS, Golden Empire ARS and the Nevada Co. ARC. W6GWL has a new 34 VA and 100-watt generator. The Sacramento Valley Traffic Net held 29 Sess. & had 31B check-ins. Traffic: K6ENO 88, WA6WJZ 88, N6CVF 27, W6DFEH 12, WA6NVY 9, N6EPG 6, WA6OWH 6, N6YR 6, WA6ZUD 6.

**SAN FRANCISCO:** SM, Bob Smith, NA6T — SEC: N6BLN. STM: K6TP. The section was well represented at the League Official's meeting on 4-9-83. Field Day plans within the section are progressing well. Look for REDXA, HARC SCRA, MARC and SFRC on the bands. SCRA HOMEBREW CONTEST is at June meeting; don't forget to enter. Eureka now has a simplex and duplex autopatch available to travelers along Hwy 101. Check 148.1070 when in the area. Glad to hear that N6AQY is back on the road to recovery; get well soon. Lake Co. amateurs have a new Novice and upgrade class going. Mendocino Co. has new low-level autopatch available in Ukiah. Don't forget to get your NO-CODE COMMENTS in to the FCC by the deadline. Now is the time for all amateurs to express their views. Do you want the NO-CODE PROPOSITION on the FCC's terms or

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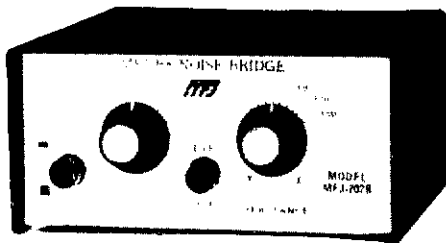
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**SAN JOAQUIN VALLEY:** SM, Charles McConnell, W6DPD — SEC: WA6YAB, STM: N6AWH, ASMs: W6TRP K6YK N6FK, WA6EYV is Technical Coordinator. Officers of the Amador Co., AR, are: W6IEV, pres.; WA6ZGS v.p.; KA6AKG, secy.; W6OQR, treas. Officers of COAC are: WA6FWD, pres.; W6DPD v.p.; W6BJT, secy.; WA6JL, treas. W6HYZ and W6STV are SILENT KEYS. W6DPD is a checkpoint for the VUCC Award. N6GJL is chasing DX. N6AM copies Baudot, ASCII and AMTOR. W6EKO has a TS930. W6PJD has a FT404. W6BITM has a FT 708R. KA6SDH has a computer. W6BVRJ and N6DYJ have IC2ATs. N6DYJ, KB6DG and W6BRU have IC3ATs. N6DYJ has an IC4AT. The ARRL Pacific Division Convention is August 19-21 in Reno, NV. Get big scores in Field Day this year. Traffic: N6AWH 274, W6DPD 28, WA6YAB 13, W6SX 10, WA6JDB 6, W6DFRS 2.

**SANTA CLARA VALLEY:** SM, Ross Forbes, W6G6FJ — STM: W6ZJR, SEC: KA6R, PIO: W6B6PU, ACC: W6MKM. Attention to all who submit reports to me! Please be sure that your information REACHES me by the 3rd of the month. As of recent months, many reports are arriving by the 10 and 15th of the month. This is TOO LATE to be included in the current reports. Please have your reports to me by the 3rd. I send everything in to Hq. by the 7th of the month. We held our section meeting for under the new section structure, and had a nice turnout. While many think the director and vice director are no longer in contact with the members, don't forget that every member can STILL telephone the director and vice director, as well as drop them a letter. Also, every club in the section can STILL have the director and vice director attend your club meeting. All you have to do is invite them to attend. Many clubs are now getting ready for their Field Day activities. SPECS is using a new remote base to help HT coverage. Welcome to KA6YGT into the section! At our section meeting, many clubs expressed an interest in a section wide meeting of clubs to discuss emergency communications. We are working on this now; however, clubs are encouraged to contact the SEC (KA6R) and have him attend your meeting to discuss this subject in detail. During March, ECs participated in the FIRST nationwide SET with the ENY section. Congrats to all who participated! you all did an outstanding job! Sorry that no report appeared in last month's QST; it seems to have been lost in the mail. W6RPA is now N6IU. Traffic: W6BYV 252, W6KZJ 183, KE6ZA 109, W6PPI 54, W6RFF 52, W6B6FJ 30, W6ZRJ 18, KA6YGT 3.

## ROANOKE DIVISION

**NORTH CAROLINA:** SCM, Ian C. Black, WD4CNR — STM: W4EAT, SEC: KU4W.

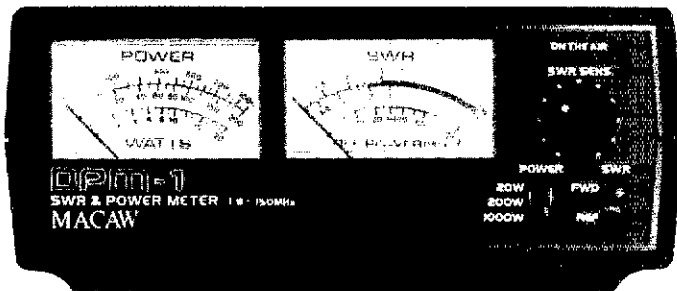
Net	Time (Z)	Freq.	QNI	QTC	Mgr.
CMN	1245	3.927	550	183	W4EAT
CNE/1	0000/0300	3.573	575	272	AB4S
CBN	2300	3.715	200	61	NJ4L
JFKN	2330	3.923	1044	161	WB4WII
THEN	0030	3.923	1106	129	WD4LRG

Read with interest the letter to the F.O. from Michigan SM. In Spring, I used a QCD. It opened the competition for new section organization. It seems a good analysis of action for a smooth transition. However, some earlier statements & thoughts of mine were resurrected. It was noted with some misgivings that it was decided to print the tfr reports quarterly. These reports are the manifestations of the extent of public service within a section. Together with reported activity during emergencies, these reports make up the total of what we hams did for our fellow man that month. Putting a greater time element between reports sounds a little like moving that aspect of Amateur Radio toward the back of the bus. Introverted reporting should have a forum, but should not report on our activities along hobby lines take precedence over reporting activities for the public weal? Fortunately, Hq. allows this to be an individual decision. Every SM will give this one a hard look. Also see storms brewing in the financial realm. Some fine tuning needed for section budget formulas. David Stockman, where are you when we need you? Most complete list ever of ham clubs in section turned over to me at Charlotte. Super job by K4SWN, our ACC. W64MJH our TC, working on plans for on-the-air forums. Ma Bell says if your phone won't work, call 'em. If your rig won't work, get on the air and talk to WB4MJH. Don't ask me how to do either one. Traffic: WB4WII 408, WD4CNR 266, WD4LRG 195, W4GRO 130, K4NLK 126, AB4S 123, K4PJ 123, NT4K 104, KU4W 97, WA4OBR 78, W4EAT 75, WD4HT 70, WA4SRD 64, K4RWV 50, W8JUP 46, WA4CUD 44, WB4CYN 44, WB4N 43, KA4DHP 41, WD4CEB 32, N4EHM 29, KA4KJ 29, KA4UBN 18, KZ4A 15, W4WXZ 11, WD4JPR 10, N4UE 10, KA4ATK 9, WA4PID 8, WA4YQ 8, N4GGI 7, K4AM 4, W4TWD 4, WB4SLF 2, (March) NE4J 33, W4EHF 11.

**SOUTH CAROLINA:** SM, Jimmy Walker, WD4HLZ — ASM: WB4UDK, SEC: K4SUG, STM: W44NK, OO: W4NTO, TC: NE4G, PIO: WD4NMF, NMs: KA4LRM WB4SOD. At the request of many of you, I changed the format of this column. This month I will return to the old format to inform you of the new ARRL Field Organization taking shape in our section. Noted above are section level appointees as of March. ACC, GL and BM remains open at this time. If you are interested, contact the SM or ASM. ACC is being covered by the SM and PIO. WD4NMF. He requested by letter that each club select a PIA. At this time, he has been contacted by this club. Why is so difficult to establish lines of contact with clubs? Large amounts of info are available if we know where and who to send it to. PIA is an important position; see that your club has one appointed. Traffic: K4ZN 360, K4WJR 205, W4FMZ 155, KA4AUR 135, W4NTO 125, K4ZB 45, KE4WC 36, WB4UDK 35, KA4LRM 30, W0K1T 26, WD4NMF 23, WD4FUP 18, W4DRF 10.

**VIRGINIA:** SM, Phil Sager, WB4FDT — STM: WD4ALY, SEC: WB4UHC, Affiliated Club Coordinator: WD4KQJ. Chief OO: W4HU, Chief OBS: K3RZR. Virginia Traffic Net (VTN) 7260 1 P.M. Virginia Sideband Net (VSN) 3947 6 P.M. Virginia Slow Net (VSN) 3680 6-30 P.M. Virginia CW Net (VN) 3680 7 & 10 P.M. Virginia Late Net (VLN) 3947 10:15 P.M. Virginia amateurs! In case of an emergency, would you know how to check into any of the above state-wide nets and handle emergency traffic? If not, write to our Section Traffic Manager, Don Wigent, WD4AL, Rt. 2, Box 32, Earlysville, 22936 will bring the information you need. PSHR to K4JST WD4ALY K4WVK WA4CCO KR4V KB4WT AA4T NT4S W4LXB KA4IUM NN4I KA3DTE KB4OG and WA1VRL W3ATQ and K4AET just missed BPL this month. W4HIR passes Extra. N3RC operates QGWA contest at age 39! N4HAK new ORS, Anyone interested in an infor-

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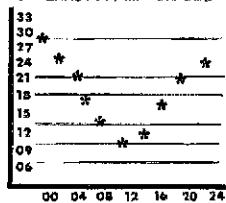
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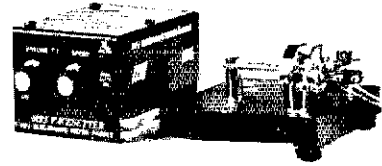
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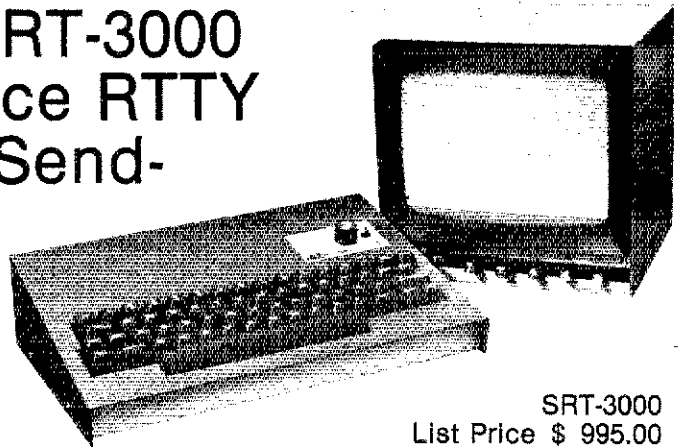
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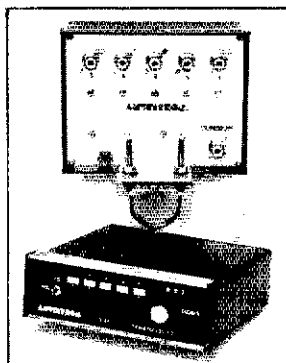
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mal net concerning computers? Contact KA4IUM or KA1ST. WA1JV celebrates his 50th year in Amateur Radio this month. Remember the Roanoke Valley ARC "Mayfest" is May 29. The Virginia Teletype Society Net meets on the 147.105 rpt'r near Roanoke every Monday night at 9 P.M. The Roanoke Division Service Award this year was awarded to W4RI, of Mclean. W4RI helped organize AMRAD and was the editor of the ARRL QEX technical publication. He is the new Technical Dept. Manager of the ARRL, replacing W1FB, who is retiring. WAARES rendered communications assistance for the Colonial Half Marathon. Does your local club have a club historian? Having a club historian can be very useful to the club. A club historian can give the club order in its history and its accomplishments. Traffic: W3ATQ 478, K4AEY 462, WB4PNY 321, WD4FTK 302, AAAAT 283, WA4LJI 268, WD4ALY 244, K4JST 243, KA3DTE 226, W3BBN 200, K4KDJ 182, KR4V 154, WA4UJ 128, KA4IUM, 123, K4JM 88, WB4KIT 85, NN41 82, WD4OCW 68, N4HAK 59, KB4OG 58, W4NWM 53, K4VWK 49, NT4S 41, NT4U 40, KB4WT 40, W4LXB 27, WA1VRL 27, KC4HN 26, KA4JXZ 26, WB4MAE 24, WB4FDT 20, KB7J 19, W4CFV 18, WB4JHC 18, W4NFA 17, K3PZR 15, N4FNT 12, K4MLC 12, W4PVA 11, K4W 10, WA4TV8 9, N4BJ 9, W3BBQ 6, WB4DQZ 6, NF4T 6, W5TZC 6, W4KXE 5, N3FC 5, W4DM 3, WD4KQJ 3, N4YE 3, W4KX 2, N4LE 2, KM4X 1.

### ROCKY MOUNTAIN DIVISION

COLORADO: SEC: K3PUR, STM: WD8AIT. On Sunday April 10, 20,000 gallons of nitric acid was split in a northern Denver railway. Adams Co. ARES was activated at approximately 4 A.M. Easter morning. The spill was in Denver Co. but the wind was blowing in the direction of Adams Co. at that time. The Red Cross was activated at 8 A.M. that morning along with five shelters, three of which were used. The other two were activated just as a backup in case of a wind change. A 500-sq. block area was evacuated, involving 5000 people. ARES operators were used as shelter managers by the Red Cross, and as wind spotters for the National Weather Service. In all, 40 ARES people were active from Adams, Denver and Arapahoe Cos. This number does not include the people working with the weather service. Although not officially activated because of the nitric acid, N5B operators were called and asked to be the wind spotters. Traffic: W4JL 100 and certain nets later in the day in case of incoming or outgoing DWI (Disaster Welfare Inquiry) traffic. There was no DWI traffic to speak of so N5B involvement was minimal. By 1 P.M. that Sunday, all the evacuees were allowed to return to their homes and the operation was shut down. K3PUR felt the operation went very smoothly with only one minor problem arising, which has now been clarified so that it will not happen again. A big thanks to all who helped, monitored, or made themselves available during the holiday. Nets: CWN: sess. 28, QNI 200, QTC 148, QNF 757. Traffic: WA0HJZ 2695, N0BQ 2447, K0AN 450, W0VX 309, WA0BY 184, K0BN 134, WD0A 131, K0AN 450, 122, W0LAE 118, W0EJD 117, K0ANLI 93, W0BNH 45, W0NFV 47, W0LQ 28, K0TIV 26, W0GW 4, (Feb.) K0AN 455, W0VYX 257, W0LQ 54, (Jan.) W0LQ 42.

