QST

December 1973
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OFFICIAL JOURNAL OF THE ARRL

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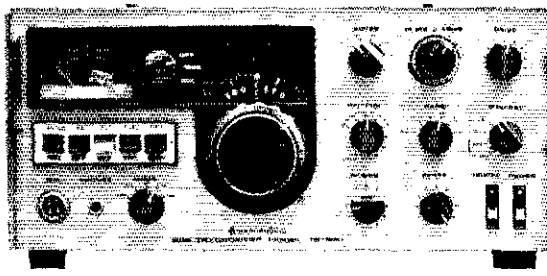
Pride in knowing that you own today's ultimate in state-of-the-art technology . . . pleasure in operating a rig whose day in, day out performance will show you why the Kenwood name is world-famous for reliability and value.

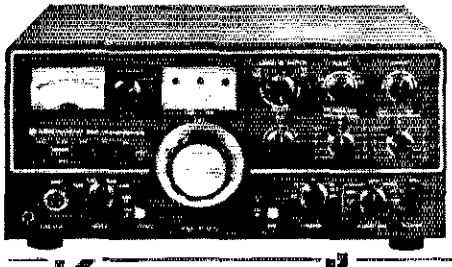
Kenwood's superb solid state SSB transceiver

TS-900



. . . the ultimate transceiver. The promise of the transistor has been fulfilled. Here is the transceiver you will want to own . . . whatever you have now, get ready to trade up. Its important features are far too numerous to list. Its specifications are superb The TS-900 is unquestionably the best transceive of its kind ever offered. The price $795.0

PS-900 (AC Supply) $120.00, the DS-900 $140.0

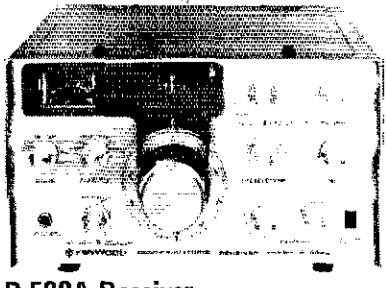


TS-520 Kenwood's go every place . . . do everything transceiver

The new TS-520 is the transceiver you have wanted, bu could not buy until now. It is a non-compromise, d everything, go everywhere 5 band transceiver for SSB o CW that performs equally well at home, in an automobile airplane, boat or trailer. The TS-520 features built-in A *power supply, built-in 12 volt DC power supply, built-i* VOX with adjustable gain delay and anti-VOX.

The price $599.0

Kenwood's winning pair



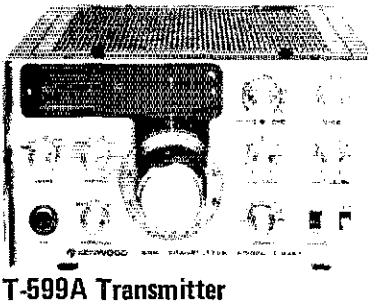
R-599A Receiver

The R-599A is the most complete receiver ever offered. It is solid state, superbly reliable, small and lightweight, covers the full amateur band . . . 10 thru 160 meters, CW, LSB, USB, AM, AM.N and FM.

The price $439.00

The T-599A is mostly solid state . . . only 3 tubes, has built-in power supply, full metering (ALC, Ip, RF output & high voltage), CW-LSB-USB-AM operation.

The price $459.00



T-599A Transmitter

Please call or write for complete specifications. Also available at Kenwood dealers throughout the U.S.

Henry Radio

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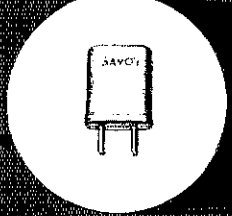

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Either type for amateur VHF in Regency, Swan, Standard, Drake, Varitronics, Tempo, Yaesu, Galaxy, Trio, Sonar, Clegg, SBE, Genave.

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Complete packaged multi-band antenna systems employing the famous Bassett Sealed Resonators and Balun from which air has been removed and replaced with pure helium at one atmosphere. Operating bands are indicated by model designation.

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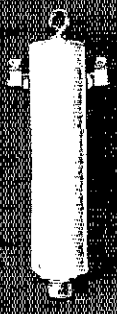

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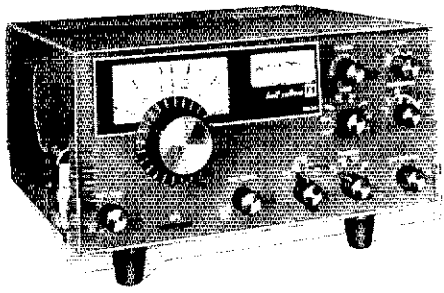
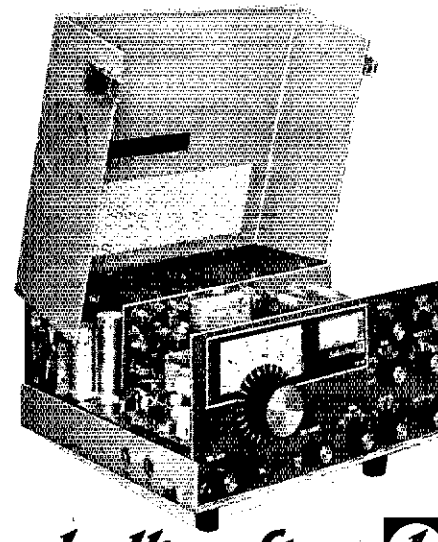
Hallicrafters' all-american made FPM-300, Mark II "Safari" SSB/CW transceiver is Q5... from the Mauritania solar eclipse expeditions to a famous raft adventure in the Atlantic.

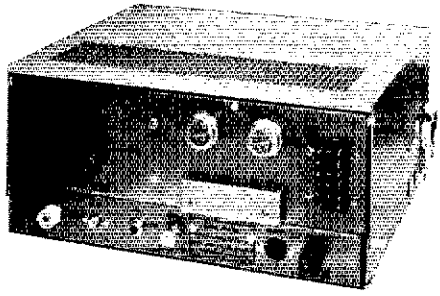


Proven design in the tradition of the HT-37 and solid-state dependability are combined in this compact transceiver featuring state-of-the-art FET's, hot carrier diodes and bi-polar transistors for peak, reliable performance for only $625.

Some of the high performance specifications are:

- Designed for fixed, portable and mobile use
- Equipped with a self-contained Universal AC and DC power supply system
- Compact dimensions (HWD) 5½ x 12 x 11 inches
- Weight: 25 pounds
- Tuning ranges: 8-600 kHz Bands, 80-10 meters
- Built-in speaker
- Power requirements: 117 V or 234 V 50/60 AC; 13.4 VDC negative ground
- Modes: Selectable Upper or Lower Sideband-CW or RTTY
- Type of service: continuous operation with 2-tone S SB-CW-RTTY (50% duty cycle)
- Power Output: 125 Watts P.E.P. (Nominal) into 50 ohms
- Receiver Sensitivity: Less than 1 uV for 15 db SN Ratio
- Selectivity: 2.0 kHz
- Receiver IM: 60 db below 2 equal 10MV signals
- Receiver Image and IF Rejection: Greater than 60 db.
- Internal Receiver Spurious: Less than equivalent 1 Microvolt Signal
- Transmitter IM: 30 db below P.E.P. (26db below one of two equal tones)
- Adjacent Channel Desensitizing: 3 db with greater than 10,000 MV
- Sideband Suppression: -50 db minimum @ 1 kHz
- AF Power Output: 2 watts
- Stability: 100 Hz after warmup. Max. 100 with 10% line voltage change
- Frequency Readout: Within 1 kHz ± 100 kHz of Cal. Point not more than 3 kHz across entire 500 KC Band
- Break-In CW: Semi-Automatic
- CW Sidetone
- Audio Frequency Response: 500-2500 Hz Nominal
- AALC: 12 db Compression
- AGC Figure of Merit: 60 db minimum
- Crystal Calibrator: Provides 25 kHz Calibration Signals
- Optional Accessories: MR-300 Mobile Installation Kit; HA-60 Blower Fan Kit, works on AC or 12VDC





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QST

DECEMBER 1973

VOLUME LVII NUMBER 12

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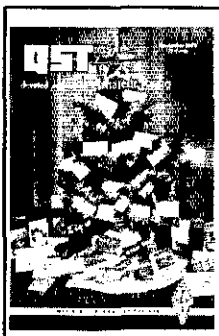

OUR COVER

The ARRL Christmas tree wishes Seasons Greetings to all. See page 29 for greetings from staff.

— CONTENTS —

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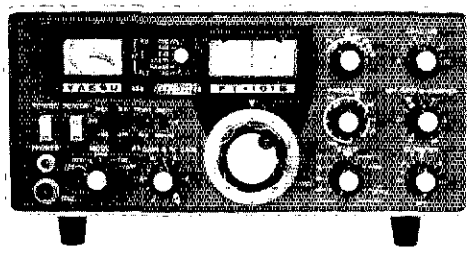
IT'S HERE NOW The NEW FT101B

With These Added Features and
NO INCREASE IN PRICE



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1. VFO (warning lite) on or off
2. Clarifier (warning lite) on or off
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4. 8 pole filter for better rejection
5. Sidetone output
6. Antitrip input

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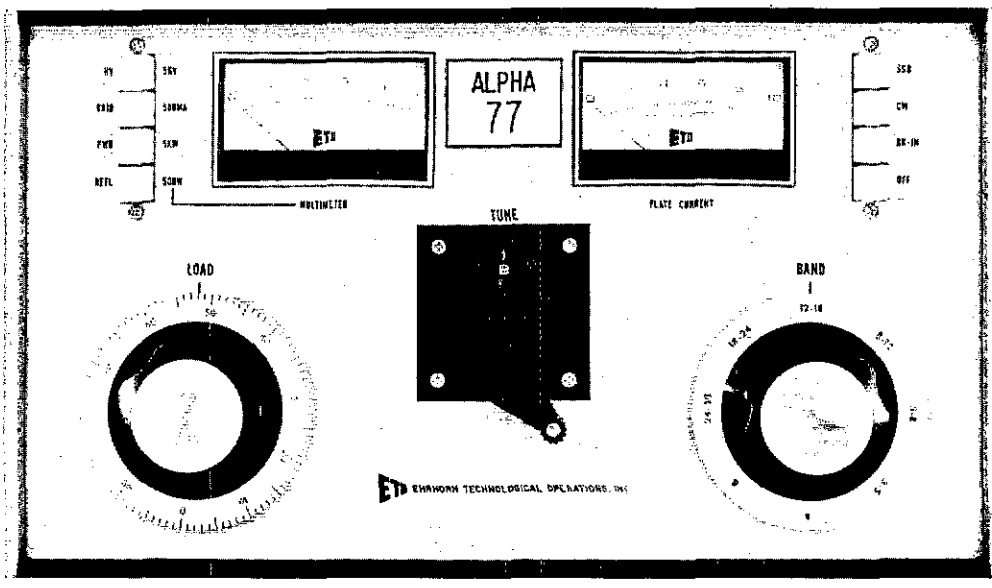
"OPERATING ON-THE-AIR WITH THE **ALPHA 77** IS A PURE PLEASURE"



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(QST — March 1973)

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. ARRL Field Organization station appointments are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS or V.H.F. PAM. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist

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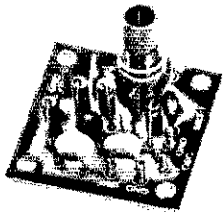
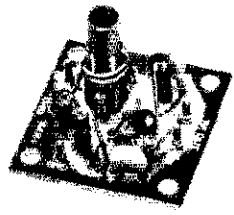


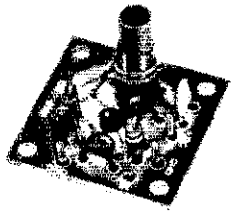
1. MXX-1 TRANSISTOR RF MIXER

A single tuned circuit intended for signal conversion in the 3 to 170 MHz range. Harmonics of the OX oscillator are used for injection in the 60 to 170 MHz range. Lo Kit 3 to 20 MHz, Hi Kit 20 to 170 MHz (Specify when ordering) **$3.50**



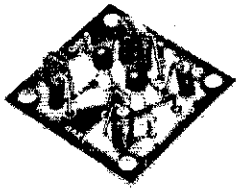
2. SAX-1 TRANSISTOR RF AMP

A small signal amplifier to drive MXX-1 mixer. Single tuned input and link output. Lo Kit 3 to 20 MHz, Hi Kit 20 to 170 MHz (Specify when ordering) **$3.50**



3. PAX-1 TRANSISTOR RF POWER AMP

A single tuned output amplifier designed to follow the OX oscillator. Outputs up to 200 mw, depending on the frequency and voltage. Amplifier can be amplitude modulated. Frequency 3,000 to 30,000 KHz. **$3.75**



4. BAX-1 BROADBAND AMP

General purpose unit which may be used as a tuned or untuned amplifier in RF and audio applications 20 Hz to 150 MHz. Provides 6 to 30 db gain. Ideal for SWL, Experimenter or Amateur **$3.75**

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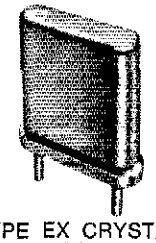

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the 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 practically every worth-while amateur in the nation and has a history of glorious 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.

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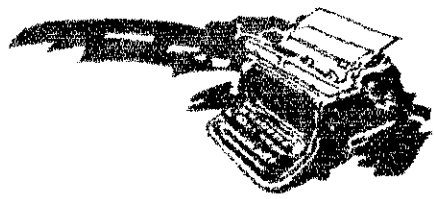
"It Seems to Us..."



THE 220 DECISION

PERHAPS IT IS a normal procedure in the current federal bureaucracy. But we can't help noticing that in proposing a new Class E CB service at 224 MHz, the Federal Communications Commission is pretty much ignoring the results of an extensive professional study of CB it has already bought and paid for.

The analysis, prepared for FCC by Advanced Technology Systems a couple of years ago under government contract, among other things shows that 70% of CBers find the present service quite satisfactory, and 20% more say it would be adequate if rules were enforced. Since the ATS study recommended a number of steps to curb misuse, it seems that if the Commission had followed the advice it sought – and paid for with public funds – 90% of its CB licensees would be perfectly content.

Where, then, is this need "of the general public for improved radiocommunication services not now effectively provided by the Class D CRS," this "pent-up demand"?

It hasn't really been shown to exist, of course; there is only pure speculation by industry. The petition triggering FCC's proposal came from the Electronics Industries Association, not from the public; and much of the comment in support (a weak minority at that) is from the CB manufacturing industry, not primarily from users or would-be users. In these days of consumerism, it isn't hard to demonstrate that the interests of the manufacturers and of the general public do not always coincide.

EIA was quoted by the Commission as having predicted a potential of ten million (10,000,000) Class E licensees. FCC's notice requested more information on what kind of calculations produced this figure. EIA's response furnishes nothing but guesses – "projections . . . expected . . . should be . . . experience indicates . . . we feel confident in predicting . . " But at least the manufacturers apparently realized the ten-million figure was preposterous and quickly changed their tune. The current EIA comment says there "should be" a growth of 250,000 per year, and "it is not unlikely" that in ten years there will be three to four million. Now, how they get 4,000,000 from ten times 250,000 is arithmetic much too complicated for us, especially when it obviously assumes 100% renewal for ten years. Further, in 1972 EIA predicted Class E would be in one out of every 10 new cars sold. Perhaps with more morning-after second thoughts, today they predict one out of 15. Are Commissioners really persuaded by this kind of wildly changing speculation? Especially when FCC records show continuing *decreases* in CB licensees the past three years – 886,951 to 868,013 to 848,029 to 834,012.*

The ATS survey said (emphasis ours): "No conclusions have been drawn relative to the need for more frequencies or a movement of the allocation for this service to a different place in the spectrum. The reason for this is a conviction that the service has problems for which ***corrective action is necessary and can be successful without regard to the availability of additional channels.***"

Once more, FCC appears to have disregarded the advice it sought and paid for.

An examination of the comments in the FCC Docket 19759 file shows perhaps 40 to 1 in opposition to the 220 CB proposal. Such public opinion is certainly not infallible, nor does a "think tank" like ATS have all the answers. But it will be most interesting – and highly significant – whether the Commission's decision will be influenced by the results of a contracted professional study of the specific subject, along with an almost-unanimous expression of the public it serves; or whether it will be influenced more by purely economic considerations as seems to be so typical of the current administration.

*Oh, those are just figures, the manufacturers tell us; CB is really growing fast — the newcomers just don't bother to get a license.

League Lines . . .

The ARRL Foundation is now a reality, and is awaiting IRS approval of its status as a recipient of contributions deductible from income tax. As many as four of the nine Foundation Board members can be other than League directors; your suggestions are solicited, for consideration by the ARRL Board at its January meeting which will choose Foundation directors. A nomination form for "industry" representatives is available from Hq. on request, as is a copy of the Foundation's articles and by-laws.

Of nine letters in the "readers comment" section of "Electronics," an industry publication if there ever was one, seven take the editor to task for supporting Class E CB. In one of the two remaining, the president of E. F. Johnson Co. says ARRL's opposition to 220 CB "lacks the support of many, if not most, of the active amateur operators." The resultant guffaws are exceeded only by our concern that some people may actually believe such a ludicrous statement.

We've mentioned from time to time the probability of another full-scale World Administrative Radio Conference being held -- the ITU has now pretty firmly established the date of that conference as 1979. The United States, with League participation, has already commenced extensive preparation for that conference.

FCC wants to write specific rules for future Oscars in the Amateur Satellite Service, rather than grant a waiver every couple of years or so. Comments are invited on the general subject, plus operating privileges; technical standards; telecommand requirements; emissions; station identification and log requirements; etc. Deadline is January 7, but ARRL will likely request postponement so position can be formulated at annual meeting later in month.

December reminders: College Bowl contest, December 1-2; ARRL 10-meter contest, 15-16; and Straight Key Night on the 31st for a safe and sane New Year's Eve. "Op Events" last month and this for details.

There is a real logjam in routine license application paperwork at FCC, with processing times of 8 to 10 weeks being reported to us by amateurs. For renewals, however, keep in mind that if your application was "timely filed" you may continue operating past expiration. It's wise to note in your logbook the date on which your renewal was mailed.

In commemoration of the 50th anniversary of the first transatlantics, French amateurs are optionally signing the prefix "HW" during late November and early December.

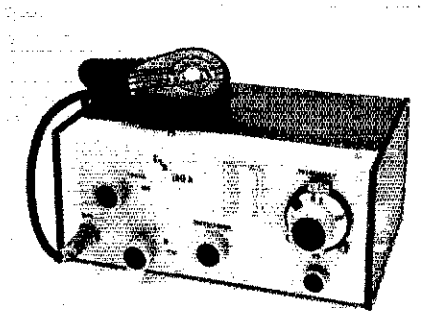
The holiday season usually is accompanied by an increase in third party traffic on the ham bands, especially overseas phone patches. Check the list of countries on page 95, November QST, to make sure your patches are legal. Special arrangements covering just the holidays sometimes are made with other countries, and are announced by special W1AW bulletin.

A most interesting book that gets less circulation than it deserves is the ARRL Annual Reports, about 100 pages crammed with information about both the fraternal and business sides of the League as an organization. Copies of the latest edition, covering 1972, are still available for $1 per copy.

FCC has a new version of application Form 610 -- more paper, more instructions, but not really more complicated. Provision is made for information on control stations and auxiliary links. Though just seeing the light of day, the form is dated April 1973, illustrating budgetary red tape problems facing the Commission staff.

Quote-of-the-Month, from a CBer with a citation: "We are not denying that some of the things we do on CB aren't illegal according to FCC regulations, but we deny we've broken any legal laws."

A Solid-State Transceiver for 160 Meters



BY TONY DORBUCK,* WIYNC

THIS ssb transceiver is suitable for QRP operation from batteries or as a main frame for fixed-station use. Its circuitry is simple enough to permit easy duplication (or substitution of components where necessary) by proficient builders with only limited experience in solid-state design.

Some 160 Notes

Technically speaking, 160 meters is interesting since it is the only amateur band in the mf range. Phone operation is similar to that encountered on the hf bands but the use of cw is somewhat different. Split-frequency operation is common and one should avoid transmitting within the DX "window" from 1825 to 1830 kHz when the band is open. While cw operation is possible with a transceiver, the above precaution should be noted. Because of the LORAN (Long Range Navigation) service, the band is split up according to geographical area and one should observe the frequency range and power limit for his region. (See recent editions of *The Radio Amateur's License Manual.*)

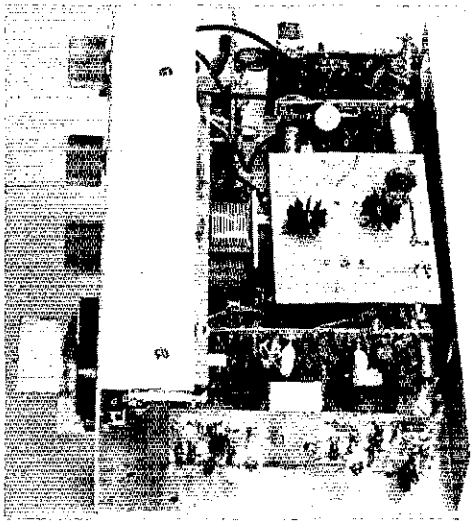
LORAN, proximity to the broadcast band, QRN, and interference from TV sets often imposes severe requirements on receiving devices for this band. While little can be done with sky-wave signals, experimentation with various antenna systems can reduce local interference to a great extent. Proximity and orientation of the antenna to the interfering source are the prime factors here. Because of latter consideration, separate transmitting and receiving antennas may be necessary. Hf-band dipoles, even though they may be electrically short on 160 meters, can still make excellent receiving antennas if a balancing network is used. The balancing transformer (T1) shown in Fig. 1 can be used for both transmitting and receiving thus reducing ground-loop currents. A simple loading coil in one side of the feed line can be used to tune out the antenna capacitive reactance.

Adequate front-end selectivity is also necessary to assure that unwanted rf energy is rejected *before* it reaches the active elements in the receiving section of the transceiver. The preselector shown in Fig. 1 may be built from readily available parts. Some experimentation with the number of turns on L1 in receive-only applications may be necessary. Use the minimum number of turns that give sufficient sensitivity without signs of overloading. This preselector could also be used with existing receivers with inadequate front-end selectivity on 160.[1]

Circuit Details

The circuit diagram of the transceiver is shown in Fig. 1 and Figs. 3 through 8 incl. The block diagram and switching logic of the transceiver are shown in Fig. 2. This arrangement eliminates the need for relays and provides excellent isolation around the 9-MHz filter board. The full capabilities of a good receiving filter may be reduced considerably by undesirable stray paths. Rf energy

*Editorial Assistant, *QST*.



"Pilot Model 1" built by Bob Wright, WA7ISP.

[1] Dell, H & K, *QST* for March, 1973.

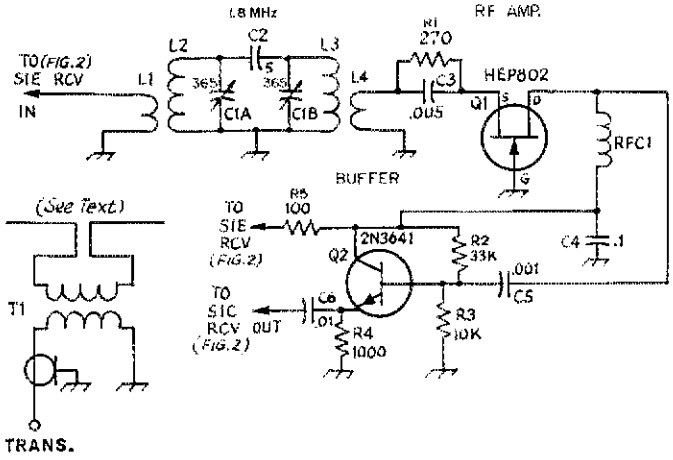
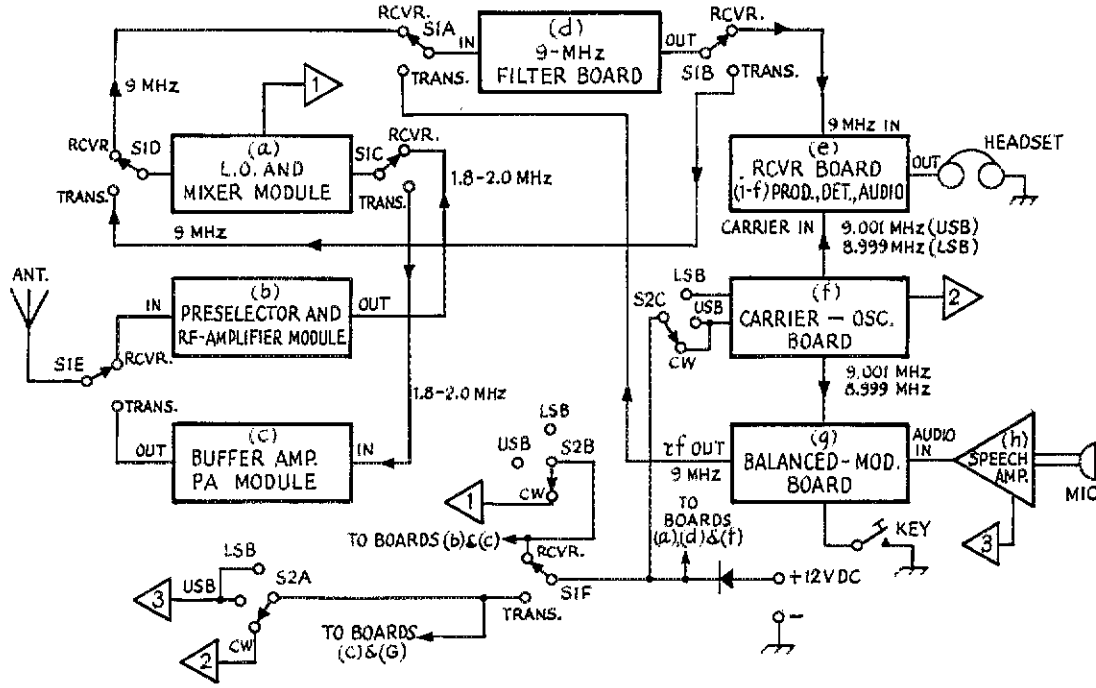


Fig. 1 — Schematic diagram of the rf amplifier and preselector. In this and succeeding diagrams, component designations not mentioned are for text references only. Unless otherwise noted, resistors are 1/4- to 1/2-watt composition and capacitors are disk ceramic.

C1 — Air variable, 365 pF per section (J.W. Miller 2112 or equiv.).
L1, L4 — 2 turns of plastic-coated wire over cold ends of L2 and L3 respectively.
L2, L3 — Modified Ferri-Tenna Coil (Radio Shack No. 270-1430). Remove coupling coil and all but 35 turns of fine wire on core (see text).
RFC1 — 2.5 mH rf choke pc-board mounting type (Millen J302-2500).
T1 — 40 turns over Amidon T-68-3 toroid (gray core) of bifilar-wound No. 26 enamel wire.

rejected by the filter goes around it through the unwanted paths. In the receive position, signals from 1.8 to 2 MHz are mixed with the LO (10.8 to 11 MHz) to give a 9-MHz i-f. Greater bandspread can be achieved by using a smaller value for C10 and increasing L5 or C11. This would reduce the band coverage, however. In the transmit position, the same mixer is used but rf energy from the balanced modulator and filter board at 9-MHz is converted to the 1.8-MHz band.

Fig. 2 — Block diagram and switching logic of the transceiver.



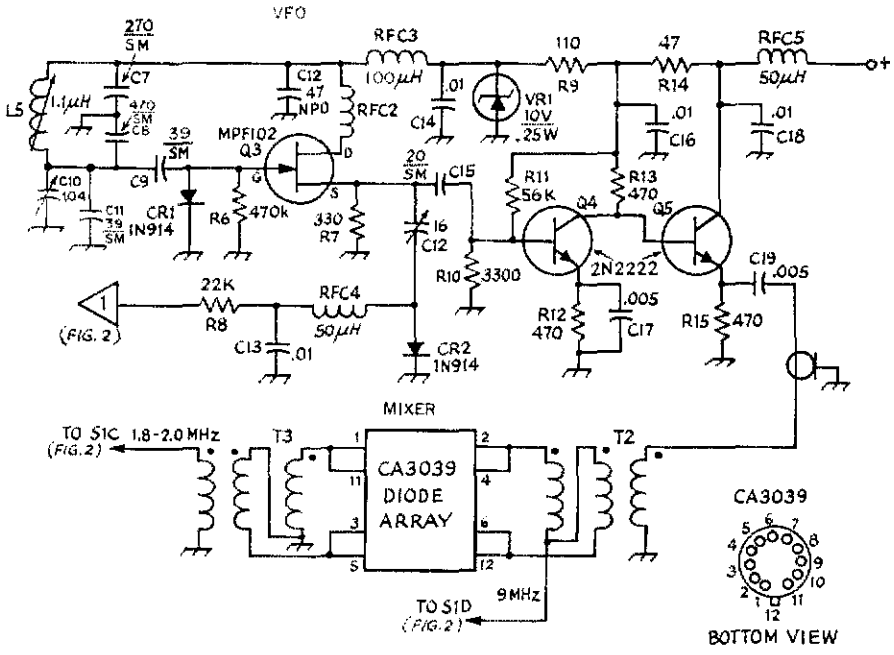


Fig. 3 — Schematic diagram of LO and mixer module. If greater bandspread is desired, a smaller value capacitor could be substituted for C10 with C11 increased by an appropriate amount to set the low-frequency end of the tuning range to 10.8 MHz.

C10 — Air variable, 104 pF maximum (J.W. Miller 2101 or equiv.).

L5 — 1.1-μH slug tuned (Millen 69054-0.91 or equiv.).

RFC2 — Three Amidon ferrite beads at drain terminal of Q3. Install on 1/2-inch length of No. 24 bare wire.

RFC3 RFC4, RFC5 — Miniature 50-μH choke (Millen Co. J300-50).

T2, T3 — 25 turns No. 28 (trifilar wound) on Amidon T-50-3 toroid core.

Because of the relationship between the LO and the i-f, a sideband inversion occurs. This means that the carrier oscillator crystals will be opposite that usually marked on the filter package. Cw operation is in the usb mode and both carrier-oscillator and VFO offset is used. The carrier-oscillator offset pulls the crystal frequency into the passband of the filter slightly, while the VFO offset can be adjusted for the desired tone on receiving. Keying is accomplished by unbalancing the 1496 IC balanced modulator. Waveshape is determined by the time constant of R62, and C59 in Fig. 7.

The low-pass filter shown in Fig. 8 is used to eliminate unwanted rf energy (LO, carrier oscillator, and other products) above 2 MHz before

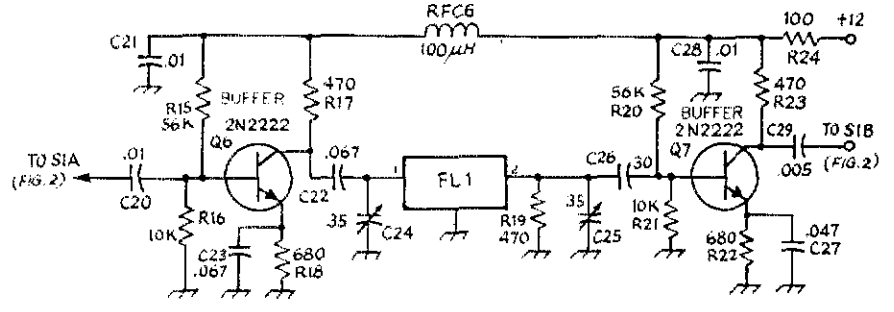
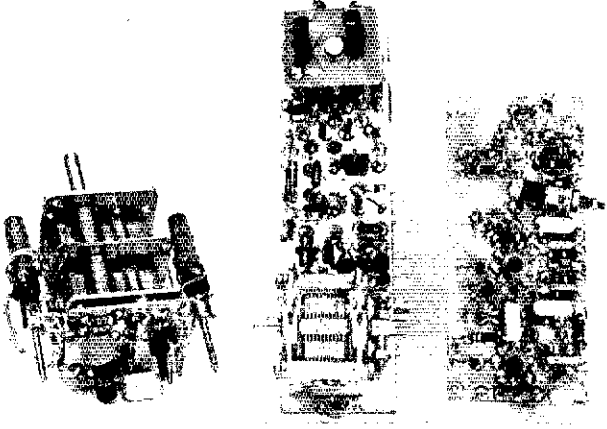


Fig. 4 — The 9-MHz filter board. Physical layout should keep input and output leads separated.

C22, C25 — 3- to 35-pF mica compression trimmer.

RFC6 — Miniature 100-μH choke (Millen Co. J30-100).

FL1 — 9-MHz crystal filter, 2.1-kHz bandwidth (KVG XF-9B Spectrum International, Box 87, Topsfield, MA 01983).



Preselector module, LO and mixer module, and receiver boards. Note method of mounting L2 and L3 on C1 body.

going to the buffer transistor Q11. While various transistors are suitable for cw service in the hf range, many will not perform well as linear power amplifiers. The variation in transistor current gain over a large dynamic range is too great. This results in distortion or imposes severe biasing problems. Generally speaking, uhf types are the best ones to use. The amplifier used with the transceiver is capable of approximately one-watt output with good IMD characteristics.

Construction

A modular-type layout was used that allows the builder to pretest various sections of the transceiver *before* installation in the cabinet. Single-sided pc board or Vectorbord construction should be avoided since unwanted capacitive and inductive coupling may cause spurious oscillations. Use double-sided pc board, or as in the case of the unit shown, isolated-pad construction.[2] The latter is highly recommended. The individual boards are then mounted in the cabinet with small "L" brackets or in the case of the VFO module, with screws.

Where interconnecting shielded cables are used (such as the connections on S1 and other rf leads), small coaxial cable is ideal. RG-174/U was used in the unit shown and it is good practice to tie the ground leads to one point where two or more cables come together. An example would be the switch connections at S1. Regular hook-up wire can be used for the power-supply leads going to each board.

While the general layout should not be critical, the one shown in the photograph is suggested. The cabinet is a Ten-Tec MW-10 and the dial assembly can be obtained from Allied/Radio Shack. The rotary switches for S1 and S2 are surplus miniature types with glass-epoxy insulation. The size of the various components available will determine the final layout, but care should be taken to keep all leads as short as possible.

It is a good idea to start with the receiver portion of the transceiver (the rf amplifier and preselector is the simplest module to build). Carefully unwind (and save) the wire from the two ferrite-loop antenna coils.

Wind a one-layer coil (35 turns) back on each form and solder it in place. Paint each coil with *Q* dope to keep the turns from unwinding. Mount the completed coils (L2 and L3) using heavy wire leads on the 365-pF capacitor as shown in the photograph. L1 and L4 consist of 2 turns of hook up wire wound on the cold end of L2 and L3 respectively. Next, lay out the circuit board for the rf amplifier, making it small enough to mount on the back of the capacitor with spacers and screws. Layout for this board (and the remaining ones) will

[2] Stahler, "Isolated-Pad Circuit-Board Construction," *QST*, May, 1973.

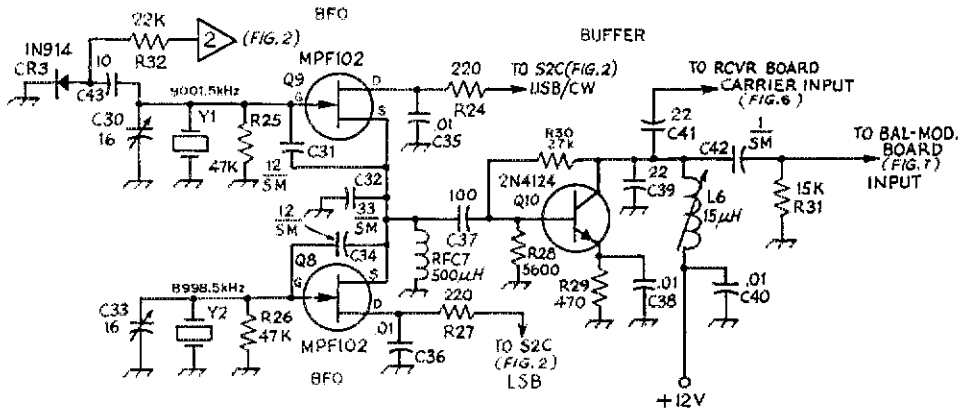


Fig. 5 — Carrier oscillator board.
C30, C33 — Miniature pc-mount air variable (Johnson 189-506-5, Allied Electronics 828-1219).
L6 — 15 μH nominal (Miller 4506 or equiv.).
RFC7 — 500-μH rf choke (Millen J30-500).
Y1, Y2 — KVG matching crystals for FL1.

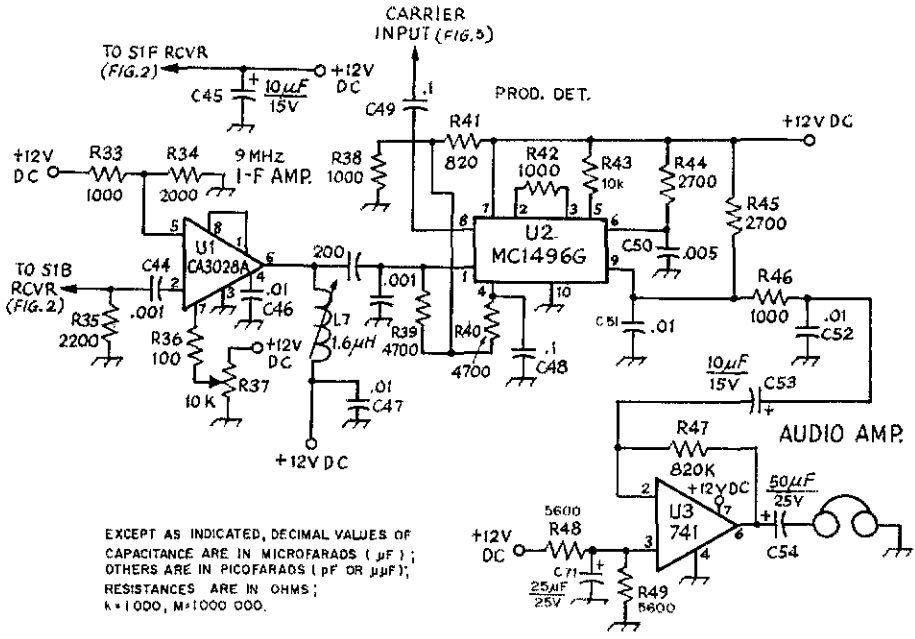


Fig. 6 — Receiver board. This includes the i-f amplifier, product detector, and audio amplifier. Audio power is sufficient for high-impedance earphones.