NEW MEXICO: Joe T. Knight, W5PDY — DEC: KB5XD, STM: KV5U, NMs: WA5UNO KB5LI W5VFO. Southwest Net (SWN) meets daily on 3.583 at 1930 local and handled 177 msgs with 225 stations in. New Mexico Roadrunner Net (NMRRN) meets daily on 3.939 at 1900 local and handled 53 msgs with 1016 stations in. New Mexico Breakfast Club meets daily on 3.839 at 0630 local and handled 95 msgs with 1038 checkins. Yucca 2-mtr net 78/18 & 93/33 handled 9 msgs with 496 checkins. Caravan Club 2-mtr net 88/08 handled 12 msgs with 107 checkins. KC6QF working on amateur station for the International Science Fair. W5RAU retired this month. Several NM rpt's down due to ice, snow and wind. Traffic: W5DAD 246, ND5T 202, W5JVO 111, W5ENI 65, N5SJ 60, KB5LI 54, WA5MIY 12.

UTAH: Leonard M. Norman, W7PBV — SEC: W87BZJ, STM: W7COX, WIMU ARRL Rocky Mtn Convention August 5-8 at Jackson Hole, WY. Congrats to Ronald C. Todd, K3FR7, on becoming the first SM in UT effective July 1. K07ZH handled traffic on two auto accidents on I-15. KA7HM new QTH Winslow, AZ. N7BNC new president. W87VER new vice president of UARC. K7RU and W7ETR working on FD plans. Traffic: WA7MEL 88, WA7KHE 88, KN7U 48, NATG 29, K7OKF 18, W7COX 15, W7PBV 13, (Feb.) WA7JRC 35.

WYOMING: SM, Dick Wunder, WA7WFC — SEC: W7TVK, STM: W8OGH. New ARRL appointees are: K07AN-Bulletin Manager; K07QY-Technical Coordinator; K07QY-OO/RFI Coordinator; K07QJ-Public Information Officer; K07QJ-Affiliated Club Coordinator. Congrats and welcome, WIMU Hamfest is sponsoring the Pky Mtn Div. ARRL Convention in Jackson Aug. 5-7. The Wyo. Hamfest will be July 23 & 24 at Meadow Park Lake & is being sponsored by the Sheridan Amateur Radio League. Lots to see and do at that. W87NHR reports the Wyoming Cowboy Net held 23 sess. with 893 QNI & 14 QTC. WA0PFJ reports the Wyoming Jackalope Net held 27 sess. with 756 QNI & 2 QTC. Traffic: W87NHR 241, K7SLM 14, KD7AN 4.

### SOUTHEASTERN DIVISION

ALABAMA: SM, H.H. Wheeler, W4IBU — ASCMs: WA4RNP KA4WVU. SEC: N4DMA, STM: WA4PIZ. SEC N4DMA has arranged with the FCC and the Civil Air Patrol for a concerted effort during emergencies. The CAP may now issue a CAP call sign to amateurs on a temporary basis here in Alabama. All DECs and ECs should contact the local CAP Wing Cmdr and offer their services. We shall all miss K4KMG on the air and in the ARES. The ARES in Tuscaloosa Co. is really shaping up. March and early April brought tornadoes and flash flooding around the state with no end to the rain at time of writing. Field Day is about to be held, as are many club functions that will require a lot of help from a whole bunch of you folks. Volunteering can bring you fun and a chance to help your neighbors. KA4TSG has come up with a novel idea. Make your two-meter net a cw net one night a week. I recommend the ARRL's new publication "The FCC Rule Book" to all. It is filled with good dope. Alabama represented 100% on CAND by W4CK5 & N4FOD, 92% on DRN5 by WA4JDH W4IBU N4FQD W4CK5 KC4G5 WA4WJF WB4IXA KD4KT N4BEN W4NTI & NW4X. PS8R WA4JDH N4FQD & WA4XP. Traffic: WA4JDH 748, W4CK5 121, N4FOD 115, WA4XP 60, W4IBU 51, NW4X 40, WB4IXA 30, KA4JL 28, KC4G5 24, WA4JPK 17, W4DGH 16, WD4DHI 15, K4GXS 12, KB8GT 11, W4WJF 11, W8ICM 4, WB4TV 4.

GEORGIA: SM, E. J. Kosobucki, K4JNL — SEC: W4BHXE, STM: W4WXA, ACC: WA4ABY, PIC: WA4PNY, SGL: W4BTZ, TC: K4UDR, OO/RFI: K4VHC. First of all I want to thank K4VHC for accepting the OO/RFI Coordinator position. He will be laying the groundwork shortly. As of this writing I am still looking for a Bulletin Mgr. W4BIA



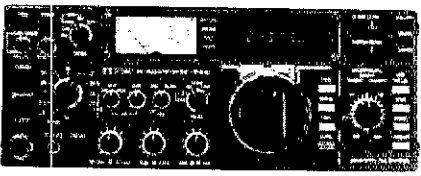
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MB-12 Mobile mount	19.50
HM-10 Mobile scan microphone	39.50
IC-720A 9-band Xcvr/1.30 MHz Rcvr	\$1349.00 999 <sup>95</sup>
FL-32 500 Hz CW filter	59.50
FL-34 5.2 KHz AM filter	49.50
MB-5 Mobile mount	19.50
IC-7072 transceiver unit, 720A/R-70	112.50

**Common accessories: 720/730/740 Regular SALE**

PS-15 External 20A power supply	\$149.00 134 <sup>95</sup>
EX-144 Adaptor; CF-1/PS-15	6.50
CF-1 Cooling fan for PS-15	45.00
PS-20 20A switching ps w/speaker	229.00 199 <sup>95</sup>
CC-1 Adaptor; HF radio to PS-20	10.00
CF-1 Cooling fan for PS-20	45.00
SM-5 8-pin electret desk mic	39.00
SP-3 External speaker	49.50
Speaker/phone patch (specify radio)	139.00 129 <sup>95</sup>
AT-100 100w 8-band automatic ant tuner	349.00 314 <sup>95</sup>
AT-500 500w 9-band automatic ant tuner	449.00 399 <sup>95</sup>
AH-1 5-band mobile ant w/tuner	289.00 259 <sup>95</sup>

**HF Linear Amplifier Regular SALE**

IC-2KL 160-15m/WARC solid state linear 1795.00 1299



**VHF/UHF Multi-modes: Regular SALE**

IC-251A 2m FM/SSB/CW Xcvr/AC ps... \$749.00 569<sup>95</sup>

**\$50 Factory Rebate until 7-31-83**

IC-551D 80w 6m Xcvr	699.00 599 <sup>95</sup>
PS-20 20A switching ps/spkr	229.00 199 <sup>95</sup>
CF-1 Cooling fan for PS-20	45.00
EX-106 FM adaptor	125.00 112 <sup>95</sup>
IC-451A 430-440 SSB/FM/CW Xcvr/ps	899.00 769 <sup>95</sup>
IC-451A/High 440-450 MHz Xcvr/ps	899.00 769 <sup>95</sup>
AG-1 15 db preamp for IC-451A	89.00 79 <sup>95</sup>

**VHF/UHF FM: Regular SALE**

IC-25A 2m, 25w, up-dn-tp mic, grn leds	\$359.00 319 <sup>95</sup>
IC-25H as above, but 45 watts	389.00 349 <sup>95</sup>
IC-25A '82 model; 25w, tp mic, red leds	349.00 289 <sup>95</sup>
IC-45A 440 FM xcvr, 10w, TTP mic	399.00 359 <sup>95</sup>
IC-120 1.2 GHz FM mobile	TBA
RP-1210 1.2 GHz, 10w repeater	TBA
IC-22U 10w 2m FM non-digital Xcvr	\$299.00 249 <sup>95</sup>
EX-199 Remote frequency selector	35.00
IC-471A 430-450 MHz, 10w base	TBA
RP-3010 440 MHz repeater	TBA

IC-290H 25w 2m SSB/FM Xcvr, TTP mic	549.00 489 <sup>95</sup>
IC-560 10w 6m SSB/FM/CW Xcvr	489.00 439 <sup>95</sup>
IC-490A 10w 430-440 SSB/FM/CW Xcvr	649.00 579 <sup>95</sup>

**VHF Portables Regular SALE**

IC-202S 2m port. SSB Xcvr, 3w PEP	\$279.00 249 <sup>95</sup>
IC-505 3/10w 6m port SSB/CW Xcvr	449.00 399 <sup>95</sup>
BP-10 Internal nicad battery pack	79.50
BC-15 AC charger	12.50
EX-248 FM unit	49.50
IC-10 Leather case	34.95
IC-3PS Power supply	95.00 89 <sup>95</sup>
IC-20L 2m amp, 10w PEP or FM	98.00 89 <sup>95</sup>
IC-30L 432 amp, 10w PEP/FM	105.00 94 <sup>95</sup>



**Shortwave receiver: Regular SALE**

R-70 100KHz-30MHz digital receiver	\$749.00 649 <sup>95</sup>
EX-257 FM unit	38.00
FL-44 455 KHz SSB filter	159.00 129 <sup>95</sup>
FL-63 9 MHz 250 Hz CW filter	48.50
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IC-2AT .15/1.5w 2m HT/batt/cgr/TTP	269.50 219 <sup>95</sup>

**220 MHz:**

IC-3A 220 HT/batt/wall cgr	269.95 229 <sup>95</sup>
IC-3AT .15/1.5w 220 HT/batt/cgr/TTP	299.95 239 <sup>95</sup>

**440 MHz:**

IC-4A .15/1.5w 440 HT/batt/wall cgr	269.95 229 <sup>95</sup>
IC-4AT .15/1.5w 440 HT/batt/cgr/TTP	299.95 239 <sup>95</sup>

**Hand-held Accessories: Regular**

BC-25U Extra 15-hour wall charger	\$10 <sup>00</sup>
BC-30 1/15-hour drop-in charger for BP-2/3/5	69 <sup>00</sup>
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BP-3 Extra standard 250ma 8.4v 1.5w battery	29 <sup>50</sup>
BP-4 Alkaline battery case	12 <sup>50</sup>
BP-5* 450 ma, 10.8v 2.3w high power battery	49 <sup>50</sup>
*BC-30 required to charge BP-2 & BP-5	
FA-2 Extra 2m flexible antenna	10 <sup>00</sup>
CA-2 Telescoping 1/4-wave 2m antenna	10 <sup>00</sup>
CA-5 5/8-wave telescoping 2m antenna	18 <sup>95</sup>
CA-3 Extra 220 flexible antenna	9 <sup>12</sup>
CA-4 Extra 440 flexible antenna	9 <sup>12</sup>
CP-1 Cigarette lighter receptacle charger for BP-3	9 <sup>50</sup>
DC-1 DC operation module	17 <sup>50</sup>
HM-9 Speaker/microphone	34 <sup>50</sup>
LC-2A Leather case without TTP cutout	34 <sup>95</sup>
LC-2AT Leather case with TTP cutout	34 <sup>95</sup>
ML-1 2m 2.3/10w HT amplifier (Reg. \$89)	SALE 79 <sup>95</sup>
ML-25 2m 20w HT amplifier (Reg. \$199 <sup>00</sup> )	SALE 179 <sup>95</sup>

**Marine band:**

IC-M12 12 ch Marine hand-held **SPECIAL \$199<sup>95</sup>**

**Misc. accessories:**

24-PP 24-pin accessory plug	\$ 4 <sup>00</sup>
BC-10 Memory back-up; 551/720/730/740	8 <sup>50</sup>
BC-20 Nicads & DC-DC charger for portables	57 <sup>50</sup>
BU-1 Memory back-up; 25A/290A/490A	38 <sup>50</sup>
EX-2 Relay box w/marker; 720A/730/701	34 <sup>00</sup>
HM-3 Deluxe mobile mic, specify radio	17 <sup>50</sup>
HM-5 Noise canx mobile microphone, 4 pin	34 <sup>50</sup>
HM-7 Amplified mobile microphone, 8 pin	29 <sup>50</sup>
HM-8 Touch-tone mic; 255A/260A, 8 pin	49 <sup>50</sup>
HM-10 Scan mic.; 255A/260A/290A/25A	39 <sup>50</sup>
HM-11 Scan mic.; 490/25A/290A	39 <sup>50</sup>
HM-14 Scanning/TTP mic; IC-25A/45A	49 <sup>50</sup>
SM-2 4-pin electret desk microphone; 551D	39 <sup>00</sup>
SM-5 8-pin electret desk mic.; 251A/451A	39 <sup>00</sup>
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**Band:** 50-54MHz  
**Mode:** SSB/CW  
**Input Power:** 250mW  
**Output Power:** 5W  
**Power Consumption:** 13.8VDC at 1.2A max.  
**Dimensions:** 110W x 39H x 142D m/m

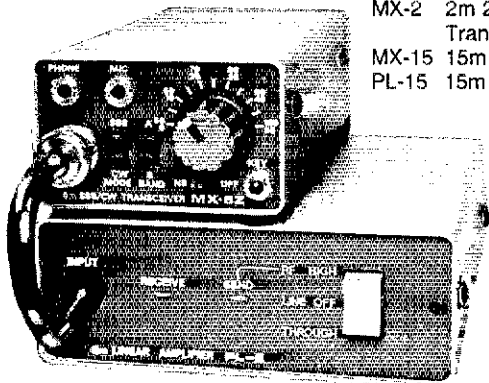
**Weight:** 520 grams

#### Features

Built-in DC 9V regulator power for MX-6Z  
 TX-RX LED indicator  
 Carrier controlled stand-by circuit

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MX-2 2m 200mW SSB/CW Transceiver kit  
 MX-15 15m 300mW Transceiver kit  
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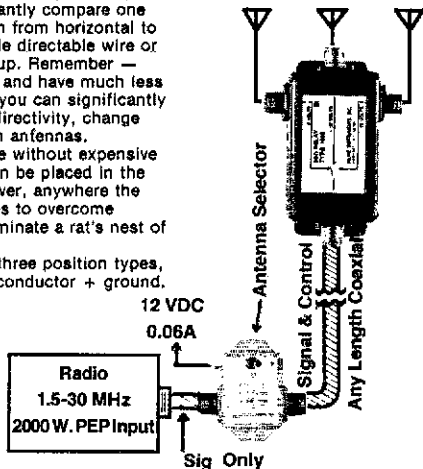
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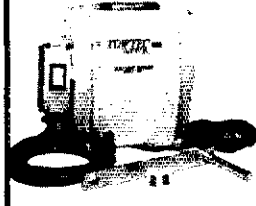
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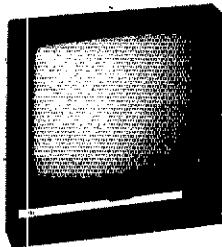
will pay on until one is appointed. For any information on clubs please contact the Affiliated Club Coordinator (ACC):

Sandy Donahue, WA4ABY  
 2805 NE Expressway/Apt. B-27  
 Atlanta, GA 30345  
 404-838-0789

We are really getting a FB start with the new ARRL programs, and with the cooperation of all of you we can have one of the top sections in the country. The members of the Columbus ARC want to thank all of you who braved the nasty weather to attend the Section Convention & the 25th Columbus Hamfest. Being a Special Service Club (SSC) has many ARRL benefits. At your next club meeting discuss it with your members and then contact WA4ABY if you desire an application. The Atlanta ARC membership, sponsors of the "Atlanta Hamfest," invite all to the big city on June 18 & 19 for probably the best hamfest that they ever sponsored. Contact your local radio or TV stations & see whether or not they will put on public service ARRL spots. If so please contact WA4PNY, the div & section PIO. Films are also available for showing. There are many issues coming up from time to time that concern this great hobby of ours. It is our responsibility to answer to many by writing our legislators. By so doing we make ourselves known, & if we all do this together we can curb many things that can affect Amateur Radio. Have a gud summer. Traffic: W4WXA 225, WB4NTW 70, N4BIM 84, K4EV 26, K4NM 20, N4DOM 18, W4HON 17, K4BAI 9, AA4EI 8.

**NORTHERN FLORIDA:** SM, Billy Williams, N4UF — SEC: W4IEA, STM: W4AC, ACC: N4AD, PIO: W4PUP, BM: W4GUJ. Two new leadership appointments have been made: Rudy Hubbard, WA4PUP (2202 Jay's Way, Milton 32570) is our Public Info. Officer (PIO), and John Witherspoon, W4GUJ (Box 518, High Springs 32643) is our Bulletin Mgr. Both are important additions to our leadership team. KF4EU upgraded to Extra at FCC exams given at Orlando Hamcation. Heavy turnout for the exams and the hamfest was again very good at the new location. Plenty of room to grow! Amateur Radio comm. were provided for the Orlando Sentinel Safan Bicycle Marathon in early April. N4ADI and VE3BSY were the organizers. The new emergency net operation plan was approved by the SMs of FL and S. Fla. at Orlando. It is our intent to provide 24-hour phone operation and back-up cw and phone coverage using the resources of 10 section and combined-section nets. KA4OFG and WA4PUP wrote excellent letters to FCC on no-code proposal. N4ARJ and N2GNP are expanding ARES org in Clay Co. New stn to be set up at Fire Dept Hq. in Doctors Inlet. WA4ZLM of LMARS gave nice talk on ham radio to Sanford Kiwanis. NS4K is 1983 FD chmn. KA4FCW gave ham demo at high school in St. Johns Co. New secy. of GARS is W4NG. Alachua ARES active in aftermath of tornado in Hawthorne. N4IGN upgraded to Advanced. GARS and UF radio club assisted in Fla. State Special Olympics. NOPARS has membership drive underway. Contact W4BTT or W4HFN for details. Jay arena clubs provided comm. for Scottie Games. KA4YML gave program for GCARC on Cable TC. Planning for GCARA club picnic underway. BARS had ham setup and portable rptr at NE Fla. Regional Science Fair. The Special Service Club (SSC) program is off and running. If your club is interested, contact ACC N4ADI for the proper forms and information. Traffic: N4PL 926, WF4X 893, WA4QXT 466, WB4ADL 426, W4WGR 359, WD4HPB 298, N4GDT 279, WD4IH 244, W4MGO 238, WA4EYU 191, W4ILE 164, NF4Y 162, NF4D 132, NY4E 119, N4ADI 110, W4KJ 101, WB4TZF 102, KD4RK 101, KB9L 94, KA4YX 72, WB4HJU 63, KF4B 59, KB4IC 78, W4GUJ 74, W4GUJ 72, KA4RVQ 57, KA4FG 56, KE4PO 50, KB4T 50, WD4MLQ 44, WD4OFO 32, WB4AWG 30, W3IDO 27, NQ4P 28, KD4QZ 24, NS4C 23, KA4ETX 23, KF4EU 18, WB4FJY 13, K44RWB 13, K4ARBY 11, WA4STZ 11, WB4YQP 11, N4UF 10, WB4DTS 6, KF4GY 6, W4LUW 5, WA4PUP 5, WB4HMT 3, KA4RMH 3. (Feb.) WB4GHU 41, W4KIX 33, WD4GUZ 4, KE4PO 2, KE4PO 2.

**SOUTHERN FLORIDA:** SM, Richard D. Hill, WA4PFK — SEC: W4SS, STM: K4ZK, ACC: AA4VJ, BM: WA4EIG. Congrats to WA4EIG who is our new Bulletin Manager, and to AA4VJ who is now our Affiliated Club Coordinator. The Ft. Myers Hamfest was held this month and was most enjoyable. W1NJM gave an interesting talk on some history of Amateur Radio. He has now returned north for the summer, but will return next December. I also attended the Orlando Hamcation, but had to miss the traffic handlers breakfast — the first one I've missed in several years. KA4TTS was appointed EC for Monroe Co. KA4TTS and KA4OAA both made BPL this month originating traffic from the Key West fair. The Dade Co. Youth Fair also generated more traffic. N4DVF is resigning as manager of the Palm Beach Co. Traffic Net, and N4FZH is assuming the duties of net manager. WA4EIG has been appointed Asst. EC for Orange Co. N2WX reported that he and W4BWS relayed two messages for the police and an elementary school following a power failure in Palm Bay. WB4WDK, EC of Highlands Co., reported that in February a tornado touched in a mobile home park near Sebring. During the Red Cross operation, the Highlands Co. ARES supplied local communication. WB4WDK also said that the Manatee Co. EC was instrumental in the operation. N4W4R, EC in Polk Co., wrote that in February the Lakeland RA sponsored a ham radio demonstration, participating were: W2H7V, W4JM, N4ZL, WB4H, W4H, W4K, K44NQC, N4CWO, W44ZC, and WB2JUF. They found about 10 young people who were interested in both novice and cw classes! N4W4R also reported that in March the FM Lakeland RA provided communications for the 5K meter "Corporate Run," with WA4OZA, N4CWO, and N4W4R assisting. W4SS writes that the PBARC, Inc., provided communications for the Mid-Winter Classic Run under very adverse weather conditions. Amateurs assisting were KE4ZH, WB4LH, KA4DRM, WD4JW, KB4AME, AA4JM, K2EWB, N4BBZ, N4AFB, N4GKI, W4SQC, WA4FTX, W4SRV, W4SS and three husband/wife teams: WB2HOC, WB2HOD, KB4HAJ, K4AMIJ, KE4VR, KE4VS, Dick Weller (ex-K3GKC, ex-W2MXY), a physics instructor at Broad Community College is now W4NAK. He got the Extra Class in Miami. At Orlando, N4GKA got his General, KB4DGR got Advanced, and KF4EO got his Extra. Congrats to all. VE3BSY has been very active on RN5D and CAND as reported by the respective net managers, WB5YDD and W5KLV. I now have computer programs to run the ARRL monthly reports (SAR and BPL) as well as the Top Twenty Trafficators for Florida Skipp. 73 de WA4PFK. Traffic: W3CUL 3068, W3VR 906, KA4OAA 471, WA4PFK 470, WA4EIC 448, WD4CUL 424, KA4TTS 397, KE4DA 330, K4SCL 327, K4ZK 320, VE3BSY 316, K4EJQ 302, WB4WYU 298, W4BAI 288, W4IA 278, W4LUW 278, W4YU 219, K4IGS 189, WD4IAW 189, KY4U 184, WA4HXU 178, W4NFK 147, N4AH 126, W4ESH 125, W4SME 122, W4GPL 120, W4PKP 114, W4YCL 113, N4BK 103, KE4O 103,



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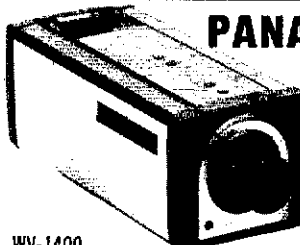
Switchable volt & Amp meter on RS-12M, 20M, 35M & 50M; Separate Volt & Amp meters and front panel voltage adjustment 5-15vdc on VS-20M, 35M & 50M.

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RS-10A	7.5	10	4 x 7 1/4 x 10 1/4	11	79.95	62 <sup>95</sup>
RS-12A	9	12	4 1/2 x 8 x 9	13	89.95	69 <sup>95</sup>
RS-20A	16	20	5 x 5 x 10 1/2	18	115.95	89 <sup>95</sup>
RS-35A	25	35	5 x 11 x 11	27	174.95	134 <sup>95</sup>
RS-50A	37	50	6 x 13 x 9 1/4	45	253.95	199 <sup>95</sup>
<i>w/ Switchable volt and Amp meter</i>						
RS-20M	16	20	5 x 9 x 10 1/2	18	137.95	109 <sup>95</sup>
RS-35M	25	35	5 x 11 x 11	27	194.95	154 <sup>95</sup>
RS-50M	37	50	6 x 13 x 11	46	288.95	229 <sup>95</sup>
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VS-20M	16	20	5 x 9 x 10 1/2	20	162.95	129 <sup>95</sup>
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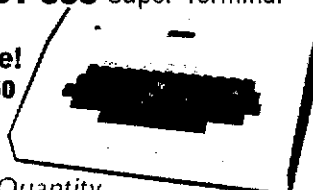
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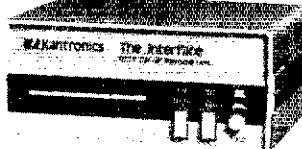
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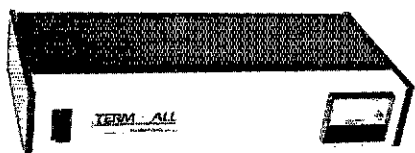
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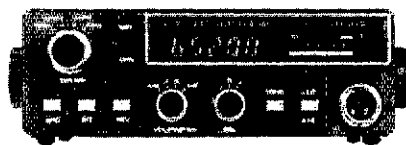
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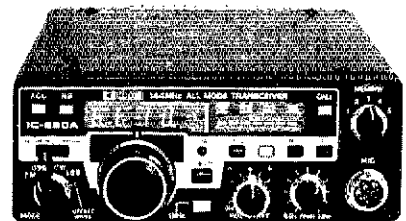


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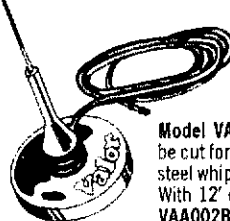
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**WEST INDIES:** SM, Gregorio Nieves, KP4EW — This is my first report as SM of West Indies section. I wish to express my appreciation to the many ARRL members in this section that reached me expressing their support for my nomination. I inherited a well organized section from the direction of KP4CV. There are a number of devoted coordinators and managers who have let me know their desire to hold their positions and from whom I am sure will have their cooperation in my term of office. I congratulate them for their well done job in the past two years and exhort them to continue with the same enthusiasm. Traffic: NP4D 128, KP4ABK 10, WP4ADG 4.

### SOUTHWESTERN DIVISION

**ARIZONA:** SM, Erich J. Holzer, N7EH — STM: W7EP, WA7FDN WA7KOE. March has passed with numerous amateurs participating in a number of public service events. ARA reports that the following participated in the Fountain Hills Fun Days: WB7OZR WB7DQK KA7DIT N7AJY WB7BVS KC7OE WA7ZT W7KMD K7LKL KA7DRV WB7CHQ N7EJY KA6GBY W7XA K7CQS WA7FSG KA7ZC K7VGC WB7TIX N7ERM KA6AUD W7DZK WA7NLY. Also the following hoped with communications for the Continental Homecoming run: KA7DT KA7EJO W7KMD K7VCI WB7OZR KC7OE WB9VMP K71PW W7WGW WA7VVG KA7DRV WB7ASR. The Green Valley ARC provided communications for the Green Valley Men's Garden Club in a drill for emergency communications. Participants were: W3BXI K8BKP W1PHX WB7ORC N7DBM W7IHR W7KMH KA7HV KA7EDJ W6R0D K8TXX KA7KWW N8CHY W7MDO W7JKA KA7HDC and K2CVT. The Tucson IBM RC reports its new officers are: K7LZ, pres.; K7MD, v.p.; KE7W, secy.; WB2COV, treas. W7TCQ was honored by the Rincon Rotary Club for his lifelong contributions in the field of radio communications and emergency communications for the community. PSHR: K87FE W5KMF. ALEN: QNI 1259, QTC 188. Cactus Net: QNI 916, QTC 139, SWN: QNI 177, QTC 225. Traffic: K87FE 124, W7EP 108, W7LVB 99, W5KMF 75, K6LL 74, W7AMM 44, K7UXB 41, WA6VZN 24, WA7KQJ 23, N7CVT 19, KA7HEV 19, N7COY 18, WA7YUL 12, KA7JNU 10, WA7NXL 9, N7EH 9, K7NMQ 9, WA7NXL 9, KE7W 8, W7YS 4. (Feb.) KE7W 4. (Jan.) KE7W 16.

**LOS ANGELES:** SM, Stan Brock, N2YQ — STM: W6INH, SEC: N6UK, ACC: N6BD. The leadership of the ARES met March 19 at N6UK's QTH and discussed the new organization within the section. Also items of mutual interest in disaster communications were discussed. A special guest Lawrence Lindstrom, Engineer-in-Charge for Communications Services for Los Angeles City was present. Also present at this meeting were S.W. Dir. Jay Holladay, W8EJH, Vice Dir. Fried Heyn, WA8WZO, Herbert Hoover, W8ZJ for Red Cross Communications, and W6POU, SM Santa Barbara Section. In addition Assistant Director A6EN for Emergency Communications for the District was present. ARES leaders for the Los Angeles District, Northwestern District, W6BMA, DEC, Northeastern District, and ECs W6ORD N6ZH WB6FRM WA6QZY N6ALD and OES K6QQN, and W6ELR also were present. DEC So. LA. District has a new call, NR6O. Congrats on your new Extra Class ticket. I'm sorry for not showing at the last few TRW swapmeets. Rain and other commitments have kept me away. I'll be back the last weekend in May. Still needed in this section are the following top level appointments: Bulletin Manager; Official Observer/RFI Coordinator; Public Information Officer; State Government Liaison; Technical Coordinator. CC reports: WB5CCY 2, K6KA 81, traffic: K6LNY 6, W6INH 3, K6TD 163, A6QA 102, K6EA 47, W6NKE 19, N6DZO 12, K6CL 9 N66V 6.

**ORANGE:** SM, Sandi Heyn, WA6WZN — SEC: W6UBQ, STM: WA6QCA, ACC: KA6NLY, BM: W6DXL, OO/RFI Coord: N6PE, PIO: KA6HNY, SGL: N6HIQ, TC: AA6DD, DEC: WB6JBI W6LKN K6GGG WB6ZYZ. From now on appointments will be handled by the section leaders. DECs outside Orange Co. will try to support programs beyond their normal ARES responsibilities. ARES reports should go directly to the STM as well as PSHR reports. Beginning April 1st a new vhf RTTY traffic net has been started by KA6HJK & WA6QCA; the net meets 10 A.M. daily on W6IWO/R 146.7(-.6) and WB6ZIR/R 145.12(-.8) linked with possibly other RTTY rpters including 220 MHz, Contact AA6DD or KA6NLY if you are interested in a local Org. Co. group for the purpose of preparing for the future volunteer licensing testing FCC program. Currently they are developing a new pool of questions that will be submitted to FCC via ARRL. The Orange, Los Angeles & Santa Barbara Section are involved in planning for the 1984 Olympic Games. Since the section activity will be in Orange Co., OC DEC WB6JBI has agreed to be responsible to organize our support. W6AM has invited everyone for a "Visitors Day" at his Rhombic Farm June 12th 1-5 P.M. Tiny Fox San Bernardino Emergency Service Office is working with Asst. DEC/RO WA6IKH on equipping a 35-foot RV and planning a county SET. July 4th Barstow ARC/ARES are planning communications support of the 2nd Barstow area Daze celebration; for info contact N6ADV or W6BNG. W6IRT is providing 24-hour code practice on 29.88 MHz at 13 wpm. Owing to passing of K6VG, close friend, K6TC will become new trustee of the Lone Pine rpt 146.2883. Also I regret to report KA6BTM has become a Silent Key. He was the editor-in-chief pres. of the So. CA Amateur Radio Computer Club (SCARCC). Help! Please send donations to treat K6DY to support the So. CA net newsletter *Zero Beat* edited by net manager K6XI. Traffic: N6GIW 307, WBNTN 224, WB6QBZ 188, A6FE 176, K6XI 144, K6GGW 101, WA6QCA 82, W6RE 61, KA6BNW 37, KA6HJK 25, WBTKV 20, K6ZCE 18, W6CPB 10, WA6WZO 7, W6LGL 6, WA6WZN 2.