L7 — Slug-tuned inductor, 1.6 µH nominal, 13 turns No. 26 enam. on 1/4-inch form.

be successful if the following rules are observed. First, keep all component leads as short as possible (especially IC leads) and second, lay out the stages in a straight line as shown in the photograph. Also assure that input and output leads are kept as far away from each other as is practical. If the isolated-pad construction technique is used, a drill press (bench style) is handy. However, either a hand-held electric drill or a crank-type hand drill may be used. Once the preselector module is completed, perform the alignment procedure before going on to the next board. Complete and test the remaining boards before mounting them permanently in the cabinet.

Alignment

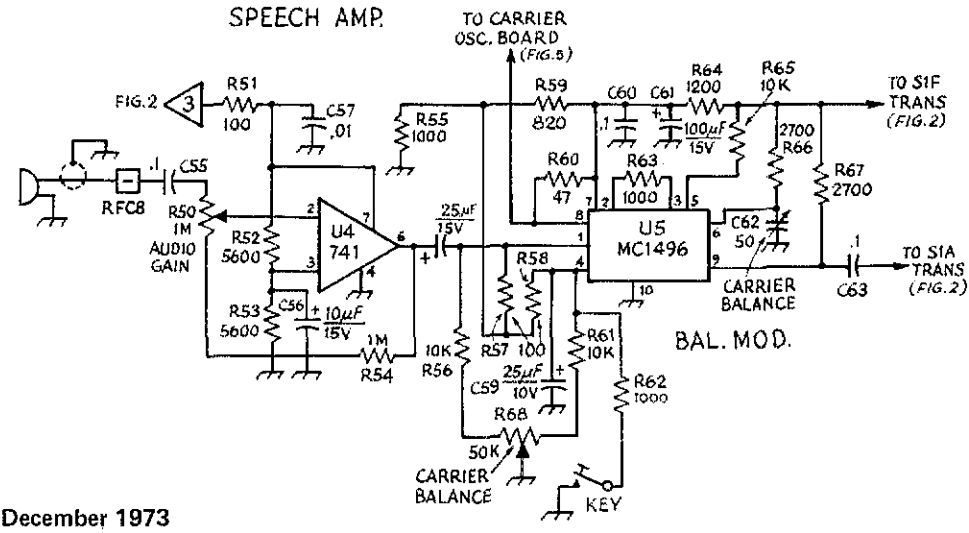
While the transceiver could be tested after it is completed, the procedure outlined here will assure each module is working before the next one is mounted in the cabinet. Necessary test equipment includes a signal source and receiver covering 1.8 to 2.0 MHz, and 9 to 11 MHz. The receiver should be capable of receiving ssb signals. Other suggested equipment would be a VTVM, a monitor scope

Fig. 7 — Schematic diagram of the speech amplifier and the balanced modulator boards.

C62 — Mica compression trimmer, 50 pF.

R52, R68 — Control, pc-mount'ng type.

RFC8 — 3 ferrite beads over microphone-input lead.



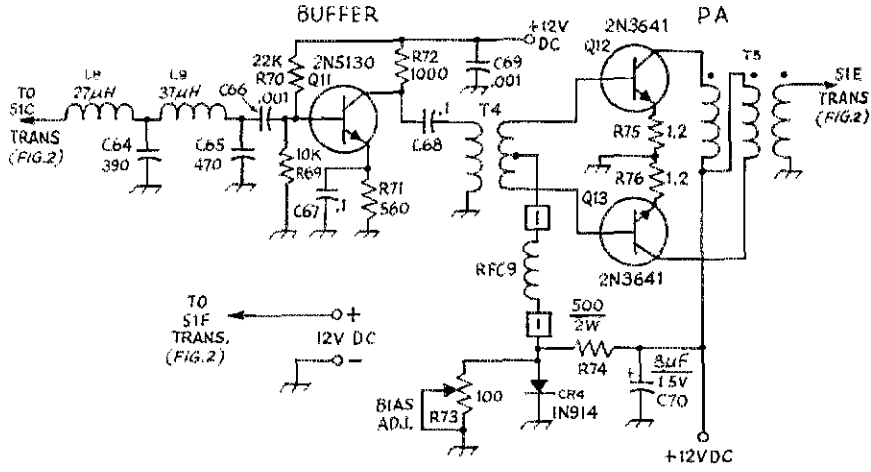


Fig. 8 — Schematic diagram of buffer and PA. If a broad-band amplifier or antenna circuit is to follow T5, a low-pass filter may be necessary to reduce unwanted harmonic energy.

L7 — 27 μH, 66 turns of No. 30 enam. wire on Amidon T-50-3 (gray) toroid core.

L8 — 37 μH, 76 turns No. 30 enam. on T-50-3 core.

R73 — Control, pc-mounting type.

RFC9 — 2.7 μH minimum. Slip a ferrite bead over each end of a small rf choke (Millen 34300).

T4 — Stack two Amidon Husky (7 mm) beads and wind a 5-turn primary and a 3 turn secondary through both cores. Use No. 26 enam. wire. Make a second transformer similar to the first one. Parallel the primaries, and series connect the secondaries observing the polarities shown on the diagram.

T5 — 24 turns No. 26 enam. wire (trifilar wound) on Amidon T-68-3 core.

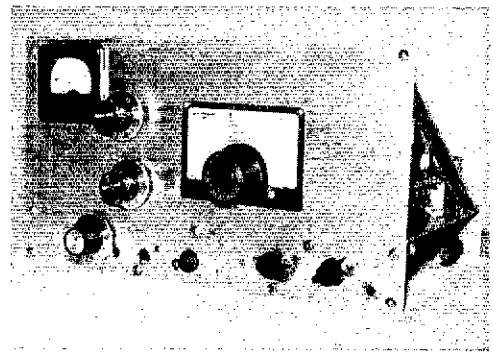
which can be used with the receiver to check modulation, and a frequency counter.

The preselector module should be aligned first. Connect a signal source to the general-coverage receiver and tune in the signal. Next, connect the preselector between the generator and the receiver and adjust the slugs until the signals peak. For correct alignment, C1 should be fully meshed at the low end (1.8 MHz) of the band. The VFO should be adjusted by setting its range for 10.8 to 11 MHz as indicated on either a general-coverage receiver or a frequency counter. The preselector and LO/mixer modules may be mounted inside the cabinet and interconnected. See blocks (a) and (b) in Fig. 2. The external receiver should be connected to the output of T2. When power is applied to the transceiver and S1 is set for RCV, signals and noise should be heard at 9 MHz as the VFO and preselector are tuned. The 9-MHz filter board should be installed and the receiver connection moved from T2 to the output of the filter. See block (d) in Fig. 2. Peak C24 and C25 for maximum signal. The carrier-oscillator board may be checked by listening with the general-coverage receiver to the two crystal frequencies (8,999 and 9,001). Mount the carrier-oscillator and receiver boards, connect a headphone set and adjust L7 for maximum receiver sensitivity. This completes the alignment of the receiver. See block (c) in Fig. 2 for details.

Refer to block (h) in Fig. 2 and mount the speech amplifier. Install the appropriate power, input and output connections. Couple a headset to the output of this circuit through a 0.5-μF capacitor and speak into the microphone. Speech should be heard. Install and connect the balanced-modulator board. Refer to block (g) in Fig. 2. Ssb signals should be detected at the output terminal of T3. Adjust R68 and C62 for minimum carrier. Interconnect the buffer/PA modules and connect a dummy load (with an output indicator) to the antenna jack. A small pilot light (No. 47) will suffice if the PA shown in Fig. 8 is used. R73 should be set for minimum collector current. A short whistle into the microphone should produce an output signal. Clear-sounding ssb signals should be heard when listening to the general-coverage receiver. This completes the ssb alignment.

Place a jumper from either the USB or LSB position of S2A to the CW position of S2A. Set the general-coverage receiver to the USB position. Turn the transceiver to the CW position and tune until a readable ssb signal is heard. Key the transceiver and, depending upon the settings of C12 and C30, a tone should be heard. C30 will determine the amount of output. Adjust C12 until the desired sidetone is obtained. This will require retuning the receiver for readable usb after each adjustment. When the adjustment is correct, a proper-sounding ssb signal can be heard in the CW position and the desired note will also be heard when the transmitter is keyed. Remove the jumper from S2A. This completes alignment of the transceiver. QST

How To Build An SSB Transmitter



Or 50 Watts on 15 Meters

BY HOWARD J. STARK,* WA4MTH

HERE IS A construction article which should be of interest to the relatively inexperienced ham. If you are not sure just how your "store-bought" rig works, then when completed, this project should supply that knowledge along with an ssb transmitter as well. Furthermore, the experience gained will be helpful in troubleshooting manufactured gear, should it stop working, and may save you a trip to the repair shop.

The unit is basically a one-band transmitter, with VFO control, for ssb operation. Used (or surplus) components were incorporated whenever possible in order to keep the cost low. This should be approximately twenty to thirty dollars exclusive of the power supply. Power requirements are: 650 to 700 V for the plate supply (150 to 200 mA), 150 V for the screen (50-75 mA), 100 V for the bias supply (10 to 20 mA), and 6.3 V ac for the filaments (3 to 5 A). The author constructed a power supply using an old TV transformer. While it's a fine idea to use surplus or junk-box components, one should be sure that they are good. Tubes, capacitors, resistors and other parts should be tested (even if only simple test instruments are available) *before* being placed in the circuit.

The block diagram is shown in Fig. 1 and gives a general plan or format for proceeding to the circuit diagram. The single-sideband signal may start with audio such as voice or a two-tone test signal. The audio and an rf carrier are passed to a diode balanced modulator.[1] Next, the balanced modulator removes most of the carrier. The signal that leaves the balanced modulator is now a double-sideband one. The next step is to remove one of the sidebands. This is done by means of the 455-kHz filter. On the 15-meter band the accepted practice is to transmit the upper sideband. If the carrier-oscillator frequency is below that of the band-pass frequencies of the filter, the filter will pass the upper sideband only. The carrier-oscillator frequency is 453 kHz and the filter band-pass center frequency is 455 kHz, so we get upper-sideband output at 455 kHz. The next step is to raise the level of the signal voltage from the filter because there is a fair amount of loss (or attenuation) in going through it. This is done easily by using a another stage of amplification, hence the intermediate frequency (i-f) block in our diagram.

In order to have frequency mobility on 15 meters (21,250 to 21,450 MHz), a VFO and mixer are necessary. The next block on our diagram is the first mixer. Here, the VFO signal is fed into the first mixer stage, along with the ssb signal (455 kHz), where they add. The VFO is tunable from 2.545 to 2.995 MHz. Thus the output range of the first mixer is from 3.0 to 3.450 MHz.

The next two blocks are the second mixer and the 9.0-MHz crystal oscillator and doubler. This latter stage doubles the output of a 9.0-MHz crystal to 18 MHz. The 18-MHz signal is fed into the second mixer together with the tunable ssb signal from 3.0 to 3.450 MHz. This mixer adds and we come out with an ssb signal tunable from 21.0 to 21.45 MHz. The final two blocks in our diagram represent amplifiers. The driver stage further raises the level of the 21-MHz ssb signal to one that will drive the 50-watt, Class-B linear amplifier. The reader should now refer to the schematic diagram shown in Fig. 2 and pick out the circuits that correspond to each block.

Construction

The rig is constructed on a homemade U-shaped chassis 2 × 8 × 13 inches (5.08 × 20.3 × 33 cm). The front panel is 7 inches (17.8 cm) high by 13 inches (33 cm) wide. No. 14 soft aluminum was used, although a harder alloy would perhaps have been better. The panel is bolted to the chassis and braced at each end with two flat braces. These are fitted and bolted to provide needed stiffness. The braces are made from 1/2-inch (1.27 cm) wide No. 8 aluminum stock. The homemade chassis saves a

* 9231 Caribbean Blvd., Miami, FL 33157.

[1] See recent editions of *Single Sideband for the Radio Amateur.*

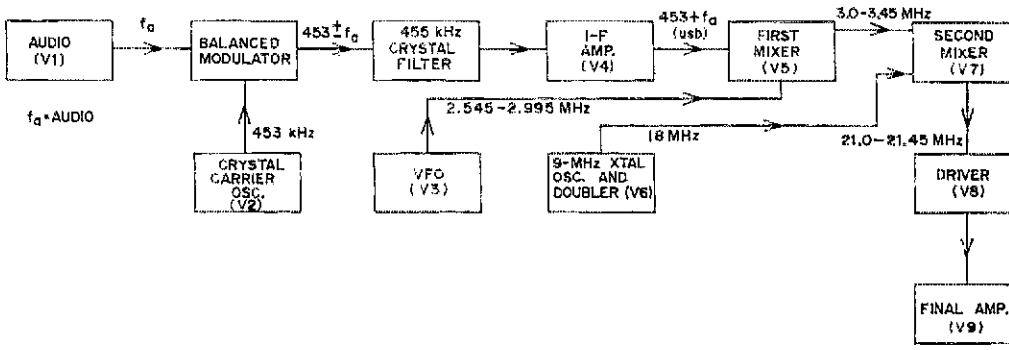


Fig. 1 — Block diagram of the transmitter.

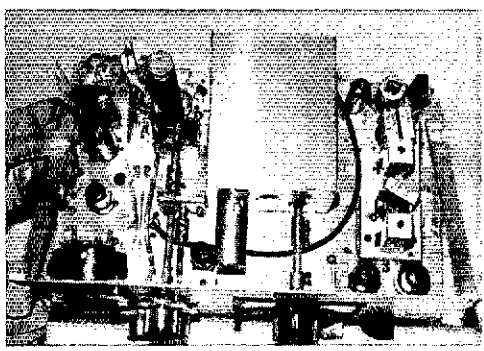
couple of dollars, so have a good supply of nuts and machine screws on hand. A 1 × 2 × 3-inch U-shaped chassis (2.5 × 5.1 × 7.6 cm) made from No. 14 aluminum stock is used for the crystal filter. Two octal sockets for the three FT-241 crystals) are mounted on it along with the two 455-kHz i-f transformers. A 3 × 4 × 5-inch box (7.6 × 10.2 × 12.7 cm) is used to house the VFO and may be purchased ready-made. From the standpoint of stability, it is a good idea to mount the VFO off the main chassis, using plastic or rubber spacers for mounts. VFO components should be mounted on terminal strips and it is important to keep the leads short. Relatively heavy wire should be used (No. 18 or larger).

The two band-setting capacitors (C1 and C2) are mounted on the rear wall of the VFO box. The main tuning capacitor (C3) was taken from a Japanese broadcast radio and was originally 375 pF. All but eight of the rotor plates were removed so that the VFO would tune from 2.5 to 3 MHz. The dial arrangement can be of the builder's choice. A National Radio Velvet Vernier (5 to 1 drive) was used in the author's unit.

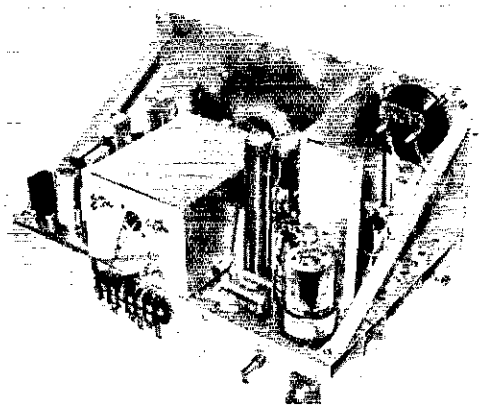
Now to constructing the crystal filter and balanced modulator. Some reading for background might be in order on the design of lattice filters using surplus crystals.[2] While on the subject of crystals, four will be needed for the filter and carrier oscillator. There are three FT-241 channel 45 crystals (453.7 kHz) and one channel 46 crystal (455.6 kHz).[3] These can be obtained from JAN Crystals, as well as other suppliers. You will notice that the difference in frequency between channel 45 and 46 is 1.9 kHz and this is approximately the passband width for our ssb signal. You can test these crystals for relative activity by listening for the second or third harmonic in a general-coverage communications receiver. The input 455-kHz i-f transformer (T2) is modified by removing all of the wire from the top end of the hollow core. Now make a bifilar winding in the area previously occupied by the coil just removed. Using two parallel strands of the wire just removed, make a jumbled winding of 25 turns (handle the two strands as if they were one strand and put 25 turns on the coil form). Solder the end of one 25-turn wire winding to the start of the other 25-turn wire and ground this junction to the can or metal case of the transformer. The author drilled a small hole through the plastic base of the transformer and put a wire up through it to bring the ground connection out of the can. In any event, find a way to bring this junction to chassis ground. The other two ends of the coil are soldered to the two lugs on the base of the transformer (where the removed coil was originally connected). This provides the primary or input to the crystal filter. The two diodes (CR1, CR2) in the the balanced modulator should be matched. This is done by measuring the forward conduction with a VOM and selecting two with nearly the same resistance readings. It's the small difference (among other things) in resistance which accounts for some of the carrier in the sideband, so measure the diodes with some care.

[2] Galeski, "The 'Imp' — a 3-Tube Filter Rig," *QST* for May, 1960, pages 11 to 15.

[3] [EDITOR'S NOTE: If these crystals are unavailable, others in the same frequency range may be substituted if the spacing is approximately 1.9 kHz. For example, channels 47 and 48 could be used.]



General layout of the transmitter. The 455-kHz filter can be seen in the right-hand portion of the photograph, next to the VFO box. C6 and C7 can be seen to the left of the VFO. Lucite or wooden-shaft extensions are used to accommodate the knobs on the front panel.



Rear view of the transmitter. Note the shield compartment and panel braces.

This method of diode selection will be found to be satisfactory. Wiring of the crystal filter and balanced modulator shouldn't give any problems. Use two terminal strips back to back on the input side of the filter assembly and solder the diodes to them.

During construction of the transmitter, the author ran out of 2.5-mH rf chokes and decided to try winding some himself. While somewhat bulky, they worked quite well. A 1/4-inch (0.635 cm) polystyrene rod, 1-1/2 inches (3.81 cm) long was used as a form. Fine wire (such as that which comes with a relay solenoid) was wound in layers until the thickness was 1/16 inch (.159 cm). This gave a dc resistance approximately equal to that of a low-current 2.5-mH choke. Do not use them where high current values (125 mA) are required.

The choke for the plate-tank circuit (RFC1) was also homemade and consisted of a layer of No. 28 enameled wire 4-1/4 inches (10.8 cm) long on a form 3/4 inch (1.91 cm) in diameter and 5 inches (12.7 cm) long. Wooden dowel stock was used. It was coated first with clear lacquer. Forms for the second-mixer (L4) and driver-output (L5) circuits are made from 1/2-inch (1.27 cm) polystyrene rod 1-1/2 inches (3.81 cm) long. One end is drilled and tapped for screw mounting. The neutralizing capacitor, C8, consists of two or three turns of No. 22 vinyl-covered wire on the cold end of L5. L4 consists of 9 turns and L5 consists of 11 turns of No. 18 enameled wire, close wound. When all the sockets are mounted, wire the filament leads using shielded wire, then test all sockets to be sure you have filament voltages at each. This completes the general description of construction. Study the photographs for further details in the layout plan.

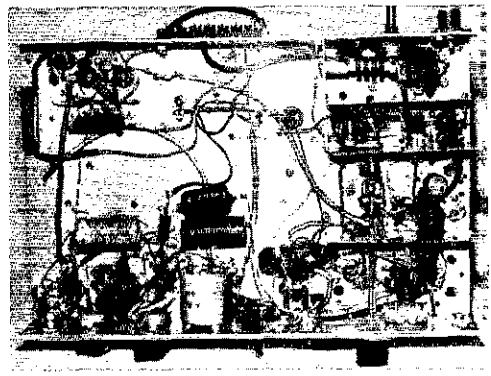
Initial Testing and Final Alignment

While the transmitter could be completely finished before any testing is done, it is advisable to check out each stage as the construction progresses. Recommended test equipment includes: a general-coverage receiver, (0.54 to 22 MHz) preferably with product detector, VTVM or VOM, a grid-dip oscillator, a 25-watt 117-volt incandescent lamp, and a two-tone test generator.

The VFO (V3) can be aligned first. Using the general-coverage receiver, find a combination of C1, C2 and C3 which tunes from 2.545 to 2.995 MHz. The speech amplifier can be checked next. The output transformer (T1) was from a surplus ARC-5 receiver where it was used in the audio output stage. Any plate-to-line audio transformer having an impedance step-down ratio from 20,000 ohms to 500 or 600 ohms could be substituted. The transformer is mounted below the chassis, up front near the speech-amplifier tube (V1). After completing the wiring you can test the stage by applying B plus and connecting a pair of ear phones through a .01-μF capacitor to the *secondary* of output transformer.

The carrier-oscillator part of the sideband generator is a simple oscillator and cathode follower using a 12AU7A (V2). A 500-ohm carrier-balance control (R1) is panel-mounted below the chassis. The lead from the cathode follower (pin 7 of V2) is a short one to the wiper arm of R1, so shielding the lead is unnecessary. A test for operation of the 453-kHz oscillator is to listen for the harmonics at 906 or 1259 kHz. They should be quite loud.

The 455-kHz ssb i-f amplifier uses a 6BA6 tube (V4) as an amplifier to raise the voltage of the single sideband signal after it leaves the filter. The signal is then mixed with the VFO output. Using shielded leads here is desirable. At this time check



Bottom view showing shield compartments. Note shaft extension for C5 to front panel.

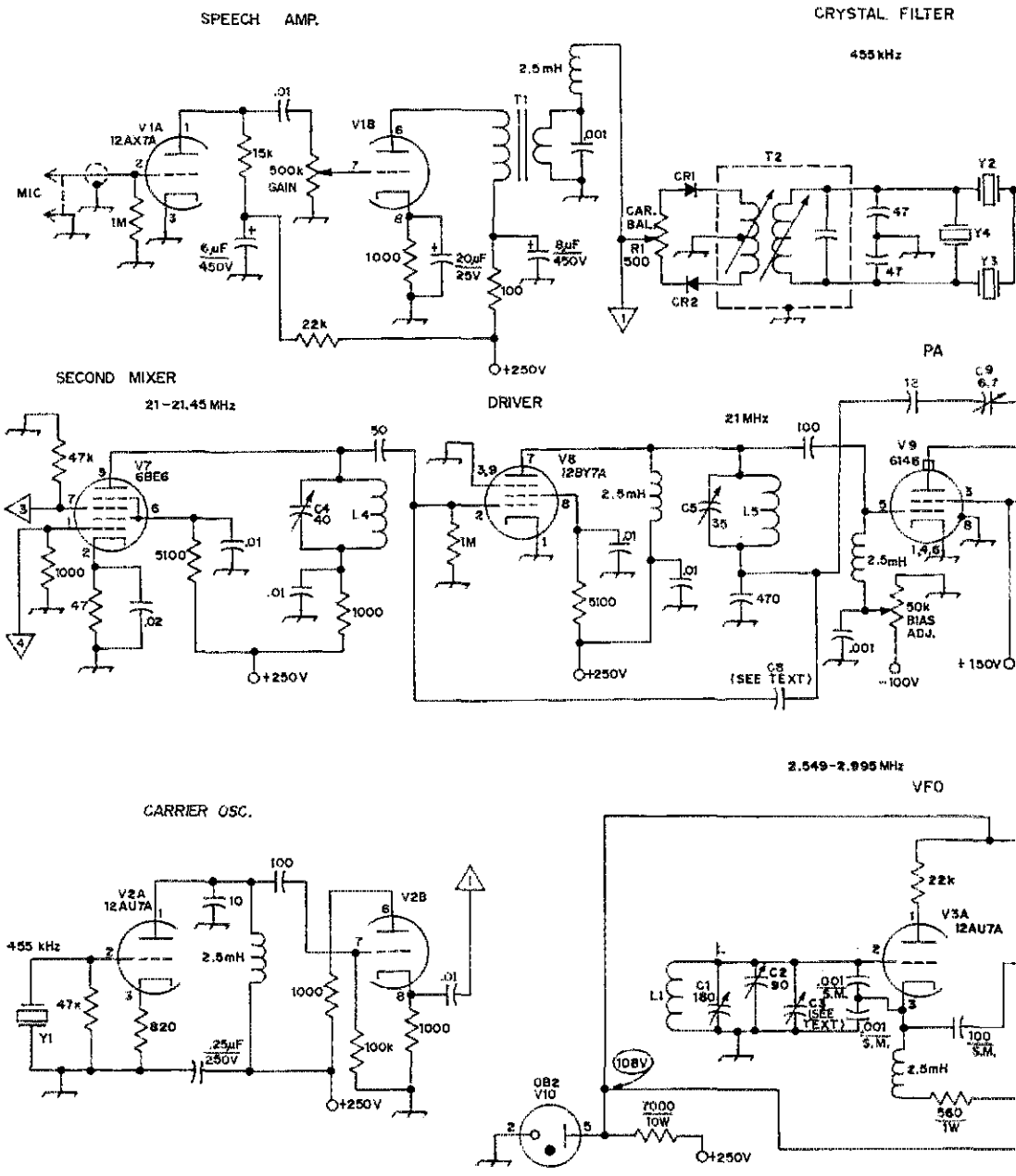


Fig. 2 - Schematic diagram of the transmitter.

Capacitors are disk ceramic and resistors are 1/2-watt composition. Component designations not listed in the caption are for text reference only.

C1, C2, C4 — Miniature air variable, screwdriver-adjustment type. Value not critical but should be approximately that shown on the diagram.

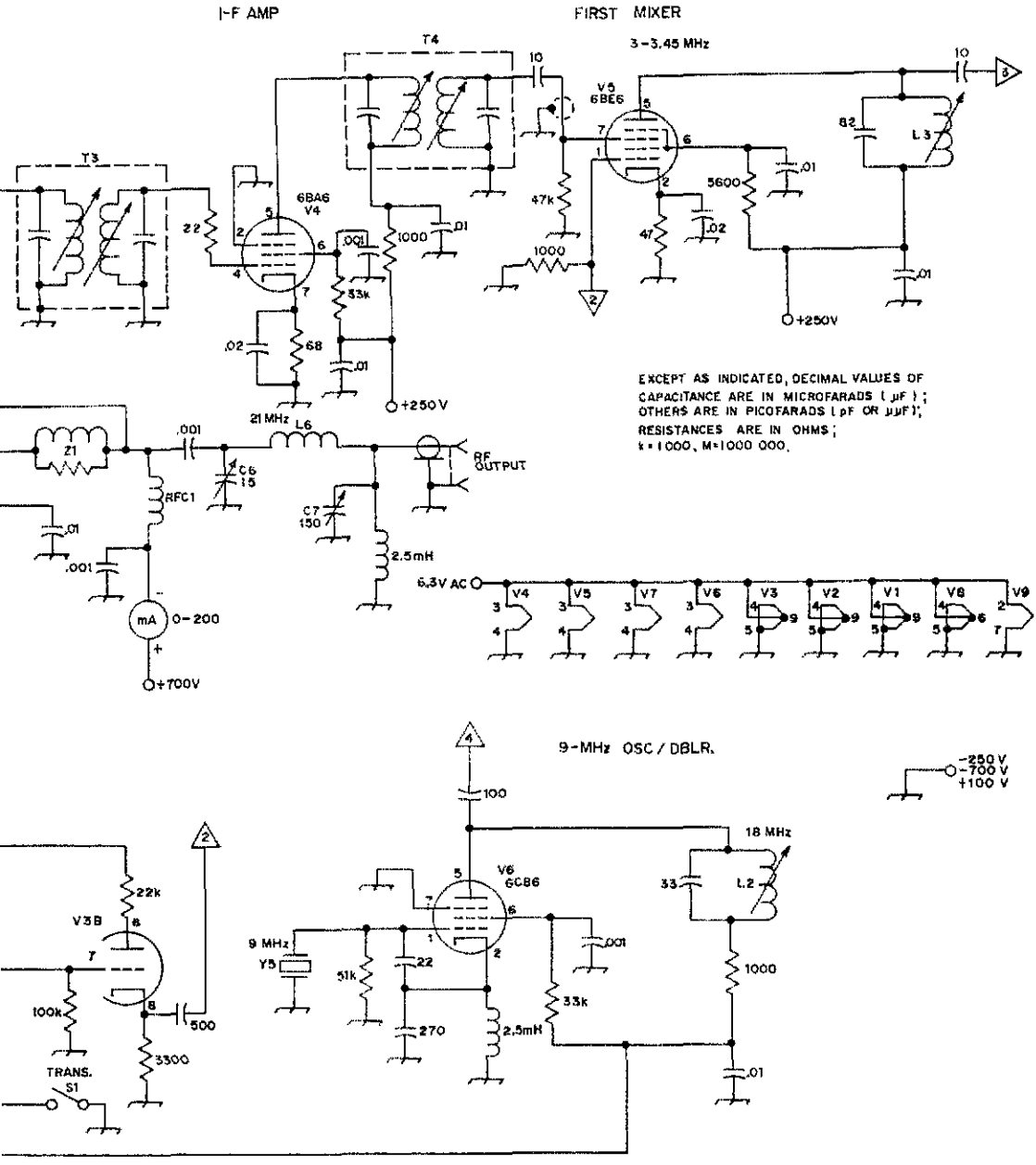
C5, C6, C7 — Air variable (see photo caption).

C9 — Ceramic trimmer, 1 to 5.7 pF.

CR1, CR2 — 1N34A or equivalent. (see text).

L1 — 30 turns of B&W Miniductor, No. 3007.

L2 — 13 turns of No. 22 enameled wire on a 5/16-inch (7.94 mm) powdered-iron core, slug-tuned form.



L3 — 40 turns of No. 30 enameled wire on a 1/2-inch (12.7 mm) slug-tuned core.
L4, L5 — See text.
L6 — 15 turns of B&W Miniductor, No. 3007
RFC1 — See text.
S1 — Spst toggle.
T1 — Audio output transformer (see text).
T2, T3, T4 — Miniature i-f transformer, 455 kHz. See text for modification of T2.
Y1, Y2, Y3, Y4 — FT-241 type, see text.
Y5 — FT-243 type, 9 MHz.
Z1 — Parasitic-suppression choke, 4 to 7 turns of No. 16 wire using a 100-ohm, 1-watt composition resistor as a form. See discussion in recent editions of *The Radio Amateur's Handbook*.

plate and screen voltages and assume for the moment the stage is working satisfactorily. The output transformer of this stage is simply tuned for maximum signal. If an rf probe is available it can be used to peak the signal at pin 7 of V5. Construction of such a probe which may be used is treated in recent editions of *The Radio Amateur's Handbook*.

The first mixer stage can now be checked out, and here is where the two-tone test generator comes in handy. Bring an insulated wire near the 10-pF capacitor in the plate circuit of the first mixer (V5) and connect it to the receiver antenna jack. Calculate where the signal should appear on the receiver dial (frequency setting of the VFO plus 455 kHz). Turn on the previously aligned stages and have a two-tone signal going into the mic jack. You shouldn't need to advance the audio gain control very far to hear the signal, but you may have to tune the receiver to find it. Be sure that you are listening on upper sideband. The balanced-modulator control should be set at mid-range. The receiver S meter will be useful in observing the relative carrier suppression. Once the two-tone test signal is picked up in the receiver (and previously having heard what your two-tone signal sounds like), you now have a basis for comparison between the two. If the received signal sounds considerably different, carefully tune the two slugs in the input transformer (T2) of the sideband filter until there is an improvement. Now tune carefully the output transformer (T3) of the sideband filter until the signal from the receiver improves some more. Retune the receiver if necessary. Tuning the i-f transformer (T4) of the 6BA6 stage will only affect the output level. It may be necessary to repeat the foregoing procedure a few times. Remove the audio signal and vary the balance control. At one setting, the S-meter reading should go to zero, indicating the carrier is suppressed.

The second mixer can now be tested; the alignment procedure is similar to that used for the first mixer. Check the appropriate voltages on the 6BE6 (V7). Also see if the 9-MHz oscillator and doubler stages are working properly by listening for the 18-MHz signal in the receiver. Next, connect the rf probe to pin 2 of V8, or bring the GDO near L4 and adjust L2, L3 and C4 for maximum indication. Use a frequency near the middle of the phone segment of the 15-meter band. Some adjusting of T4 may also be necessary, but do not touch the crystal-filter transformers.

The driver stage (V8) will give enough output for the signal to be heard loudly in the receiver. This stage is quite simple and shouldn't give any problems in wiring and testing. C5 should be peaked for maximum indication on the GDO. The final adjustment before the entire transmitter is tested is to ensure proper neutralization of the PA. The bias, screen and plate supplies are disconnected but the filament voltage is left on for this operation. The GDO is set in the *diode* position, at the resonant frequency of the transmitter and closely coupled to the tank coil (L6) of the 6146 (V9). A two-tone test signal is applied to the input and C4, C5 and C6 are tuned for maximum deflection of the GDO meter. There will not be much deflection of the GDO at this point, but enough for our purpose. Now with an alignment tool, carefully adjust the neutralizing capacitor (C9) so that you see a dip on the GDO. This completes neutralization.

Once the PA is properly neutralized, apply negative bias, screen voltage, plate voltage (700 volts) and adjust the bias control for 25 to 30 mA of idling plate current. Connect the 25-watt lamp (or a dummy load) to the output connector. Turn on the transmitter and apply a two-tone test signal. Tune the plate and output capacitors (C6, C7) for maximum brilliance of the lamp. With full output, the plate current should be 70 to 75 mA. Readjustment of C6 and C7 may be necessary to obtain this value.

This completes the testing and alignment of the transmitter and it can now be connected to an antenna. The loading may be somewhat different so adjust the plate tuning capacitor for a dip and reset the loading capacitor for the proper value of plate current. Be sure the plate tuning capacitor is adjusted to a current dip each time after the output capacitor is adjusted.

In concluding, if the author has inspired only one person to undertake a project such as this one, his objectives will have been accomplished. If in reading this article it has given someone a little better understanding of the ssb generation process, it will have made the preparation of this article worthwhile. QST

• *Technical Topics*

QST GOING METRIC

The world engineering societies are pressing for universal acceptance of the metric system, and reports indicate that the U.S.A. and others will eventually convert. Presently, however, a mixture of English and metric dimensions are being rendered here as the changeover continues in a gradual manner. Accordingly, *QST* plans to specify dimensions in diagrams and certain portions of the running text in both English and metric figures. *QST* readers have probably noticed the subtle changeover in recent issues.

Eventually, when this country converts to total use of the metric system, all new material in League publications will specify metric dimensions only. For the present, both systems will be used.

Feedback

Strange things seem to have happened to the parts layout for the Rochester VHF Converters in *QST* for August, 1973. In Fig. 4, page 31, the view is from the *foil* side of the board. Further, while the leads of Q1 and Q3 are positioned correctly from the foil side, the flat portion of the body outline should be opposite that shown. All of the lead identification for Q4 did not make it into print, but remember that the *gate* of the JFET is grounded to the foil. QST

New Front End for Heath HW-7

With the popularity of QRP these days, the Heath HW-7 is thrilling many a newcomer and OT alike. The unit's simple receiver, not its low-power transmitter, has proved to be its "weakest link." Here is an article which strengthens that weak link by adding an rf stage and a different product detector to overcome the deficiencies cited in the January 1973 QST *review of the transceiver.*

BY JERRY P. WINE,* KH6HKZ

THIS NONDESTRUCTIVE change to the popular Heathkit HW-7 is designed to remove almost all the deficient aspects of operation noted in the January 1973 *QST* review of the assembled kit. The two items of annoyance were the pronounced hum and the microphonics. The hum was prevalent while using many common antenna configurations when the unit was ac powered. Microphonics were in evidence whenever the preselector was peaked or the cabinet tapped.

These faults were particularly disturbing to me, because I had built several transistor transceivers prior to receiving the HW-7 as a present last Christmas. My home-constructed devices were not as pretty, but they worked very well, electrically.

After a great deal of experimentation I was able to improve the receiver portion of the HW-7 by two means: first, adding several capacitors at key points on the Heath printed circuit board; second, by adding an rf and product detector stage (Fig. 1) mounted on a pc board which fits nicely inside the original cabinet while still allowing access to the Heath board. Best of all, if it were ever desired to restore the unit to its original state for resale, the change could be made within a few minutes.

Before contemplating any replacement or modification it is essential to have the HW-7 in operating condition; then check your supply of junk-box parts. It is best to begin any such project with all the necessary parts at hand in order to obtain smooth operation without frustrating delay. Feel free, by the way, to substitute your available parts for the ones specified in my list of materials. But any extreme changes of values may require adjustment in the associated circuitry.

The KH6HKZ Board

The outline of the single-clad phenolic pc board is shown in Fig. 2. Any method which you care to use that provides a clean, well-cut pattern will do the job.

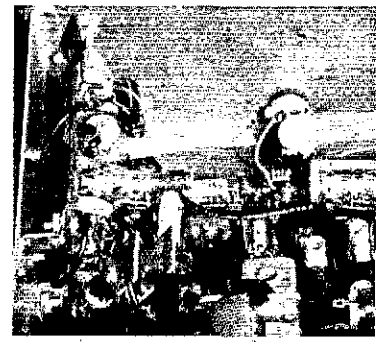
Clean up the etched and rinsed board. Make sure that all the chemicals are removed and that fingerprints have not been spread on the sanitary surface until after a protective spray has been applied and allowed to dry. Drill out the holes. Then, spread the wire leads of your capacitors and resistors to fit properly on the board. Solder, taking the usual precautions against the formation of solder bridges between the "lands" of the pc board.