**SAN DIEGO:** SM, Arthur R. Smith, W6INI, ACC: WA6COE, BM: WA6HJ, SEC: W6INI, STM: N6GVW. New appts: WA6COE, Atfl Club Coord: WA6HJ, Bulletin Mgr: KU6D, WA6IK ORS. W6INI attended meeting of So Cal Volunteers Active in Disasters (SCOVAD). North Co. Traffic Net met 30 times, handled 200 msgs. NCTN is sponsored by Palomar ARC and meets daily at 2000 on 146.73(-). Here's an easy way to get into traffic handling!

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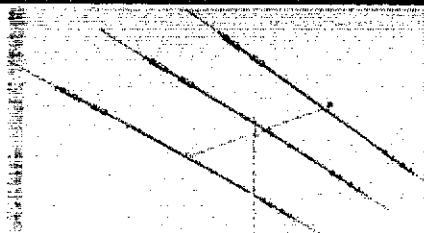
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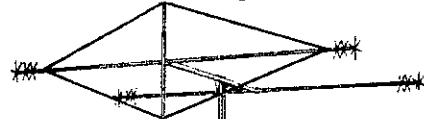
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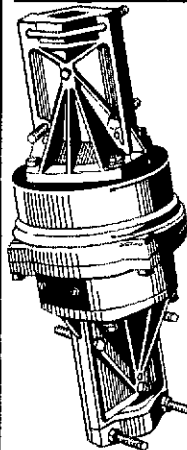
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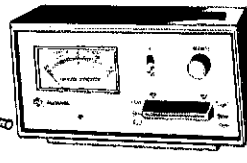
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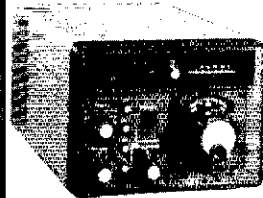


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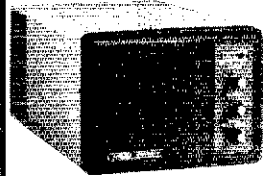
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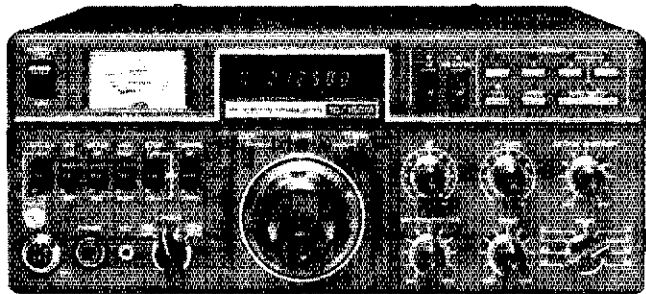
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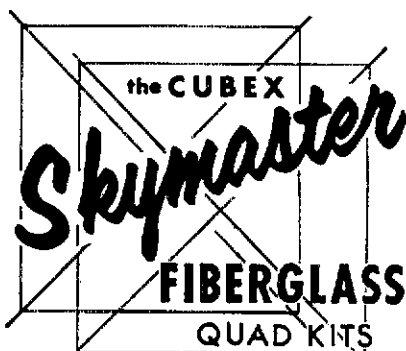
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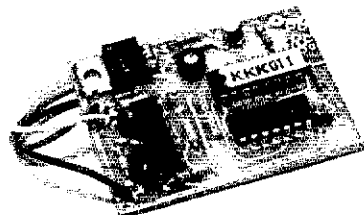


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Lemon Grove Planning Commission agreed to 100-foot antennas. Next step the City Council. ARES supported the City of San Diego and Red Cross during heavy rains. Public service events incl Cancer Society Bikeathon and SD Bicycle Club races. Upgrades: WB8HPJ N6HYN WB6JSM WB6OXM to Extra; K6HAV to Adv. KA6DVN donated a receiver to the Escondido Blind Center. The San Diego RA meets at 1930 on third Thursday at County Education Center, 6401 Linda Vista Rd. ARC of El Cajon held Apr meeting with Radioclub Tijuana members as guests. WA8CUP was spkr at inaugural meeting of Southern Dist ARES. Meetings will be fourth Thurs at Norman Center, Chula Vista. Traffic: K7BA 615, KM6I 376, KL6D 189, K6AP 184, K6BAI 149, W6HUJ 127, N6GV 61, N6AT 56, WA6IJK 33.

**SANTA BARBARA:** SM, Robert N. Dyruff, W6POU — Dir. Holladay hosts 1st cabinet mtg of Div. Mgrs, Asst Dirs, Advrs. Comm. Mbrs. Hope you sent your comments opposing FCC's "No-Code" docket 83-28. New vhf RTTY Net meets daily 1000PT. CACTS 146.1070; 223.121224.75 WB1WOJ linked to Running Springs 144.52145.12 WB2ZIRJ, with K6BHK Net Mgr, K6AL, EC Concho Valley given retirement sendoff on WA60BT/R 147.885. Sulphur Mt. RA sponsors classes on packet radio Wed. 7:30 Oxnard, N6MAJ/W6D6ASB generate 2nd harmonic. Christopher Paul! All section clubs please advise W6POU re F.D. call, site location. Bi-lingual emerg. comms. by WA6MBZ aid Bala, Mexico air rescue coordinated by WD6BNH. Baja A.H. Racing Ass'n's W6MSG crew manned checkpoint San Felipe in 200 m. race assisted by K6GQ K6ER K6YZR W6OLE W6VNZ. 1984 Olympics to include AR comms for canoeing/rowing Lake Casitas and at Olympic Village UCS-Bolita. Hoping for 3rd party tlc with ei/ participating nations. Satellite ARC hosts annual Santa Maria BBQ/fest June 19. K6FI spearheads AR videotape for state training institute in SLO. So. Calif. Net (SCN/SB) logged 444 checkins in Jan per Zero Beat — over 20 each by WD6AAO W6FJA WD6HAY KA6JWK W6RIC K6YD. Traffic: N6MA 16.

## WEST GULF DIVISION

**NORTHERN TEXAS:** SM, Phil Clements, K5PC — ASM: WA5QFD, SEC: W5GPO, STM: W5VMP, PIO: N5FDL, SGL: W5UXP, OO/RFI: W5BJBP, NMs: K5UPN W5JYI AE5I. New EC for Ochiltree Co. is K5IS. Thanks! New EC roster will be ready soon; listing by county the EC, the CD director, number of tlc operators in county, and rptg freq. of ARES activity; plus the total number of ARES members in the county. This will give responding units an idea what will be needed and available going into an unfamiliar disaster area, and who to contact upon arrival. Quick response teams are now being organized, and Red Cross ID cards will be available. Qualified teams upon completion of training. Contact K5PC or W5GPO for info. on forming a team in your area. Plan to attend Hamcom "83" the first weekend in June in Dallas. Lots of activities planned for this year. The NTX Section ARES Net meets first and third Thurs. night after TTN on 3951 KHz. All DECs, ECs or their designated reps. are urged to QNI. This net is a much faster way for all ARES groups to keep informed on our activities. Amarillo ARES unit was commended by the CD coordinator for a job well done during the "great snow of '83." Just received my first copy of the Lubbock ARC newsletter, *The Printed Circuit*, nicely done by WD5KBC. I hope I'm on your mailing list now! PS: W5PBN K65UL, K5UPN KA5AZK WA5QFD N5EZM KD5FR. Traffic: K5UPN 225, N5BT 202, KA5AZK 164, KD5FR 76, WA5QFD 46, W5PBN 32, K5UL 18, N5EZM 18, AE5I 16, K5SOR 11, K5PC 9, W5YK 4, K5HGX 2.

**OKLAHOMA:** SM, Art Roberts, W1GOM — SEC: W5ZTN, STM: K5YX, OO/RFI: K5BEK TC: W5QMJ, BM: W5AS. Greetings to the OK section. Owing to a death in the family, I have been preoccupied. My time has not been my own. New appts: ACC-K5CAY; SGL-W5NZS. There are two new DECs: N5FM for OKC; K5ENA for the Northeast quadrant. We need DECs for the Southeast, Southwest and Northwest quadrants. Interested or have a recommendation? The Osage ARES First Annual Swapfest was a rousing success. Keep the first weekend in April open. The Great Plains ARC dedicated their new wx radar. This is an outstanding example of city and amateur cooperation for the public's benefit. The CONCN NM, W57FX is now an SK. This is a great honor. W5AS will assume the NM position. KD5IS is assistant Hamnet. Hamnet Computerfest is just around the corner. See you there! Traffic: K5CXP 298, W5REC 235, W5DEF 203, K5BEK 202, W5AS 178, W5RB 148, KV5X 136, W5BELG 101, WA5OUV 74, W5DFB 62, W5VXU 57, W5SUG 55, WA5OGC 46, W5BEAY 41, KB5XI 39, WA5ZOO 32, W5VOR 30, W5ELW 29, W5EAA 28, W5SJCZ 22, K5ENA 11, K5CAY 10, KC5OU 9, N0IN 4, W5LSW 3, W5JJ 3. (Feb.) K5BEK 156.

**SOUTHERN TEXAS:** SM, Art Ross, W5KR — ASM/ATM: N5TC, SEC: WA5RVT, BPL: W5SHN W5TFB W5YDD N5DFO, SEC: WA5RVT attended VOAD meeting in Denton. He talked to group on emergency communication and the Aggie Swapfest in College Station, and is working on district plan for Southern TX section. OBS W5KLV spread widely the word of ARRL with 7 bulletins, 30 satellite bulletins, 4 propagation bulletins, 4 DX bulletins, 5 CRRLL bulletins in 46 readings on 7 nets. W5B5OU getting out much better with outdoor antenna. DRN5 Mgr W5BYDD says Southern TX section represented 100% by W5FOLU W5KLV W5SHN N5AMH K6BZK W5FJN N5CRU W5SEPA KASKRI W5CTZ K5EEN WA5RTN K5WOB N5DFO W5BYDD; passed 652 messages in 62 sessions. W5ES bulletin reports Amateur Radio ops will provide communication for Texas School Food Services during convention in El Paso in June 12-16; spring cleaning and painting of club house going forward under W5VTA, chairman, along with K5LUG W6JCT K5BPQ K5HTR K5KOX W5CPI and K5TLU. 1983 ops for Brazosport ARC are: KA6KRI, pres.; KA5DYO, v.p.; KA5HWH, secy; W5BPHO, treas. EC KA5MEN and his spouse, KA5MEM, upgraded to Extra; he is now N5EH, site is N5EG. N5EKG upgraded to Advanced. NICE GOING traffic: W5SHN 1321, W5VTA 618, W5YDD 548, N5DFO 388, W5CTZ 374, W5KLV 291, W5FOLU 136, N5CRU 116, N5TC 102, K5HTR 74, W5BGE 58, N5EFG 53, W5BMMI 45, K5SY 41, WA5RVT 37, KD5GM 30, W5KR 23, KASKRI 22, K5RF 7, W55GKH 4.

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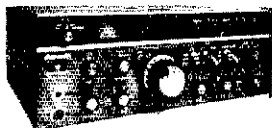
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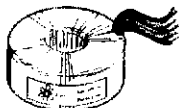
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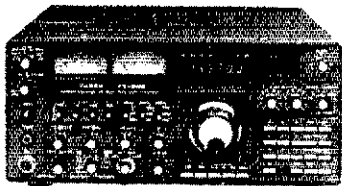
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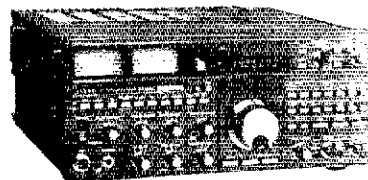


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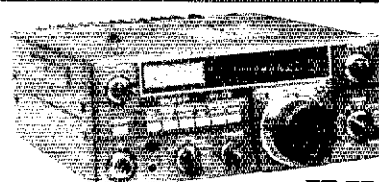


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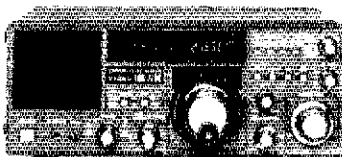
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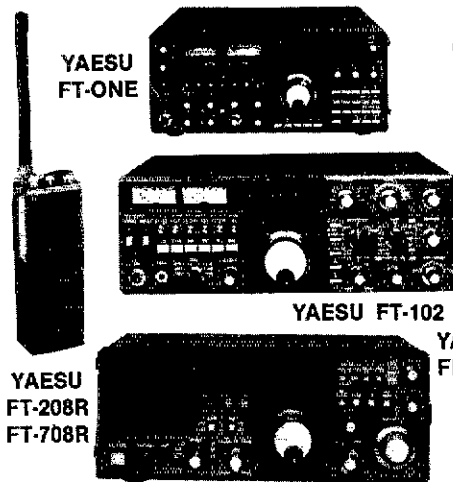
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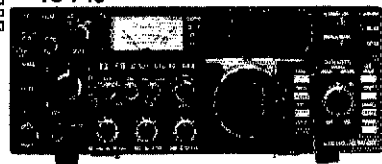
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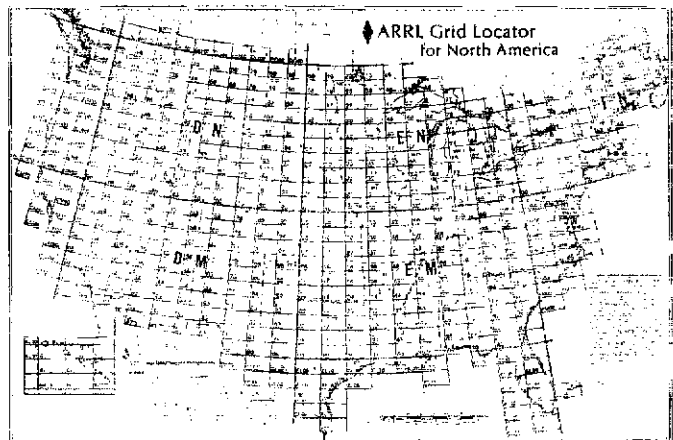
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## ARRL GRID LOCATOR

— A MUST FOR THE VHF/UHF OPERATOR —

Find grid locations *fast* with this handy 12" x 18" map. Mark off the squares you have worked for the VHF/UHF Century Club Awards (See January, 1983 QST page 49 for details.) The map is available for only \$1.00, U.S. funds from ARRL, 225 Main St. Newington, CT 06111

# Ham-Ads

# MADISON Electronics Supply

(1) Advertising must pertain to products and services which are related to Amateur Radio.