At this point, make an ohmmeter check of the board to assure that all the "shorts" and "opens" are in their respective places. Then check the board against the circuit diagram in true Heathkit fashion!

Installation

Four brackets are required to mount the new board inside the HW-7 cabinet. Two L-shaped brackets hold the board to the rear panel and two flattened, Z-shaped brackets stand it off from the left-hand side wall (as viewed from the front). Hold the board in place and mark off, on the back panel and side wall, where the mounting brackets will go, after you've mounted them on the new board. Use small screws, lock washers and nuts.

Now solder the small-diameter RG-174/U coaxial cable to *signal in* (letter *Q* on Heathkit's relay) and *signal out* (point *Z*) terminals. These cables are cut to reach the Heath pc board without strain; six to eight inches should be adequate.



Board mounted on left side panel of HW-7.

* Jerry P. Wine, KH6HKZ, P.O. Box 3136, Honolulu, HI 96802.

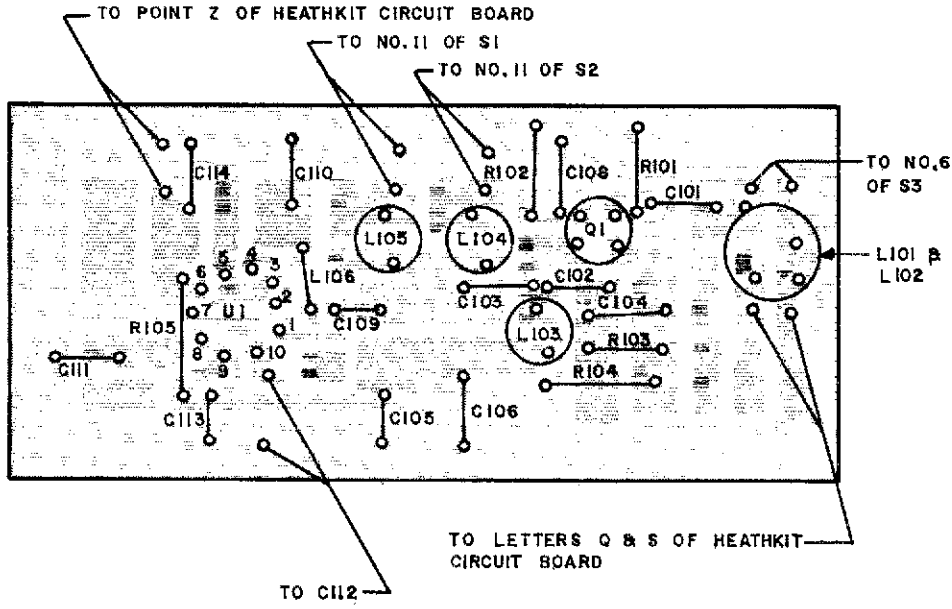


Fig. 1 — Circuit board layout of the KH6HKZ new front end for the HW-7. Numbers in the 100-series denote new components, while the lower numbers are retained for parts in the original circuitry.

Disconnect the Heath detector by removing the transistor, Q1, and save it for installation as my Q1. Both circuits use the same 40673. It is necessary to break the connection from the detector drain circuit on Heath's board to R4. I arbitrarily dubbed this disconnection of R4 as the point where my replacement circuit would terminate. . . I called the previous drain lead and disconnected R4 point, my point *Z*, as shown in Fig. 3. Connect the braid of the RG-174/U coax cable to Heath's pc-board ground. Connect the center conductor of the cable from the new board to point *Z* as shown in Fig. 3. It is wise, once again, to double check the coax shield wires because only one strand of hair-like wire "running wild" can short out the signal and cause trouble.

Temporarily, mount the board. Connect the power supply and the normally used 40-meter antenna. Turn on the transceiver in the receive mode. Listen in the headphones while tuning the preselector with the unit adjusted to the 7-MHz band; turn up the gain. If no signal is heard, check your board both visually and electrically. It is also a good idea to check all tuned circuits with a grid-dip meter for assurance that the new tuned circuits are properly resonated.

When signals are heard initially, peak the coil core on L103 for the 7-MHz band. Using a plastic tuning tool to fit your core, tune for maximum received signal strength. Do the same on the 20-meter band and then on 15 meters. Adjust the core of L104 for maximum signal on 14 MHz, and then coil L105 for the 21-MHz frequencies of interest. After all is working to your satisfaction, turn off the power supply and mount the KH6HKZ board in its final configuration with four mounting screws, lock washers and nuts.

Changes on Heath Board

Three minor changes are required on the Heath board in order to reduce background noise. C52 should be changed to .001 μF. C8 and C9 can be removed and replaced with a single unit of 0.22 μF. Finally, C13 should have a 0.1 μF capacitor shunted across it. This quiets things down nicely. (See Fig. 3.)

Acknowledgments

The finished product incorporates ideas drawn from Doug DeMaw in his April 1969 *QST* article, "Some Notes on Solid State Product Detectors." The Heath Company deserves kudos for the fine chassis and cabinet work plus a pleasurable tuning dial with surprisingly good calibration.

Results

This modification has made a fine communications transceiver. It has enabled me to work the Far East and U.S. Mainland stations from Honolulu while using only simple dipole antennas and one Hy-Gain 14-AVQ vertical with ground radials. I worked Arkansas, Wisconsin and Japan, all with acceptable signal reports. In comparison with a recently aligned multibuck receiver of the highest quality, the Heath HW-7 is now as sensitive and smooth to operate, but the selectivity is, understandably, not as good.

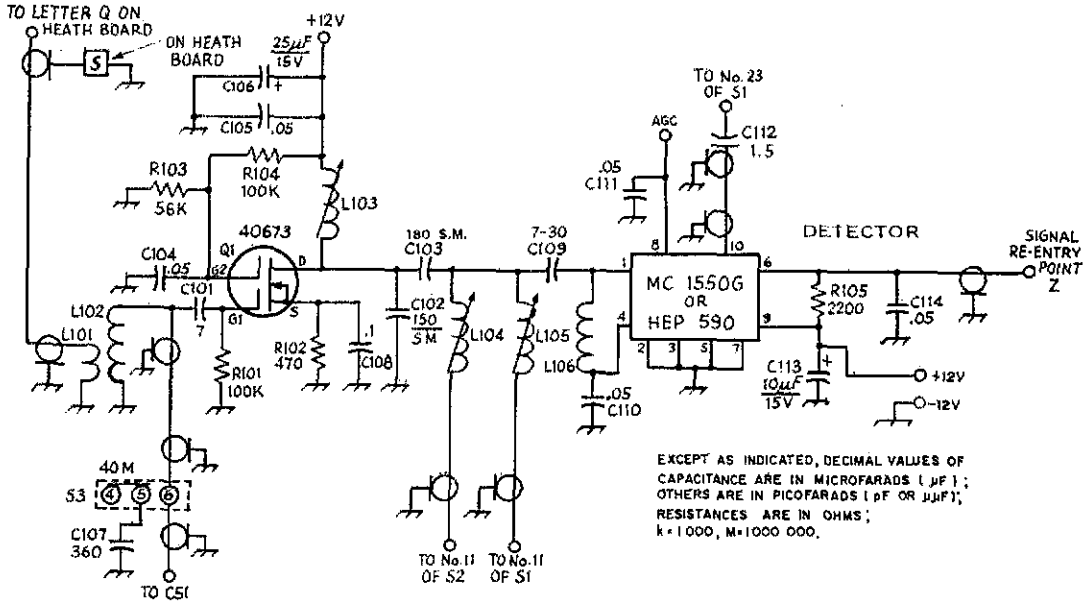


Fig. 2. – Schematic of the KH6HKZ new front end for the HW-7. Parts numbering as per Fig. 1.

All capacitor rated minimum of 15 volts.
All resistors are rated 1/2-watt.
C101 – 7-pF disk ceramic; exact value not critical (Radio Shack 272-120 suitable).
C102 – 150-pF silver mica (Elmenco 10ED-151J03).
C103 – 180-pF silver mica (Elmenco 10ED-181J03).
C104, C105, C110, C111, C114 – .05-μF disk ceramic (Centralab CK-503).
C106 – 25-μF, 15 V electrolytic (Radio Shack 272-1003 suitable).
C107 – 360-pF silver mica (Elmenco 15FD361J03).
C109 – 7.5-pF disk ceramic (Sprague 5GA-V75).
C112 – 1.5-pF disk ceramic (Sprague 10TCC-V15).
C113 – 10-μF, 15 V electrolytic (Radio Shack 272-1002).
L101 – 3 turns No. 20 hook-up wire over ground end of L102.
L102 – 10 turns No. 24 enameled wire evenly spaced around Amidon T-50-2 (or equiv.) toroid form.
L103, L104, L105 – *7 MHz:* 19 turns No. 28 enameled on 1/4-inch slug-tuned form. *14 MHz:* 14 turns No. 24 enameled on 1/4-inch slug-tuned form. *21 MHz:* 9 turns No. 24 enameled on 1/4-inch slug-tuned form.
L106 – 680-μH RFC (J. W. Miller 684A1, or equiv.).
U1 – Motorola IC, MC1550G.

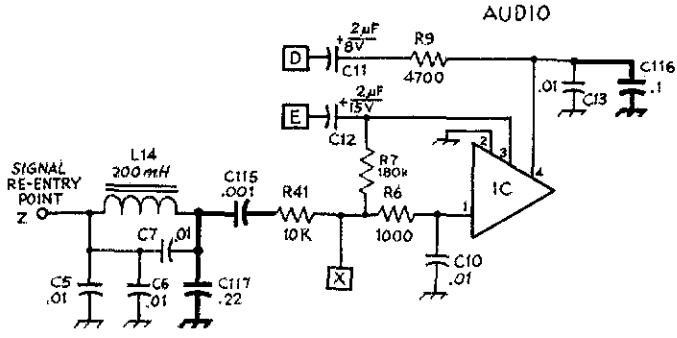


Fig. 3. – Modifications to the original Heath board are shown in this partial schematic. Heavy lines denote added parts.

C115 – .001-μF disk ceramic (Centralab CE-102).
C116 – 0.1-μF disk ceramic (Sprague QC1-227 or equiv.).
C117 – 0.22-μF Mylar (CDE 05P22).

Using the ARRL L/C/F Calculator

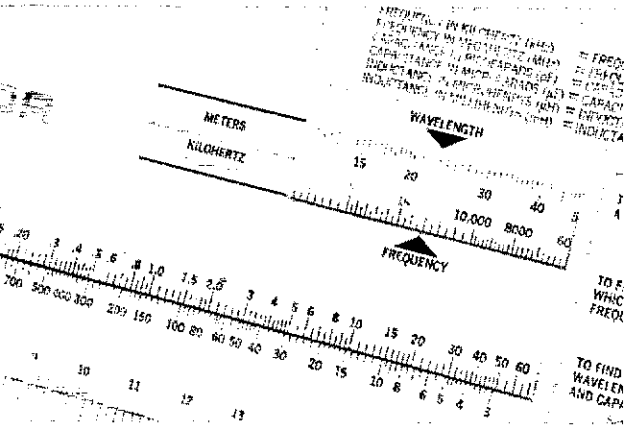


Fig. 1 — For a frequency of 13 MHz it can be seen that many possible combinations of L and C exist.

BY AL LA PLACA,* WIGRE

WHEN THE WORD *tool* is mentioned, visions of variously shaped steel implements come to mind. But not all tools are steel. TV-type tuning tools are often of plastic, fiber, or wood. Slide rules (they're tools too) are of plastic, aluminum or bamboo; and some of the specialized types are of a durable paper laminate, designed for years of use. In this latter group can be found the ARRL L/C/F Calculator. The purpose of this article is to explore some of the many uses of this versatile yet inexpensive tool which should be at home in every ham workshop.

The L/C/F Calculator

As its cryptic title implies, the L/C/F Calculator deals with *inductance* (L), *capacitance* (C) and *frequency* (F). Further, it handles inductance in such a manner as to make it almost fun to wind your own. Everything you need to know is there: markings for coil length, coil diameter, wire size, and number of turns per inch. It even has a dual calibrated scale (in centimeters and inches) printed on one side — to save you the bother of hunting up a ruler. The L/C/F Calculator is compact, measuring 25.4 cm × 10.16 cm (10 × 4 inches), and complete. Well, almost complete. It deals with coil dimensions and coil winding pitch in inches rather than in centimeters or both inches and centimeters. But in light of the fact that it will still be some years before the U.S.A. gets fully changed over to the metric system, the fact that the calculator is calibrated in inches is of no immediate concern.

Frequency

The Radio Amateur's Handbook has all the formulas necessary for finding out what inductance would be required to resonate with a specific capacitor at a frequency of interest, or what frequency would be obtained with an inductance and a capacitance of known value. If you really dig formulas, or want to play with your new mini-electronic calculator, then go to it. But most of us would prefer simply to plug numbers into a device which would, in turn, display the desired result in usable terms, with minimum expenditure of mental effort. The L/C/F Calculator will do just that. Here's how. When, for example, the slide is set so that 13 MHz appears above the FREQUENCY arrow (see Fig. 1), it will be noted that, without any further manipulation, the wavelength in meters is given (23), and a wide range of possible L/C combinations from 3 pF with 50 μH to 1500 pF with 0.1 μH is displayed for your choosing. Easy, isn't it? Sure it is! And that, alone, would be quite nice. But there is more. Suppose you have a variable capacitor with a range of from 10 to 365 pF and want to use it to tune through both the 80- and 40-meter bands. You'd want to know what value of inductance to use. With only a very few trial runs you'll find that just about any inductance in the range of from 6 to 46 μH would be usable to do that job. Six μH would enable the 10 to 365 pF capacitor to tune the range of 3.4 to 20.5 MHz, while 46 μH would provide coverage from 1.26 to 7.4 MHz. The range of possible values of inductance which satisfy the stated requirement of tuning both 80 and 40 meters is quite wide, as you can see, covering every value from 6 to 46 μH. Which should be used? That depends on the way the tuned circuit is to be employed in an actual circuit. Some circuits require a high L/C ratio and others require a low L/C ratio.

What's high and what's low becomes second nature after a while, but for newcomers it's always a confusing point. It's one of those things which never seem to be explained in the handbooks or articles on building gear. One hundred pF on 10 meters would be considered high C in most types of circuits, but at 160 meters that same 100 pF would be considered as low C. After a while and with more exposure to circuit diagrams of various pieces of radio equipment you'll come to realize what the "normal" values of capacitance and

* Technical Assistant, *QST*.

inductance are, for each of the amateur bands, and will be able to recognize (without being told) whether a circuit is high or low C.

Capacitance

Much of the ground covered in the above section on *frequency* can be applied to using the L/C/F Calculator for capacitance problems. Any setting of frequency (to the arrow) will instantly provide you with plenty of *L-C* possibilities from which to choose. For an inductance at hand (if its value is known) the required value of capacitance for almost any frequency can be read off the calculator directly. Most variable capacitors, by the way, have at least a four to one (minimum to maximum) range of capacitance. This will yield a two-to-one range in frequency. Which opens up the possibility of tuning all five hf bands with one variable capacitor and just two inductances (or a single tapped coil), one for the 80- and 40-meter bands (2:1 frequency range), and one for 20, 15, and 10 meters (also 2:1 frequency range).

With broadcast-type variable capacitors (365 pF maximum) the range is much greater yet, but in practice one runs into a case of diminishing returns by trying to tune so great a spread of frequencies in one fell swoop: no bandspread.

Inductance

On the reverse side of the L/C/F Calculator is to be found the Single-Layer Coil Winding Calculator. And this is worth its weight in gold for the savings in time, effort and pulled hair. With this calculator you can:

1) Find the number of uniformly spaced turns per inch for a given inductance when coil length and diameter are predetermined.

2) Find the coil length for a given inductance when coil diameter and turns per inch are specified.

3) Find the coil length for a given inductance when coil diameter and wire size are given, providing the turns are close spaced.

If you've ever wrestled with the inductance formulas in the handbooks, you'll very quickly appreciate just how much of a boon this calculator really is. For example, your junkbox may have a commercially wound coil one-half inch in diameter and two inches long, with a winding pitch of 16 turns per inch. How would you find the inductance? One way is to resort to the formula in the handbook, which is

$$L = \frac{a^2 n^2}{9a + 10b}$$

where L = inductance in μH
a = coil *radius* in inches
b = coil length in inches
n = number of turns,

not something you'd care to put up with on a regular basis. Another way to solve the problem of finding the inductance of your junkbox coil is to use the L/C/F Calculator and set the coil diameter of one-half inch opposite the coil length of two inches. The inductanceis read off under 16 turns per inch. In this example, the answer is 2.7 μH.

Now honestly, which of the two methods just described for finding inductance is easier? – you betcha!

What About Toroids?

The calculator is designed to solve inductance problems based on single-layer wound (solenoid type) coils. However, it can be used rather successfully with toroidal wound coils as well, as described by Griffin Chiles, K3AH, in the Technical Correspondence section of the April, 1971, issue of *QST*, page 48. To use the system he's described requires the use of another piece of equipment, a dipper (as it's commonly called these days), either a grid-dip meter, or an FET dipper or a tunnel dipper. This type instrument is an excellent investment when you're starting to put together your ham workshop; after you have obtained a multitest meter (that's always first on the list) the dipper should be the next piece of test equipment for which you should go shopping. With a dipper and the L/C/F Calculator you're really in business, set to tackle any problem which may arise involving those three parameters of L, C and F.

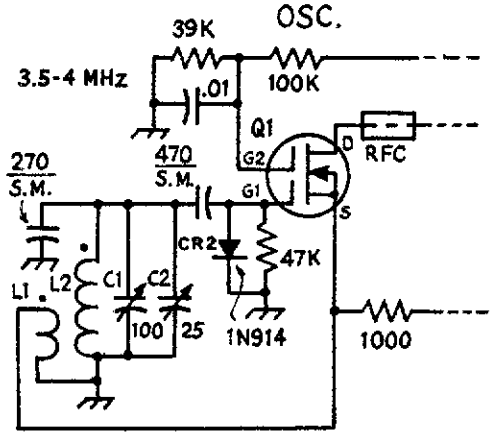


Fig. 2 – Partial schematic diagram from page 142 of the ARRL *Radio Amateur's Handbook*.

Practical Applications of the L/C/F Calculator

The examples cited above were given to provide a basic idea of the handling of the calculator. Now let's get down to the nitty-gritty; the practical, day-in, day-out uses of the L/C/F Calculator.

VFOs are a form of wonder and excitement to many Novices. The ARRL Technical Information Service gets a large number of requests from Novices about VFO construction and adaptability.

Fig. 2 is a partial reproduction of a VFO schematic shown on page 142 of the 1973 edition of the ARRL *The Radio Amateur's Handbook.* This circuit was chosen for use as an example for two reasons: VFO circuits are of interest to Novices these days, and this particular one gives no inductance value for L2, its most critical component! OK, let's go find the value of L2. In order to do that we need some information about the circuit. So, what do we know about it? We know the intended frequency range, 3.5-4.0 MHz. Fine. What else? We know the capacitance across the coil: 270 pF, 100 pF (maximum), 25 pF (maximum) and that's about it (except for stray capacitance inherent in the wiring together of the parts – this is usually very small, being no more than about 10 pF). The 100 pF variable capacitor is the tuning capacitor, so the other variable is used as a "band-set" capacitor and therefore should be set at something other than its maximum or minimum value. Half way sounds like a good choice; we'll use that. So now, what is our total amount of capacitance across the coil? It's 270 + 100 + 10 (stray) + 12 (C2 set about midway) = 392 pF. We know that this is the amount of capacitance with the tuning capacitor fully meshed (closed) at 100 pF, so our coil must resonate with 392 pF at 3.5 MHz. Fig. 3 shows the necessary setting on the calculator and the answer, opposite 392 pF, is (approximately) 5.3 μH. A 100 pF (maximum) variable capacitor usually has a minimum capacitance value of about 10 pF. When the tuning capacitor in this circuit is fully *un*meshed the circuit will be at the high-frequency end of the band. Let's check. What's the total amount of capacitance across the coil when the tuning capacitance is only 10 pF? It's 270 + 10 + 12 + 10 (stray) = 302 pF. So at the top end of the band we have 5.3 μH and 302 pF. Set them up on the calculator and see what frequency you read. I get exactly 4.0 MHz, don't you?

So it checks out. The required inductance is 5.3 μH. But what you're really interested in knowing is, what is this in physical terms – how many turns of what diameter, at how many turns per inch for how many inches of what size wire? Here's one of several techniques which may be employed for solution of the problem. Set the inductance (5.3 μH in this case) opposite some arbitrary number of turns per inch on the coil-winding side of the calculator. This will yield, in the slot above it, various combinations of coil lengths and diameters. Examine them all for practicability. Let's begin with 4 turns per inch and work up from there if required. Set the inductance (5.3 μH) opposite 4 turns per inch on the coil winding calculator. Read off the various combinations in the cut-out above. A coil 1 inch in diameter would require that the coil length be over 10 inches. Hardly practical! That would make the coil about twice the size of what the whole VFO should be. Rule out a one inch diameter coil! How about 2 inches diameter? That would make the coil 4 inches long. Better, but still too big. A coil of a larger diameter would not be practical nor compatible with the rest of the circuit (transistorized gear should be small, remember?). Let's try another winding pitch. How about 6 turns per inch (6 tpi)? Set 5.3 μH opposite 6 tpi. Scan the combinations available. Doesn't look too much better does it? Let's skip 8 tpi and move to 16 tpi. But before proceeding, I'll answer that question which I know you're just bursting to ask: why are we using only pitches of an even number? There's good reason for it: commercially wound coils are available only in those pitches. If we can find a commercial coil of practical size which suits our needs, why should we wind one? Right? Right! So, on with the search. Set 16 tpi atop 5.3 μH and see what goodies are displayed for our choosing. Ah, things are looking better! Half-inch diameter at 3-1/2-inch long is good, as is 3/4-inch diameter at 1-3/4-inches long. Even 1-inch diameter at 1-1/8-inches long is still practical. Looks as though we've hit pay-dirt. Sixteen tpi seems to be what we're after. Any of these last few alternatives will do nicely. Can we use a commercial coil? Perhaps. In 1/2-inch diameter commercial coils the longest available is only 2 inches. We need 3-1/2 inches (see above) for 5.3 μH. So that's out. In 3/4-inch diameter the maximum length available in commercially wound coils is 3 inches. We need only 1-3/4 inches, so that coil (B&W 3011) would meet our requirements if suitably pruned. In 1-inch diameter commercial coils the maximum length is again 3 inches and since that, too, exceeds our required length (1-1/8 inches for a 1-inch diameter coil), we have a second candidate (B&W 3015) for our project. Take your pick. Both of these coils should, for 5.3 μH, be trimmed to their proper length: the 3011 to 1-3/4 inches and the 3015 to 1-1/8 inches.

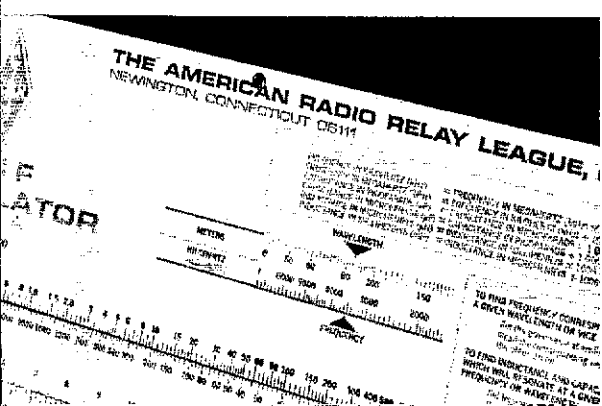


Fig. 3 – At 3.5 MHz a capacitance of 392 pF requires an inductance of 5.3 μH, as shown.

Winding Your Own

If you wish to wind your own coils, the L/C/F Calculator can help you in this endeavor, too. The simplest way would be for you to set the required inductance, 5.3 μH, opposite whatever gauge magnet wire you may have at hand. Say, for instance, you have a roll of No. 20 enameled wire. Set 5.3 μH over the wire size, 20. On the tpi scale above the inductance value you'll be able to see how many turns of No. 20 enameled wire can fit into one inch of winding space: 29-1/2 turns. Make a mental note of that figure. Fig. 4 shows 5.3 μH set

at 20 tpi and the resulting array of possible coil diameters and lengths. For a coil diameter of 9/16 inch the length would be 1 inch and we would have 29,5 turns. But if the diameter were 2-1/4 inches then the winding need be only 1/4 inch long (for 5.3 μH). At 29-1/2 tpi, a length of 1/4 inch consists of only 7-3/8 turns. Obviously, larger diameter coils would require still fewer turns to obtain the same inductance, if the tpi is kept constant. By now you should have the idea.

Coil Forms

Parts are hard to get. Coil forms are no exception. But far too many newcomers are wont to use anything other than the particular form specified by the author of the article from which they are building something. They needn't be. Very few circuits are critical enough as to warrant the use of only the specified coil form or material. Examples of such critical circuits would be the coil used as the frequency determining element in a VFO, the core material of any toroid-wound form, and any coil which will be handling high power levels (as in a power-amplifier tank circuit). And even with these circuits, some leeway is permissible – but seek the advice of those more experienced with such circuitry before attempting any substitutions.

Coils may be wound on almost anything rigid enough to support them. Many household items (they're readily available) make fine coil forms. Examples of these would be: pill bottles, hair curlers, toilet-tissue rolls after they've been given a coat of shellac, broom handles, even scrap lengths of small diameter plastic pipe. I'm sure you can think of many more. The general rule is, if it's the right size – use it!

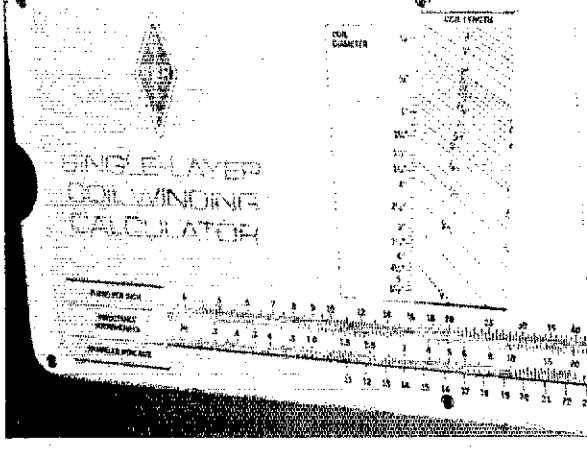


Fig. 4 – An inductance of 5.3 μH with a winding pitch of 20 tpi can be of many sizes and shapes. The photo shows the many combinations of coil length and coil diameter for 5.3 μH.

Wrap Up

The L/C/F Calculator is a *must* for the experimenter and even casual builder of equipment for use in the rf spectrum. It is true that it is not the only tool available for the intended purpose. If one has access to such niceties as *Q* meters, inductance bridges and computers then he can forego the simple calculator. But for only two dollars the L/C/F Calculator is an excellent piece of poor-man's test equipment. Try it; I'm sure you'll agree. QST

The Post Office Department promises faster mail service with Zip codes. Use yours when you write ARRL. Use ours, too. It's 06111.

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A High Performance 20- 40- and 80-Meter Vertical System

BY J. SEVICK,* W2FMI

IN A PREVIOUS ARTICLE on vertical antennas,[1] we have tried to point out some fundamental characteristics of ground-mounted verticals, namely: (1) a good image plane is necessary for efficient operation, (2) a vertical over a good image plane compares favorably with a dipole at an elevation of one-half to one wavelength, (3) a short vertical compromises little in the way of performance.

This paper describes a highly efficient three-band vertical system for 20, 40 and 80 meters using elements of the order of an eighth wavelength. The system consists of an 80-meter vertical in parallel with a 20/40-meter trap vertical. Actually, either the 80-meter or the 20/40-meter vertical can be constructed and used alone if one is not interested in triband operation. The input impedances of both antennas are 12-1/2 ohms and they use the same 4:1 matching transformer.[2] The antennas also use the same radial system consisting of 100 radials of No. 15 aluminum wire 50 feet (15.2 m) in length (a lesser number of radials can be used as is discussed later in the article). Because of expected lower sunspot activity and, hence, poorer propagation conditions on the higher bands, the 40- and 80-meter portions of this antenna system, in particular, should prove very effective in DX communication over the next few years.

The first part of this paper deals with the design and tune-up considerations of the 80-meter element; the second part with the 20/40-meter element and the way it is used with the 80-meter vertical forming an efficient triband system. This is followed by reports on performance. Reference is also made to other alternatives for a multiband vertical system.

* Bell Laboratories, 600 Mountain Ave., Murray Hill, NJ 07974.

[1] Sevick, "The W2FMI Ground-Mounted Short Vertical," *QST*, March, 1973.

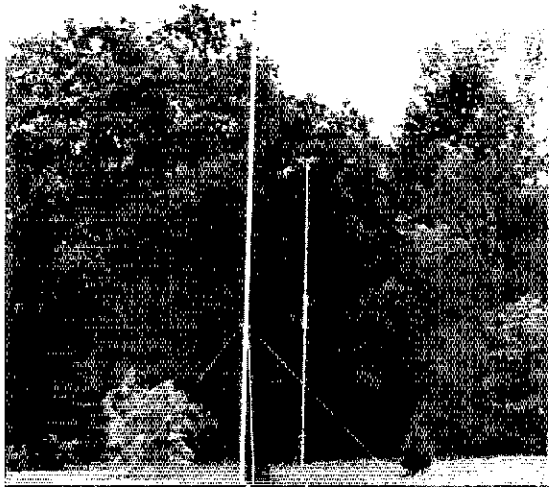
80-Meter Vertical

The two considerations in designing the 80-meter element of this vertical system were: (1) a good bandwidth for a reasonable height (a height one person can handle); and (2) proper spacing between the 80 and 20/40 portions such that coupling is negligible and both can be used over the same radial system.

Prior to building the shortened vertical described in this article, two others were constructed and tested on the air. One was a 22-foot (6.8 m) vertical[3] which had a 65-kHz bandwidth.

[2] Sevick, "The W2FMI 20-Meter Vertical Beam," *QST*, June, 1972.

[3] See footnote 1.



The triband vertical showing the polypropylene guys which provide an extra margin of support.

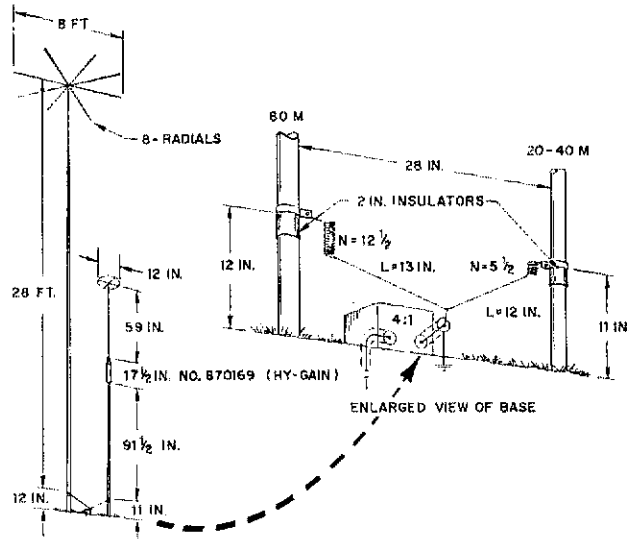


Fig. 1 — The 20-, 40- and 80-meter vertical antenna system. Tuning and construction details are given in the text.

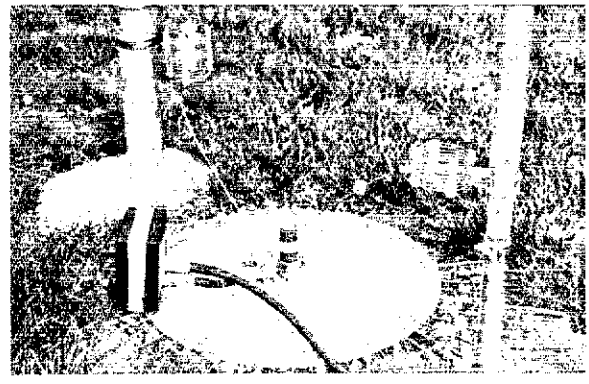
The other was a trap vertical[4] with only a 20-kHz bandwidth. Both of these antennas were used separately over the same image plane of 100 radials and were efficient radiators. Therefore, the main reason in going to a slightly longer antenna was simply *to obtain a broader bandwidth.* The eighth-wavelength vertical on 40 meters from the previous work[5] promised considerable improvement by adding only a few feet. The results are shown in Figs. 1 and 2. The total height turned out to be 29 feet (8.8 m). This resulted in a bandwidth of about 140 kHz, a little more than twice the bandwidth of the 22 footer.

The vertical, in Fig. 1, uses a 20-foot (6.1 m) section of thick-wall aluminum tubing. (It was used some years ago as a ginpole for erecting a beam on a 40-foot (12.2 m) tower.) An 8-foot (2.44 m) extension was constructed with 1-inch (2.54 cm) tubing bolted in place using spacers for centering. The insulator at the bottom is phenolic tubing with a canvas base.[6] It has a 1/2-inch (1.27 cm) thick wall, is 9 inches (22.86 cm) long and has an ID of 1 inch (2.54 cm). The bottom aluminum tubing supporting the antenna is 3-1/2 feet (106.68 cm) long with 2-1/2 feet (76.2 cm) of it placed in cement. The diameter of the hole in the ground is about 1 foot (30.48 cm). Even though this construction could probably be self-supporting, three simple polypropylene guys at about the 7 foot (2.13 m) level are used for extra margin of support. The radials at the top use 1/2 inch (1.27 cm) aluminum tubing.[7] The base loading consists of 12-1/2 turns of a B&W 3029 coil.[8] Actually, 14 turns are on the coil. A shorting stub, as shown in the close-up picture of the base of the two antennas, is used for adjustment. To place the minimum SWR near the low end of the phone band, where much of the DX is worked, 1-1/2 turns were shorted out. The final number of turns employed depends, to some extent, on the number of radials used in the image plane. A simple check is to set the shorting tap at some convenient point, like 12 or 13 turns, and plot the SWR. If the minimum value appears too high in frequency, then add about a half a turn of coil. This half turn should change the position of the minimum SWR value by about 50 kHz. As can be seen in Fig. 2, the minimum value of SWR is practically 1:1 and occurs at 3.840 MHz. This also verifies the input impedance value of 12-1/2 ohms, as expected from the previous work on short verticals.

20/40-Meter Vertical

In extending the operation of a vertical system over other bands, many alternatives are available. A trap vertical with a 12-1/2-ohm input impedance

Close-up of the base of the triband vertical antenna.



[4] To be published later.
[5] See footnote 1.
[6] Cadillac Plastic and Chemical Co., Post Office Box 810, Detroit, MI 48232.
[7] Construction details on the top hat are also given in the reference in footnote 1.
[8] 2-1/2 inch diameter, 6 tpi, No. 12 wire.

can be connected in parallel with the 80-meter vertical. Alternatively, the trap vertical can be designed to present an impedance of 50 ohms and thus be connected to the input side of the 4:1 transformer.[9] If broad-band operation is desired on only 80 and 40 meters, then one-eighth wavelength verticals on both bands can be used.[10]

For this work, a 20/40-meter trapped vertical having an input impedance of 12-1/2 ohms was used. It offered a rather simple mechanical form of parallel operation as is shown in Fig. 1 and the close-up picture. The bandwidth on 40 meters of 155 kHz appeared acceptable. As will be seen in a subsequent article, this bandwidth can be extended by about 50 percent by using the 50-ohm design of a trap vertical.

In the first attempt of parallel operation, the 20/40-meter vertical was placed only 14 inches (35.56 cm) away from the 80-meter vertical. The coupling appeared excessive. The 80-meter vertical was detuned by approximately 50 kHz. The 20/40-meter vertical also required excessive base loading in order to present an acceptable input impedance. By doubling the spacing between the verticals to 28 inches (71.12 cm), the interaction between them became negligible. The final values of heights and loadings were practically the same as if the elements were operating alone.

[9] The characterization and design of these trap verticals will be published later.

[10] See footnote 1 for details on the 40-meter vertical.

The adjustment of the 20/40-meter vertical is somewhat more complicated than the 80-meter vertical. An impedance bridge, as described in the *ARRL Handbook*, is of considerable help. In this case, there are two degrees of freedom: (1) varying the number of turns at the base, and (2) adjusting the lengths of the vertical sections.

Basically, the tuning is as follows: The tap is set at about 5-1/2 turns and the 20-meter section adjusted to give an acceptable value of SWR, both in position in the band and in magnitude. If the impedance is too high, it can be lowered by increasing the number of turns and lowering the height of the 20-meter section for resonance. After this, the 40-meter portion is then tuned. A plot of the SWR vs. frequency can immediately give an indication of the necessary adjustment of the section above the 20-meter trap. If the minimum value appears too low in frequency, a shortening of the top section is required. In no case should large adjustments be made. A change of a few inches has considerable effect. If the input impedance on 40 meters appears too low, then the 20-meter section has to be lengthened. This requires that the whole procedure be repeated. In any case, the initial adjustment should be started on the highest band of the trap vertical.

Results

Short verticals have been used by the author during the past year with considerable success. Many DX contacts were made on 40 meters with

Table I — Some Results With Triband Vertical

Date	*Station Contacted*	*W2FMI Signal Report*	*Freq. MHz*	*Input Power SSB (Peak)*	*Comments*
3/13	K5LWL/YV6	59 + 10 dB	7	2 kW	very, very strong signal, only one signal stronger — he used a Yagi at 120 feet
4/3	WB5HJY	59 + 40 dB	7	2 kW	superior to anything on band
4/4	ZF1SP	59 +	14	2 kW	very, very nice signal
4/4	WA4MUR/4	59 + 40 dB	14	2 kW	best signal on whole band
4/18	KV4HW	59 + 10 dB	7	2 kW	loudest on band
5/9	K6YIY	59	4	2 kW	K1GZL and I are only ones they hear
5/9	W9LZX	59 + 30 dB	4	2 kW	strongest (very consistent signal)
5/12	W2DU	59 +	4	2 kW	tremendous signal
5/17	VK5PB	56-7	4	2 kW	remarkably strong
5/17	W4JNY	59 + 20 dB	4	2 kW	outstanding, certainly one of best
5/22	VK5PB	59 + 10 dB	7	2 kW	really amazing
5/23	ZL3RJ	57-8	4	2 kW	one of the strongest he's heard for some time — pinned the S meter
5/27	WA2BQL	59 + 30 dB	4	200 W	very potent — Stronger than most locals — couldn't believe you were using 200 W

antennas varying in length from 6 (1.83 m) to 33 (10 m) feet. Since an extensive ground system was used, very little difference in effectiveness was noticed between the antennas.[11] This even includes redesigned trap verticals. As was stated before, the objective of the present investigation was to design a three-band vertical system which not only yielded competitive antennas on the lower bands, but one that was capable of covering a considerable portion of 80 meters. As was seen, a separate one-eighth wavelength antenna connected in parallel with a trap vertical not only gave a bandwidth on 80 meters of 140 kHz where the SWR was less than 2:1, but was short enough to not require considerable help in erection.

During all this time of operation of short verticals on 40 meters, and as of this writing, including several months on 80 meters, very few signal reports were received which did not indicate one of the best signals on the band. Table I gives some of the reports and comments received. In only three specific cases on 40 meters have the short verticals been bested by other antenna systems. One is shown in Table I where K5LWL/YV6 reported a stronger stateside signal by an amateur using a Yagi at 120 feet (36.6 m). The other cases include a comparison with W2GO of Linden, New Jersey. On 40 meters, VK5PB reported 6 dB and VK2WC 10 dB in favor of W2GO's signals. He was using a 2-element Yagi at 60 feet (18.3 m). The elements were 44-1/2 feet (13.6 m) in length and the boom, 20 feet (6.1 m). On 80 meters, only one other station received a stronger report on direct comparison. This was by W2HCW, when comparing my signals with VK5PB. The difference was 2 to 3 S units. His antenna was an 80-meter Yagi at 120 feet (36.6 m).

Invariably, most amateurs were surprised by the performance of these verticals. In many instances, questions were asked regarding the minimum number and length of radials required for efficient operation of ground-mounted verticals. As was noted in previous articles,[12] the answer depends to some extent on the conductivity of the soil at the respective locations. Poorer soils not only require more radials, but ones that are also considerably longer. Although more experimental work is required in this area, it appears that about 50 radials, 0.2 wavelength long, should generally give good operation. The loss in this case will be approximately 1 to 2 ohms. Doubling the number to 100 radials should reduce the loss to less than 1 ohm. It should be noted that even 1 to 2 ohms of loss are appreciable with these short antennas since their radiation resistances are only 12-1/2 ohms.

[11] See footnote 1.
[12] See footnote 1.

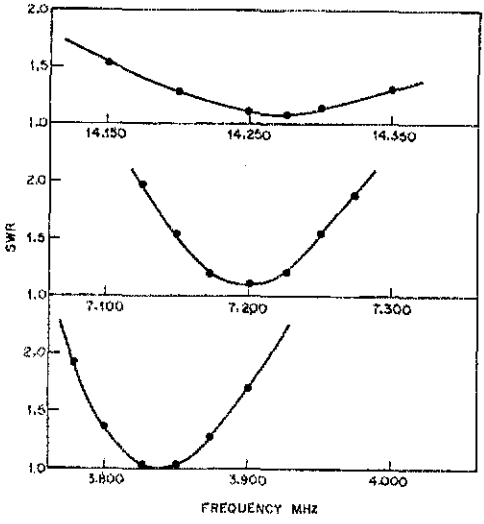


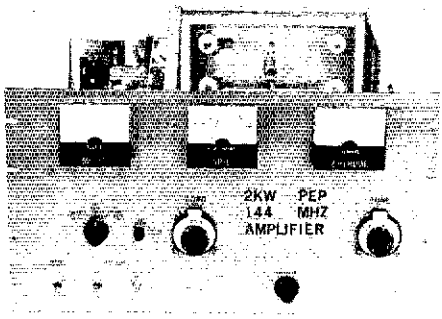
Fig. 2 -- Standing wave ratio vs. frequency for the 20-, 40- and 80-meter vertical antenna system.

Again, I would like to acknowledge the help, encouragement, and interest shown by the many amateurs during our experimental studies on verticals. Very few antenna laboratories can boast of a greater number of willing and competent field stations. In particular, we would like to thank Al Jones, W2GO, for his considerable help in obtaining comparative reports in Australia and New Zealand. QST

Strays

After years of complaining about Field Day interfering with her wedding anniversary, Bede Gooch, XYL of W9YRV, was surprised by the Twin City ARC members with a 23rd anniversary cake and second honeymoon tent at the club's Field Day site this year.

A 2-KW PEP Amplifier for 144 MHz



Part I

BY EDWARD L. MEADE, JR.,* K1AGB

ATTAINING a 2-kW PEP input level at 144 MHz is possible with a variety of tube types presently available. During the "slide-rule" design phase of the amplifier to be described, consideration was given to parallel operation of grid-driven tubes such as the 4CX250 series, or cathode-driven tubes like the more recently introduced 8874 series. Advantages or disadvantages notwithstanding, multiple-tube operation in a 2-kW PEP, 144-MHz power amplifier had the appearance of a "stop-gap" measure, rather than a state-of-the-art solution. The idea of multiple tube operation was set aside in favor of using a single tube.

Large external-anode triodes, in a cathode-driven configuration, offer outstanding reliability, stability and ease in obtaining high power at 144 MHz. The selection is somewhat limited and they are not inexpensive. Performance, on the other hand, is nothing short of spectacular. Data on the recently introduced 3CX1500A7/8877, a high-mu, external-anode power triode, appeared very promising. A reasonable heater requirement (5 V at 10 A) and an inexpensive socket and chimney combination made the tube even more attractive.

Several designs for 144-MHz amplifiers with large external-anode tubes have been presented to the amateur fraternity. Unfortunately, many of these employ tubes using expensive sockets which require modification to achieve amplifier stability — even when the amplifier is cathode driven. All of these amplifiers have one thing in common — a lack of true mechanical and operational simplicity.

The techniques employed in the design and construction of the cathode-driven 3CX1500A7/8877 amplifier described in this article have removed many of the mechanical impositions of other designs. Those remaining should be well within the capability of the vhf-er seriously interested in constructing a similar unit.

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Plate-Tank Design

The primary objective of plate-tank design in this amplifier was mechanical simplicity in conjunction with satisfactory electrical performance. Typical "coil and capacitor" circuits are impractical at the frequency and power level involved. Cylindrical-coaxial tank circuits, although ideal, suffer from a lack of form flexibility and are difficult for the home builder to construct. Application of air strip-line techniques seemed to hold the most promise in achievement of the design objectives.

Air dielectric strip-line circuits have the advantages of lower attenuation, higher Q, smaller size, lower cost and greater ease of fabrication than coaxial circuits. The power handling capability of a strip-line tank is comparable to a coaxial tank with the same conductor separation. Strip transmission lines, in general, are designed to operate in the same electro-magnetic modes as round coaxial cable. Operation of strip lines in the "dominant mode" requires that two ground planes be employed, above and below the center conductor. The spacing between these planes must be less than one-half wavelength, if higher-order modes are not to be supported.

Design of an air strip-line plate-tank circuit at 144 MHz is somewhat straightforward. Complementing the traditional rules for the design of plate circuits employing resonant-line sections are approximations, formulas, and form factors governing the relationships between the physical and electrical parameters of air-dielectric strip lines. Electrically, the air-dielectric strip line is a section of transmission line, similar to coaxial cable, possessing a characteristic impedance (Z_o) and electrical length in degrees. In this amplifier we are dealing with a capacitively loaded quarter-wave line (less than 90 degrees long), short circuited at the receiving or "cold" end. Capacitive loading is the

combined effect of tuning, loading, stray, and tube output capacitance at the sending or "hot" end of the line. The combined value of these capacitances, 26 pF, represents a reactance (X_c) of 42.2 ohms at 145 MHz, which was chosen as the design center frequency for the amplifier.

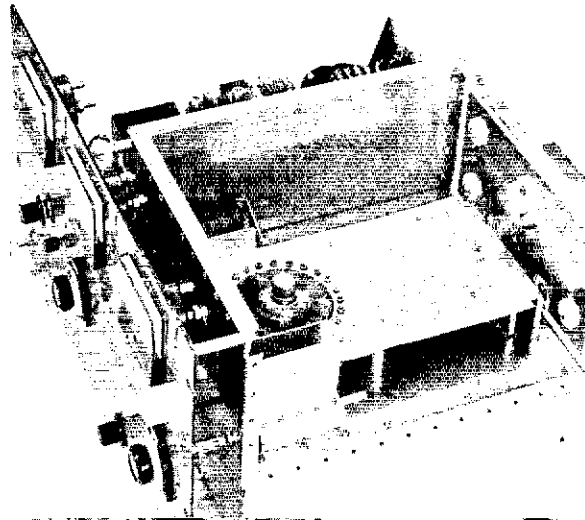
There are two common types of air strip-line configuration. First is that of a center conductor with two equidistantly spaced ground planes. In this configuration, equal amounts of current flow on both sides of the center conductor and on both ground planes. The second form of air-dielectric strip line is that using a conductor of essentially zero thickness above a single ground plane of infinite width. Most of the current in this type of line is concentrated between the conductor and the ground plane. Formulas and graphs are available to calculate Z_0 for both configurations.[1]

Several electro-mechanical parameters in this amplifier prohibit the use of equidistant ground planes, so the formula for a single reflecting ground plane was used in initial calculations. For obvious reasons, a cover is desirable on the amplifier. Thus we are faced with a compromise situation – a strip line with two ground planes of unequal spacing. To minimize the effect of this cover on the line, it was decided to limit the amount of current flowing on the top of the plate-tank strip line (and hence in the top cover) to no more than 25-percent of the total current in the tank. This was done by placing the top cover 4-1/2 inches above the strip line and fixing line height above the chassis ground plane at 1-1/2 inches. The total spacing of six inches between the top ground plane (the enclosure top cover) and the bottom ground plane (chassis base) is much less than one-half wavelength at 145 MHz, so the line should operate in its dominant mode. To be on the safe side, a "single-ground-plane" line width was calculated for a line Z_0 of about 104 ohms, based upon the line height of 1-1/2 inches above the chassis. The 104-ohm value will be the highest possible impedance level that can be obtained, as the formula used for impedance calculations assumes a line of essentially zero thickness above a reflecting ground plane of infinite width. Line thickness and the addition of the second reflecting ground plane (enclosure top cover) will lower the line impedance to the 40- or 50-ohm range. The resultant line width (5-7/16 inches) was sufficient to provide circumferential contact around the tube anode cooler with room to spare. This wide line permits the distrubution of rf current over a large surface, resulting in a low current density and small line loss. Silver plating the line enhances the smoothness of the rf-current distribution and reduces surface resistance. Estimated line lengths were generated, based on several different line Z_0 and the fixed value of X_c in operation in the tank. They were put on a graph to assist in the determination of an effective line Z_0 in the operating amplifier.

Theoretically, when a tube is operated in a cylindrical-coaxial tank, the anode should be truly "equipotential" for rf and the electrical length of the tank center conductor will include the length of the anode cooler, up to the ceramic insulation. The air strip line presents an asymmetric load to the tube, and therefore it does not seem reasonable to consider the physical end of the anode cooler, near the grid ring, as the electrical terminating point for the strip line. The mechanical end of the line extends beyond the center of the tube by 2-3/4 inches This represents about 12 degrees of electrical length and is a significant portion of the total line length. It would seem more reasonable to assume that the mechanical end of the air-dielectric strip line is the effective electrical line-termination point, to be used in the calculation of effective line Z_0 in operation in the amplifier. The importance of a high effective line Z_0 is not as great with lines of one-quarter wavelength as it is with lines of multiple quarter wavelengths. Ideally, the ratio Z_0/X_c should be on the order of 1.5 to 2 for quarter-wavelength lines. This is a measure of frequency dependence, and wide deviations from these values are manifest by very wide or very narrow lines, inordinate values of tank Q and poor efficiency. In lines of multiple quarter wavelengths, the effects of frequency dependence become more noticeable.

Localized heating because of the possibility of asymmetric rf current flow on the tube seals and control grid does not appear to be a problem. This

[1] This and all subsequent references are given at the end of this article.



Here the tube and plate line is in place, with the top and side of the compartment removed for clarity. The plate-tuning vane is at bottom center. A bracket is attached to the side panel to support the rear of the Teflon rod supporting the tuning vane. The coil at the opposite end of the plate line is RFC1, connected between the high-voltage-bypass plate and the top section of the plate-line sandwich. Items outside the tube enclosure include the filament transformer, blower motor, relays, and a power supply to operate a VOX-controlled relay system.

subject was discussed with colleagues during the initial design phase and the general consensus was that, even though the tank was not cylindrically coaxial in structure, the effect of tank asymmetry should be minimal, as the current return path is different by much less than one-eighth wavelength circumferentially from one side of the tube to the other. The effects of an asymmetric tube tank relationship will probably become more noticeable with this tube if the frequency of operation is increased appreciably. The use of tubes of smaller physical dimensions, such as the 4CX250 or 8874 series, in similar circuits at higher frequencies, is an effective method, as demonstrated by Knadle,[2] of circumventing this current flow/return path problem.

In an effort to determine the amount of heat transferred from the tube anode cooler to the tank circuit, a direct tank-temperature measurement was made at the tube end of the line. The amplifier was operated with zero bias and no drive, at about 850 watts anode dissipation for a period of 3 minutes. At the end of that period, the tank circuit temperature had stabilized at +65°C. At 2-kW PEP

Fig. 1 — Schematic diagram of the amplifier. Included is information for the input reflectometer used as an aid to tuning the cathode circuit for low SWR. C7, C8, and C9 are fabricated as described in the text and Fig. 2.

B1 — Blower. Fasco 50752-IN or Dayton 2C610. Wheel diameter is 3-13/16 inches.

C1, C11 — 500 pF, high-voltage ceramic capacitor. Centralab 858-S or equiv.

C2 — 5- to 30-pF air variable. Hammarlund HF-30-X or equiv.

C3, C4, C5, C6 — 0.1 μF, 600-V, 20-A feedthrough capacitor. Sprague 80P3 or equiv.

J1, J2, J6 — Coaxial chassis-mount connectors, type BNC.

J3 — Coaxial connector, type N.

J4 — Coaxial panel jack, UG-22B/U (Amphenol 82-62 or equiv.).

J5 — HV connector (James Millen 37001 or equiv.).

L1 — Double-sided pc board, 1-1/4 × 4-7/16 inches.

L2 — 4-1/4 inches of No. 18 wire. L1 and L2 are part of the input reflectometer circuit described in the text under the heading of "Support Electronics."

L3 — 6 turns No. 18 enam., 5/8-in. long on 3/8-in. dia form (white slug).

L4 — 3 turns No. 14 enam., 5/8-in. long × 9/16-in. ID. Lead length to L3 is 5/8-in. Lead length to cathode bus is 3/4-in.

L5 — Air-dielectric strip line. See text and Fig. 2.

P1 — Coaxial cable connector, type BNC.

P2 — Coaxial cable connector, type N.

R1 — Meter range multiplier. Ten 500-k Ω, 2-watt composition resistors in series.

RFC1 — 7 turns No. 16 tinned, 1/2-in. ID × 1-in. long.

RFC2 — 18 turns No. 18 enam., close wound on 1-megohm, 2-watt composition resistor.

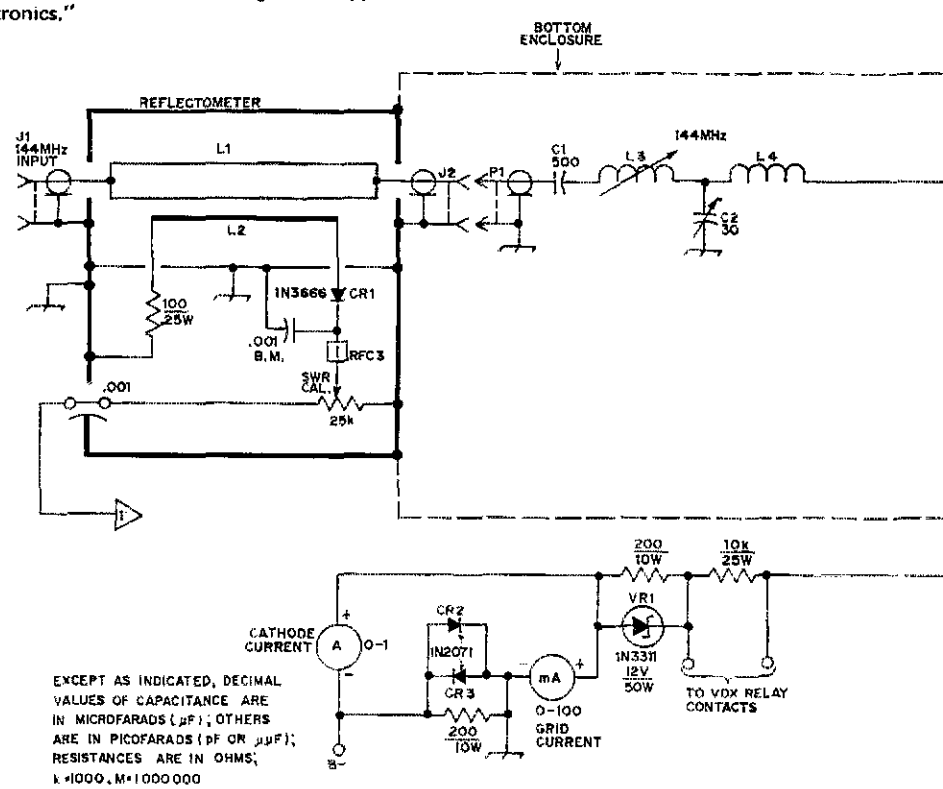
RFC3, RFC4 — Each 2 ferrite beads on component leads.

RFC5, RFC6 — 10 turns No. 12 enam. bifilar wound, 5/8-in. dia.

S1 — Single-pole, three-position rotary switch, non-shorting contacts.

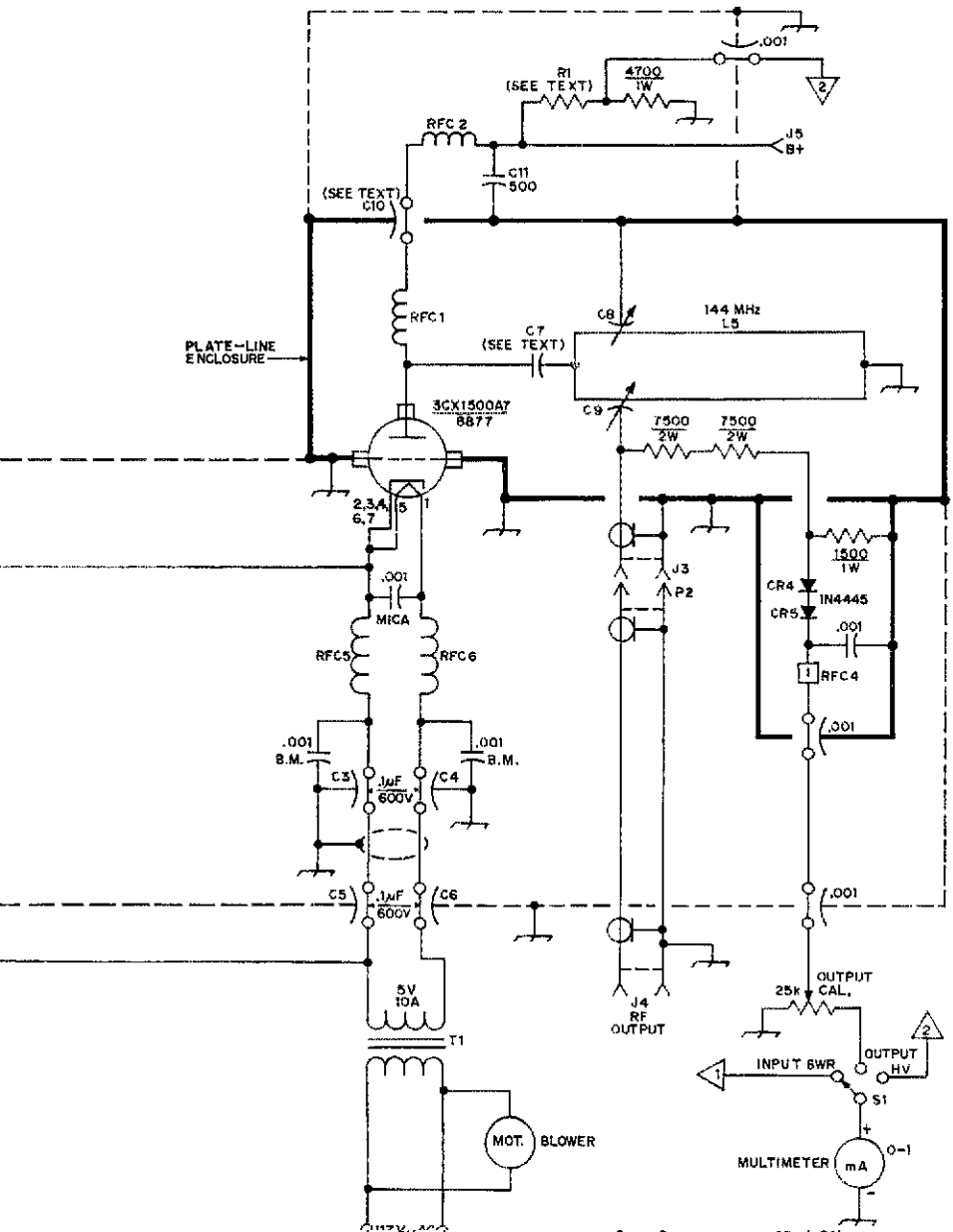
T1 — 5-V, 10-A secondary, center tap not used. (Stancor P-6135 or equiv.).

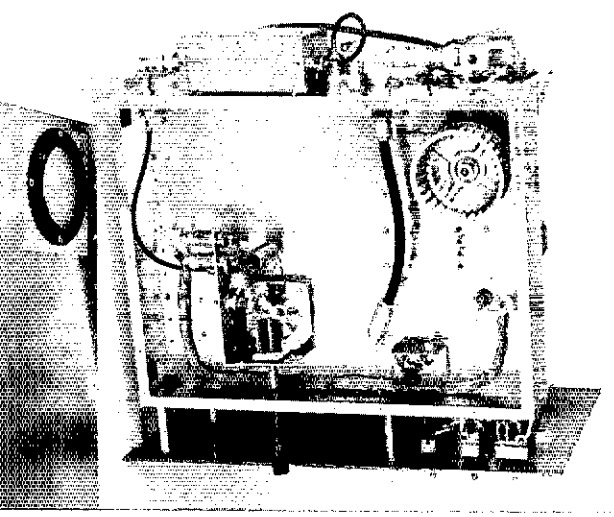
VR1 — 12-V, 50-watt Zener diode.



input, taking into account voice duty factor, this would represent a tank-temperature rise of approximately 15°C above typical blower air-input temperature. This small thermal rise should have negligible effect on the mechanical or electrical operating parameters of the tank, if rf heating is kept to a minimum.

The plate tank operates with a loaded Q on the order of 40 at 2-kW PEP and 80 at 1-kW. Typical loaded Q values of 10 to 15 are used in hf amplifiers. In comparison, we are dealing with a relatively high loaded Q, so losses in the strip-line tank-circuit components must be kept very low. To this end, small diameter Teflon rods are used as mechanical drive for the tuning capacitor and for physical support as well as mechanical drive for the output-coupling capacitor. The tuning vane or flapper capacitor is solidly grounded, through a wide flexible strap of negligible inductance, directly to the chassis in close proximity to the grid-return point. A flexible-strap arrangement, similar to that of the tuning capacitor, is used to connect the output coupling capacitor to the center pin of a type N coaxial connector mounted in the chassis base. Ceramic (or Teflon) pillars, used to support the air strip line, are located under the middle set of plate-line dc isolation bushings. This places these pillars well out of the intense rf field associated with the tube, or high-impedance end of the line. In operation, plate tuning and loading is quite smooth and stable, so a high-loaded Q is apparently not bothersome in this respect.





The placement of input-circuit components and supporting bracket may be seen in this bottom view. When the bottom cover is in place, the screened air inlet allows the blower to pull air in, pressurizing the entire under-chassis area. The Minibox on the rear apron is a housing for the input reflectometer circuit.

In this amplifier, output coupling is accomplished by the capacitive probe method. As pointed out by Knadle[2] "Major advantages of capacitive probe coupling are loading linearity and elimination of moving contact surfaces."

Capacitive-probe coupling is a form of "reactive transformation matching" whereby the feed-line (load) impedance is transformed to the tube resonant-load impedance (R_O) of 1800 ohms (at the 2-kW level) by means of a series reactance (a capacitor in this case). At the 1-kW level, R_O is approximately twice that at the 2-kW PEP level. Therefore, the series coupling capacitor should be variable and of sufficient range to cover both power levels. Formulas to calculate the transformation values have been presented in *QST*.[3]

The electro-mechanical method of probe coupling used in this amplifier is easy to assemble and provides good electrical performance. Also, it has no moving-contact surfaces and enables placement of the output coupling, or loading, control on the front panel of the amplifier for ease in adjustment.

Metric Equivalent of Some Dimensions Used in the Text

1/32	= .78 mm	2-5/8	= 6.66 cm
1/16	= 1.58 mm	2-3/4	= 6.98 cm
3/16	= 4.76 mm	3-9/16	= 9.04 cm
1/4	= 6.4 mm	4-1/4	= 10.79 cm
3/8	= 9.52 mm	4-3/8	= 11.11 cm
13/32	= 10.31 mm	4-1/2	= 11.43 cm
7/16	= 11.11 mm	4-5/8	= 11.74 cm
1/2	= 12.7 mm	5-7/16	= 13.81 cm
3/4	= 19.05 mm	6	= 15.24 cm
15/16	= 23.81 mm	9-1/8	= 23.17 cm
1-1/16	= 2.69 cm	10-1/2	= 26.67 cm
1-1/2	= 3.81 cm	11-1/4	= 28.57 cm
2-1/4	= 5.71 cm	13	= 33.02 cm

Input Circuit Design

The input matching circuit consists of a T network which matches the 50-ohm driving source to the complex input impedance of the tube (about 54 ohms at the 2-kW level, in parallel with 26 pF). One might be tempted to drive the amplifier with 50-ohm line through a coupling capacitor, directly into the tube cathode. Doing so neglects the shunting effect of the 44 ohm parallel capacitive reactance represented by the 26 pF. Also, the 54-ohm "real" component of the tube input impedance is a function of cathode current and is realized only when the amplifier is operating at the 2-kW PEP level. Thus, a widely varying load would be presented to the exciter as the amplifier goes from idle to full power. A properly designed matching network will serve as a "storage tank" for drive power, because of the inductive "flywheel" effect, and compensate for the 26 pF as well. In presenting the driving source with a relatively constant load, not necessarily a purely resistive 50-ohm load, somewhat less drive power will be required. Intermodulation distortion will be reduced to some degree if an input matching circuit with an operating Q of two or greater is used. A low-Q matching circuit offers the advantage of reasonable bandwidth and component values which do not make the network appear very sharp in tuning. The nominal circuit values employed were computer derived,[4] based on the tube input characteristics mentioned above.

The second part of this article will appear in a subsequent issue. Construction of the input circuit and the plate-line assembly will be explained, as well as some notes on the operation and performance of the amplifier. QST

References

1) *Reference Data for Radio Engineers*, ITT, 5th Edition, Chapter 22, p. 26-27.

2) Knadle, "A Strip-Line Kilowatt Amplifier for 432 MHz," *QST*, in two parts; Part I, April, 1972, p. 49; Part II, May, 1972, p. 59.

3) Belcher, "RF Matching Techniques, Design and Example," *QST*, October, 1972.

4) Davis, "Matching Network Designs with Computer Solutions," Motorola Semiconductor Products, Inc. Application Note AN-267.

Technical Correspondence

GRAPHICAL SOLUTION OF IMPEDANCE-MATCHING NETWORKS

Technical Editor, *QST*:

Articles which have appeared in *QST* by WA4JVE[1] and WA5EKA[2] on the subject of impedance matching have prompted me to forward a version of the graphical representation of the equations used to design matching networks that I have been using for some time, Fig. 1. My original graph was constructed shortly after encountering W1DF's comprehensive treatment of the subject sometime back.[3]

I find the graphical representation more convenient than the algebra given by WA4JVE and capable of handling a greater range of values than WA5EKA's novel nomograph. The graph also gives a good picture of "which way you're going" when varying parameters. Values read directly from the graph are of better accuracy than practical considerations require.

For anyone wishing to construct such a graph and lacking a calculator, the common equations were reduced to their trigonometric equivalents and values determined from tables of trigonometric functions. Thus:

$$Q = \frac{Rp}{Xp} = \frac{Xs}{Rs} = \tan\theta$$

$$\frac{Xp}{Rs} = \frac{Rp}{Xs} = \frac{1}{\sin\theta\cos\theta}$$

$$\frac{Xp}{Xs} = \frac{1}{\sin^2\theta}$$

$$\frac{Rp}{Rs} = \frac{1}{\cos^2\theta}$$

[1] Belcher, "RF Matching Techniques, Design and Example," *QST* for October, 1972.

[2] McAlister, "Simplified Impedance Matching and the Mac Chart," *QST* for December, 1972.

[3] Grammer, "Simplified Design of Impedance-Matching Networks," *QST*, in three parts; Part I, March, 1957; Part II, April, 1957; Part III, May, 1957.

Of course, if you have an HP-35 electronic slide rule or access to a computer, the whole thing is easy. – *T. W. McGee, W7JBR, 13025 Shorewood Dr. S. W., Seattle, WA 98146.*

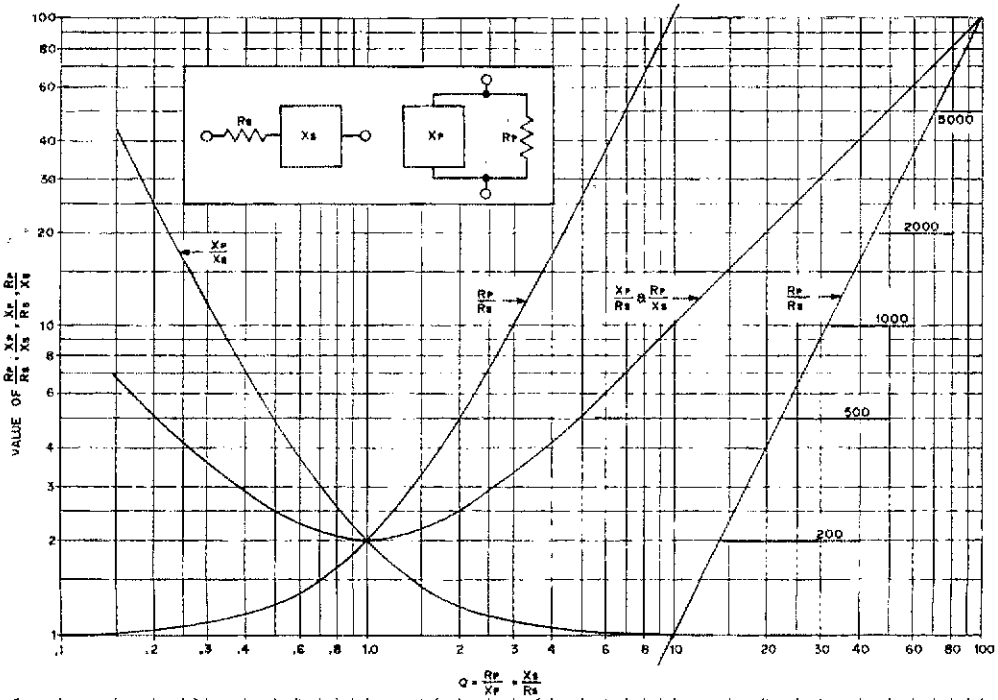
ONCE MORE ON THE TTL MICRO-TO KEYER

Technical Editor, *QST*:

Recently I built the Micro-TO keyer with TTL ICs as described in the September, 1972, issue of *QST*.[4] A problem appeared with the keyer immediately: the first dot of a character following a character ending in a dash came out as a dash. The false dashes made the keyer unusable. The problem was cured simply by making one change in the circuit. I connected pin 1 ($\overline{C}$) of the 7473 dual *J-K* flip-flop to pin 9 (Q) instead of pin 8 ($\overline{Q}$). The keyer now works perfectly. – *C. Edward Galbreath, W3QBO, 8326 Still Spring Ct., Bethesda, MD 20034.*

[4] Aldridge, "The Micro-TO Keyer with TTL ICs," Technical Correspondence, *QST*, September, 1972, p. 57. Also see Compton and Swain, "Clock Pulses in the TTL Micro-TO Keyer," Technical Correspondence, *QST*, July, 1973, pp. 45-46.

Fig. 1 — Graph for solving impedance-matching problems. See references of footnotes 1, 2, and 3 for further definitions of terms and example problems.



Hints and Kinks For the Experimenter

CORRECTION CHART FOR SWR MEASUREMENTS

It is not always convenient to measure SWR directly at the antenna. However, by using the graph shown in Fig. 1, the SWR can be obtained by measuring it at the input to the transmission line and using the known (or estimated) loss of the transmission line.[1] The curves in Fig. 1 were obtained from the formula:

$$SWR_{out} = \frac{R+1}{R-1}$$

where

$$R = 10^{-(D/10)} \left[\frac{SWR_{in}+1}{SWR_{in}-1}\right]$$

and D is the transmission line loss in dB.

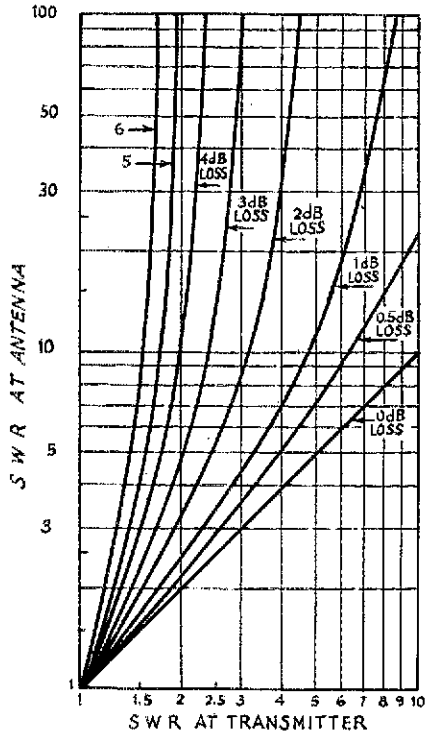


Fig. 1 – SWR at antenna vs SWR measured at the transmitter for various line losses.

[1] [EDITOR'S NOTE: A similar discussion was presented in this *QST* column (July, 1973). However, K4GWQ has put the equations in a very convenient graphical form.]

For example, if the line loss is appreciable (greater than 4 dB), the SWR at the transmission-line input will be less than 2:1 even if the line is poorly matched to the antenna. Fig. 1 can be used also to calculate the input-vs-output SWR relationship of an attenuator when its loss is known.

Fig. 2 is included so that the SWR can be calculated easily from wattmeter readings. This curve is plotted from the equation:

$$P_f/P_r = R^2 = \left[\frac{SWR+1}{SWR-1}\right]^2$$

Pf/Pr is the ratio of the indicated forward to reflected power. – *Leon W. Couch, K4GWQ*

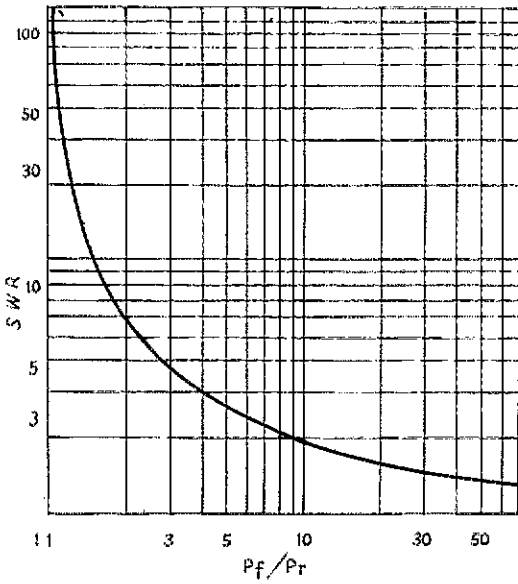


Fig. 2 – Chart for converting forward and reflected power to SWR.