(2) The Ham-Ad rate is 85 cents per word. A special rate of 25 cents per word applies to hamfest and convention announcements, to individuals seeking to dispose of or acquire personal equipment, and to other advertising which, in our opinion, obviously qualifies for the individual rate.

(3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8-1/2" x 11" sheet of paper.

(4) Closing date for Ham-Ads is the 20th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received August 21 through September 20 will appear in November QST. 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 respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

## 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 — WTGAQ/6 Box 530, Santa Rosa CA 95402.

QO and QST 1950-1982 also 73 and Ham Radio issues for sale. Two dollar minimum order. Cost 50 cents each 1976 and later issues, all other 30 cents each including USA shipping. Send SASE, chronological order and payment to W6LS, 2814 Empire Avenue, Burbank, CA 91504. Available issues and refund sent within one month.

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.

FOX-TANGO Club Newsletters for Yaesu Owners. Back issue (1980/1981) looseleaf sets \$6 each, both for \$10 while they last. Fox Tango Club, Box 15744, W. Palm Beach, FL 33416.

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.

NEW JERSEY - The Jersey Shore Chavermir are sponsoring the Jersey Shore Hamfest and Electronic Flea Market on June 12, 1983, 9 AM to 3:30 PM at the Jewish Community Center, 100 Grand Ave., Deal, NJ. Admission \$3 per person (children under 12 & XYLs free). Refreshments available. Many awards. Table (\$5) and tailgating (\$2.50). Spaces may be reserved by SASE and advance payment to "Jersey Shore Hamfest", PO Box 192, West Long Branch, NJ 07764 by May 15. Talk-in on 147.045 + 6; 146.52 Simplex.

WHEELING WV Hamfest, Wheeling Park, Sunday, July 24. Major award plus cash award. Dealers most welcome, tables available, indoor displays only \$2 admission fee required but reserve space. Contact: TSRAC Box 240, RD 2, Adena OH 43901. Phone 614-546-3930.

NJ Computer Fleamarket (4th. year), June 11-12, Meadowlands Hilton Hotel - Rte. 3 - Exit 16W NJ Turnpike. Buyers \$5, sellers \$12. Fleamarket in covered parking lot! W2TGH, 201-297-2526, Kengore, POB 13, Franklin Park, NJ 08823. (Also-Fall show on Oct. 15-16.)

NORTHWEST '83, The Northwestern Division Convention, will be in Spokane's Convention Center, July 8-10, 1983. Technical Seminars, Displays, Swapfest, Banquet with NBC's Roy Neal, DX Breakfast, and more. For information write: Kyle Pugh, KATGSP, Box 3933, Spokane, WA 99220.



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ICOM IC 730 '869

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1.2 GHz!

IC-RP3010 - 440 mHz

IC-RP1210 - 1200 mHz

10 watts, PLL freq. (1.2 GHz), DIP switch, CTC55 access, DTMF control functions, selectable hang time.

Six memories, 2 VFO's, programmable tones and offsets, memory or band scans programmable, 3 tuning rates, RTT on FM, green LED readout.

All items guaranteed.

IC-120  
1.2 GHz FM



**NEW TELEX-HYGAIN TRIBANDER EXPLORER 14**, extremely broadband, 14 ft. beam, add-on 30 or 40 meter. COMPLETE TOWER PACKAGE-tower, beam, CD 45 rotor, coax arms, and prepaid freight to the 48 states. LIST ... \$1767.00  
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8315P silverplate, PL-259 ..... 1.00  
UG-176 adaptor ..... .30  
831J dbf female ..... 2.00  
82-61 N-Male ..... 3.00

## BELDEN CABLE

9258 RG8x ..... 19/ft.  
8214 RG8 foam ..... 39/ft.  
8237 RG8 ..... 33/ft.  
8235 300 Ohm kW  
twinglead ..... 20/ft.  
8000 14 Ga. stranded ant ..... 10/ft.  
8267 RG213 ..... 46/ft.  
8448 rotor cable ..... 27/ft.  
9405 heavy rotor cable ..... 45/ft.

## CONSUMERS wire RG214

nommil spec. .... 70/ft.  
HYGAIN TH7DXS ..... 329.00  
TH5MK28 ..... 318.00  
Ham 4 ..... 199.00  
Ham X ..... 249.00  
Explorer 14 ..... 279.95

## EXPLORER PACKAGE

Beam, with balun and kit for either 7 or 10mHz option. LIST ... 399.95  
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## CUSHCRAFT A3

A4 ..... 229.00  
YAESU FT77 ..... 519.00  
FT102 ..... 969.00  
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## KANTRONICS Interface

Software in stock now!  
SHERWOOD, W6TOG kits 10% off list  
CURTIS K5B.

K5 Littlebugger ..... 29.95 ea.

AEA MM2 ..... 149.00

CK2 ..... 119.00

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for RTTY and CW. .... 169.95

HUSTLER 6BTU ..... 139.00

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Wait 'til you see the trade-ins you can get on this one!

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500pF/30kV doorknob cap ... 16.00

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YAESU FT-ONE + acces. .... 2300.00

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HK-1 ..... 29.95

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R-T - \$30  
HV Mk II - \$33  
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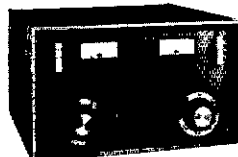
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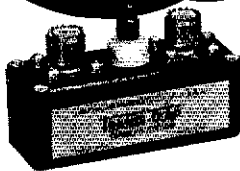
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# For Antenna and AC Lines

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R-T, HV  
Mark II  
Series

LT, HT



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### Surge Protected Master AC Control Console

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IC-730

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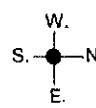
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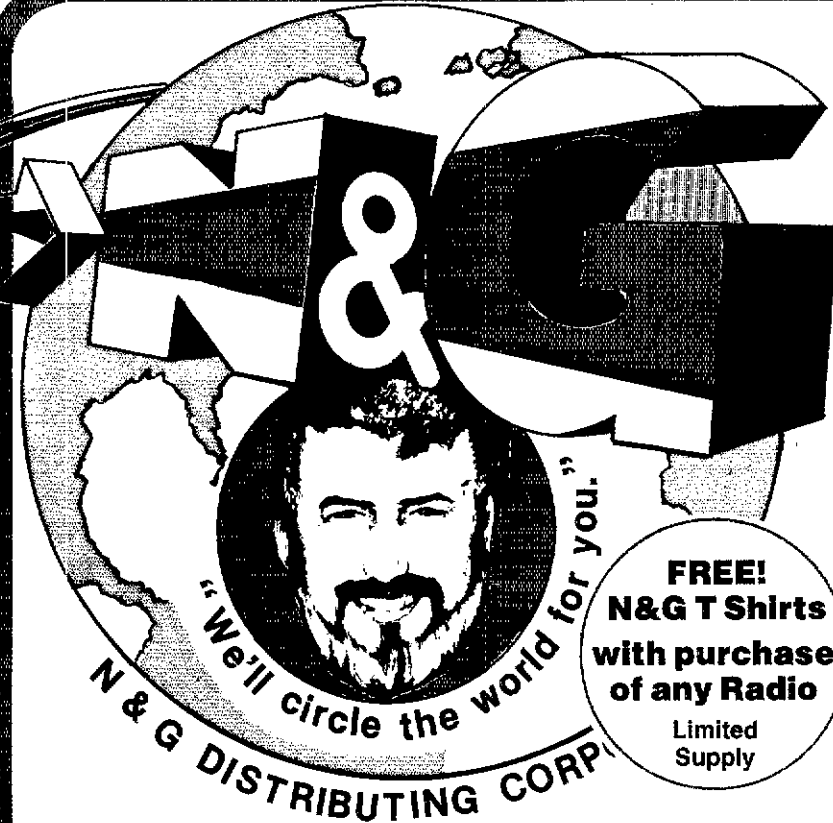
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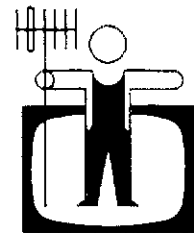
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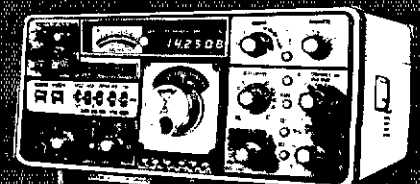
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**COLUMBUS, OHIO hamfest** - 3rd Annual - Saturday June 18. Free parking. Trunk sales - \$2 per space. Admission - \$1. Location - Battelle Memorial Institute Auditorium parking lot (Rt 315 and King Ave). Talkin - 7/15 and 52. In-to - Bill, WBLLU, 614-261-7053 or Kevin, WA8OHI, 614-891-2205. Sponsored by the Battelle Amateur Radio Club - W8CQK.

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**HAMFESTERS 49th Annual Hamfest and Picnic**, Sunday August 14, 1983, Santa Fe Park, 91st and Wolf Road, Willow Springs, IL. Southwest of Chicago. Exhibits for OM's and XYL's. Famous Swappers Row. Tickets: at gate, \$3, advance \$2. For advance tickets, check or M.O. and S.A.S.E. to Hamfesters, P.O. Box 42792, Chicago, IL 60642.

**THE CENTRAL Kentucky ARRL Hamfest**, sponsored by The Bluegrass Amateur Radio Society, will be held Sunday, 8:00 AM to 5:00 PM August 14, 1983 at Scott County High School, Longlick Road and US Route 25, Georgetown, Kentucky (Off. 75/64). Technical Forums. Awards and Exhibits in A/C facilities. Outside Flea Market space, no charge. Tickets \$3.50 advance and \$4 @ gate. For more information or tickets write Edward B. Bono, WA4QNE, P.O. Box 4411, Lexington, KY 40504.

**HALL of Science Amateur Radio Club**, annual indoor/outdoor rain or shine, HAMFEST, will be held Sunday June 13, 1983 9 A.M. to 4 P.M., at Municipal Parking Lot, 80-25 126th Str. (1 block off Queens Blvd.) Kew Gardens, Queens, New York City. Sellers: donation \$3, Buyers \$2, XYL's, kids free. Walk/talk in frequency 146.520. For information contact: Tony Russo WB2OLB, 212-441-6545, John Powers KA2AHJ, 212-847-8007.

**THE FRIENDLIEST hamfest of WNY**, the Batavia Hamfest, presented by GRAM, Inc. on Sunday, July 10 in Alexander, NY. Advance registration is still just \$2 to Batavia Hamfest, P.O. Box 572, Batavia, NY 14020. Watch the Hamfest Calendar for details.

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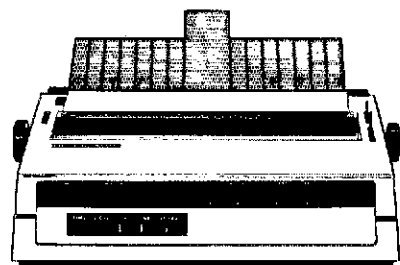
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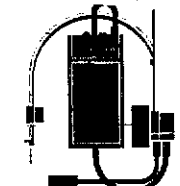
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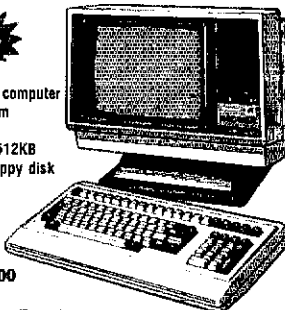
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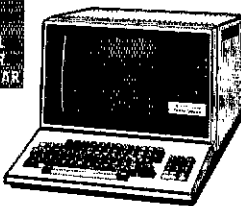
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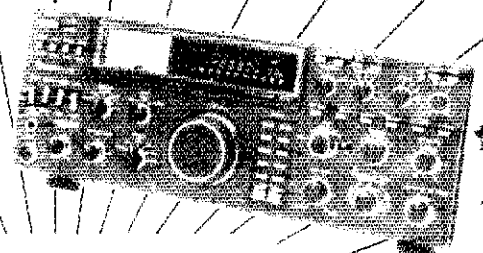
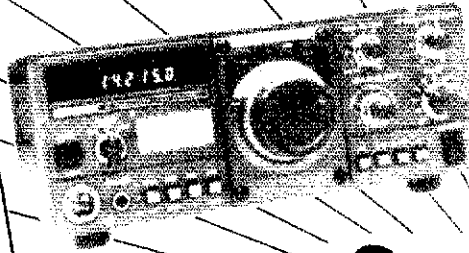
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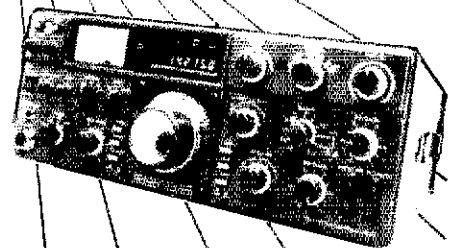
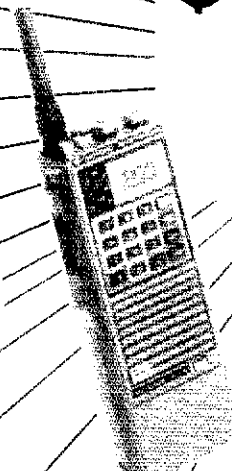
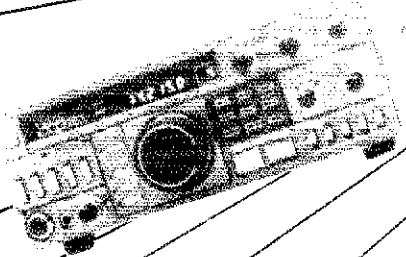
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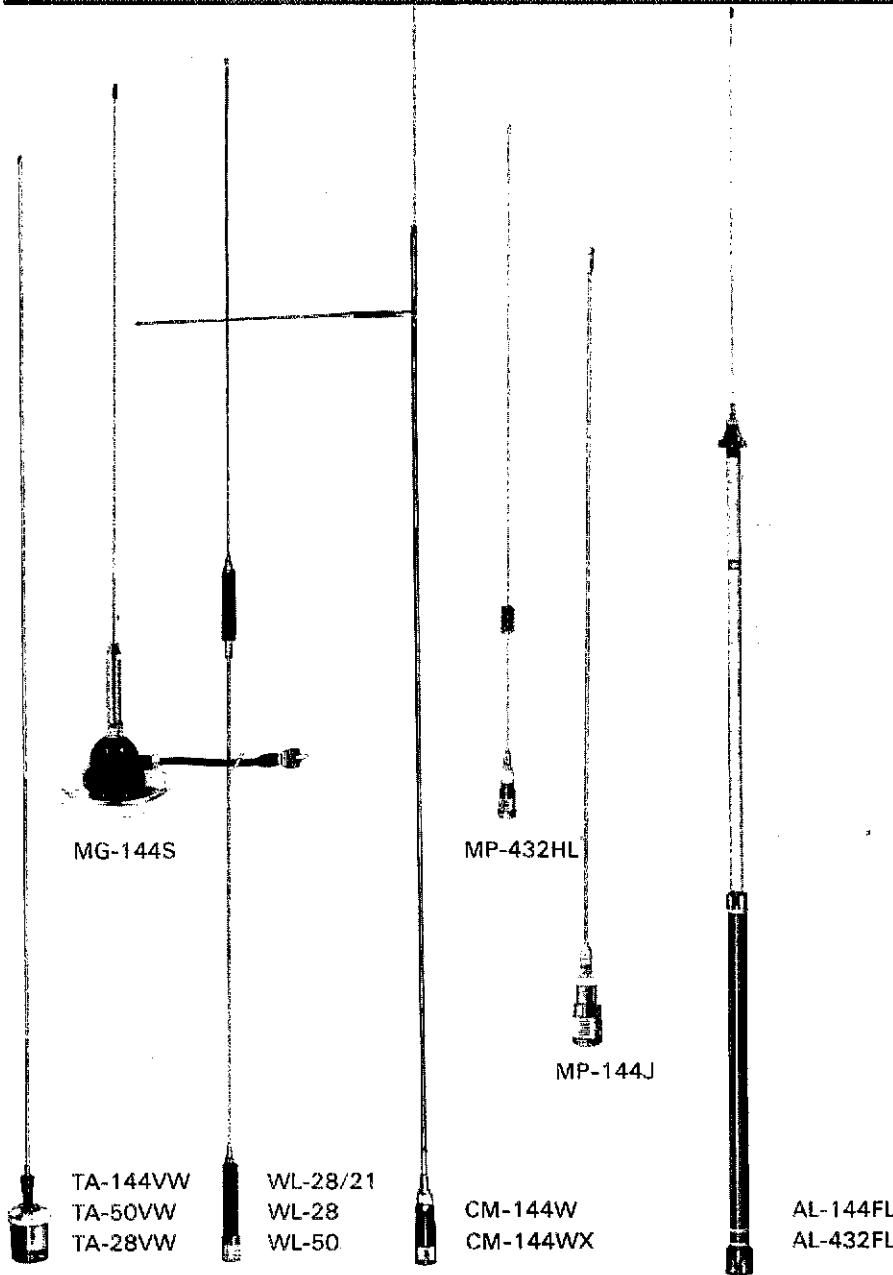
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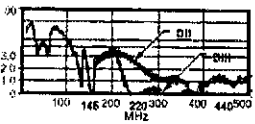
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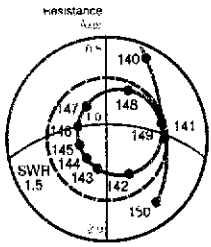
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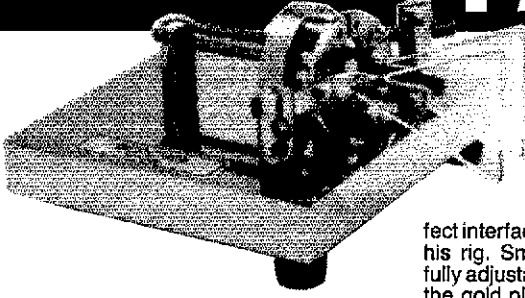
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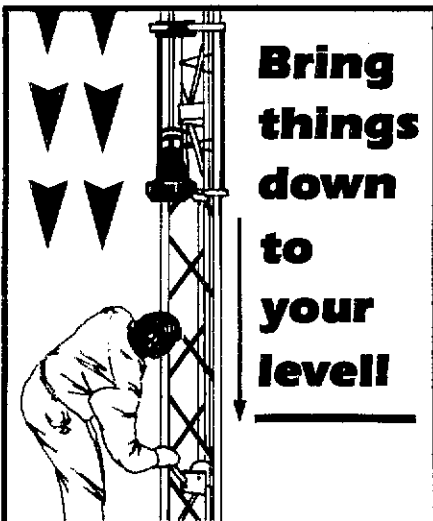
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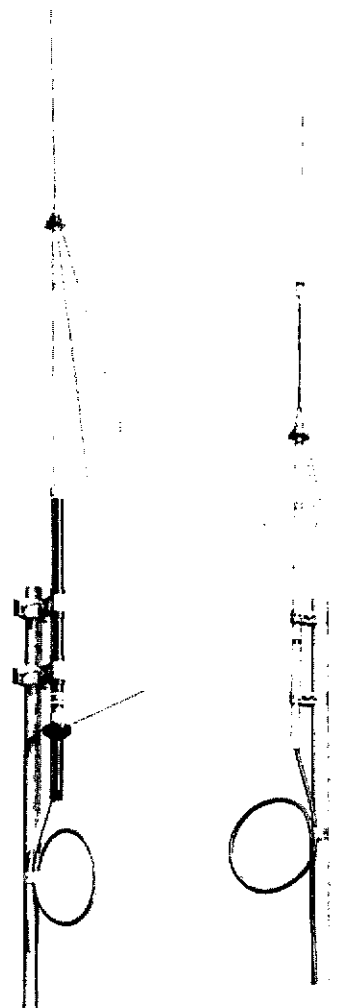
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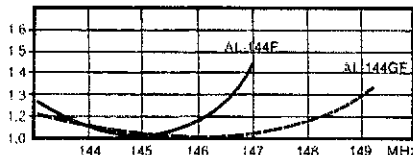
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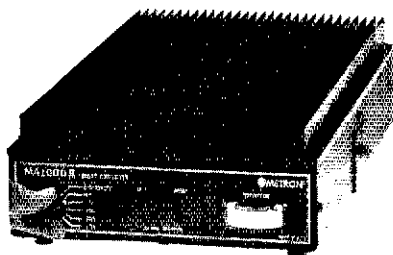
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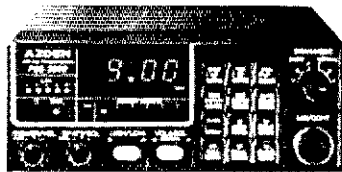
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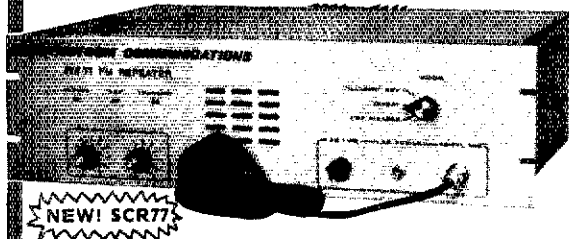


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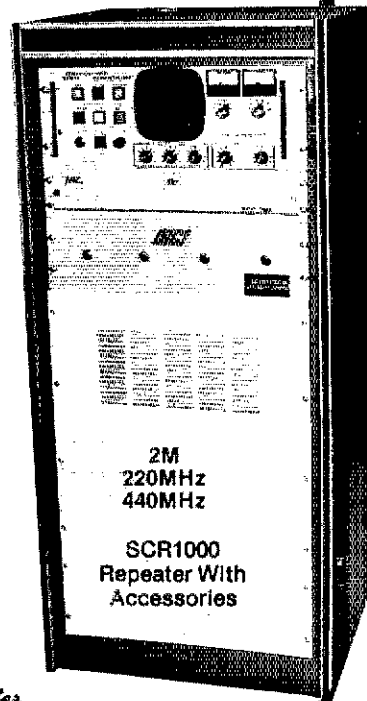
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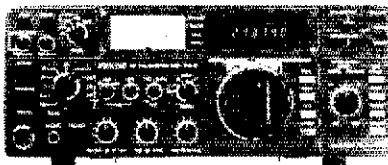
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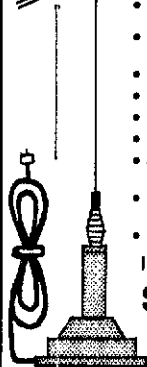
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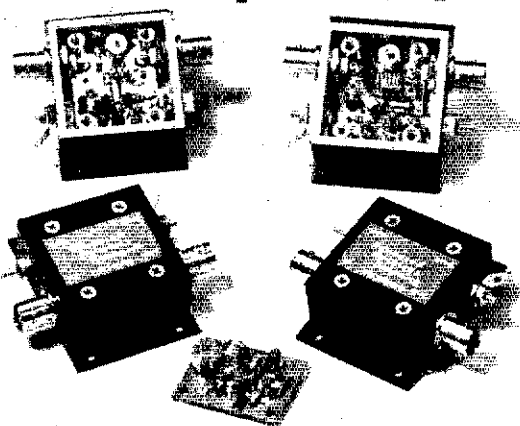
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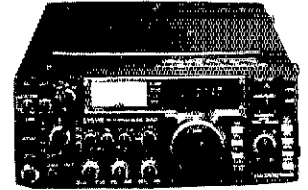
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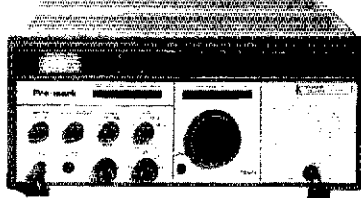
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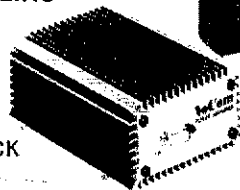
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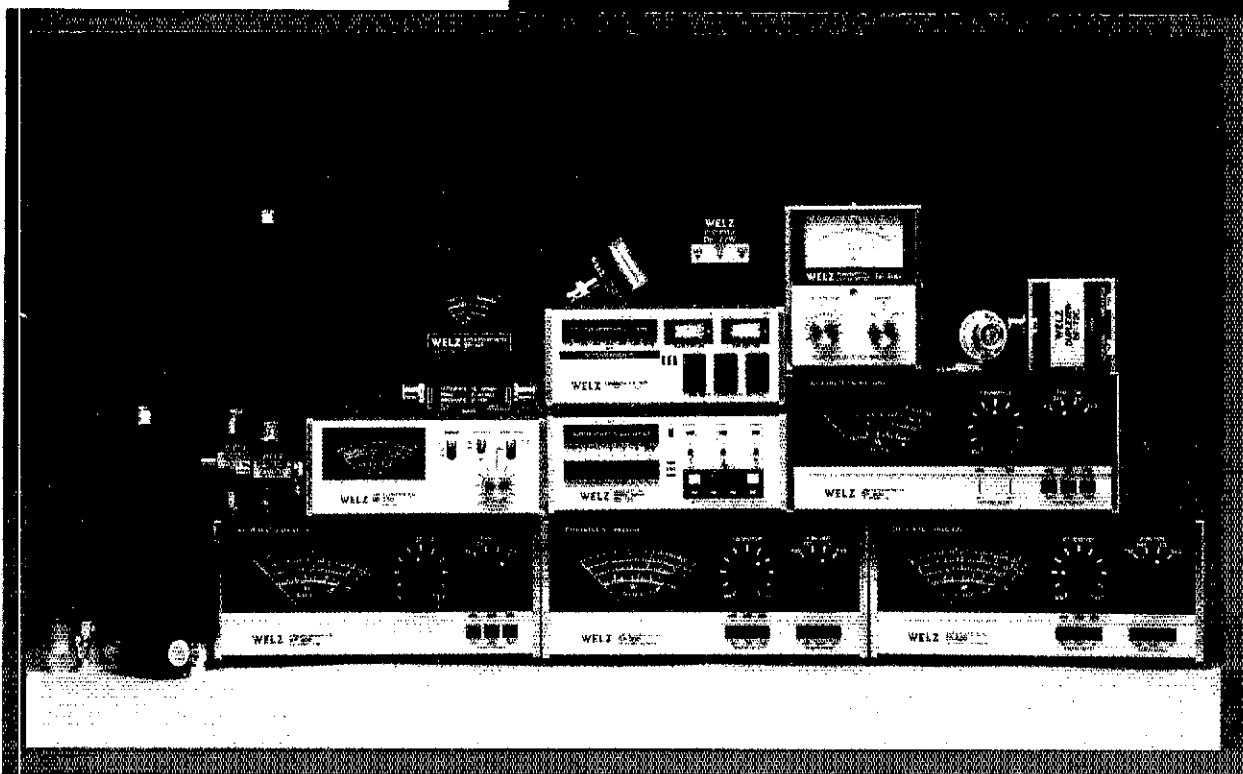
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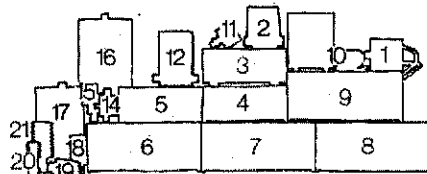
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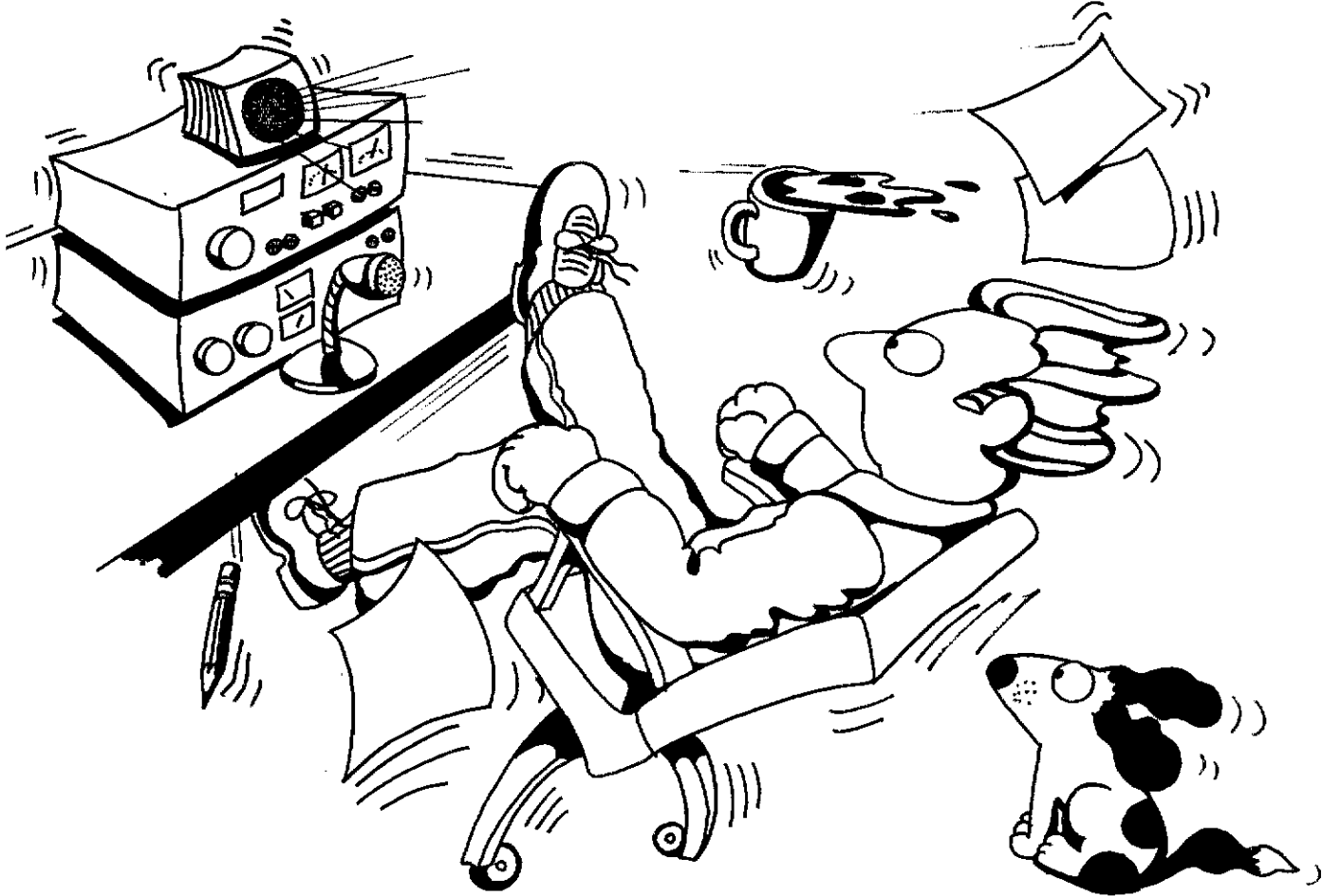
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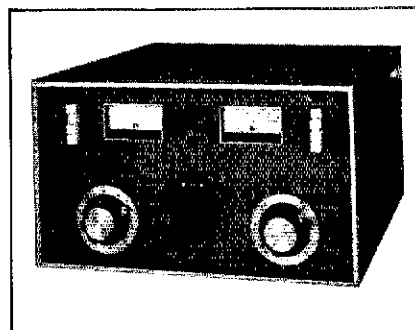
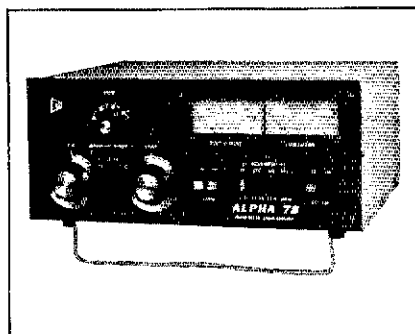
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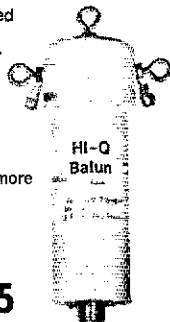
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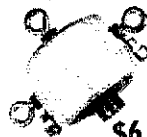
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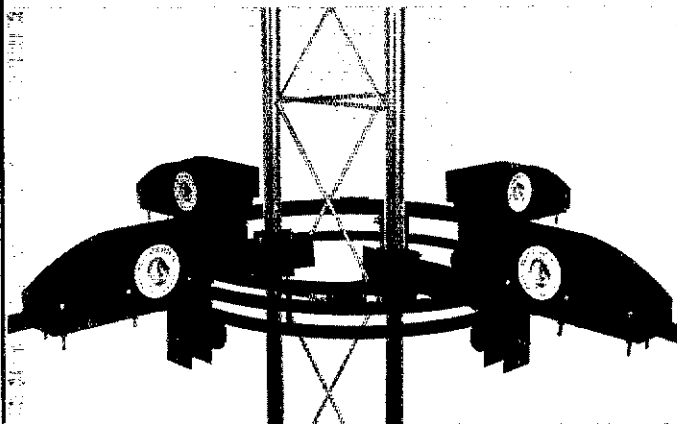
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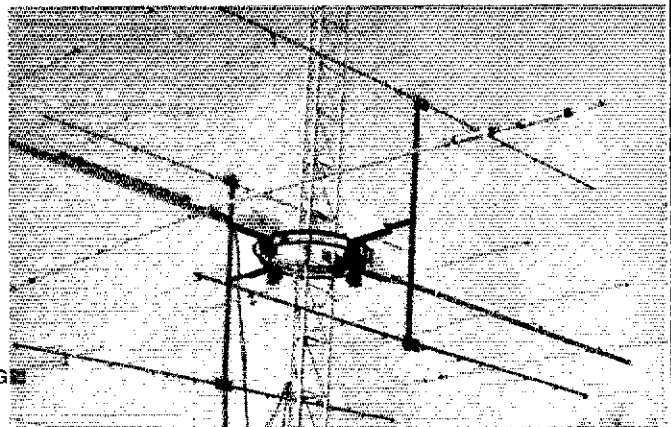
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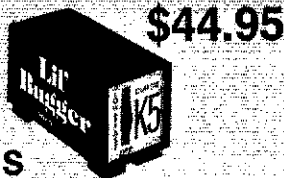
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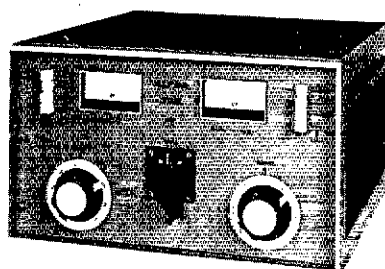
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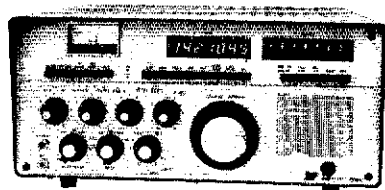
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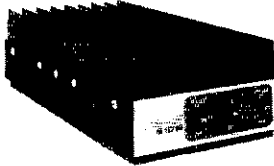
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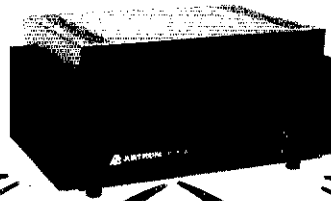
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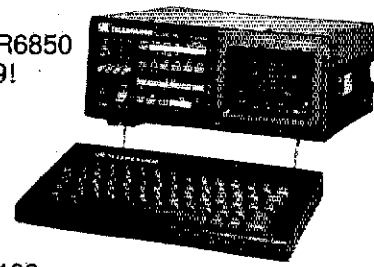
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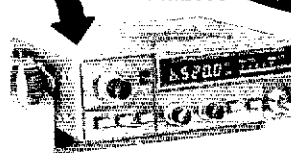
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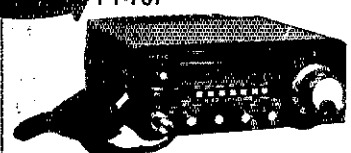
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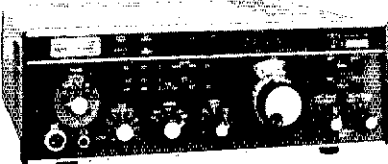
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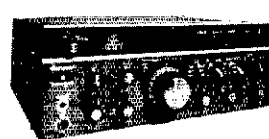
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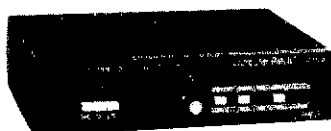
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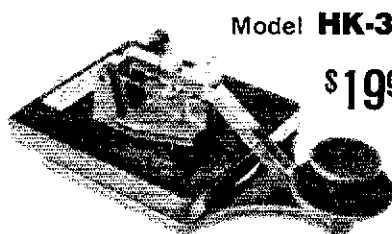
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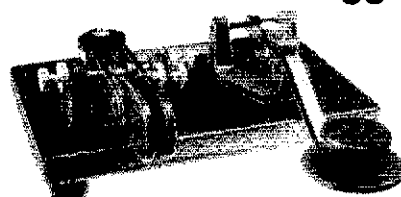
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# ARRL LETTER