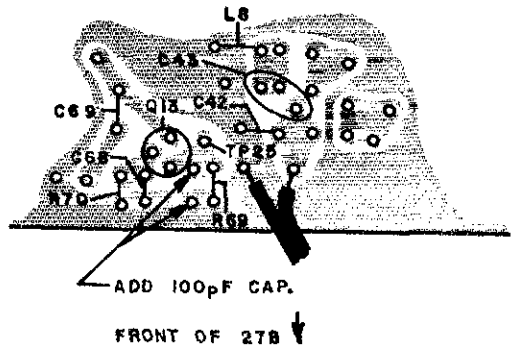
A SOURCE OF HEAVY DUTY SWITCHES

Most electric ranges have rotary switches that control the heater units. A common type has one position, *off*, with five heat-level positions. The switches could be used to place two transformer windings in series or parallel, from a 230- or 117-V source. Many other uses for these heavy-duty switches can be found around the shack. The ones described are quite adaptable. – *W. C. Holder, W4AAZ*

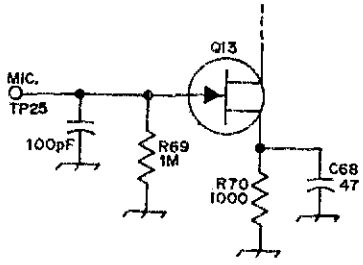
RF FEEDBACK IN THE CLEGG FM-27B

In some installations, there is the possibility of rf feedback through the mic-input circuit in the Clegg FM-27B 2-meter transceiver. Typical symptoms include hum on the transmitted carrier and poor audio quality. If sufficient rf energy is picked up on the wire going from the mic connector to the FET (Q13), the FET becomes forward biased and may detect even a small amount of ripple on the carrier.

The solution to the problem is to solder a 100-pF capacitor from the gate of Q13 to ground as shown on the schematic diagram. The capacitor can be installed in the two holes, indicated by the arrows, that are already drilled in the circuit board. – *R. M. Ziegler, WA2ILB*



The 100-pF capacitor may be added at the point shown. Holes already exist on the circuit board of the FM-27B for installation of the capacitor.



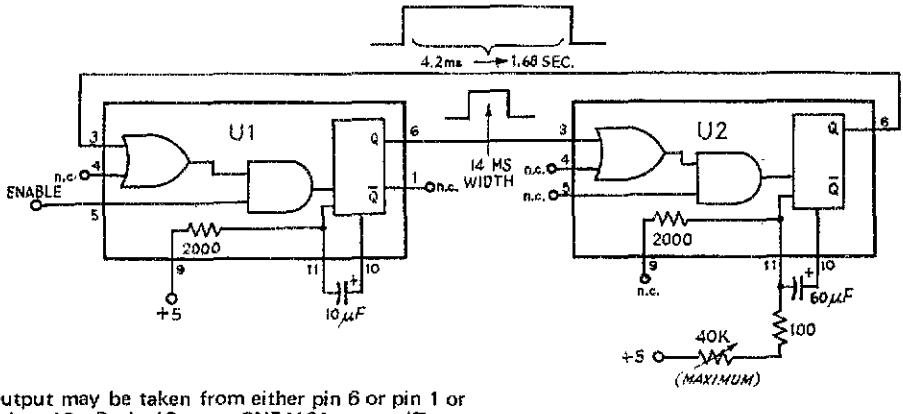
Mic-input circuit of the Clegg FM-27B 2-meter transceiver. Adding the 100-pF capacitor, shown from the gate of Q13 to ground, should aid in eliminating problems of rf-feedback into the microphone circuit.

IC CLOCK FOR TTL KEYER

While designing a TTL keyer, I ran across a novel way to generate clock pulses very accurately and still say the keyer was built totally of integrated circuits (well, almost anyway). Later as the design of the keyer changed, the clock remained the same, with the exception of a few extra wires.

According to the way the keyer is designed, this clock may either be a free running or an instant start clock. The flexibility is obtained by using 2 SN74121 TTL ICs and some garden-variety capacitors and resistors. Refer to the diagram. Since the application called for instant-start operation, the ENABLE line was included. This is a Schmitt trigger input. If a free-running clock is needed, a momentary-contact normally-open push-button switch connected from ENABLE to ground should be added in the event that the initial state of the 74121 is unfired.

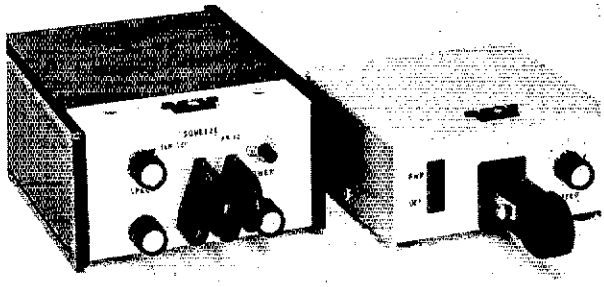
If the clock is used as the clock for a keyer where timing is critical, remember that there are two pulses to time. The one generated by U1 is of fixed length, and that from U2 is variable. The formula for pulse width is $t_p = 0.7C_T R_T$ (refer to the diagram for pulse widths with the values shown). The pulse width from U2 is varied by means of the potentiometer. With some power supply changes in the Micro-TO keyer shown in the *Handbook* for 1972, this circuit could replace the clock shown there. – *Bill Horger, WN4DWB*



Output may be taken from either pin 6 or pin 1 or either IC. Both ICs are SN74121 types (Texas Inst.). All capacitors are electrolytic. Internal nominal value is 2000 ohms.

Recent Equipment

To acquaint you with the technical features of current amateur gear.



The Ten-Tec KR-40 and KR-5 Electronic Keyers

OUTWARDLY, the collection of Ten-Tec keyers appear pretty much alike, owing to the fact that the classic brown and white Ten-Tec cabinets are used as enclosures. Generally speaking, the paddles are similar too, and are fashioned from molded plastic. The KR-40, however, goes a step beyond the lower priced units by offering an adjustable weighting circuit, squeeze-keying paddle and a built-in sidetone monitor.

The KR-40

When this reviewer first began using the KR-40 some odd manifestations took place with respect to the keying speed. Without warning, the sender's speed would increase abruptly or decrease for short periods, causing what can only be called a trauma! It is a rather startling event when one is sending cw at, say, 20 wpm, then suddenly that person finds himself hustling along at 30 wpm! The immediate solution was to turn down the speed control and proceed with the QSO. But, alas, no sooner was the situation remedied then the speed jumped from 20 to 10 wpm! After doing some investigating it was learned that the problem resulted from a lack of regulation in the built-in power supply of the KR-40. Changes in ac line voltage (especially when the XYL was ironing) would cause the anomaly to occur. The matter was brought to the attention of the engineering staff at Ten-Tec, and the recommendation was made to them that a Zener-diode regulator be installed between the base of the pass transistor and ground in the power supply. After studying the situation for a few days, Ten-Tec notified us that a Zener diode would be used in all future models of the KR-40. They supplied us with a diode, it was installed, and no more problems with keying-speed glitches were observed.

It is difficult to comment about the features of any brand of keyer without reflecting the personal biases of the reviewer. Certainly, no two cw operators share like views when it comes to overall performance. Therefore the observations to be listed are purely those of this writer, and may not apply with respect to the evaluations made by others.

Good Points

1) The electronics of the KR-40 provided faultless operation during six months of daily use.

2) No difficulty was experienced from stray rf getting into the keyer.

3) The unit is very compact, thereby being useful for portable operation when space is at a premium, and when one must travel in "schooner-rig" fashion.

Some Other Observations

1) The unit is rather lightweight. It was necessary sometimes to operate with a book atop the keyer to keep it in place on the desk.

2) The reed relay sticks and locks up when using the keyer with some grid-block-keyed rigs.

The Ten-Tec KR-40 Keyer

Dimensions (HWD) and Weight:
2-1/2 × 4-3/4 × 8 inches, 2-1/2 pounds.
Power requirements: 105 to 125 V ac at 0.125 A, 50 to 60 Hz.
Keying function: Iambic.
Price class: $90.
Manufacturer: Ten-Tec Inc., Sevierville, TN 37862.

3) No terminals are available for attaching an external paddle.

4) There is no provision for external dc power connection.

5) No built-in speaker is provided for sidetone monitoring.

6) No switch exists for locking the keyer on during tune-up of the transmitter (some rigs do not have a tune function).

The foregoing may not represent operating inconveniences to other users, and should not be taken as bad points against the KR-40.

Features

This equipment has dot and dash memories. It is completely solid state. The KR-40 is a squeeze-type keyer, but can be used in the normal fashion by those who do not subscribe to the squeeze-keying concept. Speed is variable from 6 to 60 wpm. – *W1CER*

The KR-5

The KR-5 may be Ten-Tec's low-priced keyer but it provides the user with the feel and performance normally experienced only with some more expensive units. The paddle is the first thing that catches the eye. Molded from black high-impact plastic, the paddle utilizes spring-loaded adjustment screws accessible from the front panel which may be set for optimum actuation force and return time. This provides a surprisingly smooth and expensive feel. A traffic-handling friend who is a confirmed "bug" operator gave it his endorsement, saying that it was the only keyer he had ever used which had the right feel.

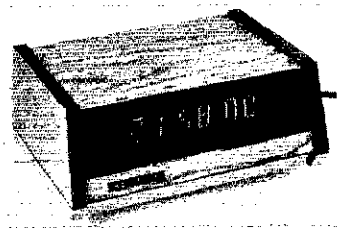
The completely solid-state circuitry is simple and straightforward. The weight ratio is fixed and favors the lower speeds (below 25 wpm) but may be varied by changing a single resistor. There is no sidetone monitor built in. Keyed output is obtained by a reed relay rated at 15 volt-amperes. Maximum keying voltage is 400. Its modest power requirement (6 volts dc at 150 mA or 12 volts dc at 200 mA) makes it a likely candidate for battery operation in the field or at home. – *W4WFI*

The Ten-Tec
KR-5 Electronic Keyer

Dimensions (HWD) and Weight:
2 × 4 × 6 inches, 1 pound, 6 ounces.
Power requirements: 6 volts dc at 150 mA or 12 volts dc at 200 mA.
Price class: $35.
Manufacturer: Ten-Tec, Inc., Sevierville, TN 37862.

QST —— QST —— QST

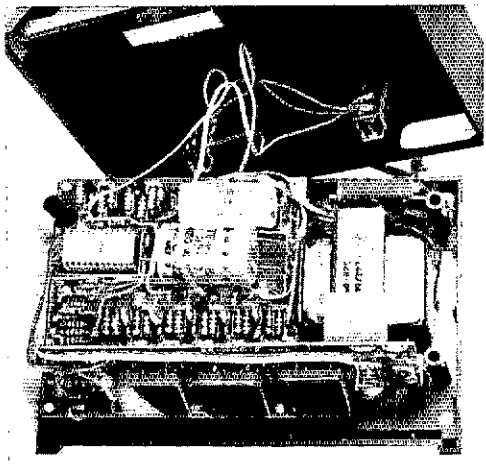
The Heath GC-1005 Electronic Clock



THE REALLY "IN" THING to own for time keeping these days is a digital clock. What simpler way is there to obtain the information necessary for entry in the station log? With a digital clock you can merely glance at the display and write down four digits that are indicated (or six digits, if you're interested in keeping track of seconds, too).

Of course digital clocks in mechanical form have been with us for years. A relative newcomer to the clock field, however, is the moderately priced all-electronic digital clock. Some, by comparison, are quite expensive, and here is where the "do-it-yourself" approach can pay dividends. The Heath GC-1005 Electronic Clock kit, while costing more than an ordinary wall clock, can be obtained for considerably less cash outlay than most ready-to-plug-in devices with equivalent features. The time-to-build factor isn't bad, either. Heath rates this clock as a "3-evening kit"; the working time between laying out the parts and checking off the last step in the instruction manual was just 9 hours for this writer.

The outside and inside views of the completed clock are shown in the photos. The cabinet is of jet-black molded plastic, and included with the kit is simulated wood-grain self-adhesive paper for optional decorative use. Inside the clock may be seen a power transformer and a pair of circuit boards, on which nearly all of the other components are mounted. The vital functions of the clock are handled inside a single integrated circuit – a big 24-pin job – which performs all of the timing and display-control tasks for the instrument. Most of the remaining components are associated with the display, serving to drive the indicators. Of course the advantage of an electronic clock over a mechanical one is that there are no moving parts to



The inside of the Heath digital clock. The three neon-tube display indicators are visible at the front, mounted on the display circuit board. The main circuit board contains the IC (visible at the left), power supply filter capacitors (at the right of the IC), and other small parts. On the rear panel of the cover are mounted the slide switch for activating the alarm and the snooze-alarm switch. The speaker and time-setting switches are hidden beneath the main circuit board.

wear out. The Heath GC-1005 just sits there silently, flashing the seconds by at an almost unnerving rhythmic pace. And there's almost no heat generated inside the enclosure – a bit of warmth from the transformer is all.

The IC which is used in the clock is manufactured by Mostek Corp., being of the MK5017P series. The IC can be wired into the circuit to provide either a 12- or a 24-hour display. The choice is made by the builder during construction of the clock, but is easy to alter, should he later change his mind. (The omission or inclusion of a single wire on one of the circuit boards is all that's involved.) With a 24-hour display, the indication goes from 00 00 00 at midnight through 01 00 00 to 23 59 59, just one second before the following midnight. This is great for the fellow who logs his contacts in 24-hour time. More suited for ordinary household use, the 12-hour display goes from 12 00 00 at midnight through 1 00 00 (the leftmost digit is not illuminated) to 11 59 59 just before the next midnight.

Another feature included in the IC is an alarm function. That's right – the GC-1005 is an electronic alarm clock! The "alarm" is an electronically generated tone which emanates from a speaker mounted at the bottom of the enclosure. But a steady tone, it isn't. Instead, it's a beep, beep, beep type of alarm, with the beeps occurring at exact 1-second intervals and lasting a half second each. The tone is a bit raspy, and would likely be given a T-4 or T-5 report by most cw operators. But for this application it is pleasing – not raucous enough to startle a person, but different enough to let one know that something unusual is going on. It'll gently awaken even the most sound sleeper. The clock has a snooze-alarm feature, too. After the alarm sounds, depressing a spring-return slide switch deactivates the alarm beeper for a nominal 7-minute period. This 7-minute time interval is an internal function of the IC, and there is no way in which it can be changed externally to give a 10-minute period . . . a thought that will cross the minds of many amateurs considering an identification reminder. Whether the clock is wired for 12- or 24-hour operation, the alarm feature works on a 24-hour basis. In other words, if the alarm is set to go off at 7:00 A.M., it won't sound off at 7:00 P.M., even though the alarm may be activated. As a matter of fact, the alarm can be turned off in the morning right after it sounds, and be activated immediately; it won't sound off again for another 24 hours.

The Display

The display indicators are neon glow tubes. A somewhat abbreviated schematic diagram of the display system is shown in Fig. 1. From the diagram and the photos, it may be seen that each digit of the display can be formed by the proper combination of up to seven segments. Instead of being on continuously, the digits are pulsed or strobed. This technique has not seen much use in amateur equipment having illuminated readout segments, but is commonly used in several applications. Perhaps the most familiar to amateurs is in electronic calculators. The advantage of the pulsed display is that, for the average level of power consumed, the display is much brighter than if the digits were to glow continuously.

The segments for two digits are contained in a single envelope. Thus, three tubes make up the display, one each for hours, minutes, and seconds. Each segment of each digit is a separate and independent chamber filled with neon gas, with an independent cathode. All segments of a given digit have a common anode, however. A potential of approximately 155 volts is applied across each segment to cause it to glow.

Input pulses to the display may be divided into two categories, those for digit strobing, and those for segment strobing. In order for a given segment to be illuminated, the digit strobing pulse *and* the segment strobing pulse for that particular segment must be present in time coincidence. The strobing pulses for the digits are applied at inputs marked A through F of Fig. 1, and the segment strobing pulses are applied at inputs 1 through 7. The digit strobing pulses provide anode voltage for the tubes, and are applied in sequence at inputs A through F for seconds, tens of seconds, minutes, tens of minutes, hours, and tens of hours. The pulse duration for each digit is 1.4 ms, with pulses for a given digit recurring once every 10.6 ms. The switching off of the pulse at input A, for example, occurs simultaneously with the switching on of the pulse at B. Thus, a single scan takes place in 1.4 × 7 = 9.8 ms. There is a "dead time" of about 0.8 ms

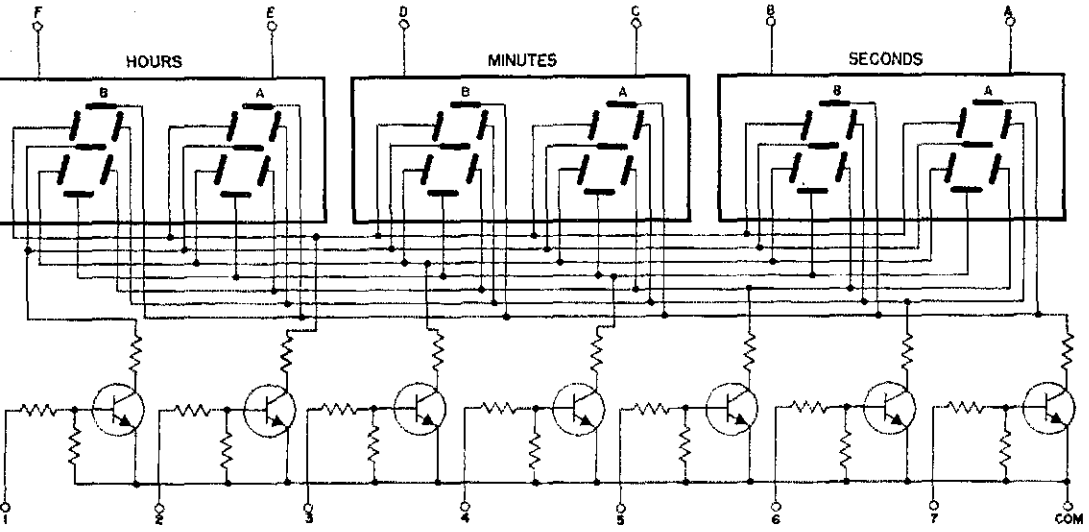


Fig. 1 — Schematic diagram of the display indicator section for the Heath clock.

before the next scan begins. In this way, the row of digits is scanned about 95 times per second. These times are nominal and will likely vary slightly from one clock to another. The frequency is controlled by external timing components in conjunction with the oscillator inside the IC.

While the strobing pulses are being applied in sequence at inputs A through F, segment pulses are also being applied at inputs 1 through 7 in parallel format, or simultaneously. Suppose that a digit strobing pulse is applied at input A, providing anode voltage for the seconds indicator. And suppose that, simultaneously, positive strobing pulses are applied at inputs 5 and 6. If the diagram is traced out through the switching/inverting transistors to the tube cathodes, it may be seen that the two right-hand vertical segments of all digits will be at common (ground) potential. A figure 1 will therefore be illuminated in the seconds position. No segments of other digits will be glowing at this instant, because no anode voltage is applied to them. If a figure 8 is to be displayed, as another example, positive pulses are applied to all inputs, 1 through 7, at one time. As the digit strobing pulses move along the display from seconds through tens of hours, the segment coding pulses change in step, to display the proper digit in the correct position for the time to be indicated. The IC controls the coding and distribution of all pulses to display numerals 0 through 9 or 0 through 5, as needed, in the appropriate position.

One possible disadvantage of a pulsed or strobed display such as this is the creation of rf hash which may be heard in a nearby receiver. (Some electronic calculators we've had in the ARRL lab have been particularly bad on this account, in the low hf range.) However, the Heath clock is as clean as a whistle — we found no detectable hash on any frequency, broadcast band through 20 MHz.

Miscellaneous Features

The reference frequency for the time-keeping section of the IC in the clock is taken from the power line. The clock may be operated from either a 50-Hz or a 60-Hz line, another choice which is to be made by the builder, involving the omission or inclusion of a wire on a circuit board. Thus, the accuracy of the clock is no better (or no worse) than the accuracy of the line frequency, the same as with any other line-powered electric clock. In the New England area, we noted departures from WWV's time ticks of as much as 3-1/2 seconds within a couple of hours after setting the clock. However, without touching a thing, the display was only 1/2 second away from WWV within another three hours, which goes to show that the long-term accuracy of the power-line frequency isn't at all bad, at least in this particular area. Similar accuracy can probably be expected in most other parts of the 48 contiguous states and Canada.

Setting of the clock is done with two spring-return slide switches, located on the bottom of the cabinet. One switch is used for rapid advance of the minutes indication (0 through 9), and the other for hours (midnight through midnight). Activating both switches simultaneously provides rapid advance for tens of minutes. A third slide switch causes the seconds display to be held at zero and prevents it from advancing. Returning this switch to the operate position on an even minute permits the clock to be set "on the nose."

An ALARM switch is also provided for the time-setting functions. Sliding this switch causes the indicator display to show the time for which the alarm is set. If the alarm time is to be changed, the time is set with the two spring-return switches as mentioned above. An NE-2 type A.M.-P.M. lamp indicator functions to show whether the alarm is set for morning or evening hours. (This lamp also

functions when the regular time-keeping section is being reset, if the time-hold switch is activated.) All the while during the setting of the alarm time, the time-keeping section of the clock is still chugging away, so that when the ALARM switch is returned to its normal position, the correct time is indicated.

Another neat feature of the clock is the "power has been off" warning. If the power is interrupted only momentarily – a few seconds – the clock will continue to display time when power returns, and the time error will be only that short period for which the current was off. But if the current should be off for more than a few seconds, enough time for the power supply filter capacitor to discharge significantly, the time-keeping section "loses its memory." When power is reapplied, the display indicator shows a steady 88 88 88 (just as appropriate for ham radio as 73 73 73, isn't it!). Anyway, there's no mistaking the fact that the time indication isn't for real if there has been a power interruption. – *K1PLP*

Heath Company GC-1005 Electronic Clock

Dimensions (HWD): 2-7/8 × 6-7/8 × 5 inches overall.
Weight: 2 pounds, 3 ounces.
Power requirements: 120 or 240 V ac, 50 or 60 Hz, 6.5 watts.
Display: Six full digits, each being 9/16-inch high by 3/8-inch wide. The display may be read comfortably by a person with normal vision from a distance of 12 or 15 feet.
Format: 12 or 24 hour time display.
Accuracy: Determined by power-line frequency.
Alarm: 24-hour operation, snooze alarm at 7-minute intervals.
Price class: $55.
Manufacturer: Heath Company, Benton Harbor, MI 49022.

December, 1923

. . . An extensive article on the upcoming (fourth) Transatlantic tests brings additional comment from the Editor, pleading for no selfish transmissions during listening periods. At copy time no one realizes the 8AB-1MO contact in late November will scoop the tests.

. . . To know whether that weak signal signing 8AB is French, British, U.S., or what, ARRL proposes some international intermediates. Instead of "de" there will be a two-letter combination indicating the nationality of caller and called, and 14 arbitrary letters are assigned countries with known activity. A Connecticut station calling a Canadian would be, for example, 9AL cu 1AW; and the return transmission, 1AW uc 9AL.

. . . A new author, name of A. L. Budlong, tells us that in his extensive receiving experience a tuned r.f. stage is a complete waste of time and if we want to improve a regenerative set, go all the way to superhet.

. . . With intense public interest in homebuilt radio, newsstand distribution of *QST* is skyrocketing – and expensive. Beginning with this issue, operating news and calls heard will appear only in membership copies, not those on the stands.

. . . Lots of technical info in this issue. S. W. Place disagrees with an August article endorsing hard rubber insulation, and states the case for phenolics – Bakelite et al. 8ML analyzes Edison storage "B" batteries and tells us how to build a rack of cells. Karl Hassel points out the features of good tuner design (some of these ideas at 9ZN will later show up commercially in Z-Nith products).

Strays

In consecutive QSOs, K1ZND worked UL7JAE and UL7EAJ.

December, 1948

. . . Stability is an important subject of the day. W1TS shows us how to build a 6AG7-6L6 series-tuned VFO – minimal frequency drift, no noticeable chirp, and shockproof mounting to eliminate vibration. For the receiving end, W1DX capitalizes on the stability of 3.5 and 7 Mc. circuits by designing some crystal-controlled converters for 14 Mc. and higher bands – following the Collins concept.

. . . W1DBM has another in a series of what will become classics in treatment of TVI problems – filtering, traps, shielding; Phil can set a TV atop his 800-watt rig in Connecticut and pick up New York stations with no harmonic interference.

. . . Another step is some extensive tests to determine the impact of the unfortunate selection by RMA (now EIA) of 21 Mc. as the standard intermediate frequency for TV receivers. K2XBH is an experimental license for W1DBM (the 21-Meg. band is not yet assigned us) to check potential problems, with the cooperation of GE, RCA and Hallicrafters. One solution – in cases of interference, shift the 21.25 sound channel (mostly RCAs) to 21.9 Mc.

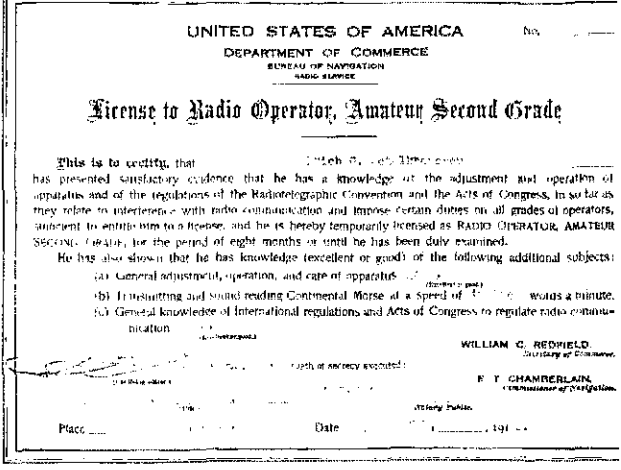
. . . Gladfelter and Davis describe the use of an interferometer for measurement of the frequency of microwave energy; extension of the ray paths produces peaks and nulls as they reinforce or cancel.

. . . W2BNY shows how to build a 10-meter mobile rig in the bottom mounting chassis of a surplus PE-103 dynamotor (wonder if motor vibration showed up in modulation?).

. . . The cover shows ten-year-old Jane Bieberman, newly licensed as W3OVV under OM W3KT's training; she still holds the call. – *WIRW*

Reminiscing . . .

BY E. G. SCHALKHAUSER,*
W9CI



UNITED STATES OF AMERICA

DEPARTMENT OF COMMERCE

BUREAU OF NAVIGATION

RADIO SERVICE

License to Radio Operator, Amateur Second Grade

This is to certify, that ... has presented satisfactory evidence that he has a knowledge of the adjustment and operation of apparatus and of the regulations of the Radiotelegraphic Convention and the Acts of Congress, in so far as they relate to interference with radio communication and impose certain duties on all grades of operators, sufficient to entitle him to a license, and he is hereby temporarily licensed as RADIO OPERATOR, AMATEUR SECOND GRADE, for the period of eight months or until he has been duly examined.

He has also shown that he has knowledge (excellent or good) of the following additional subjects:

(a) General adjustment, operation, and care of apparatus ...

(b) Transmitting and sound reading Continental Morse at a speed of ... words a minute.

(c) General knowledge of international regulations and Acts of Congress to regulate radio communication ...

WILLIAM C. REDFIELD,
Secretary of Commerce.

Oath of secrecy executed:

F. T. CHAMBERLAIN,
Commissioner of Navigation.

Notary Public.

Place ... Date ..., 191 ..

Nostalgia Grips an Old Timer . . .

NOW THAT more than fifty years have elapsed since our American Radio Relay League has been functioning, and very successfully, I would suggest that we have a "Gathering of the Clan" as a tribute to those who have lasted this long from the start. There is a tremendous satisfaction in being one of the old timers, to whom ARRL has meant so much.

The many countless recollections over the more than fifty years have me classed as a "millionaire with earnings still coming in."

As I page through the first thumb-worn two issues of *QST*, dated December 1915 and January 1916, and follow through on over 650 issues since then, I still recollect the happenings of the early days as telegraph signals were pounded out on 200 meters-plus – the rotary gap roaring its high-pitched whine, and the hot-wire antenna meter crawling up to . . . 6 . . . 7 . . . 8 amperes.

How we recall the intense quietness that followed when the change-over switch was thrown to receive, to listen – ears straining to pick up that faint dah-dit-dah over the Brandes headphones as the whisker on the galena crystal was adjusted – oh so carefully – again and again, for the most sensitive spot.

After midnight was the best time to operate, not because there was less traffic, but by then other outside disturbances were down; folks had gone to bed and quietness usually reigned.

Greatly cherished were the early station appointment certificates. Here we find the signature of our first president and founder, Hiram Percy Maxim, and our secretary, Clarence Tuska. And a special frame was located for that "License to Radio Operator" from the United States Department of Commerce.

We clearly remember the announcement of the first Presidential Relay. The message originated in Washington, D.C. on February 21, 1916, was relayed from station to station across the country, every station silent after 10 P.M., and thousands of radio amateurs listening as the telegraph signals were relayed from one pre-arranged station to the next across the United States, west, and then back again to Washington, all within the then remarkable short time of a few hours.

Each month we waited eagerly for the next issue of *QST*, as we do today, ready to try out a new published circuit, build another piece of gear, construct another receiver or modify the old one, experiment with new tubes – build, tear down, build again – and thereby constantly learn and enhance our wireless knowledge.

Talking to hams at the monthly meetings, at regional conventions and gatherings, on field days, planning the hamfests, swapping yarns and just getting acquainted in meeting people face-to-face with whom we had previous contacts – all this is part of ham radio as it was and still is being practiced today. There are no barriers, just fellows who have common information to hash over, and doing it without regard to social status or range of profession in life.

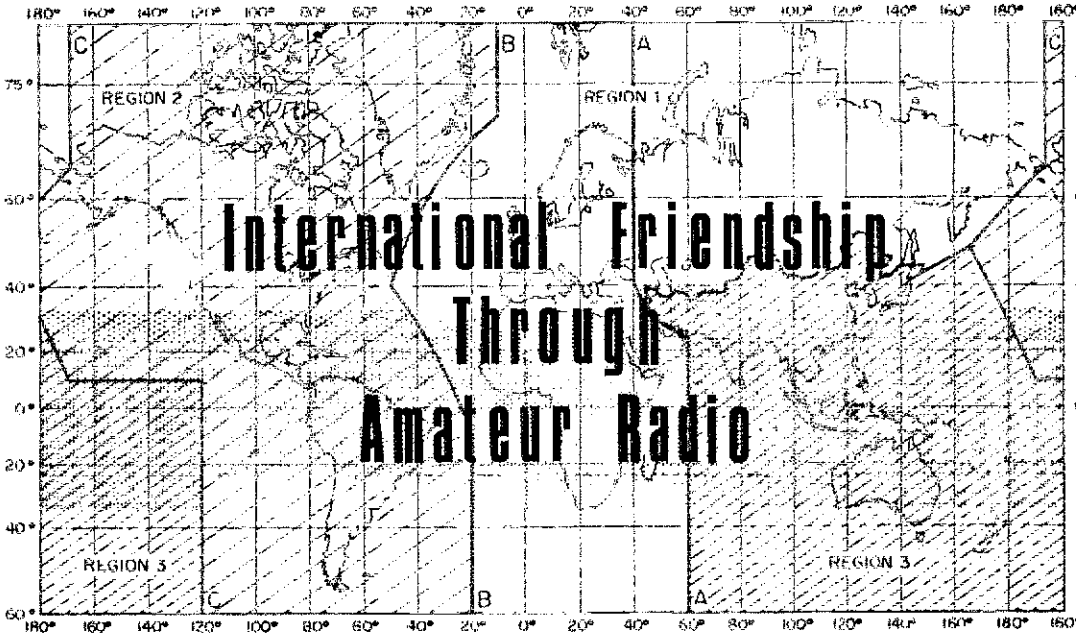
The whole world is our classroom, our laboratory, our common meeting place. We learn to exchange a common but unique language. We have a common code of signals and abbreviations, and not particularly concerned whether these originate from Tokyo or from the Fiji Islands. The messages are readily understood. And there is no home or shack in which one feels being a stranger when "wireless" amateurs get together. I have met "strangers" on avenues and in shops of Chicago and San Francisco. They have been recognized on a street car in Amsterdam and in the hotel lobby of Geneva. The ARRL insignia and the station call letters on a coat lapel are identification anywhere in the world and many a "stranger" makes a friend for life.

Yes, my sixty years in this most extraordinary, pleasant and interesting hobby of hobbies has opened more welcome doors and has spelled more welcome news, and above all has recorded in my log more high drama than one could possibly ask for in several lifetimes.

Every issue of *QST*, from the first prized copies to the current issue in 1973, is in my library – and is there for just one over-riding and all-encompassing purpose: namely, a constant reminder of what ARRL has meant to me during all these years. Do you suppose, Mr. Editor, that probably there are enough others in our fraternity, still hamming who also share a common friendship in ham radio, dating way back, who would like to share a "meeting of the clan"? QST

* Professor Emeritus, Bradley University, Washington, IL 61571

Chart of Regions as Defined in Table of Frequency Allocations



International Friendship Through Amateur Radio

BY ARTHUR K. MEEN,* Q.C., VE3RX

MR. CHAIRMAN, fellow amateurs, ladies and gentlemen:

First, may I express my pleasure and delight in being offered the opportunity this year to be your keynote speaker. We in Canada think of you, not just as neighbors, but – with our common heritage of language customs, and the English Common Law, – more as cousins or as brothers. We consider it our good fortune that we have you next door to us, across a 3-thousand mile undefended border – may it ever be so.

Secondly, I am here, not in my more or less formal capacity as Associate Counsel (Canada) to the American Radio Relay League, but simply in my capacity as a fellow radio amateur.

The theme of this convention and therefore of my remarks to you this afternoon, is "International Friendship Through Amateur Radio," and so my thoughts are directed to that theme and in particular, to the influence which some of our amateur radio activities have on international friendship and on our image on the world scene.

Before I get into some of the elements which comprise the amalgam of your and of our image on the world scene, perhaps I might dwell for a moment on the structure of the International Telecommunication Union (ITU) and the International Amateur Radio Union (IARU).

To begin with, the ITU, which is a branch of the United Nations, but much older, started out somewhat over 100 years ago known as the International Telegraphic Union. Membership in the ITU is limited now to those countries that are members of the United Nations. There used to be about 60 such members, but recently along with membership increases in the United Nations itself, we now see ITU membership standing at about 145 or so. Some of these new countries have absolutely no tradition or history of amateur radio at all and they therefore tend to look upon the amateur radio bands as a waste of good frequencies, frequencies which they covet for other purposes. It is the ITU, not your Federal Communications Commission nor our Department of Communications up in Canada, which controls the broad frequency assignments and so I am sure you must recognize the significance which the vote carried by these new countries may have at future frequency allocation conferences. The next ITU conference at which frequency allocations will be considered is expected to be held in about 1978 to 1980. This is not really very far away and will be upon us all too soon. As to what we may be able to do in the meantime, I shall have more to say later.

IARU Organization

Then there is the International Amateur Radio Union or, as we know it, the IARU. This is a world federation of all national amateur radio societies. It was founded in about the year 1925 by about nine countries including Canada as a separate country

* Associate Counsel, ARRL.

represented by the Canadian Division of ARRL and of course also including the United States represented by the ARRL itself. Today, the IARU comprises about 85 national societies from all corners of the globe. IARU has, on a rather unofficial basis, adopted the ITU division of the globe into three regions as follows: Region 1 – comprising Europe and Africa; Region 2 – comprising North, Central and South America; and Region 3 – comprising Pacific and Asia.

Region 1 has been operating since a Paris conference of IARU in 1950, but Region 2 has been operative for only the last six or seven years, and Region 3 for only the last two or three years. But suffice it to say that all three regions, despite substantial problems of geography, particularly in the case of Region 3, are operational.

I think it bears emphasis that IARU is not an arm of the ITU. It is a completely separate entity being the world voice of our national amateur radio societies. Its objectives are many and varied, but at the moment one of its major concerns is to get across a sort of message to its member national societies and through those societies to the amateur radio fraternity themselves. In short, the message may perhaps be expressed like this, "You don't win concessions or indeed, just hold your own, by attending a conference and making a pitch." In fact, IARU and its member national societies do not have any direct voice whatever at ITU conferences. They can only express their views indirectly through the delegates from their, and other, countries. Hence, your, and our, national society, ARRL is very eager indeed to develop and maintain good liaison with the United States, Canadian and other national delegates to ITU conventions so that, when the crunch is on, so to speak, in 1978 or 1980, enough delegates will know and understand the very positive role which we amateurs believe we can play. In this regard, ARRL is so concerned with these matters that the Board of Directors recently set up a special sub-committee of the board called the International Affairs Committee. But this committee, and R. M. Booth, W3PS, in Washington, and Noel Eaton, VE3CJ, in Ottawa, and all the others who are active in representing our interests, cannot do it all alone. Our activities are quite unlike anything else: our voices are heard, literally, around the world. Your local camera club may have just as many members, and just as lively and provocative discussions, but they know who's listening; when we are "on the air," we never do.

Trips, like those of Gus Browning, (W4BPD) taken to many foreign lands, basically have done much over the years to engender in those foreign lands a better understanding of the United States, and of Canada too. But it is all too easy for us to ruin everything by some careless, thoughtless words or actions, and turn good into bad.

The "Ugly North American?"

We must remember, to begin with, that American and Canadian amateurs are as a group the wealthiest in the world. Furthermore, we are about equal in numbers to all the rest of the amateur radio world combined and, in addition, we must not forget that we enjoy remarkably secure and stable 120 V 60 Hz electrical energy supply at reasonable cost. The impact of this is that by and large, on the world scene, the signal from the 2 kW PEP ssb rig into a 3- or 4-element wide-spaced Yagi or cubical quad up 90 feet from Stateside or from Canada is what dominates and the trouble is that there are so many of us, too. I suppose that even if we were to stick to our 180-watt exciters, into dipoles up 30' – because of sheer numbers, we'd still dominate. But kW linears and high gain arrays are here to stay, I guess, and anyhow, I'm not preaching QRP today. The point I want to make is that our prosperity and our numbers, though just great in many ways, can adversely affect our image on the world scene. Let's face it – people are human, so it behooves us to tread as lightly as possible with our heavy feet.