FOR MEMBERS ONLY

We thought you might like to know a little more about the ARRL Letter and how we put it together. Since the last of October, we've been bringing you the very latest in news from the FCC, ARRL Hq. and the world of Amateur Radio. When we say latest—we mean latest!

For instance, we were in the mail with the details the very next day after FCC gave the okay for the use of 10 MHz. We were in the mail the very next day after the FCC adopted their NPRMs on no-code and the volunteer exam program. We brought the information to our subscribers first, we brought it to them in a readable, nonsensational manner and we brought it to them accurately.

There is a reason for that. Let's take a look at the process of putting together an issue. During the two-week period between issues, Peter O'Dell, KB1N, and Wayne Yoshida, KA6KGU, compile the top stories in Amateur Radio. On Tuesday morning of publication week, Pete, Wayne and other key staffers meet to discuss the top stories. We tentatively select a lead story, and the other stories are ranked in importance. The secretaries begin loading the stories into the word processor. Then we double check the facts and their meaning with the experts—people who really know what is going on. After all, one or two people can't be expected to fully understand the implications of all the complex stories making

news in Amateur Radio today. With the Letter, it is a team effort.

Wednesday, afternoon, we do a rough layout. Thursday we do the final layout, and at 2 p.m. we turn camera ready copy over to the printer. By noon Friday he delivers the printed copies to our mailer, who has it in the hands of the Post Office by 5 p.m. That means the details are in the mail to our subscribers less than 36 hours after the story happens.

There's only one small hitch—the FCC meets Thursday mornings. We have just enough time to bring you the latest news from the FCC and still meet our deadline (*actually, we planned it that way*). On days like those when the FCC adopted the order for the 10-MHz allocation or when they adopted the NPRMs on no-code and the volunteer examination program, we went through a "disaster drill" between 10:30 a.m. and 2 p.m. Funny, none of the local hams showed up with HTs to help us out though. It's more work for us, but it keeps our subscribers up-to-date on the very latest happenings.

We invite you to compare our track record with all the other sources of news about Amateur Radio. The ARRL Letter is FAST, READABLE, NONSENSATIONAL and ACCURATE. Subscribe today. (*Actively affiliated ARRL clubs can subscribe, also. You can use our material in your newsletter as long as you give us credit.*)

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HEATHKIT SB-303 CW/SSB filters, SB-401, ev-638 mic., SB-600, cables, spare finals, manuals. FB cond. \$495. KA1FYG, 1540 High Hawk, East Greenwich, RI 02818.

VIKING Ranger II factory wired \$200. Drake R-4B \$250. Both units excellent. Dan KB9W, 309 Scholl, Amery, WI 54001 715-268-2332.

TS-830S, VFO-240, SP-230, PC-1, MC-50 \$850 5M-220 w/pn B6-8 - \$300 - you pay shipping N2BJX 716-683-5703.

WANTED: Heath HG-10 VFO, contact Gary Weddel, 703 North Sycamore, Pleasanton NE 68866, 308-388-4965.

WANTED: Drake C-4, MN-2000, Collins 30L-1, Roderick, Box 1463, Little Rock, AR 72203 501-988-2527.

SPRING Cleaning! Tektronix plug-in units, exc., 1A1, \$125, also 1A4, others; H-P meters, \$15. Spectrum analyzer, oscillators, manuals, muchmore; All lowest prices. S.A.S.E. for large list. Joseph Cohen, 200 Woodside, Winthrop, MA 02152.

WEATHER Facsimile Recorder. Westrex Model RJ4. Excellent condition \$125 plus shipping. Paper included. Bob Eiselt, KA0AFG, 517 South Lakeshore, Spirit Lake, IA 51360 712-336-1354.

MEMORY Kayer; AEA CK-1, never used, \$50. Joe Naylor, N7XXV5, 13519 Westport, Houston, TX 77079.

TS-820 with CW filter, Magcom speech clipper, owners manuals, service manuals, original cartons. Excellent condition, \$495. Joe Naylor, N7XXV5, 13519 Westport, Houston, TX 77079.

IC-701 including power supply, mic. \$650. Kenwood TS-820S \$525. Both mint condition and include shipping. 305-743-5000. W4WVB.

KENWOOD TR-2200A w/accessories. Original box. New condition \$100. Dycomm 2-meter 10-40W amplifier \$40. New Autek QF-1A \$43. KOBE 515-753-6047 (nites).

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KENWOOD TS820S \$675, VFO820 \$120. Both for \$700. TS830S CW filter. Deluxe knob \$835 mint. FOB W7YOF 602-967-1755.

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ANTENNA Tuners. MFJ900 \$35 MFJ901 \$45. Both with little use. W0M2C, 26 Princeton Circle, Longmont, CO 80501.

SELL: Drake L4B, mint \$650 plus shipping. Kantronics Mini Reader \$150. W1GAJ, David Schwartz, 1183 Southeast St., Amherst, MA 01002.

ICOM 701, 701PS, IC-SM2 mike: mint condition, functions perfectly, factory cartons, all manuals \$650. W67PRV, 7411 S.W. 59th Ave., Portland, OR 97219 503-244-7013.

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WANTED, military surplus radios, we need Collins 618T, ARC-94, ARC-102, 718F-2, MRC-95, MRC-108, VC-104, 671U, RT-712/ARC-105, RT-804/APN-171, ARC-114, ARC-115, RT-823/ARC-131 or FM-622, RT-857/ARC-134 or Wilcox 807A, ARC-159, ARC-164, RT-859/APX-72, APN-153, antenna couplers 490T, CU-1658A, CU-1669A, CU-1239/ARC-105, Sperry Rand 3226A1, 3226B1, 490B-1, 690D-1, top dollar paid or trade for new Amateur gear, write or phone Bill Step 704-524-7519, Step Electronics Company, Highway 441, Otto, NC 28763.

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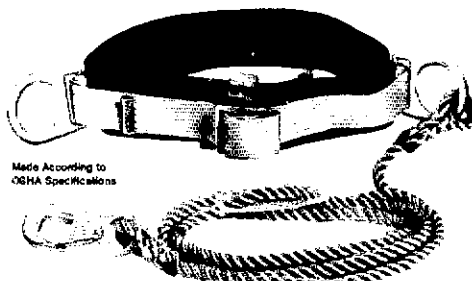
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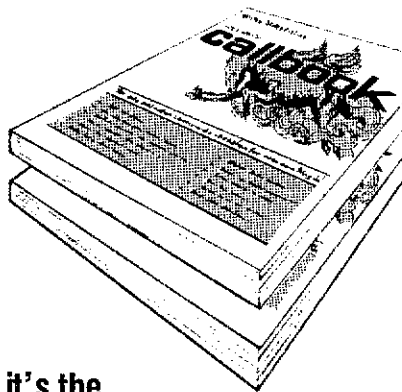
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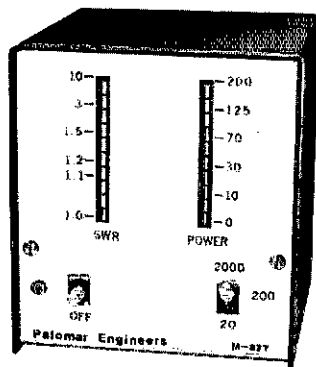
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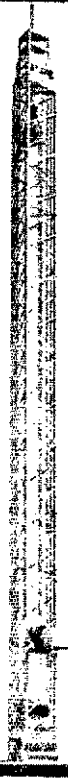


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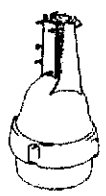
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- 66BS 6-el 6-mtr Beam ... \$109
- 18HTS 80-10 mtr Hy-Tower Vertical ... \$339
- LC-160 160-mtr Coil Kit for 18HTS ... \$39
- 214 14-el 2-mtr Beam ... \$35
- 28QD 80/40 mtr Trap Dipole ... \$49
- 58DD 80-10 mtr Trap Dipole ... \$99
- BN86 80-10 mtr KW Balun W/Coax Seal ... \$19

## MAGO (WILSON) ANTENNAS

- SY-33 3-el Tribander Beam ... \$199
- SY-36 6-el Tribander Beam ... \$269

## MOSLEY

- CL-33 3-el Tribander Beam ... \$229
- TA-33 3-el Tribander Beam ... \$199
- TA-33JR 3-el Tribander Beam ... \$149
- 5-402 2-el 40-mtr Beam ... \$279

## HYGAIN/TELEX SPECIAL!

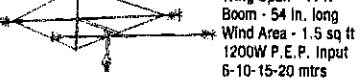
- For a limited time only, SAVE \$500 on this fantastic offer from HyGain and Texas Towers!
- HG-52S Tower—HyGain's Most Popular List \$1,095
- CD-45II Rotor—HyGain's Most Economical List 165
- Explorer 14 Antenna - Hy-Gain's New Compact Broadband Model List 399
- HG-10 Heavy Duty 10 ft. Mast List 69
- HG-COA Coax Arms (Set of 3) List 39
- Total Package List Price \$1,767
- Texas Towers Package Discount -500
- Your Total Package Cost \$1,267

PLUS—FREE SHIPPING! Anywhere in the Continental USA. We can substitute any HyGain antenna or rotor in this special promotion at similar savings—Don't miss out on this fantastic opportunity to own one of the finest antenna systems available anywhere.

## KLM

- KT34A 4-el Broad Band Tribander Beam ... \$309
- KT34XA 6-el Broad Band Tribander 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 Slick Monoband Beam ... \$599
- 6el-15mtr Big Slick Monoband Beam ... \$389
- 6el-10mtr Big Slick 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

- 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

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 x 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
- 3/8" EE (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 E-Hook 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) ... \$ .59/ft
- 9901LD Cable End (for 2100/4000 cable) ... \$4.95
- 9902LD Cable End (for 6700 cable) ... \$5.45
- Socketast Potting Compound (does 6-8 ends) ... \$8.95

## BALVANIZED STEEL MASTS

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

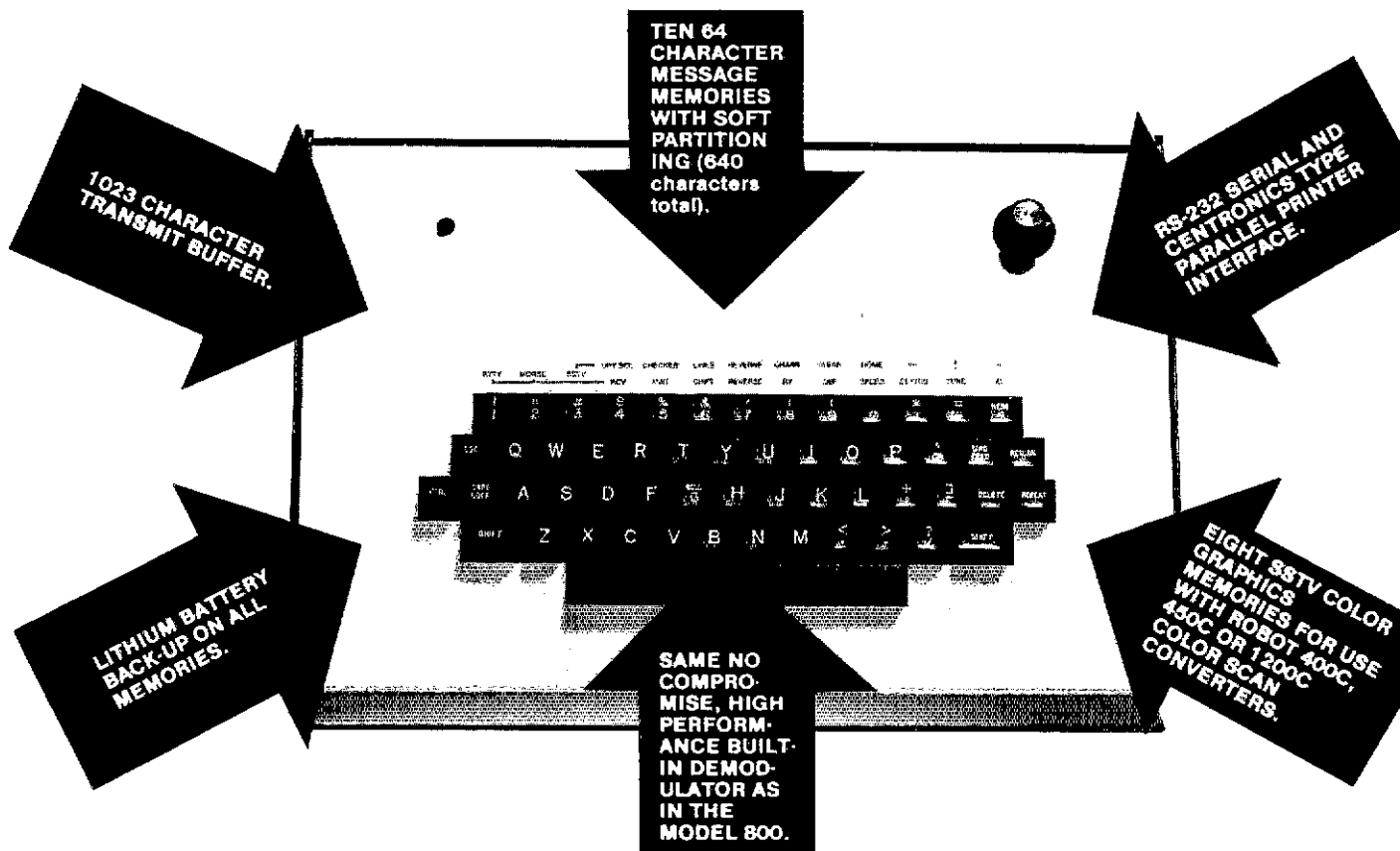
# TEXAS TOWERS

DIV. OF TEXAS RF DISTRIBUTORS INC  
1108 Summit Ave., Suite 4 / Plano, Texas 75074

ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE. TELEPHONE (214) 422-7306



# 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 train. 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 visit our literature or visit your Robot dealer.

\*The Model 800C does not receive SSTV pictures. A scan converter is necessary for this.



ROBOT RESEARCH, INC.  
7591 Convoy Court • San Diego, CA 92111 • (619) 279-9433

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 bypassed 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 inadvertent 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:

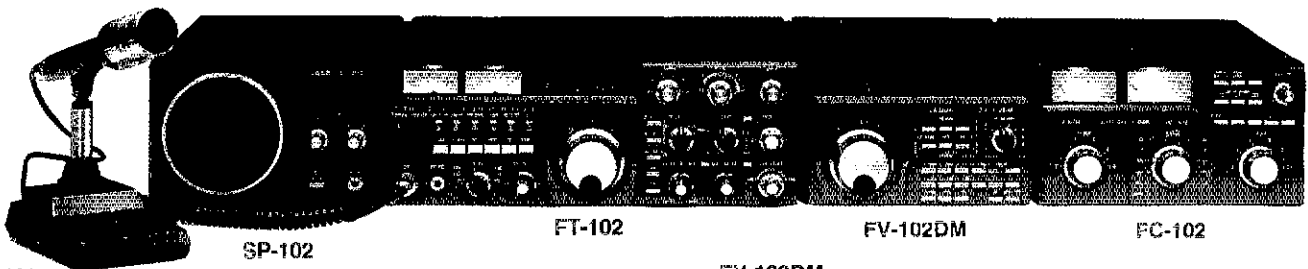
Better than 70 dB

#### 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

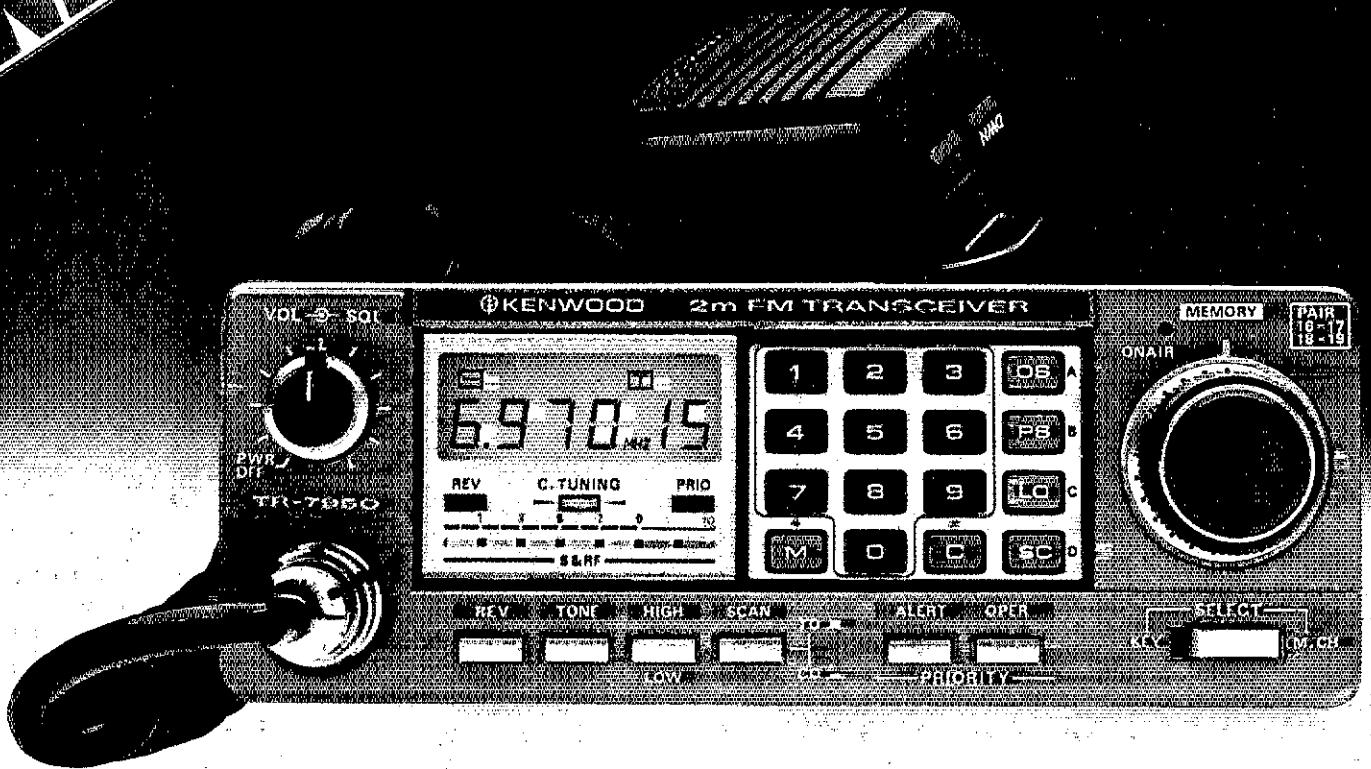
The FV-102DM Synthesized External VFO tunes in 10 Hz steps. Keyboard entry of frequencies, UP/DOWN scanning, and 12 memories make the FV-102DM a "must" for serious DX or contest work.

### 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.

# NEW

# Watts to see...



## Big LCD, Big 45 W, Big 21 memories, compact.

### TR-7950/7930

Outstanding features providing maximum ease of operation include a large, easy-to-read (direct sunlight or dark) LCD display, 21 multi-function memories, automatic offset, programmable priority channel, memory and band scans, built-in lithium battery memory back-up, built-in 16-key autopatch encoder, and a choice of a hefty 45 watts output (TR-7950), or 25 watts output (TR-7930).

#### TR-7950/TR-7930 FEATURES:

- NEW, large, easy-to-read LCD digital display**  
 Easy to read in direct sunlight or dark (back-lighted). Displays transmit/receive frequencies, memory channel, repeater offset, (+, S, -), sub-tone number (F-0, 1, 2, 3), tone, scan, and memory scan lock-out. Includes LED S/R-F bar meter, and LED indicators for REVERSE, CENTER TUNING, PRIORITY, and ON AIR.
- 21 NEW, multi-function memory channels**  
 Stores frequency, repeater offset, and optional sub-tone channels. Memories 1 through 15 for simplex or  $\pm 600$  kHz offset. Memory pairs 16/17, and 18/19 are paired for non-standard repeater offset. Memories "A" and "B" set upper and lower scan limits, or for simplex or  $\pm 600$  kHz offset. In MEMORY mode, a circle of light appears around the memory selector knob. When the memory selector knob is rotated in either direction to channel 1, an audible "beep" will sound.
- Choice of 45 or 25 watts output**  
 The TR-7950 provides a hefty 45 watts output, while the TR-7930 features a more modest 25 watts. A HI/LOW power switch allows power reduction to approx. 5 watts.
- Long-life lithium battery memory back-up**  
 Built-in lithium battery has an estimated 5 year life.
- Automatic offset**  
 The microprocessor is pre-programmed for simplex or  $\pm 600$  kHz offset, in accordance with the 2 meter band-plan. "OS" key allows manual change in offset.
- Programmable priority alert**  
 The PRIORITY channel may be programmed in any of the 21 memories. With ALERT switch "ON," a dual "beep" sounds when a signal is present on the PRIORITY channel. An OPER switch allows an easy move to the PRIORITY channel.
- Programmable memory scan lock-out**  
 "LO" key for programming scan to skip selected memory channels, without erasing the memory.
- Programmable band-scan width**  
 The lower limit may be programmed into memory "A," and the upper limit into memory "B"
- Center stop during band-scan, with indicator**  
 Stops in center of channel during band-scan, with center tuning indicator.
- Scan resume selectable**  
 Scan stops on busy channel. Selectable automatic time resume-scan (approx. 5 sec., adjustable), or carrier operated resume-scan. A scan delay of approx. 1.5 seconds built-in.
- Scan control using up/down microphone**  
 Momentarily pressing UP or DOWN button on microphone tunes one step in the selected direction, on memory or on 5-kHz step tuning. Holding the button for about 2 seconds starts UP or DOWN automatic scan action. Scan start also possible using "SC" key on keyboard. Scan may be cancelled by momentarily pressing the PTT switch, or by pressing both UP/DOWN buttons simultaneously.
- Programmable sub-tone channels**  
 Optional TU-79 3 frequency sub-tone unit provides keyboard selectable sub-tone channels, which may be stored in memory.
- Built-in 16-key autopatch, with monitor**  
 The keyboard functions as a 16-key autopatch encoder during transmit. DTMF tones appear in the speaker output when a key is pressed during transmit.
- Front panel keyboard control**  
 Used for selecting frequency, offset, programming memories, controlling scan, and autopatch encode. Keyboard lighting is provided.
- Extended frequency coverage**  
 Covers 142,000-148,995 MHz, in 5-kHz steps.
- Repeater reverse switch**  
 Locking-type switch, with indicator.
- "Beeper" amplified through speaker**
- Compact, lightweight design**
- Easy-to-install adjustable-angle mobile mounting bracket**

#### 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.

More information on the TR-7950 and TR-7930 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.