Before leaving this point, I think it only fair to say that on the two occasions when I have had the pleasure to play the role of the fox instead of one of the hounds (Jamaica as 6Y5RX and Grand Cayman as ZF1RX) I encountered nothing but extreme courtesy and almost universally excellent operating techniques from Stateside. For all I know, however, there may have been a few other foreign stations trying to catch me too who went away gnashing their teeth at all those wealthy Ws and Ks and VEs who got to work the only ZF1 they'd ever heard.

I don't know any simple answer to this really. I suspect that ambient electrical noise is rising slowly year by year as more and more cars and appliance are put to use, and that this will be a world-wide phenomenon and not limited to North America. If this is so, then maybe the kW linear really is here to stay.

Certainly, I am not suggesting that 90 percent of us give up the amateur radio service to go fishing – or take up stamp collecting.

But therein lies the problem created by sheer numbers of W and VE stations running high-powered sophisticated gear.

International Scofflaws

My first illustration concerns a certain gentleman, a well-known amateur who took his rig down to Jamaica, set it up on the north shore in one of the holiday resorts there, and proceeded to operate portable 6Y5 without benefit of a Jamaican license. (This was before Jamaica worked out reciprocal licensing provisions). He operated there

(Continued on page 146)

For its keynote speaker, the 1973 Dayton Hamvention chose a person ideally suited to discuss international aspects of ham radio – a "foreigner," if anyone really accepts the existence of the northern U.S. border, yet one intimately familiar with W/K ham activity to be able to talk frankly about our foibles as well as our good points. Especially with an allocations conference on the horizon, this is an important message for all of us.

There is a comparatively small number of amateurs who, collectively, spend hundreds of hours each week monitoring the amateur bands and recording the presence of intruders, non-amateur stations. We are all much indebted to these amateurs and especially to the dean of them all, W1NF. Art Ericson, W1NF, now 80 years old, records some of his thoughts about the Intruder Watch.

The ARRL Intruder Watch

BY ART ERICSON,* W1NF

IN 1962, two years before my retirement, I became aware of the great number of non-amateur stations that were found in the restricted segments of the amateur bands, and I wrote to Eastern Massachusetts SCM Frank Baker, W1ALP, to express my concern. He responded by sending me a supply of Communications Department forms on which amateurs were to log all of the intruders they heard, with these logs then being transcribed by ARRL Headquarters into individual complaints filed with FCC.

Soon after that, ARRL formed an Intruder Watch and began actively soliciting complaints by amateurs of the presence of intruders.[1] The Communications Department Form CD-36 soon became too cumbersome, because of the multitude of reports being received by Headquarters, and so the reporting process was streamlined. Now, we have a manifold form complete with carbon paper the original goes to FCC, one carbon to ARRL, and the second carbon is kept by the individual Intruder Watcher.

Even though those carbon copies are on mighty thin paper, the 20,000 reports that I have sent in since 1963 make a pile that is 38 inches high! I myself have made up a list of some 250 intruders that I have identified by call sign, and I think it's quite possible that the records kept by FCC probably indicate a somewhat higher number of identified intruders.

Now, some of you are asking – what is an intruder? You must first understand that in order to accommodate all of the government and private requirements for frequencies in the spectrum it is necessary that there be "sharing" of certain segments. For example, the International Radio Regulations adopted at Geneva in 1959 specified that the frequencies 3500-3900 shall be shared between the Fixed, Mobile, and Amateur Services. Although in the United States and Canada it is national policy not to assign those frequencies to anything but amateur, in other countries you will find all sorts of stations in the other two services (Fixed and Mobile) operating in the region 3500-3900 kHz. This is all perfectly proper, and so many of the stations that you hear on 80 meters are not really intruders. However, the frequencies 3500-3900 are *not* shared with Broadcasting, and so if you heard a broadcast station operating below 3900 kHz, he would be an intruder.

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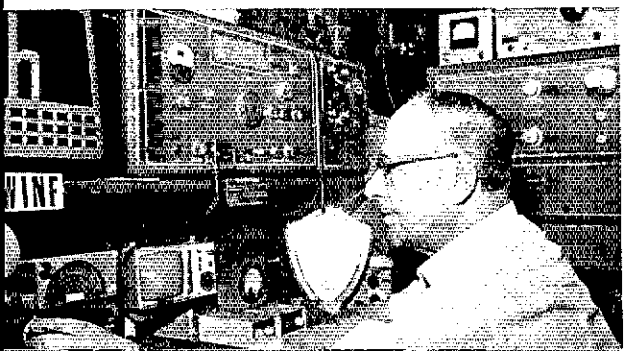
[1] Although we have grown accustomed to using the word "intruder" in a rather free and easy fashion, legally we are concerned with the stations that are causing harmful interference. No. 115 of the Radio Regulations, Geneva 1959, states, "Administrations of the Members and Associate Members of the Union shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations given in this Chapter or the other provisions of these Regulations, except on the express condition that harmful interference shall not be caused to services carried on by stations operating in accordance with the provisions of the Convention and of these Regulations." Thus, the intruder must be causing harmful interference to be the subject of a complaint. Or, to put it another way, it is perfectly okay for any station of any service to operate in the amateur bands, provided that no harmful interference is caused and no complaints are received. That is the *raison d'etre* of the Intruder Watch, to record the harmful interference caused by stations of other services and to file the appropriate complaints through the proper channels. – *W1RU*



Art Ericson, W1NF, the dean of ARRL's Intruder Watchers, still hale and hearty at age 80, and devoting many hours each day to helping protect the amateur bands.

There *are* some exclusive segments, and the band 7000-7100 kHz is supposedly exclusively amateur. Unfortunately, there are a considerable number of intruders in that exclusive segment, mostly broadcasting stations, and we Intruder Watchers file a good many complaints on that kind of operation. Again, the segment 14,000-14,250 is exclusively amateur, and the portion above 14,250 would also be exclusively amateur except that the Soviet Union has notified the ITU that it will operate stations in its Fixed Service between 14,250 and 14,350. The entire 15-meter band is exclusively amateur, according to the international regulations.

So, in order to determine what is an intruder, you must first understand what the shared segments are and then you can identify anything *else* as being an intruder, remembering, of course, that he must be causing harmful interference. I've summarized this in a little table which you will find as a part of this article.

Although being an Intruder Watcher requires a great deal of patience and perseverance, I am convinced that the Intruder Watch has paid off and will continue to pay off as we draw nearer to a general World Administrative Radio Conference. For example, broadcasting stations used to be quite numerous in the 7000-7100 kHz segment and I used to log about 15 of them every night. However, now there are only three regulars on at 0300 Greenwich, which is when I listen. Of course, the segment 7100-7300 kHz is loaded with many broadcasting stations the world over, and we amateurs find it quite difficult to enjoy a QSO under those ridiculous conditions. Unfortunately, it is a shared band. Nevertheless, we Intruder Watchers make a practice of monitoring that segment, because some of the broadcasting stations are guilty of beaming transmissions to North and South America (which is against the rules) and some of the countries use more than one frequency in that segment, which is rather poor frequency management. That is, it is not helpful in conserving spectrum space. Unfortunately, three of the biggest users of broadcast frequencies (BBC, USSR, and the VOA) all use several frequencies simultaneously carrying the same program in that segment, which I think is a most unfortunate situation.

The 14,000-14,250 kHz segment is supposed to be strictly amateur, but even at this date I log about five intruders weekly. These particular intruders use mostly RTTY and they don't sign very often.

I put in an average of about eight hours a day on Intruder Watch. During daylight hours I scan the 20-meter band, and hardly a day passes that I am not able to log at least a couple of intruders. Nevertheless, I feel that the band is much improved since 1963, when I used to log a great many more intruders than I do now.

When I first started the Intruder Watch, I was logging images and some harmonics, and so I built an image dipper which certainly improved my operation. I very seldom heard images anyway, but this gadget eliminated any doubt after I began using it. It covers from 20 MHz to 3 MHz and was described by W8ZCQ in *QST* for January, 1967.

Table I — What Are Intruders

On — kHz	*Intruders Would be the Following*
1800-2000	Broadcasting. Any U.S. or Canadian non-amateur, except Loran.
3500-3900	Broadcasting. Any U.S. or Canadian non-amateur.
3900-4000	Western Hemisphere Broadcasting. Any U.S. or Canadian non-amateur.
7000-7100	Any non-amateur station.
7100-7300	Western Hemisphere Broadcasting. Any non-amateur station other than broadcasting.
14,000-14,250	Any non-amateur station.
14,250-14,350	Any non-amateur station except fixed stations in the U.S.S.R.
21,000-21,450	Any non-amateur station.
28,000-29,700	Any non-amateur station.

Another important discovery I made was that if one uses the wrong antenna length on the receiver, one hears a lot of stations that are really not on the band you are tuned to. I therefore spent some time arranging the correct antenna for each band that I monitor, and it has certainly paid off.

Occasionally I use two receivers. I will set one to an RTTY transmission, in the hope that I will eventually hear him sign on cw, while I tune around with the other receiver for other intruders.

Participating in the Intruder Watch has brought me a great deal of personal pleasure and pride. I am proud to know that I have served the longest of any of the individual Intruder Watchers and that the large number of reports that I have turned in have been helpful to the League and to the FCC in their work. In 1969, at the New England Convention in Boston, I was honored with the Ham of the Year Award for 1969 because of my work in Intruder Watch. This plaque hangs proudly near my smoking stand for all to see, including myself. It gives me a feeling that I have done something worthwhile for amateur radio, and as I mentioned when I received the plaque, I could not have spent this time had it not been for my wife's tolerance, for which I am deeply thankful.

I would certainly recommend that if anyone wants to put in an hour or two a week and perform a service which may well be extremely important for the future of amateur radio, he write to ARRL Headquarters and ask to be enrolled in the Intruder Watch. We'd be glad to have you help! QST

OSCAR NEWS

This marks the first anniversary of the "Oscar News" section in *QST*. Interest in the amateur satellite program has broadened greatly in the last year; the vast majority of present Oscar users came aboard after the first orbits were already history. No doubt many other readers would like to join them, but aren't quite sure how to go about it.

First, a few facts. Oscar 6 contains a *translator* which receives signals in the 145.9-146.0 MHz range (*uplink*) and retransmits them at the high end of ten meters, 29.45-29.55 MHz (*downlink*). The power output of the satellite's transmitter is on the order of one watt, and this power is shared by all users of the satellite. If there are ten signals in the passband, all of equal strength, they will use about 100 mW. apiece; if there are 100 (not at all unusual!) their individual signals will be retransmitted at just a 10 mW level. The only way an individual user can make himself louder on downlink is at the expense of the other users.

Because of this, and because relatively low power is required to use the satellite, Amsat, the FCC, and ARRL have urged strongly that all Oscar 6 users limit their power to 100 watts effective radiated power. How you arrive at that power level is up to you. If, for example, you have 20 watts output, 3 dB loss in your coax and a 10 dB gain antenna pointed at the satellite, your erp is 100 watts. If you increase your transmitter power to 200 watts output, all you need is a dipole or other non-gain antenna. Note that the antenna gain is figured *pointing at the satellite*; if your beam is pointed at the horizon and the satellite is overhead, you're not getting much benefit from its gain! An elevation control, that is, a rotator mounted so as to change the angle which the boom of the antenna makes with the ground, is ideal. A good compromise can be arrived at simply by pointing the beam up at an angle of 20-30 degrees. Experience has shown vertical polarization introduces less fading than horizontal, but circular polarization is best. KH6IJ's two articles (*QST* for January 1973, p. 21, and June 1973, p. 11) are good starting points if you want to build your own uplink antenna.

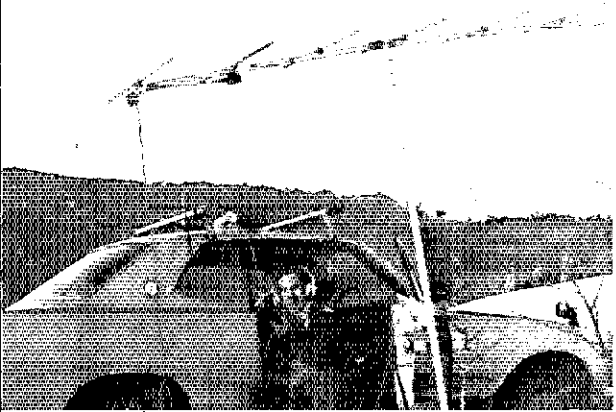
For downlink, you can use almost any receiver and antenna which will cover the high end of ten meters. Your success with Oscar, though, will be proportional to the performance of your receiving system; remember that that 10 mW signal is coming from thousands of miles away! A preamplifier will be a useful addition to most receivers, and a beam will be very helpful. Some amateurs have tried to use Oscar and have been disappointed not to be able to hear their own signals. A few have increased power above 100 watts erp; others have given up. The answer to their problem probably lay in their *receiving* setup; increasing power only creates problems for those who have taken the trouble to install adequate receiving systems, and who run the suggested power level.

When your station is ready for Oscar operation, the first problem you face is determining when the satellite is within range, and when it is available for use. The plotting of orbits is a bit too complex to go into in this column, and has already been covered in *QST* articles in October 1969 and March 1970. If you don't have those issues handy and you'd like the information, the articles are reprinted in a 32-page booklet entitled "Member's Guide to Amateur Satellites," available from Hq. for a 6 × 9-inch self-addressed envelope with 16¢ postage.

The operating schedule of Oscar 6 has undergone several changes while it has been in orbit. The

OSCAR 6 TWO WAYS

	Stations	*States*	*Countries*
G6RH	297	13	40
I5TDJ	150	—	27
JA1ANG	30	1	3
KL7MF	167	32	18
KS6ER	15	1	4
LA1K	—	30	38
OH2RK	253	6	43
VK7LZ	58	—	4
VK7PF	86	—	5
YU2RIO	207	14	23
4X4MH	265*		22
K1HTV	522	48	39
W2YFM	60	—	3
K2ZRO	185	45	17
W3BWU	139	38	14
K4MSG	61	28	3
K4ZCP	185	37	7
W6OAL	200	41	6
WA7GCS	1636*	43	12
W7ZC	319	38	2
W9OII	228	50	17



The enthusiasm of Japanese hams isn't lessened by snow and cold weather. Last February, JA1VDV and JH1HKS drove into the mountains about 100 miles from Tokyo to put Nagano Prefecture on the air as JA1VDV/JAØ. Ten watts of ssb into this seven-element yagi accounted for ten contacts through Oscar 6.

best way to keep up with future changes is to keep an ear on W1AW's special Oscar bulletins. Orbital information is available from the same source. At this writing, the satellite is turned on only for *ascending* (south to north, or evening local time) orbits on Mondays, Thursdays, and Saturdays. The schedule may have changed again by the time you read this.

When you have figured out the times you can use the satellite, you have only one more hurdle to clear: hearing yourself on the downlink. Since Oscar 6 is a crossband device, it is possible to transmit on two meters at the same time you're listening on ten. Most successful users do just that. If you're fortunate enough to know your exact frequency on two meters and you have an accurately-calibrated receiver, you should have little difficulty. Just use the formula:

$$F_{down} = F_{up} - 116.456 \text{ MHz} \pm \text{Doppler}.$$

Doppler can change the frequency by as much as 4.5 kHz in each direction during an overhead pass.

If you're using a crystal-controlled transmitter, *don't* rely on the frequency stamped on the crystal to be accurate. It's not unusual for FT-243 crystals to be 50 kHz off by the time they're multiplied to two meters! Of course, an accurate and stable VFO is best, and VXO is entirely practical due to the relatively narrow range of frequencies being used. Transverters, either commercial or homebrew, are in wide use.

While just about every mode imaginable has been used through Oscar 6, cw and ssb are best. Cw contacts have far outnumbered phone so far. Code speeds range from 5 wpm up, and there are few operators who won't QRS to work a new station. Initial contacts are apt to be little more than an exchange of signal reports, but once you've worked the same station a couple of times the contacts tend to be longer and chattier. And, regardless of the length of the contacts, a cameraderie develops just on the basis of common interest between operators who have contacted via satellite.

W9OII Makes Third Oscar WAS

In September, W9OII became the third station to qualify for the special Amsat WAS award. Ken says that Oscar 6 reawakened his interest in ham radio, which had been dormant for several years. All we can say is, it didn't take him long to catch up!

Ten Meter Contest

November *QST* carried an announcement of the ARRL 10-Meter Contest scheduled for December 15-16. Oscar contacts *will* count, so check the rules and go to it! – *K1ZND*

Recent Satellite DX Achievement Award Winners

G8CEX G8GP DK4QE I1TEX WA4VUH DU1EJ W8NZS SM5AH WA9NPM W2GV W6OCP WØCY W7EOT/KH6 F1QV I5TDJ KH6BTV HB9RG KH6GMP OZ8SL JA3JM SM5CJF DU1POL.

Certificates have been issued to 153 stations in 26 countries and 5 continents.

JPL Amateur Radio Club Successfully Tests New AO-B Translator

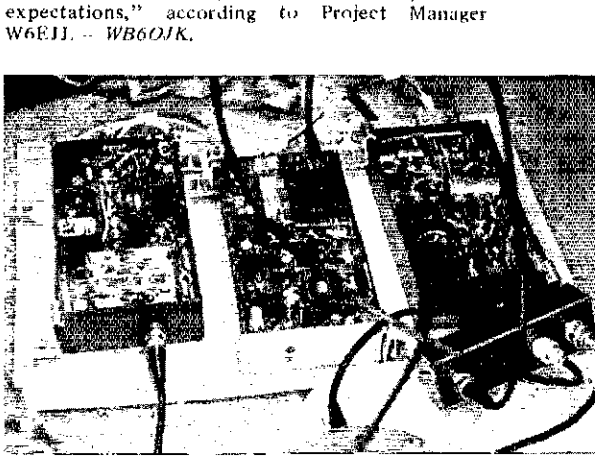
An operational earth-flight test of equipment to be launched on Oscar 7 was held Saturday, October 6, by the JPL Amateur Radio Club as a volunteer support effort for Amsat. This final test prior to space launch was the follow-up to an earlier "shakedown" flight in September. Launch of Oscar 7 as a "secondary payload" has been approved by NASA and is slated for early in 1974.

Payload gear consisting of a 432 MHz to 145 MHz translator and a 2304 MHz beacon transmitter was flown from Van Nuys Airport in a Beechcraft Bonanza J owned and piloted by K6KVC. His flight crew included Flight Coordinator WA6OPB and Payload Engineer K6KCY. Departing Van Nuys at 0933 PDT, the flight plan called for fly-overs at San Diego, Santa Barbara, San Jose, Sacramento and the San Joaquin Valley with a lunch stop at Palo Alto. Cruising altitude was approximately 12,000 feet giving a radio horizon of up to 150 miles. The 432 MHz to 145 MHz translator was built in Germany by DJ4ZC/DJ5KQ, while the 2304 MHz beacon was built by the San Bernardino Microwave Society.

Waiting on the ground at the Van Nuys residence of WA6VRT were 21 operators manning four field-erected communications centers which maintained contact with the aircraft and amateurs throughout California and in Nevada and Oregon who assisted in this unique test venture. Liaison and contact/relay stations were WA6DKD and a group on Mt. Pinos, along with W6ASH and W6VKP at Palo Alto Airport.

Operations and frequencies were the same as the translator will use when it becomes operational in orbit: uplink frequency is 432.150 MHz and the downlink (output) is 145.950 MHz, both with a bandwidth of ±25 kHz.

Final tabulations of participating stations, including 35 stations transmitting on 432 MHz, proved the test "very successful and up to all expectations," according to Project Manager W6EJJ. – *WB6OJK*.



The DJ4ZC "Umsetzer" for Amsat-Oscar B. The receiver is on the left, with the transmitter in the center and the power processor and modulator on the right. The photo was taken by K6PGX in the hatch of K6KVC's airplane during the recent West Coast test flight.

40th ARRL

International DX Competition Announcement

GET YOUR BEAMS TUNED your dipoles higher and your stay-awake remedies ready – the 40th annual DX Competition will be arriving shortly. There are no rules changes this year.

New this year, however, is an additional (optional) checksheet for W/VE types. It is similar to the CD-175 (the "sample check sheet" shown here) but without prefixes listed. This sheet will allow those with higher anticipated QSO totals to allocate a desired amount of space to each prefix – so as not to be bound by the limitations of the CD-175. The number of the new sheet is CD-175A and will be sent only on request. If you are not familiar with countries/prefixes or do not make large amounts of QSOs do not ask for this sheet – you will be entirely satisfied with the regular one.

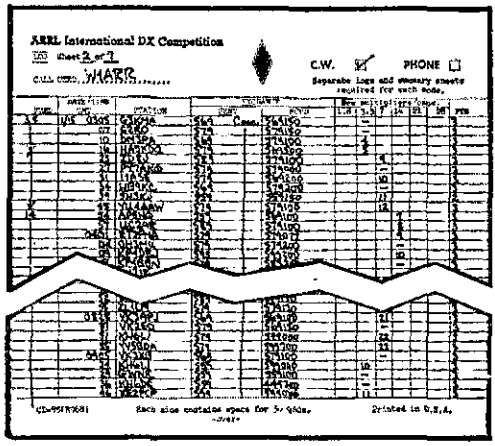
The FCC has set forth some guidelines as to which forms of identification of an amateur station will be acceptable for short QSOs such as DX and contest exchanges.

Examples of acceptable end-of-exchange transmissions of less than 30 seconds are:

"DX1DX de W6XYZ 589 CAL BK"
"DX1DX W6XYZ 589 CAL K"
"DX1DX 589 CAL de W6XYZ K"
"DX1DX 589 CAL W6XYZ K"
"589 CAL DX1DX W6XYZ K"

For telephony, the voice equivalent of the foregoing examples may be used, substituting "this is" or "from" for "de", etc.

Your log must be postmarked no later than April 23, 1974 in order to be eligible for *QST* listing and awards. The club secretary's letter must be received no later than June 4, 1974. Check sheets *must* be included with your entry. – *WA1PID*



◀ Sample log sheet

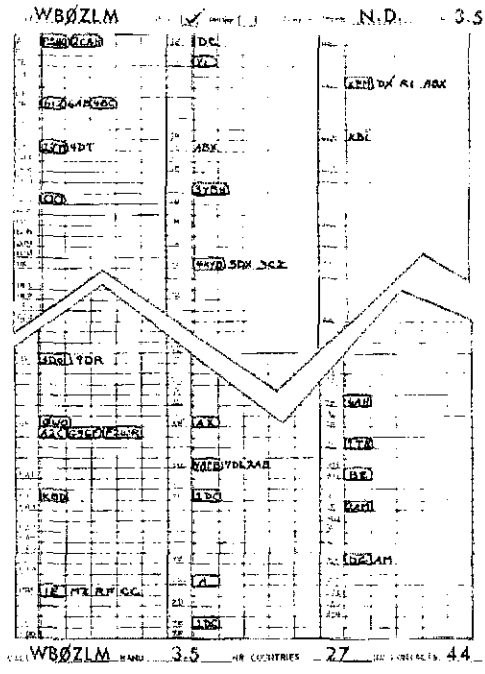
Rules

1) *Eligibility:* Amateurs operating fixed amateur stations in any and all parts of the world are invited to participate.

2) *Object:* Amateurs in the 48 continental United States and Canada will try to work as many amateur stations in other parts of the world as possible under the rules and during the contest periods.

3) *Conditions of Entry:* Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.

4) *Entry Classifications:* Entry may be made in either or both the phone or cw sections: cw scores are independent of phone scores. Entries will be further classified as single or multiple-operator stations. Single-operator stations are those at which one person performs all the operating, logging and spotting functions. Multiple-operator stations are those obtaining assistance, such as from spotting or relief operators, or in keeping the station log and records. Single-transmitter multioperator entries



▲ Sample check sheet

CONTEST PERIODS

Phone		*CW*	
Starts	Ends	Starts	Ends
Feb. 2, 0001 GMT	Feb. 3, 2359 GMT	Feb. 16, 0001 GMT	Feb. 17, 2359 GMT
Mar. 2, 0001 GMT	Mar. 3, 2359 GMT	Mar. 16, 0001 GMT	Mar. 17, 2359 GMT

will be recognized as a distinct category from multi-multi. The use of electronic or mechanical devices or other methods of simultaneous operation *on two or more bands is prohibited. The use* of spotting nets(operator arrangements involving assistance through DX alerting nets, etc.) places an entry in the multioperator category.

5) *Contest Periods:* There are four weekends, each 48 hours long: two for phone work and two for cw.

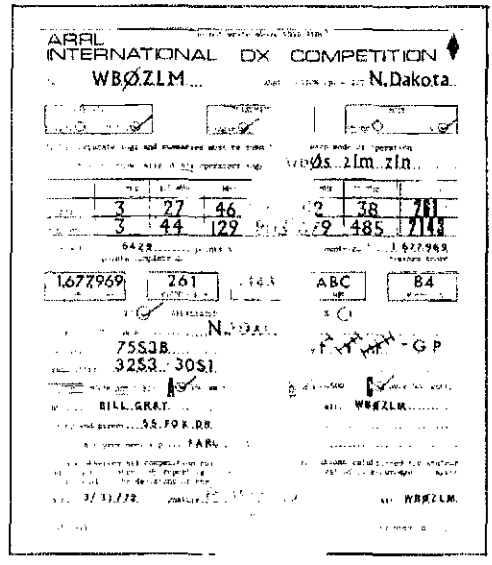
6) *Valid Contacts:* In the phone section, all claimed credits must be made voice-to-voice. In the telegraphy section, only cw contacts count. Cross-band contacts may not be counted.

7) *Exchanges:*

a) *Amateurs in the 48 continental U.S. and Canada.* Cw participants will transmit a three-figure number, representing the RST report, plus their state or province. (The latter may consist of an appropriate abbreviation.) Phone participants will transmit a two-figure number consisting of the readability-strength report plus the state or province. Example: WA8VRB might transmit "579Mich" on cw, "57Mich" on phone.

b) Amateurs outside the 48 continental U.S. and Canada will transmit six-figure numbers, each consisting of the RST report, plus three "power" numbers; the power indicator will represent the approximate transmitter-power input. Phone con-

(Continued on page 152)



Sample [illegible] sheet

27th VHF Sweepstakes Announcement

THERE ARE THREE major changes in the January VHF Sweepstakes exchange this year. These changes are the result of a recommendation by the Contest Advisory Committee (membership as of this writing: W1BGD, chairman, W2EIF, W3BQV, K4BAI, K5TSR W6DQX, K7NHV, WØHP and KH6IJ).

1) It is no longer necessary to send the time or date.

2) Between the number and the call a precedence has been added. This letter corresponds to your power input. If your power is 50 watts (dc input) or less, you send "A" – over 50 watts, you send "B." The letter changes as you change power classifications, i.e., using 10 watts on 2 fm is "A" and 400 watts on 2 ssb is "B."

3) The check now corresponds to the year you were first licensed.

Please examine the sample contest exchange on the bottom of this page.

Read the rules thoroughly and request the appropriate logsheets from ARRL Hq. Unless first class postage is enclosed with your request, the material will be sent via third class mail. Eight cents postage is enough to receive logs for 400 QSOs. Your entry must be postmarked by February 4, 1974 to be eligible for *QST* listings and awards. Club secretary's letters must be postmarked by February 11, 1974. – *WA1PID*

(Continued on page 156)

	Nr	*Precedence*	*Call*	*CK*	*Place*
Exchanges	Consecutive Serial Number	Power input less than 50 watts dc	Send your station call	CK (Last two digits of year first licensed)	Your ARRL section
Sample	NR 1	A	WA3FHB	65	MDC

SECTION EMERGENCY COORDINATORS OF THE AMATEUR RADIO EMERGENCY CORPS

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does your locality have an EC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your section.

ATLANTIC DIVISION

Delaware	*W3DKX	Roger E. Cole	345 E. Roosevelt Ave.	New Castle 19720
Eastern Pennsylvania	W3FBI	Paul D. Mercado	55 Lindberg Ave.	Broomall 19008
Maryland D.C.	K3LLD	John Munholland	306 Holland Rd.	Severna Park 21146
Southern New Jersey	*W2YPZ	Charles E. Travers	State Police Rd.	Trenton 08628
Western New York	W2CTP	David Flinn	866 Ridge Road	Lansing 14882
Western Pennsylvania	W3KPJ	Henry T. Schneider	1806 Water St.	Wesleyville 16510

CENTRAL DIVISION

Illinois	W9AES	R.G. Martin, Jr.	2134 Ridgeview Dr.	Decatur 62521
Indiana	WA9YXA	Col. W. Alexander Henry	1057 Spicewood Dr.	Jeffersonville 47130
Wisconsin	W9NGT	Sherman G. Carr	756 W. Washington Ave.	Hartford 53027

DAKOTA DIVISION

Minnesota	WA0NQH	Donald R. Knott	Route 2	Raymond 56282
North Dakota	WA0AYL	David E. Beach	Apt. 7, 1116-19th Ave. S.	Grand Forks 58201
South Dakota	WA0RIQ	Loren L. Dobson	2001 S. Spring Ave.	Sioux Falls 57105

DELTA DIVISION

Arkansas	WB5CEC	Wes McCullough	Box 403	Barling 72923
Louisiana	K5SVD	William E. Mixon	1007 Green Oaks Dr.	Baton Rouge 70815
Mississippi	WA5HII	Charles Rogers	5716 Magnolia Dr.	Jackson 39209
Tennessee	WB4DYJ	Milo Ward	Rt. 3, Laurel Rd.	Clinton 37716

GREAT LAKES DIVISION

Kentucky	WA4GHQ	James F. Odom	401 Carlisle	Lexington 40505
Michigan	W8MPD	Stanley J. Briggs	1885 Pinetree Rd.	Trenton 48183
Ohio	WA8COA	James E. Weaver	11652 Hollingsworth Way	Forest Park 45240

HUDSON DIVISION

Eastern New York	W2URP	Charles A. Starks	1041 Argo Boulevard	Schenectady 12303
N.Y.C. & Long Island	K2HTX	Charles Haubeil	208-8th Ave.,	E. Northport 11731
Northern New Jersey	K2KDQ	Jack D. Wilk	P.O. Box 1175	Passaic 07055

MIDWEST DIVISION

Iowa	K0CLI	Carl Smedal	Box 902	Ames 50010
Kansas	K0JMF	Merton Uhlig	1182 Gage Blvd.	Topeka 66604
Missouri	K0BIX	Clifford E. Chamney	Box 86, Debby Lane	Warrensburg 64093
Nebraska	K0ODF	Lynn Bilyeu	406 Henkens Dr.	Chadron 69337

NEW ENGLAND DIVISION

Connecticut	W1HDR	John C. Sullivan	Whitney Rd.	Columbia 06237
Eastern Massachusetts	W1AOG	Donald L. Guptill	17 Park St. Ct.	Medford 02155
Maine	K1CEI	Allen E. Schark	42 Maple St.	Presque Isle 04769
New Hampshire	K1RSC	John Johnston	P.O. Box 116	Rye 03870
Rhode Island	W1YNE	Gordon F. Fox	13 York Drive	Coventry 02816
Vermont	W1VSA	H. A. Preston, Jr.	RFD 1	Charlotte 05445
Western Massachusetts	WA1ONB	Robert H. Phoenix	Box 431, N. Washington St	Belchertown 01007

NORTHWESTERN DIVISION

Alaska	KL7HFM	Fred Wegmer	P. O. Box 973	Eagle River 99577
Idaho	WA7EWV	Dale A. Broek	1508 Alder Drive	Lewiston 83501
Montana	W7TYN	Joseph D'Arcy	1916 Haggin Ave.	Anaconda 59711
Oregon	W7HLF	Dwight J. Albright	1678 Orchard Home Dr.	Medford 97501
Washington	W7UWT	Raymond McCausland	2812 Hayton Ave.	Bremerton 98310

PACIFIC DIVISION

East Bay	WB6RPK	Charles Weber	1087 Via Honda	San Lorenzo 94580
Hawaii	KH6BZF	Lee R. Wical	45-601 Lubiko Rd.	Kaneohe 96744
Nevada	WA7BEO	S. L. Blain	500 Cherry St.	Boulder City 89005
Sacramento Valley	W6SMU	Theodore W. Rast	7512 Winding Way	Fair Oaks 95628
San Francisco				
San Joaquin Valley	WB6RZI	Harry D. Grace	Rt. 6, Box 458	Sonora 95370
Santa Clara Valley	WA6RXB	Ralph W. Michelson	19150 Portos Dr.	Saratoga 95070

ROANOKE DIVISION

North Carolina	K4EBG	Herb Lacey	1027 Medlin Dr.	Cary 27511
South Carolina	WA4ECJ	Richard H. Miller	1509 Highland Ave	Camden 29020
Virginia	WA4PBG	Montie L. Cone	317 Van Buren St.	Falls Church 22046
West Virginia	WA8NDY	Delf A. Norona	P.O. Box 523	Buckhannon 26201

ROCKY MOUNTAIN DIVISION

Colorado	K0FLQ	Richard L. Schmidt	13640 E. Center Ave.	Aurora 80010
New Mexico	W5ALR	R. B. Goodman	1501 Mesilla, N.E.	Albuquerque 87110
Utah	W7GPN	Carl R. Ruthstrom	447 - 5th St.	Ogden 84404
Wyoming	K7NOX	Glen Blackburn	P.O.Box 164, 1739 E. 22nd St.	Cheyenne 82001

SOUTHEASTERN DIVISION

Alabama	W4DGH	Raymond L. Ringer	Box 1	Valley Head 35989
Canal Zone	KZ5GW	George W. Rae	Box 8	Gamboa
Georgia	K4EQO	Dean Maples	2355 Biscayne Dr.	Lithonia 30058
Northern Florida	W4IKB	G. D. McKechnie	P. O. Box 545	Chipley 32428
Southern Florida	W4IYT	Andrew C. Clark	31 Lenape Drive	Miami Springs 33166
West Indies (P.R.-V.I.)	KP4CB	Paul Girard	URb San Francisco	Rio Piedras, Puerto Rico 00928

SOUTHWESTERN DIVISION

Arizona	*W7CAF	Gary Hamman	2813 E. Campbell Ave.	Phoenix 85016
Los Angeles	WA6QZY	Bill Carpenter	4623 Center Street	Baldwin Park 91706
Orange	WA6TVA	Steven R. Phillips	272 Villanova Rd.	Costa Mesa 92626
San Diego	W6GBF	Cy Huvar	108 Jamul Ave.	Chula Vista 92011
Santa Barbara	WB6HJW	Ernie Kapphahn	903 N. Bradley Rd.	Santa Maria 93454

WEST GULF DIVISION

Northern Texas	K5QKM	Joe Alexander	Route 1, Box 3	Athens 75751
Oklahoma	WA5FSN	Leonard Hollar	710 So. 10th St.	Kingfisher 73750
Southern Texas	WA5YXS	Arnold B. Rich	P. O. Box 392	Los Fresnos 78566

CANADIAN DIVISION

Alberta	VE6XC	Roy Ellis	Box 2, R.R. 1	Ft. Saskatchewan T0B 1P0
British Columbia	VE7EB	H. E. Savage	4553 West 12th Ave.	Vancouver 8
Manitoba	VE4IH	A. R. Binkley	383 Scotia St.	Winnipeg 17
Maritime	VE1HI	F. R. Fraser	40 Murray Hill Drive	Dartmouth, N. S.
Ontario	VE3EWD	Ed W. Doyle	301 Lacasse Blvd.	Tecumseh N8N 2B7
Quebec				
Saskatchewan				

*ACTING SEC

Announcing the 1974 ARRL

Simulated Emergency Test

January 26-27, 1974

AMATEUR RADIO EXISTS BECAUSE IT QUALIFIES AS A SERVICE. For years, that phrase has introduced the Simulated Emergency Test Bulletin which is sent annually to Amateur Radio Public Service Corps (ARPSC) leaders and which contains information to assist them in planning a meaningful exercise of our emergency capabilities. The SET affords amateurs the opportunity to demonstrate on a bi-national scale the public service value of amateur radio and gain valuable experience in communicating under near realistic emergency conditions. All amateurs are urged to participate in this year's event. It may be your last chance (on a large scale) to prepare yourself before your services are required for a real emergency!

What is the SET?

Local Emergency Coordinators establish realistic plans of action for their Amateur Radio Emergency Corps (AREC) group. (Are you a member of the AREC? It simply requires that you register your capabilities with your EC. For information, write your EC, SEC, SCM or ARRL Hq.) A disaster situation is developed. Stations are asked to originate traffic. Mobile units and emergency-powered stations are activated. Liaisons are established with local agencies (e.g., Red Cross, Salvation Army, police, etc.). Local nets are activated to facilitate communications within the communities involved. Advise your EC of your availability for the exercise. EC's name and address can be obtained from your SEC (see adjoining page) or SCM (see page 6). Or check with local c.d. to ascertain possible Radio Amateur Civil Emergency Service (RACES) plans in your area.

Messages going outside local areas are handled via the National Traffic System, a sequential system of nets designed to facilitate handling of medium and long-haul traffic. (Independent nets are also invited to participate. Net managers write to ARRL Hq. requesting the SET Bulletin and report forms.) AREC and net members are needed to shuttle traffic between local nets and section nets. If you seldom handle traffic or have been inactive with network operations, here is the place to start. Or report into your section net with traffic for your SEC and some for friends.

New this year is the Daytime National Traffic System. The Continental Traffic Net will be holding its usual 1830 GMT session as well a special session at 1630 GMT on both SET days. Net frequency is 14.315 MHz and any station with traffic is welcome to report in. Daytime region nets will also be meeting and the evening NTS nets will be conducting the usual additional cycle beginning at 1400 local time. There will be plenty of net activity; check with your net managers to determine net meeting times and lend your support.

We ask that each participant originate at least two or three messages for the SET. One should be directed to the SEC (address on the adjoining page) indicating that you are active in the test and another one or two to friends locally or anywhere in the U.S. or Canada. If you would like, send more than three messages. Many net managers reported that traffic was light last year. Let's reverse the trend.

Would you know how to handle emergency communications if this was your neighborhood? The annual Simulated Emergency Test provides opportunity for all amateurs to gain experience in conducting communications during simulated emergency conditions. Will you participate in the 1974 SET? *(Photo by WAØEYY)*

It is the intent of the SET that the activities prove educational, interesting, stimulating and may perhaps be hectic. The experience gained (and we all can stand improvement) should be well worth your time.

For Background Information

If you are confused as to what AREC, NTS and RACES are all about, write ARRL for a copy of the *Public Service Communications Manual*. Enclose a self-addressed envelope (6-1/2" × 9-1/2" or larger) with 16 cents postage. The Net Directory may also be helpful in that it lists net times, frequencies, etc. Send an s.a.s.e. (6-1/2" x 9-1/2" or larger) with 24 cents postage. Is a reminder of standard message format needed? Ask for Op Aid 9B with your business-size s.a.s.e.

What, your SEC or SCM indicates there's no EC in your area? Perhaps you can organize something

(Continued on page 82)

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity HRH

CONDUCTED BY BILL MANN,* WA1FCM

PSHR — Modified

SINCE ITS INCEPTION IN LATE 1969, the Public Service Honor Roll has undergone a few changes in scoring and format. Originally, more points were allowed for checking into and net controlling cw nets than for phone nets. The minimum total score was 25 points. All listings were broken down by categories. The Honor Roll premiered in February 1970 *QST*. PSHR grew larger each month overshadowing BPL in size. The point minumum was raised to 30 effective with the July 1970 issue. Some argued that it required just as much skill to control a phone net and operate efficiently as on a cw net. January 1971 *QST* presented the first PSHR with equal points for both cw- and phone-net operation. PSHR grew. Space limitations demanded another look at the listings. Effective with October 1971 *QST*, breakdown by categories was limited to those making 45 points or more. Since then PSHR has remained unchanged.

In 1973, PSHR broke a few records. An all-time high number of listings (173) was attained. This year's low (130) is higher than the number of listings in any month previous to 1973. The PSHR is consistently running over a half-page while BPL continues to dwindle.

Why is the Honor Roll growing? We hope primarily because more amateurs are becoming more involved in public service activities. With the advent of the daytime supplement of the National Traffic System, more amateurs are becoming NCSs and assigned liaison stations, particularly on phone. Secondarily, the PSHR "application form" appears on the back of the monthly Station Activity Report cards making it "easier" to report listings to the SCM.

The intent in establishing a public service honor roll was to: (1) recognize non-traffic-count functions such as reporting into nets, NCSing, performing liaison assignments, etc., (2) encourage versatility and (3) supplement BPL with a listing of similar stature. A recent Communications Department Poll, sent to all CD appointees, field leadership, etc., reflects a majority opinion that PSHR should be made "tougher to attain." Amid some comments that PSHR was already hard enough, remarks aired were: "PSHR is so simple to 'make', I've never bothered to send in my scores." "Why waste all the *QST* space with columns of redundant numbers: 10, 10, 12, 12, etc." "You stress mode versatility, but most any operator can be listed while only participating on one mode." "Make PSHR more meaningful, like BPL."

Beginning with the January PSHR, which will appear in April 1974 *QST*, the point minimum will be raised from 30 to 40 points. Only point totals will be indicated. Participants are still asked to submit the breakdown by categories to their SCMs who will forward the scores and breakdowns to Hq. The only difference for submission will be that only stations earning 40 points or more will be eligible for listing.

PSHR will now be too difficult? Not really. Volunteer for another NCS function or ask for assignment as liaison station. "Phone men" can try cw or maybe handle some phone patches. The "cw man" may join some of the phone nets, try phone patching or make BPL. Become more versatile; expand your expertise.

PSHR Point Assignments. Although there will be no changes in the scoring, it has been some time since the "rules" have appeared. We repeat them here.

Any nets for which point credit is taken, either as a check-in, NCS, etc., must be an NTS or other ARRL-registered net. The net(s) must be registered in the *current* ARRL *Net Directory*. When a new net directory is announced, only nets registered in that directory are eligible for this point credit.

* Assistant Communications Manager, ARRL.

In August, the Missouri CW Net held a meeting in Joplin. Most of those attending are pictured. Seated, l. to r., are: WBØFQM, WBØDUB, WNØGAQ, WAØFKD and WØOUD. Standing are: KØBIX, Assistant SCM, WØOOT, WBØACW, WØGLZ, WØGJ and WØBV, RM and Assistant Director.

1) For reporting into a cw net – 1 point, maximum of 10 points per month.

2) For reporting into a phone, RTTY or ATV net – 1 point, maximum of 10 points per month.

3) For NCSing a cw net – 3 points, maximum of 12 points per month. NCS must be performed by amateur assigned by the net manager, or a regular net member (participant) who volunteers after 3-minute time lapse from net starting time.

4) For NCSing a phone, RTTY or ATV net – 3 points, maximum of 12 points. Other provisions of Rule 3 apply.

5) For performing liaison function between nets – 3 points for each function, maximum of 12 points per month. Liaison must be assigned by the net manager or by the net control station. Voluntary unassigned liaison function does not count.

6) Legal phone patches – 1 point each, maximum 20 points per month. Phone patches with "illegal" foreign countries or patches in violation of FCC Rule 97.114 *do not* count.

7) Making BPL – 3 points maximum per month, regardless of traffic total.

8) Handling Priority (P) or EMERGENCY traffic directly with or within a disaster area – 1 point each message, no maximum.

9) Service as net manager for entire month – 5 points.

Remember, revisions are effective with your January Station Activities Report to your SCM.

BPL – Not Modified

While we're on the subject, you may have heard rumors that Brass Pounders League is about to be discontinued or undergo a name change. Not so. In the previously mentioned CD Poll, appointees voted overwhelmingly to keep BPL and retain its name. BPL will continue unchanged.

Perhaps you've noticed the reference near the bottom of the BPL table regarding BPL Medallions. Readers are referred to July 1968 *QST* for background information. With many newcomers to traffic handling since 1968, it's a good time to repeat.

Back in 1954, the Board of Directors passed a motion to establish an award to be presented to any operator making BPL for the third time. The award is in the form of a medallion. After an individual's call appears in the BPL table the third time, he is sent an affidavit card on which he indicates that all traffic was handled in standard ARRL form on amateur bands and reported to his SCM. When the card is returned, the medallion is sent to have the recipient's call engraved on it, then shipped to the individual.

The medallion is a one-time-only award, i.e. it is not issued every three times someone achieves BPL. It is not necessary that the three months involved be consecutive. Any three months since June 1954 will qualify an operator. Only individual amateurs operating at their own stations are eligible for the medallion. It is not necessary to ask for the medallion; the procedure outlined above begins automatically after the *QST* issue bearing the third BPL listing appears in print.

WA6JCG, standing in the doorway, has designed and built this trailer for emergency use. The trailer contains ac and dc power, antennas and rigs to cover 75 through 2 meters and provisions are included to maintain 72 hours of operation.

The note at the bottom of the box will be changed to refer to December 1973 *QST*. – *WA1FCM*

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for September Traffic

Call	*Orig.*	*Rec'd.*	*Rel.*	*Del.*	*Total*
W3CUL	244	976	894	59	2173
K3NSN	106	850	850	48	1854
WAØVAS	113	470	43	427	1053
WØWYX	51	468	109	359	987
KØONK	112	435	412	13	972
WA8MCR	20	383	344	39	786
W6RSY	58	341	249	39	687
K3PIE	17	312	286	26	641
W3VR	133	251	235	12	631
W1PEX	315	161	105	24	605
WBØHOX	319	253	197	18	587
W3EML	65	310	205	3	583
WA3RCI	115	178	135	98	526
WØWYX(Aug.)	56	461	145	330	992

BPL for 100 or more originations-plus-deliveries

K9MWA	215	WA5ZZA	119	WA3AIQ	103
WN1REB	163	K6UYK	119	WNØJFJ	102
W8QXU	139	WA8WZF	119	WA3PZO	100
WA3EOP	137	WB9CAC	118	WNØHZZ	100
WB8ITT	124	WØOYH	108	WNØIIO	100
		WBØGVR	105		

More-Than-One Operator Station

W7DK/7 317

BPL Medallions (see this issue) have been awarded to the following amateurs since last month's listings: W1BFY, WB2NOM.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

Public Service Honor Roll September 1973

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below, as reported to their SCM. A delineation of the points awarded for each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category. Those making fewer than 45 points are listed with point totals only.

Category	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	
Max. Pts.	*10*	*10*	*12*	*12*	*12*	*20*	*3*	*-*	*5*	*Totals*
WAØZTW	4	10	12	12				40	5	83
KØBIX	10	10	12	12	12	12				68
WA3QOZ	10	10	12	12	12	4			5	65
WB4SVH	10	10	12	12	12	2			5	63
WA8ETX	10	10	6	12	12	8			5	63
WAØVAS		10		12	12	20	3	1	5	63
WBØHOX		10		12	12	18	3	2	5	62
WA1MSK	10	10	12	12	12				5	61
WA2TRK	10	10	12	12	12				5	61
WA3DUM	10	10	12	12	12				5	61
WB5EEY	10	10	12	12	12				5	61
W5GHP	10	10	12	12	12				5	61
W7OCX	10	10	12	12	12				5	61
WBØGVR	10	10	12	9	12		3		5	61
WA3RCI	10	10	12	12	12	1	3			60
WØOYH	10	10	12	6	12	2	3		5	60
W4OGG	10	10		12	12	15				59
WA5ZZA	10	10	12	12	12	3				59
KØBAD/4	10	9	12	9	12				5	57
WB2OYV	10	10	12	12	12					56
WB2RKK	10	10	12	12	12					56
WB8NRC	10	10	12	12	12					56
WBØHBM	10	10	12	12	12					56
VE1AMR	10	10	12	12	12					56
WAØVYB	10	10		12	12	6			5	55
K3ZNP	10	8	12	12	12					54
WBØCZR	10	10	12	9	12	1				54
W3ABT	10	10	9	9	12	3				53
K3KAJ	10	10	12	12	9					53
WA3QDH	10	10	9	12	12					53
W6JTA	10	10	12	6	12	3				53
WB8KZD	10	10	12	9	12					53
WB4VYU	10	10		12	12	3			5	52
K3OIO	10	10	12		12	6				50
WA9QVT/4	10	10	12	6	12					50
WBØHSZ	10	10	12	6	12					50
KØJTW		10		12	12	16				50
W2MTA	10	10	12		12				5	49
WB4TVU	10	10	12		12				5	49
K7OUF	10	10	12		12				5	49
WB9KVN	10	10	12		12				5	49
WAØMLE	10	10	12		12				5	49
KØMRI	10	10	12		12				5	49
WAØIFC	6	10	9	12	12					49
VE3FQZ	10	10	12	12					5	49
KL7IDO		10		12		20		1	5	48
WA1PGY	10	10	3	12	12					47
WA6DEI	10	10	12	3	12					47
K8MLO	10	10	3	12	12					47
WA8UPJ	8	10		12	12				5	47
WB4RUA	10	7	6	6	12				5	46

WA1LNF	44	W3LOZ	39	W2KAT/3	34			
WB2CHY	44	WA3SKP	39	WB2VEJ	34			
WA2SHT	44	W4HFU	39	K3CB	34			
K3DCB	44	W4SQQ	39	WA3QIA	34			
WA4BAA	44	W4WCG	39	WA3SWF	34			
K5YTA	44	W4ZJY	39	W3YA	34			
K6UYK	44	W5RB	39	K4KNP	34			
W8GLC	44	WB8NCD	39	WB5FML	34			
WB9EAY	44	W9MUC	39	WA6IDN	34			
WAØROK	44	WBØBMG	39	W6YBV	34			
VE3GJG	44	WBØHCK	39	WA7JUH	34			
VE3SB	44	WØHI	39	W9FWH	34			
WA2BSU	43	CT1ARB	39	K9HDP	34			
K4IAF	43	VE3AWE	39	W9KX	34			
W7DAN	43	VE3DPO	39	W9QLW	34			
K1YMH	42	VE3GFN	39	VE3EHF	34			
WA3ATQ	42	WA7MEL	38	W3QU	33			
WA4AVD	41	WB9CAC	38	WB8AYC	33			
WB8JGW	41	WB2ADW	37	WB2CST	32			
WØOF	41	WA3EOP	37	WB4DXN	32			
VE3GT	41	WA3PZO	37	K4FCZ	32			
WB2ENK	40	WA6TVA	37	WB4QXT	32			
WB4EKJ	40	WA7OCV	37	WB5BFW	32			
WB4NFR	40	WB8ITT	37	W6DEF	32			
W4WXZ	40	WA2UOO	35	WA6GEN	32			
WB6AKR	40	WA3MQP	35	W6OAW	32			
WN1REB	39	WA4KWC	35	W7IEU	32			
W1UBG	39	W7BQ	35	W8JD	32			
WA2EXX	39	W7PI	35	KØSPR	32			
W2FR	39	W1CE	34	VE3FRG	32			
WB2LZN	39	WA1MXV	34	WB8KXV	31			
W2RUF	39	W2FIR/5	34	W9EI	31			
K3DZB	39			WAØYVT	31			

*Denotes multioperator station.

Category Key. (1) Checking into cw nets, 1 point each; (2) Checking into phone/RTTY nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/RTTY nets, 3 points each; (5) Performing assigned liaison, 3 points each; (6) Legal phone patches, 1 point each; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points.

Traffic Talk

Been on a witch-hunt lately? Every once in a while when it comes time to start a net there is a contact in progress right on net frequency, or it seems that every Hertz in the neighborhood of net frequency is being used. What's the matter with these guys, don't they know that a net is supposed to be using the frequency? It's likely they don't so let's chase them off *our* frequency. And we'd better have a station ready to move up or down at the slightest hint of stations closing in on us. Ever hear such a situation? Reminds one of a witch-hunt.

How many net members have stopped to imagine what the "interferer's" opinion of the situation might be? Typically, a couple of guys are having an informal chat. Suddenly, they hear heavy nearby interference. Then a station interrupts the conversation to say that they are causing extreme interference to a net and would they please move. While pondering what to do, another station breaks in saying: "real considerate of you guys to be sitting here idly gabbing and hampering our net's business. We have 25 people on our net!" What kind of impression does this make of network operations? Perhaps the "interferer" tunes on to the net frequency. Will he hear a smoothly run net handling only formal traffic in a businesslike manner? If it is anything but a top-notch operation, his opinion will sink even further. Is a witch-hunt in the best interest of the net? NO!

Consider the alternatives. If net frequency is in use, move up or down somewhat so *you* do not interfere. Net stations will look around for the NCS if the "net's" frequency is busy. Not many amateurs are rockbound to a particular frequency any more! Handle only genuine net business. Clear the frequency as soon as possible. Hold up informal chat until after the net, when a different frequency can be selected. If during the net session, a station calls someone or calls CQ and by so doing causes bad interference to the net, the NCS might tactfully advise the station that the frequency is being used. Or the NCS may direct a net member to advise the station. Net members should not take it upon themselves to ask stations

Summer is the time for net picnics and Texas CW Net members held theirs on July 21. Attending were W5JVR, WB5DDP, WA5ZBJ, WA5ZBK, WA5ZBN, WB5DQE, WA5MUM, WB5IOG, WB5DBK, W7WAH/5, W5ABQ, W5QO, W5QU, W5EZY, WB5FMA, WA5UHT, WB5FID, W5RPS, WB5GJD, WA5FJN, WB5AMN, W5LDA, WB5IMA, WA5YPI, K5MYY, WA5YEA, W5RJA, W5FQQ, K5SOR and WN5JJZ; most of whom are pictured above.

to move. They may cause more interference than the station calling CQ!

Be considerate of others using nearby channels. They are just as entitled to them as a net is. Don't give network operation a bad name by laying claim to a particular frequency.

■ *Procedural points.* Again, we must remind that SERVICE, SVC, QNS, XX, etc., are *not* suitable for the check of a message or used in association with the check. The only purpose of the check is to indicate the number of words or groups in the text. Don't be lazy and show a lack of proficiency by not using the check correctly. Pass the word, eh?

■ *National Traffic System.* Each of the three NTS areas, Eastern, Central and Pacific, has an Area Staff established to discuss NTS-related matters and make recommendations to the Communications Manager. The Staffs are composed of region and area net managers, the TCC director and three members-at-large from within the area.

The Central Area Staff held a meeting in conjunction with the Midwest Division Convention at Lincoln, Nebraska, October 5-7. Those present were Chairman WØZHN (MAL), WAØMLE (CAN), KØBAD/4 (RN5), WA9EED (9RN), WØHI (TEN), KØAEM (TCC) and W9QLW (MAL). Absent was W5MI (MAL) who was recovering from eye surgery. W1NJM from Hq. and Daytime Tenth Region Net Manager WBØHOX attended as observers. During open parts of the meeting, section officials and other interested persons participated. ECAC member, WØPB discussed emergency-related matters with the Staff.

Topics covered included: (1) the Simulated Emergency Test and related DNTS schedule, (2) change of CAN frequency, (3) welcome WBØHOX to NTS managership, (4) discussion of fair traffic, (5) resolution to get more people involved in liaison and NCS spots, (6) ways to generate more traffic, (7) recommendation that W4HFU succeed KØBAD/4 as RN5 manager when the latter is transferred at year's end, (8) holding next CAS meeting in the Fifth Region (9) discussion of DNTS managerships in the Central Area and W5HWY recommended as manager for DRN5, (10) resolution to extend full voting membership to DNTS region managers and CTN assistant manager upon their official appointment by the Communications Manager, (11) resolution to urge every NTS participant to solicit more participation in NTS and more traffic originations.

The formal business meeting lasted in excess of 6 hours.

■ *September reports.* K2KIR reports that K2RYH has resigned his Sunday night EAN NCS slot after years of service. Fourth annual CAN certificates go to K4QCQ, W5s MI SBM, W9s CXY NXG QLW, WØs BV HI, KØAEM. Third annual to KØBAD/4. Second annuals to WB4s EKJ YCV, W5TNT. First annuals to W4HFU, K4BSS/4, W9EI, WA9s EED QVT/4, WB9KVN, WAØROK. PAN's K7NHL sez conditions improving and regions are beginning to repair their representation. CTN reps and alternate NCSs are still needed on DTRN. W2FR indicates that 2RN traffic is still considerably below last year's monthly totals and has issued a Fifth Annual award to W2MTA, Second Annual awards to WA2CXY, WB2NOM and first time awards to W2s MLC QNL. D3RN certificates have been sent to W3s CWC, WA3s ATQ CIG DUM GSM HV PLC PZO QLG SCR SKP, by manager WA3QOZ. RN5 certificates are being sent to K1ONW/5, W4s HFU OGG, K4s CNY EJL VND, WA4SCK, WB4s EKJ YCV, W5s EDT EIJ FW GHP MI MYZ QU RB SBM TNT WZ, K5s OTM YTA, WA5s YZW ZBK ZZA, WB5s DLW DQE FDP, W7WAH/5, WA9QVT/4. RN7 aided by fair traffic, reports W7KZ. AMgr. KØBIX submits first DTRN report. DTWN Mgr. W5PNY is looking for more support from various sections in Twelfth Region.

Net	*Sessions*	*Traffic*	*Avg.*	*Rate*	*% Rep.*
EAN	30	1350	45.0	1.175	97.2
CAN	30	900	30.0	.866	98.8
PAN	30	981	32.7	.813	97.8
CTN	30	292	9.7	.144	75.2
1RN	55	355	6.5	.355	90.3
D1RN	30	90	3.0	.227	61.9

Net	Sessions	Traffic	Avg.	Rate	% Rep.
2RN	60	406	6.8	.558	98.7
D2RN	18	18	1.0	.095	43.3
3RN	60	650	10.8	.560	97.2
D3RN	30	166	5.5	.335	96.6
4RN	53	439	8.3	.355	85.2
DRN4	11	25	2.3	.103	34.8
RN5	60	585	9.6	.370	93.1
RN6	60	665	11.1	.476	100.0
RN7	60	392	6.5	.517	69.0
8RN	48	317	6.6	.392	66.1
D8RN	21	45	2.1	.409	48.9
TEN	60	490	8.2	.439	83.0
DTRN	30	140	4.7	.130	77.0
ECN	60	259	4.3	.364	93.4
TWN	53	334	6.3	.215	64.3
DTWN	6	1	0.2	.015	6.0
TCC Eastern	108[1]	586			
TCC Central	86[1]	496			
TCC Pacific	102[1]	648			
Sections	2951	10882	3.7		
Summary	*3846*	*21512*	*5.6*		
Record	*3975*	*27764*	*15.4*	*1.357*	

[1] TCC functions not counted as net sessions.

[2] Section and local nets reporting (94): APSN (AB), MTN (MB), APN (Mar), CM GBN ODN OPN OQN (ON), WQ-V/UHF (PQ), AENB AENM AENO AENR (AL), Snipers (AK), ATEN HARC (AZ), OZK (AR), NCN SCN (CA), SSN (CO), CPN CN NVHFTN (CT), FAST FMTN FPTN GN NFPN QFN TPTN VEN (FL), GSBN GSN GTN (GA), IMN (ID, MT), ILN (IL), TLCN (IA), KWX OKS-SS (KS), KNTN KSN KTN KYN MKPN (KY), SGN (ME), MDCTN (MDC), EMN WMN (MA), MJN MSPN PAW (MN), MTN (MS), JC2AN MoSSB MSN WEN (MO), MTN (MT), NJN NJSN WFN (NJ), NLI NYS (NY), CN NCNN NCSSBN THEN (NC), BMEN BNR COAREC-10 COAREC-2 OSSBN (OH), OLZ OPEN OPON SSZ STN (OK), BSN OSN (OR), PTTN WPA (PA), TN TNN (TN), TEX TEX-SS TTN (TX), BUN UCN (UT), VN VRN VSBN VSN (VA), NSN WSN (WA), BEN (WI).

Transcontinental Corps

W3EML has issued annual TCC certificates to the following (with numbers in parenthesis indicating number of consecutive yearly certificates): W1s EJI (4) QYY (3), *W2GKZ (7), WA2s CNE (1) ICU (3)* UWA (7), KJCB (4), W4SQQ (5), K4s FAC (2) KNP (6), WB4s OMG (2) SGV (1), W8s IBX (2) PMJ (4) VDA/4 (2), WA8PIM (3). TCC-Pacific certificates have gone to W6RSY K7QFG.

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	120	90.0	1589	586
Central	95	90.5	1008	496
Pacific	120	85.0	1321	648
Summary	*335*	*88.4*	*3918*	*1730*

The TCC roster (Sept.): Eastern Area (W3EML, Dir.) – W1s BJG EJI NJM OYY, W2s FR GKZ, WA2s AYC CNE CXY UWA, W3EML, K3s CB MVO, WA3OGM, W4s SQQ UQ, K4KNP, WB4s OMG SGV, W8s PMJ VDA/4, K8KMQ, WA8PIM, VE3SB. Central Area (KØAEM, Dir.) – W4s OGG ZJY, K4BSS/4, WB4YCV, W5s GHP MI QU SBM TNT, WB5s FDP FML, W9s CXY NXG, K9HDP, WA9EED, WØs HI IYP LCX ZHN, KØDDA, WAØTAO. Pacific Area (K5MAT, Dir.) – W5RE, K5MAT, WB5CSO, W6s BGF EOT ISC MLF RSY VNQ VZT, WA6DEI, WB6s AKR VKV, W7s BQ GHT KZ UTM, K7s NHL QFG, WØLQ, KØOTH.

Independent Net Reports (September)

Net	Sessions	Traffic	Check-ins
20 Meter ISSB	19	1041	336
North American Traffic	25	257	434
Ohio Valley Teenage	28	88	267
75 Meter ISSB	30	342	1227
1MRA	45	469	1462
Hit & Bounce Slow	16	98	132
Hit & Bounce	30	508	272
Eastern Area Slow	30	167	270
40 Meter Sideband	19	1567	205
Clearing House	25	296	342

Public Service Diary

■ While testing a new 2-meter fm rig on July 21, KØLCB came upon a serious auto accident which had just occurred in a remote area of Missouri. Through quick action by WØSJY, police, fire personnel and ambulances were summoned, probably saving the lives of some of the injured. – (KØLCB)

■ During Sept., Harris Co. (TX) amateurs operating through WR5AAA made first reports and summoned aid to twelve auto accidents and one fire. – (WA5ABA, EC Harris Co.)

■ At 1100 on Sept. 10, EC W7RJW was notified by the King Co. Police of a search for a father and son in progress near mountainous Skykomish, WA. K7GZO was dispatched to the rendezvous point and by 1500 had established contact with W7QCV and conducted several phone patches. At 1700 the lost hikers were found. – (W7RJW, EC BEARS)

■ On Sept. 10, WA9SHM while mobile approaching Denver, CO on I-25, placed an emergency call on the WØJGL repeater and was answered by WAØHWP and WØICR. WA9SHM's mother, a passenger, needed oxygen to assist her breathing. He was directed to the Castlewood Fire Department where oxygen was obtained. The mother was ambulanced to a hospital. WA9SHM was directed to the hospital after being separated from the ambulance by heavy traffic. – (WAØHLQ, SCM CO)

■ A mountain climber was missing near Darrington, WA on Sept. 12. The BEARS group was asked to set up a communications circuit the following day. WA7JUB operated K7NWS from the field beginning at 0800 and contacting Seattle, Tacoma, Everett, Bellingham and other points with some phone-patch traffic. W7LIO and WA7QFD were base stations in Seattle. The search ended unsuccessfully at 2000. – (W7RJW, EC BEARS)

■ On a ship in the Bay of Bengal, a seaman got a hand badly crushed in a hydraulic hatch on Sept. 14. Fearing gangrene, the ship's master W2ZXM checked into the SEA NET on 20 meters to locate helicopter service. VQ9R was NCS and within minutes a doctor, DU6EG, gave medical instructions and confirmed possibility of gangrene. Several contacts were made with officials to locate ships in the area with helicopter service. XV5AC contacted the Air Force in Thailand. 9V1QF supplied the coordinates of an oil rig off Burma which turned out to be within 8 miles of the ship and the patient removed by helicopter. A total time of 8 hours had elapsed from time of injury until the victim was under doctor's care and enroute to the hospital, probably saving his life. – (W2ZXM, 9V1QF/WB6IZF)

■ On Sept. 15, WA8WQU mobile witnessed a two-vehicle accident with injuries on I-75 between Dayton and Cincinnati, OH. His 2-meter fm call was answered by a local mobile who autopatched police and ambulance. K3WKV was nearby and monitoring, arrived at the scene and administered first aid. – (WA8WQU, EC Genesee Co., MI)

■ On Sept. 23 the owner of a camp near W2URP's was seriously cut by a power saw. W2URP applied first aid and en route to the hospital he called on 2-meter fm and raised W2GOX who called the hospital and alerted the emergency room of the pending arrival. – (W2URP, SEC ENY)

(Continued on page 73)

ARRL QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 5 by 8 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

W1,K1,WA1,WN1 – Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.

W2,K2,WA2,WB2,WN2[1] – North Jersey DX Assn, P.O. Box 505, Ridgewood, NJ 07451.

W3,K3,WA3,WN3[1] – Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.

W4,K4 – North Alabama DX Club, P.O. Box 2035, Huntsville, AL 35804.

WA4,WB4,WN4 – J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL 32901.

W5,K5,WA5,WB5,WN5[1] – ARRL W5 QSL Bureau, Box 1690, Sherman TX 75090.

W6,K6,WA6,WB6,WN6 – No. California DX Club, Box 11, Los Altos, CA 94022.

W7,K7,WA7,WN7 – Willamette Valley DX Club, Inc., P.O Box 555, Portland, OR 97207.

W8,K8,WA8,WB8,WN8 – Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.

W9,K9,WA9,WB9,WN9 – Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.

WØ – Reggie Hoare, WØOYP, P.O. Box 115, Mitchellville, IA 50169.

KØ,WAØ,WBØ,WNØ – Dr. Phillip D. Rowley, KØZEL, Route 1, Box 455, Alamosa, CO 81101.

KP4,WP4[1] – Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, PR 00902.

KV4 – Graciano Belardo, KV4CF, P.O. Box 572, Christiansted St. Croix, VI 00820.

KZ5 – Lee DuPre, KZ5OD, Box 407, Balboa, CZ. Box 407, Balboa, C7.

KH6,WH6[1] – John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.

KL7,WL7 – Alaska QSL Bureau, Star Route Box 65, Wasilla, AK 99687.

VE1 – L. J. Fader, VE1FQ, P.O. Box 663, Halifax, NS.

VE2 – A. G. Duemen, VE2IJ, 2960 Douglas Avenue, Montreal Quebec, H3R 2F3.

VE3 – R. H. Buckley, VE3UW, 20 Almont Road, Downsview, ON.

VE4 – D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg R3N OE8, MB.

VE5 – A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, SK. S4S 5E5.

VE6 – O. C. Davidson, VE6TK, 1108 Trafford Dr. NW, Calgary 47, AB.

VE7 – H. R. Hough, VE7HR, 1291 McKenzie Rd., Victoria, BC.

VE8 – Frank Van Der Zande, VE8OO, P.O. Box 72, Fort Smith, NWT X0E OPO.

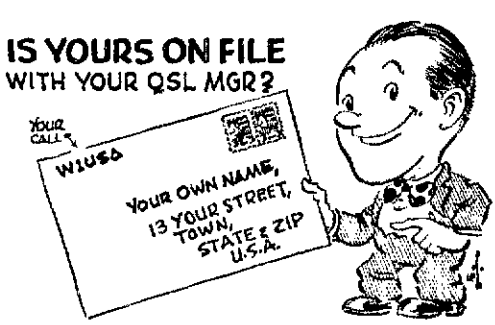
VO1 – Ernest Ash, VO1AA, P.O. Box 6, St. John's, NF.

VO2[1] – Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, LB.

SWL – Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

[1]These bureaus prefer 5 by 7 inch business envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the "IARU NEWS" section of the June and December issues of *QST*.



COMING ARRL CONVENTIONS

January 19-20 – Southeastern Division, Miami, Florida.
March 1-3 – Delta Division, Lafayette, Louisiana.
March 23-24 – Great Lakes Division, Muskegon, Michigan.
June 8-9 – Georgia State, Atlanta.
June 15-16 – Florida State, Orlando.
July 19-21 – NATIONAL, New York, N.Y.

NOTE: Sponsors of large ham gatherings should check with League Headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.

Hamfest Calendar

Indiana – The Fort Wayne Hamfest is January 13 at Shiloh Hall (1/2 mile west of Ind. 3 on Carroll Rd.). Flea market, food, softies. Tickets $1 advance; $1.50 door. Tables available – 4 ft. $1. Write: AC-ARTS, P.O. Box 342, Ft. Wayne IN 46801. Talk-in .94, .28, .88, .52. Electronics goods only!

Michigan – The Fifth Annual Swap and Shop is Sunday, January 13 at Frost Junior High School, Cafetorium, 23261 Scotia, Oak Park MI.

Nevada – SAROC 1974, January 3-6 at the Flamingo Hotel Convention Center, Las Vegas. Technical program, meetings and cocktail parties. Additional info. Write Southern Nevada Amateur Radio Club, P.O. Box 73, Boulder City NV 89005. QST

Strays

I would like to get in touch with . . .

. . . disabled veterans interested in forming a DAV net on ssb. WØAUH.

. . . French teachers and others willing to speak French over the air to high school students. K7SPH.

. . . retired amateurs in Bergen county New Jersey who would be willing to help with a high school radio club. WA2DWB.

. . . amateurs interested in participating in a daytime 40-meter central states RTTY traffic net. W5GY and W8LZE.

. . . anyone having information about radio clubs at Ohio State University prior to 1925. WB8CLF.

. . . CX7 owners to form an information exchange net. Listen for WØYVA/4 on 14, 242 kHz Wednesdays at 1600 GMT and Sundays at 2000 GMT. WØYVA/4.

. . . anyone with old call letter license plates to spare. Jim Fox, 10176 Page Drive, Menfor, Ohio 44060.

. . . builders of scale plastic WWII models, stamp collectors, and anyone interested in UFOs. WN2EOO. QST

Correspondence From Members-

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

GETTING OUT THE VOTE

● Within the past seven years, I have lived and operated in five sections and three divisions of ARRL, under many different directors and SCMs. At times I have strained in vain to find in the minutes of ARRL Board Meetings any indication of my director's participation except in the roll call and the group portrait. This month, I am dismayed to see in the *CD Bulletin* that only 27 of 75 SCMs (36%) responded to the poll from the previous bulletin. Who should be more active and interested in such matters than the elected SCMs?

At election time, I have occasionally wanted to do something. My personal responsibilities preclude advancing myself as a candidate. While active on the air, I have never been close enough to other amateurs to be able to select and promote a candidate. Around half of the elections in the section or division of my residence have been "no contest" with only one candidate nominated, frequently the incumbent.

I have always felt it is unfair for any candidate to be elected director or SCM on the basis of five or ten valid petition signatures alone. If only one candidate is nominated, send out ballots anyhow, and give the electorate the opportunity to vote for the candidate or vote "No." If "No" wins, then let the office stand vacant for six months, or until the next batch of director or SCM elections. That should rattle the electorate to come up with additional nominations. – *Kurt Meyers, W8IBX, Detroit, MI*

MOST FASCINATING MODE

● SSTV is the newest, most fascinating mode of communications today, with extreme technical involvement by hams in this field. Slow Scan is not just another "eccentric" mode, which should be run in the cw bands . . . it's the only means of *direct* worldwide two-way picture exchange today without satellites or wires.

Through Slow Scan TV a Florida housewife may make her first batch of baklava, while guided by a Greek ham, who is watching her on a SSTV monitor, as she mixes ingredients in front of a ham's SSTV camera. Or, a ham may learn how to tune his auto's carburetor, while being guided by a mechanic "looking over" by means of SSTV.

Further, we are all familiar with how commercial TV replaced radio . . . surely future audio-only contacts will appeal to just mobile operating.

If I, or any other SSTVer can help, just let us know. We are more than willing to share our enthusiasm with the world. *Dave Ingram, K4TWJ, Birmingham, AL*

STOOPING TO HELP

● It has been deplorable indeed to read in the October issue of *QST* the bizarre attack by W2LT on the "editorial excellence" of *QST* and the articles by WBØBEM, and most especially when he did not have the courtesy to produce the *corpus delicti*.

Unlike the miracle of W2LT, amateurs are no longer born with their ticket attached to the umbilical cord and their station call sign tattooed on their buttock. Most amateurs have a lingering and sympathetic memory of how they, too, had to start from scratch.

There is an old axiom that says "No man stands so tall as he who stoops to help a little child." I would like to paraphrase this to read "No radio amateur stands so tall as he (or she) who stoops to help a beginner." WBØBEM subscribes to this connotation. Evidently, W2LT does not.

Viva *QST* and Margaret Koerner! – *Warren A. Freeman, WN4DAM, Newnan, GA*

DISTURBED

● It was with interest that I read in August *QST* the remarks made at an amateur convention by FCC's Prose Walker, W4BW. They certainly show that a lot of original thinking is going on at FCC, which, in my opinion, is all to the good. For one thing, his observations on the Conditional Class license dovetail with my own.

A couple of things, however, disturbed me. One is the suggestion of type-approval by FCC of amateur equipment. During his treatment of this subject, Mr. Walker implied that home construction of amateur equipment is a thing of the past. While personally I admit to being an "appliance operator," a lot of home-brewing is still going on, most prominently in the area of final amplifiers and in vhf equipment. It would be disappointing and self-defeating, in my opinion, if FCC were to take measures which would directly discourage such home-brewing by adopting standards which would make it difficult for a one-of-a-kind transmitter to pass. Anybody who is familiar with the added cost to the military (read "taxpayer") of equipment which meets MILSPECS will also ask what the added cost to the amateur of type-approval would be.

. . . The other thing that disturbs me is the incompleteness of Mr. Walker's analysis showing how much less space a cw signal takes up than any kind of phone signal. I am certainly not anti-cw, to which my membership, along with Mr. Walker's, in the First Class CW Operators' Club will attest, but his analysis leaves out a few important facts. In theory, a cw signal takes up an infinitely small bandwidth, but in fact, receivers being what they are, do not receive it that way. Any such analysis is therefore incomplete without reference to characteristics of front ends, crystal filters, i-f bandpass figures, and other receiver characteristics. Give me two average-width ssb signals of equal strength and I will demonstrate to all comers that I can easily read either conversation on my state-of-the-art receiver when they are only 300 hertz apart. Other factors, such as use of directional antennas, geographical location, varying power levels, more

frequent occurrence of multi-station QSOs on phone, and propagation conditions must also be taken into account if any such analysis is really to be considered complete. – *Alfred A. "Fred" Laun, W9SZR/LU5HFI, Cordoba, Argentina*

MEASURED RESPONSE

● I was just looking at a copy of *QST* and I noticed something that read "6.31 cm." Unfamiliar with this type of code, I proceded to dig in my chemistry book and I noticed that this was part of that "foreign" thing called the "metric system." Or something like that.

Seriously, though, I am very glad to see *QST* looking ahead to see what apparently the Congress can't see quite yet. Congratulations! – *Kiernan K. Holliday, WA6BJH/4, Goldsboro, NC*

● Just received my October issue and was very pleasantly surprised to see your attempt to start us on the metric system. I think that this is one of your better ideas. – *J. Kuperman, WA3IFY, Phila, PA*

● It's nice to see more use of the metric system of measurement in *QST* and hopefully in all ARRL publications. However, I hope that you use a little common sense when it comes to precision and accuracy.

It is obvious that the millimeter dimensions given in the diagrams on page 97 of October *QST* are nothing more than arithmetic conversions. For instance: 5/8" is equal to 15.875 mm by arithmetic definition or computation but is by no means an accurate measurement for the purpose. One has to remember that a millimeter is just a little larger than 1/32 inch!! To be precise to 1/1000 of a millimeter is ridiculous! So, please don't be any more precise when using metric measurements than the *equivalent* in inches and feet. In most cases measurement to the nearest millimeter or to the nearest 1/2 mm is quite accurate enough. Most metric micrometers are calibrated to just 1/100 mm (.01 mm).

I hope to see the day in the not too distant future when all ARRL publications and FCC test questions dealing with measurement are metric. I think radio amateurs are better prepared to accept and use the metric system of measurement than the general public at large. – *Terry L. Nelson, WA7UEL, Kent, WA*

SLIGHTED?

● The ARRL presentation to the FCC (September *QST*, page 50) was quite informative. The chart delineating amateur operations by ssb, cw, vhf, RTTY & SSTV is interesting, but also inadequate to show actual operating percentages of an amateur's activity.

If somebody were to ask me what modes I used, I would say RTTY, cw & ssb, thus hitting all three categories in that particular graph.

However, I should now like the League to present for the member's interest, a similar graph based on active participation on each of the modes available. The grand total could not come to over 100% unlike this graph which adds up to approximately 105%. For instance, if somebody were to ask my participation, I'd say; (per month average)

RTTY	–	160 hr.
cw	–	30 min/mo typical
ssb	–	1 hr.
		161.5 hrs. typical month

Of course this is not a typical amateur's participation, but illustrates the fallacy of the type of graph presented, as far as band occupancy is concerned. Thus I should like to see members polled with regard to band occupancy, not on a "Do you operate ssb, cw, etc. basis," but on a "how much" basis. – *Irvin M. Hoff, W6FFC, Los Altos Hills, CA*

PROMOTING HAM RADIO

● Recently the Adams County Amateur Radio Society donated a copy of the *Radio Amateur's Handbook* and a year's subscription of *QST* to the local public library. The results have been satisfying. Demand for the *Handbook* was so great that we donated a second copy. The library places each current issue of *QST* in the reading lounge; the binder containing an announcement of the time and place that our radio society meets. Some of the benefits recognized to date include;

1) An increased membership in our radio society.

2) A greater public awareness of amateur radio.

3) Excellent public relations.

4) A centralized location for the lending of amateur radio publications.

One club member donated the last decade's issues of *QST* to the library. New ARRL members can now refer to articles footnoted in the current issue.

May I suggest that ARRL initiate a campaign to promote more of the same, if it is not already actively doing so? – *Dean E. Hale, WA3IVE, Secretary, Adams County Amateur Radio Society, Gettysburg, PA*

[EDITOR'S NOTE: Clubs wishing to disseminate more information about amateur radio to the general public may take advantage of the special offer approved by the Executive Committee and announced in January "League Lines." It is half price ($13.50) for a complete set of ARRL publications, provided the request comes from an affiliated club, and it is intended for a local library who will agree in writing to add the manuals to their shelves.]

QST EXTRA

● Please make available as a single *composite* reprint (for a price, of course), the "*QST* EXTRA" written by M. Walter Maxwell, W2DU, entitled "Another Look at Reflections," presented partly in April, June, and August and to be continued in future issues.

The value of such an informative article, long overdue and obviously painstakingly written for the broadest ham population's comprehension, is evidenced by your flagging it a "*QST* EXTRA." Maxwell's own knowledge and experience plus a wealth of information obtained from dozens of references make this a unique work, motivated particularly by and for the radio amateur. If only they will read and study it!

You know the value of reprints, the value being enhanced in this case because of the number of parts and separate *QST* issues this article is being spread over.

A *composite* reprint could (1) be available indefinitely to future hams not having access to these several issues of *QST*, (2) be used as study material for technical classes and discussions held by ham clubs and others and (3) be available to both domestic and foreign radio amateur non-members of ARRL. – *W. E. Carson, K4UO, Dunedin, FL*

would make it difficult for a one-to-one

IARU News

INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

U.S. – DENMARK RECIPROCAL OPERATING AGREEMENT

As mentioned in this department last month, Denmark has announced that it will now accept applications for temporary amateur licenses from any amateur visiting, or planning to visit, that country. Canada and Denmark concluded a reciprocal operating agreement almost immediately upon announcement of this new policy. This agreement was followed closely by a similar one between the U.S. and Denmark, which became effective on November 10.

AUSTRALIA CLOSE TO NOVICE LICENSE

The *Wireless Institute of Australia* reports that Novice licensing proposals have advanced to the stage where final Government approval is all that is required. While the detailed regulations are not yet available, it is likely that Novice licensees will be identified by station call signs with the standard VK prefix and a three-letter suffix, the first letter of the suffix to be "N." Individuals will be permitted to hold limited (vhf only) licenses simultaneously with Novice licenses.

Further details will be printed when they become available.

FIRST TRANSATLANTIC CONTACT COMMEMORATED

The first amateur two-way communication across the Atlantic took place on November 28, 1923, between 8AB in France and 1MO in the United States ("It Seems to Us," *QST* for November 1973). The 50th anniversary of this important event was marked by a letter from *REF* president F5PT to *ARRL* president W2TUK, reproduced at right. F5PT's mention of the Oscar 6 work being done between the two countries today underscores the fact that amateur radio has not run out of challenges for the tenacity and enthusiasm of its practitioners.

While on vacation during October, *QST* Technical Editor W1CER was invited to speak at a meeting of the *Amateur Radio Society of Barbados*. After the meeting, Doug presented Society president Ron Armstrong, 8P6BN with a copy of the ARRL *Handbook* signed by the League's technical staff. Pictured are *ARSB* technical director 8P6FE, vice-president 8P6AZ, W1CER/8P6EU, 8P6BN, secretary-treasurer 8P6ES, and QSL manager 8P6AQ.

PARIS, le 1 er OCTOBRE 1973

Mon cher Président,

Dans quelques jours, tous les OM vont se souvenir qu'il y a cinquante ans, l'Atlantique était vaincu sur ondes courtes, grâce à la tenacité et a l'enthousiasme de F.H. Schnell, 1MO et L. Deloy, 8AB.

Au moment où nos deux pays sont en liaison via OSCAR 6, nous pouvons juger du chemin parcouru . . .

Au nom de RESEAU DES EMETTEURS FRANCAIS, je vous adresse, ainsi qu'aux Amateurs Americains et a l'A.R.R.L., nos 73 les plus cordiales.

P.L. TROLLIET – F5PT
President du R.E.F.

The 40th anniversary of the founding of the *Liga Colombiana de Radio-Aficionados* was commemorated by the issuance of a three-color stamp featuring the emblem of the society.

ARRL Fights 224-225 MHz CB

The American Radio Relay League has filed a massive opposition and request for oral argument in Docket 19759, under which FCC proposes to take the frequencies 224-225 MHz from the amateur service and assign them to a new Class E Citizens Radio Service.

Each of the fifteen copies filed with the Commission totals 72 pages (and weighs almost 12 ounces when printed one side only!) so it is impractical to print it all here in *QST*. Some extracts:

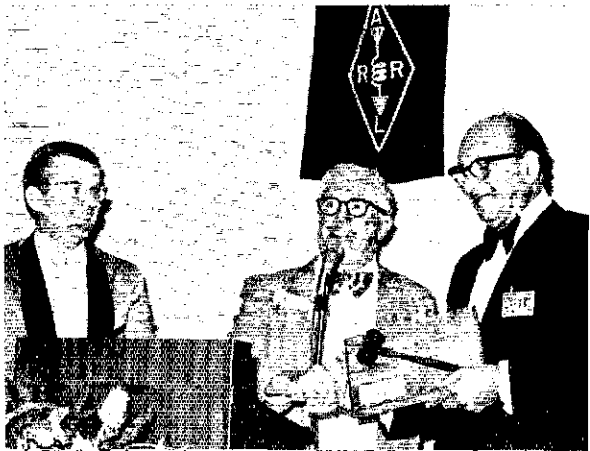
"A searching in-depth study of the Citizens Radio Service and the use of a scarce and precious natural resource – the radio spectrum – for purely personal purposes is long overdue. The League recommended such a study in its opposition to the petition for rule making of the Electronics Industries Association, RM-1747. Most unfortunately, however, the scope of the inquiry of this proceeding is far too limited and superficial. The proposal to reallocate the 224-225 MHz band from the amateur to the Citizens Radio Service is based on the unsupported and unproven assumptions: (1) that the frequencies now allocated to the Citizens Radio Service are so overloaded that the purposes for which the service was created cannot be achieved; (2) that frequencies in the 27 MHz region are either unsuited or unavailable for use by an enlarged Citizens Radio Service; (3) that the 224-225 MHz band is either the only band or the best band for an expanded Citizens Radio Service; (4) that a 'disciplined' service can be established which will not interfere with the primary Radiolocation Service; (5) that Amateurs are making little use of the 224-225 MHz band; (6) that Canada and Mexico will not object to a derogation of the treaty which assigns the 220-225 MHz band to Radiolocation and the Amateur Radio Service on a co-equal basis; and (7) that the need for and potential use of the 224-225 MHz band by the Citizens Radio Service is greater than by the Amateur Radio Service . . ."

The document goes on to "shoot down" each of these assumptions in turn.

Another point: "It seems more than mere coincidence that the lack of respect for law and order and the increase in the crime rate throughout the nation in the last fifteen years has paralleled the increase in the lack of respect for the provisions of the Communications Act of 1934 and the rules and regulations of the Federal Communications Commission and the increase in illegal operations by many operating in the Citizens Radio Service. Yet the Commission now proposes to create a new Citizens Radio Service, which *must* be a *disciplined* service, despite a history of progressive rule changes which have been unsuccessful in accomplishing this objective with the Class D service. . ."

The next section bears the heading, "A Disciplined Service Cannot Be Established Until the Basic Cause of the Lack of Discipline in the Class D Service Has Been Determined and Corrected," then develops this theme over the next three pages.

Quite a bit of space is devoted to showing that 27 MHz can provide a great deal more real service than it is now doing; that the Class A Citizens Radio Service band at 462 and 467 MHz can handle much more occupancy than it now has; and that the 220-225 MHz band is *not* suited to a Citizens Radio Service. The treaty violations inherent in the proposed service are dealt with, together with the difficulty in protecting Canada and Mexico from harmful interference with the ranges of transmission frequently possible on 220 and four of Canada's largest cities less than fifty miles from the U.S. boundary.



Eli Nannis, W1HKG, genial host at New England Division conventions for more than a decade, plans permanently to escape from our famous Yankee winters by moving to Florida. Here New England Division Director Robert York Chapman, W1QV, (center) presents a service award to Eli upon his retirement as president of the Federation of Eastern Massachusetts Amateur Radio Associations, sponsor of the conventions. Looking on at left is Gene Hastings, W1VRK, co-chairman of these conventions for an equal period.

The first-ever ARRL Technical Symposium – a pilot project for others hopefully to come – was held at Reston, Virginia (in a sort of double-header with the Roanoke Convention) Friday, September 14 on the theme, "Space Communications." Charles Dorian, W3JPT (photo at left) kindly agreed to manage the event on behalf of ARRL. Chuck is secretary of the Radio Amateur Satellite Corp. (Amsat) and an assistant director of the ARRL Atlantic Division. A typical view of a symposium session is at right with William A. Tynan, W3KMV, at the rostrum. *(W9QKE photos)*

Key arguments, of course, focus on the need of the amateur service for these frequencies: ". . . in spite of the discouraging effects of those proposals, the band now is widely used by Amateurs and soon will be virtually saturated with repeater and associated operations in the population centers of the United States . . ." Figures are quoted from various voluntary frequency coordinating committees to back up this assumption.

Another heading, "Citizens Radio Is a Land Mobile Service Which Should Be Restricted to Land Mobile Frequencies," is followed by a listing of frequency bands available to land mobile services, including a whopping 103.6 MHz just above 225 MHz!

Some conclusions: "The radio spectrum is a priceless natural resource. The policy of the United States always has been to use this natural resource as efficiently and effectively as possible. The only exception to this policy, albeit unintentional, has been the gross misuse of the frequencies allocated to the Class D Citizens Radio Service . . . The use of most valuable spectrum space for a chit-chat party line communication service more suitable for the telephone, which is the essence of the instant Class E proposal, would be a complete abdication of this nation's responsibilities . . ."

Here is the Summary and Table of Contents, which furnishes a pretty complete outline:

Only a *disciplined* service may be permitted in the 220-225 MHz band because of the possibility of interference to Radiolocation, the primary occupant. No practical suggestions have been submitted as to how a *disciplined* service can be achieved, particularly if the service is to be attractive to tens and hundreds of thousands of potential users. A study by the Georgia Institute of Technology under a Commission contract concludes that an effective monitoring system for HF and VHF frequencies would cost an additional $3.7 to $8.36 million. The complete lack of *discipline* in the Class D (27 MHz) Citizens Radio Service and the inability of the Commission to devise practical licensing and effective enforcement procedures should place the Commission on notice that a service sufficiently well disciplined to prevent disastrous interference to the primary Radiolocation Service simply cannot be achieved. The only comprehensive study of the Citizens Radio Service, made under Commission contract by Advanced Technology Systems, Inc., supports the conclusions (1) that the long distance "skip" characteristics of 27 MHz are a contributing but not the prime cause of the lack of discipline of the Class D service, (2) that 27 MHz is ideal for a personal radio service, (3) that far more efficient and effective use can be made of the 27 MHz band, and (4) that the number of users of the 27 MHz band can be multiplied many times. Every single objective of the proponents of a Class E service can be achieved by more efficient use and a nominal expansion of the 27 MHz band. The amateur interest in and use of the 220-225 MHz band have experienced substantial growth since the adoption of repeater rules a year ago in Docket 18803. The risks inherent to government operations in and adjacent to the 224-225 MHz band from the proposed Class E service are so great that the required public interest, convenience and necessity conclusion cannot be made.

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"A Medium Power HF SSB CW Transmitter" in the May, June and September issues of *QST* won the Cover Plaque Award for its author, Tim Hulick, W9MIJ/4, left. Roanoke Director, Vic Clark made the presentation at the Roanoke Division Convention in Reston, Virginia (*Tnx to W4PED for the photo*).

ROBERT H. STEELE
2ND DISTRICT, CONNECTICUT

Congress of the United States
House of Representatives
Washington, D.C. 20515

October 19, 1973

The Honorable Dean Burch
Chairman
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Mr. Chairman:

The FCC presently has under consideration Docket No. 19759, relating to the creation of a new class of Citizens Radio Service and the reallocation of frequencies between 224 MHz and 225 MHz.

It is widely known that the Amateur Radio Service has made significant contributions over the years in the development of communications, and in times of emergency, amateur radio has often proved invaluable.

The change in spectrum allocation that the FCC has under consideration would likely result in the reduction or loss of many of the vital functions now performed by radio amateurs, a serious loss to the welfare of our nation.

I believe it is in the public interest to preserve the 220 MHz band for the amateur radio operators, and I hope that the FCC will insure this resource is not curtailed.

I urge you to carefully review the many comments you have received on the proposed rule making and to give them your most thoughtful consideration before making a final decision.

With best regards,

Sincerely,

ROBERT H. STEELE
Member of Congress

Representative Robert H. Steele (R, Conn.) is convinced the full 220 MHz band should be retained for amateur use, and so expressed himself to FCC.

FULL TEXT AVAILABLE

Amateurs wishing to obtain a full copy of the filing may send a 10 by 13 inch self-addressed envelope, preferably containing 56 cents postage, to ARRL, asking for "ARRL Filing on 220."

Some thousand amateurs have sent us copies of their own filings on this matter; hopefully there are many more we have not seen. Time has now passed for comments from individuals and for replies to the comments of others. However, interested Congressmen can continue to express an interest in the matter and can urge that full-dress oral argument be held. QST

Strays

Putting It All Together!

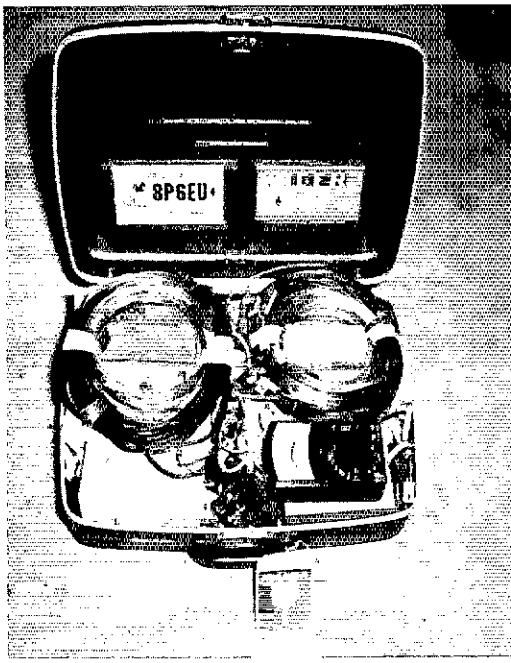
Portable operation can be a problem with regard to getting all of the required equipment packed into a small container . . . even for the QRP man. The situation is compounded by the need to carry redundant equipment to those areas where repair parts are not available. The accompanying photographs illustrate the "before" and "after" aspects of an exercise in packaging a complete lineup of gear for a trip to the West Indies in 1973.

A typewriter case for a Smith-Corona Electra 120 was available, and appeared to be a suitable size for hand carrying the station aboard the airplane. There were some anxious moments after the gear was laid out on the floor preparatory to packing it. Doubt existed concerning the writer's ability to fit it all into the relatively small carrying case. Considerable fit-and-try endeavor ultimately provided the desired end result – the whole "show" in one carrying case, as seen in the second photograph.

The following items were included for two-band QRP operation on 40 and 20 meters!

1) HW-7 transceiver (modified).
2) Homemade 2-band transceiver (back-up gear).
3) Two 12-V dc regulated supplies, 1A.
4) 40-meter dipole with 50 feet of RG-58/U.
5) 20-meter dipole with 50 feet of RG-58/U.
6) Spare solid-state keyer and battery.
7) Headphones.
8) VOM and test leads.
9) Brown Brothers keyer paddle.
10) 100-kHz standard/field-strength meter.
11) Soldering iron and solder.
12) Set of hand tools and knife.
13) 500-foot roll of 170-lb. test nylon cord.
14) Ac adaptor and three-way plugs.
15) Clip leads, roll of tape, and hank of hookup wire.
16) Spare fuses, diodes, transistors, and ICs.
17) Log book and pencils.
18) Foreign and American amateur licenses.

All of the material was packed into the typewriter case, including several pieces of foam-rubber material which prevented the units from banging together while enroute.



The roving amateur may find this rundown of interest in planning a travel kit for operation afield. Only one item is missing from the list – a pint bottle of DX oil – and it's doubtful that there would be room for it in the carrying case, anyhow! – *W1CER*

QST Congratulates . . .

Albert Robitaille, W1YUT, recently honored with Scouting's highest training award, the Wood Badge. The award is earned by completing a two-part advanced adult Scouter training and application course.

Julian N. Jablin, W9IWI, awarded a plaque as author of the best article published in 1972-73 in *Mercury,* the magazine of the Royal Signals Amateur Radio Society. RSARS is an organization composed of radio amateurs currently or formerly serving with the British Army Royal Corps of Signals. W9IWI is one of 10 American members of the organization.

Polycarp K. Gabegbeku, M.D., EL2CI; John A. Schindler, M.D., W4RFA; Sigurd Meng, DL2HI; and Walter H. Thain, M.T., W4KKB; honored with certificates of merit from the Medical Amateur Radio Council, Ltd. (MARCO). The awards recognize services given by the recipients through both medicine and amateur radio.

Dr. William G. Schrenk, WØPAH, Professor of Chemistry, Kansas State University, recipient of an award for teaching excellence from the Standard Oil (Indiana) Foundation Incorporated.

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

Amateur Radio's Young Ladies

AS WE ALL KNOW amateur radio licenses of all classes are available to anyone who is interested enough to take the trouble to qualify. We often make all sorts of witty remarks about our terminology on the air — that all men are called "old man," and all women are "young ladies," whether we are six or six hundred. We usually add that the best part of radio is its equalizing effect, that if the contact is interesting, and the operator is skillful, age simply doesn't count.

The so-called "distaff side" of amateur radio is a very excellent example of the fact that an operator is neither too young, nor too old to be a part of the pleasure we derive from our activity on the air. KØPOF, for example, received her license over 16 years ago when she was 75, and now, at the age of 91, is the "grande dame" of YL operators. In September this year WB4LQO, Elsie McCraw, far better known as "Timmie" on the air, qualified for her Extra Class ticket at the age of 61.

When it comes to checking to find the age minimum of the younger YLs there seems to be no particular limit for the gals who really want to buck the code test and the baffling technical language of the written examination. JH3ROF, Akemi Saito, at present enjoying an enforced silence because of the lack of reciprocal licensing, is 14 years old and holds both code and phone privileges in Japan. Right now she is anxiously awaiting the return to her country so she can resume operating.

WB5GTO received her General Class license at the age of 11. Linda is very active on 40 meters when school work is not limiting her time on the air. An even younger YL, Kathleen Carroll, was 10 when she passed the Novice exam and was issued the call WN1PGG.

The growing group of 9 year old YLs is headed by Kathy Kusluski, WB8LOZ with a Technician license, California's Sydney Haynes, WN6RTR, is very active on 80, 40 and 15 meters. WNØFNT, Judy Prather, in Sioux City, and Linda Wells, WNØJTG, of Ames, represent two of Iowa's youngest ladies; while WN7TWJ, Teresa Kimber, is a 9 year old in Wyoming.

Barbara Ann Richman, WB4MHX, age 12, holds a General Class license and was another of the nine year old Novice group. Recently Barbara entered the W1AW Qualifying Run and passed at 20 wpm. She also holds a commercial radiotelephone license with broadcast permit.

As with so many records, the one of who is radio's youngest YL was made to be broken. Since the 1920s, 8 has been the youngest age, with Tamra Williams, WNØKXO, the fourth YL to claim this distinction. However, Tamra's 1973 record lasted only a short time. No sooner was the information published in *QST*, "YL News and Views," in October 1973, when Deanna Storey, age 7, of Bettendorf, Iowa, successfully passed her Novice exam, and received the call letters WNØKID. There may have been younger people who operated in the early days of radio, but so far as we know now, Deanna is not only the youngest YL to receive a license, she may also be radio's youngest operator.

Because of the many different modes of operation, and the vast number of activities that exist for us to taste and then select as our favorite form of emission and on the air activities, this age span of 7 through 91 represents over 11,000 women in the United States who have been sharing the daily pleasures of amateur radio.

Roanoke Division ARRL 1973 Service Award presented at the Division Convention to Kay Anderson, W8DUV, by Harry Dannals, W2TUK, ARRL President. *(Photo courtesy W4PED)*

*YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.

Dot Baumgardner, WA8IJW, Tape Topics Librarian of the Eastern United States area of the YLRL taping YL Harmonics in this club service to blind YLs.

The full rules for the 1974 YL-OM contest will be published in the "Operating Events" column of *QST*.

YLRL "Adoptee" Program

"YL News and Views" has received a number of inquiries concerning the YLRL "Adoptee" program, and the method by which women in foreign countries may be "adopted" by amateurs in this country. Specifically the inquiries have been from OMs who are interested in this activity.

The YLRL Adoptee program is open to women only, and is limited to YL clubs affiliated with YLRL, or to individual YLRL members. Originally it was introduced to assist DX women in overcoming the tangle of red tape so often encountered in international money exchange when these women wished to become members of YLRL. By a member, or an affiliated club sponsoring, or "adopting" a DX YL this problem was overcome.

The 1973 Directory Issue of *YL Harmonics*, lists 71 women who have become members of the club through this program. These YLs represent 32 countries, and all 5 continents.

1974 YL-OM Contest

The 1974 annual YL-OM Contest has been scheduled for the following weekends in 1974. Cw beginning 1800 GMT, February 23, and ending 1800 GMT, February 24. The phone contest will begin 1800 GMT March 9, and end 1800 GMT, March 10, 1974.

Eila Russell, WA8EBS, 1973 YLRL Vice-president, has scheduled both contests for weekends so that the OMs will be able to take part.

The contest logs must be mailed by March 25, 1974, and received by April 25, 1974. Because of the problems of delays and mix-ups that so often occur in the delivery of the mail, as much time as possible has been allowed for these logs to arrive.

The YLRL Board of Directors has voted to award certificates to Novice winners in every one of the YLRL sponsored contests. Novices are encouraged to participate in the YL-OM, and their logs will be very welcome.

"Tape Topics"

One of the services that YLRL sponsors is the "Tape Topics" program for sightless YLs. Under this program 7 1/2 ips reel tapes are recorded by members of the club to assist these women in keeping up with YL activities. The contests of each tape includes recordings of the latest issue of *YL Harmonics*, the official publication of YLRL, giving news of the activities of the club members in this country and abroad; also the "YL News and Views" columns of *QST*, as well as other news of interest, amateur or otherwise to fill an 1800 foot reel. Each tape is mailed free of charge to those on the mailing list on loan for a period of 10 to 14 days. It is then returned to the Tape Librarian of YLRL for further distribution.

These tapes are available to all sightless YLs in the United States including Alaska and Hawaii. There is a separate program for Canadians that is carried on by CLARA, the nation wide YL club of Canada. At present there is no plan to distribute the tapes to other countries.

Those who are interested in receiving these tapes should write to Tape Librarian in their geographical area. In the Eastern United States she is Dot Baumgardner, WA8IJW, 20470 Lorain Road, Fairview Park, Ohio, 44126. The Western U.S. Librarian is Raj Cauthers, K7NZO, Star Rte 1, Box 250, Tahuya, Washington, 98588.

Everybody moved before the picture was taken but the WAYLARCS at the YL luncheon at the Roanoke Division Convention were augmented by 3 PJ-YLs. W3RXJ, WA4UWK, K4BNG, W3CDQ, W4HRD, W3UTR, K4EAM, LU1BAR, W4TVT, W3TNP, K3FYS, W3WRE. *(WB8LAI photo)*

YLs attending the AFCEA luncheon, Washington D.C. in September were: l-r front row: Liz Zandonini, W3CDQ; Maxine, WA4UWK; Kay Anderson, W8DUV. Back row: Lil Gunther, ex-W2FUD; Myrtle Cunningham, WA6ASY; Rose Ellen Bills, WA2FGS.

YLRL Certificates the Hard Way

For those women who are tired of taking it easy, and like to make their point the hard way, or who are looking for a new type of challenge in working DX, the new YLRL sponsored DX YL to Stateside YL contest should be particularly interesting. Not only are the WAC-YL, and DX-YL certificates possible awards, whether the contestant receives the high score or not, it is also quite possible for us gals to qualify for YLCC through 100 DX contacts.

Remember too that there are Novice awards so, in this newest of the for-women-only contests, there are new-type awards for us all.

1973 Howdy Days

First place YLRL member, WA1NXR, 41 points; WB4TIV, 39 points; DJ1TE, 36 points; VE1AMB, 35 points; WA7FLC, 32 points.

Thirty six YLRL members participated in the contest but submitted no logs. Twenty one non members who submitted confirmation logs were: XE1CI, WB8KYM/8, WB8FYH/1, WB5FAE, K2MGE, G5ABT, DK2KD, DK5RU, IT9LTC, DJ9NN, DK3LY, DJ1BF, DJ0OK, IT9NL, LA5IS, VE1ABB, VE3ETN, VE3ATO, F6AYF, VE1AAO, G3EDQ.

Howdy Days is the easy get acquainted contest that takes the place of a YL QSO party and opens the activity season for women operators. This year DX women were particularly active.

Roanoke Division Service Award to W8DUV

Kay Anderson, W8DUV, received the 1973 Service Award at the Roanoke Division ARRL Convention in Reston, Virginia September 14-16, 1973. The award was presented by Harry Dannals, W2TUK, ARRL President.

Originally licensed as W4BLR, Kay is a former President, and Vice-President of YLRL. Kay is active on cw, ssb, RTTY, and fm. A member of A-1 Operators Club, she has an impressive record of service in amateur radio participating in traffic, and in emergency work during national disasters.

In 1969, Kay was co-chairman of the Roanoke Division Convention in Huntington, West Virginia, served as Secretary of the Tri-State Amateur Radio Club of Huntington, and in 1969 was RTTY official station as Chairman of the Roanoke Division League Officials meeting in Greensboro, NC.

Kay was honored by being named Amateur of the Year at the Hamvention at Dayton, Ohio in 1970. She was awarded West Virginia Outstanding Amateur of the Year in the same year. In 1972, Kay and OM, Ed, W8DUW, were co-winners of the First Army MARS Commander's Trophy.

"YL News and Views" extends congratulations to Kay on her long and impressive record of service. QST

Laurie Larsen, WB9IIM, Vice-President of the Trier Highschool East Amateur Radio Club. Laurie is active on cw and fone.

Public Service *(Continued from page 62)*

■ A series of tornadoes and flooding hit several towns in North-Central Kansas on Sept. 25. Upon hearing tornado warnings, a 2-meter net was activated using the WAØCJQ repeater in Salina. As a tornado passed over Salina operations were temporarily halted then re-established on 2 and 75 meters.

The same night a tornado hit Clay Center knocking out electricity and telephone service and damaging the hospital. By 0800, Sept. 26, WØLQK, KØs MXJ TCS, WAØLXV were operating emergency stations in the area and handling traffic to and from the isolated city. Amateurs remained the only means of communications for personal traffic in Clay Center through Sept. 27. Communications were also provided for c.d. and Red Cross. – (KØEPC)

■ On Oct. 3, a construction crew accidentally cut the cables carrying all communications in and

(Continued on page 160)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

H o w :

Modest Thanksgiving bash at Grommethead Schultz's and we were lounging in the shack. He passed us some popcorn, then warmed up his transceiver and the ultracompact linear that had been blowing so many sweep tubes. "Hah-hah, we get it, Grom, we get it. Your little monster pops finals like popcorn. Very droll. Can it cook pizzas, too?" We wouldn't have been surprised if he had pulled a pie or two out of that hotbox. The *so-called engineers who designed the outfit must* have been frightened in youth by Class-A 6L6s and were getting even with the world. Even on "Tune" it smelled like melting plastic. The whole thing was just one pitifully inadequate heatsink.

Our beaming host tapped his temple smugly and started to tune up for 15. We warily edged toward a handy fire extinguisher but Grom smiled confidently. He even pressed his J-38 without wincing and upped the grid drive without flinching. We groaned in sympathy with the undersized plate transformer, visualizing more flattened sweep tubes. But Schultz kept grinning – ten seconds, fifteen, *twenty* seconds he held down that key. Suddenly, pop-pop! There went, we felt sure, another costly set of 9LQ9s.

Yet Grommethead kept smiling as he laid off the key and snapped open his little black furnace. We expected to see him haul out two more extinct amplifier tubes. Instead he withdrew two excellently popped chunks of popcorn. "Butter or caramel?" he purred. "Anchovy pizza," we demanded. "Seriously, what do you think of my new heat-overload indicator?" asked Schultz proudly. "I have about five hundred high-grade popcorn kernels taped to a hotspot inside that overpriced import. Their popping temperature is reached well in advance of excessive plate dissipation. Always plenty left for future tune-ups."

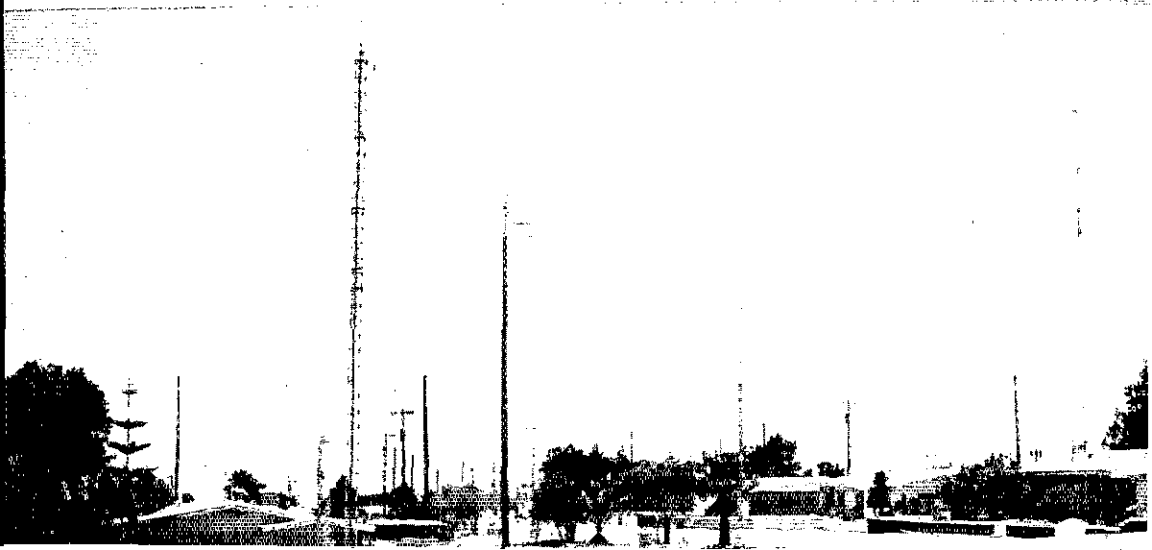
Well, we had just seen it *work*. We had to agree with Schultz that he ought to send it in to "Hints & Kinks." Tubes can run into money; popcorn is cheap. Grommethead promised to bring out our pizza as soon as he retuned back to 20. This he ceremoniously proceeded to do, all of us listening intently for his clever heat-alert. BLAMM!! Grom hopped back like a piece of his own popcorn and we nearly fell off our chairs. The rig literally blew itself up, bulging with the biggest, whitest popcorn you ever saw, and pieces of linear bounced all over the shack. Schultz was in shock.

We finally got around to pizza later but our appetites were shot after helping Grommethead clean up all that popcorn. Have you ever wondered, while cooking up a crisp batch, what the chances are that each and every kernel might chain-react and pound off all at once? Poor Grom refuses to be assured that he will never beat such astronomical odds again. He has this thing about popcorn now and won't go near the stuff. With his track record, just as well.

† † †

*c/o ARRL, 225 Main St., Newington, CT 06111.

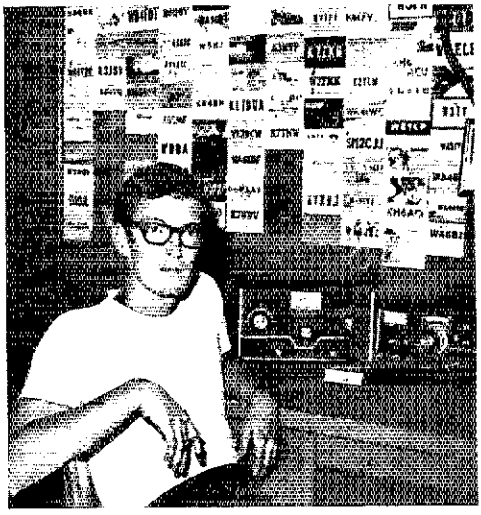
OA6s BW and BY radiate from a sweeping QTH of the Month at Ilo with this impressive set of skyhooks. Chuck and Yvonne are joined on the air here by OA6s AK BF CL CS and CQ. Antenna buffs will be interested in OA6BW's finding that a four-element quad outperforms a seven-element Yagi. He proves this regularly to all comers on 28,213 and 21,265 kHz. *(Photo via K6SE/2)*



W h a t :

40CW deserves attention now after last month's peek at 7-MHz voice DX doings. The band is top-grade DX ore, all right, and W/K miners with Extra Class tickets dig most of the gems. Upgrade! About eighty percent of the following radiotelegraphic items reported workable by "How's" correspondents Ws 3HNK 6AM 6OKX, Ks 1TKS 2HYM 2YFE, WAs 2EAH 3NUH 3SWF 3TLS 6SXL, WB9s CJS DRF, WN6SWM, VE3CUI and in literature of clubs and groups, showed up only in the 7000-7025-kHz slot: A2CCY, C21DR, C31s BL GW HF, CEs 1EG 2CF 2DK 3ED 6EZ 9BT, CMS 2AF 2AM 2AZ 2DR 2GB 2JA 2QN 2RA 3LN 6OB 6QR 7AI 8EC, CN8s BO CF CG, COs 2AA 2BM 2DC 2DL 2FC 2PY 2QR 6LN 7AI 7CD 8AY 8RC 8SM, CPs 1AA 1EU 2DR 6EE 7GM, CRs 4AG 4BS 6AI 6LX 7BN 7CI 7CN 7FI 7IZ, CTs 1BH 1DJ 1MC 1LN 1OI 1ZR 2BF 3AS CW3AA, CXs 1BBH 1BBL 2AQ 3AE 4LO 8BBI 8BBL, DA1ED, DJ7MG/OHØ, DLs 2GG/YV5 3ZM/YV3, DM2BJD, DUs 1AMA 1CI 1POL 6EG 6IV 6RH, EAs 1BC 1KC 1LR 2CI 2IA 3NJ 4CR 4IS 5CV 5LE 6BD 6BK 6CB 7JA 7QK 7RI 8CR 8DT 8ET 8FE 8FO 8FS 8IE 8URE 9AW 9EO 9EU 9EW 9GN, Els 3R 7AJ 9J ØDI, ELs 2DG 2DK 2DO 2Y ØA, EP2BQ, ET3USE, Fs 3NB 6CNQ 6CU 8VU 8CS 8HV 8SV 8TM ØAVG/FC, FB8s XC XX ZB, FCØAHY, FG7s 7AE 7AM 7TD 7TG, FK8s BO BT CE KAA, FL8s BZ DS, FM7s AH WU, FO8s AS BJ BV BW BX CR DF, FP8s AP II LQ, FR7s AW ZL, GC2LU, GI3s IVJ JEX OQR, GMs 3JDR 3JI 3OA 3PPJ 6AXO 6RV, GWs 3BJE 3MQX 5TW, HBs 9AFI 9AOU 9AMA 9BX 9KC 9QU 9VS 9ZE ØAWW, HCs 1AH 2HM 2TV, HIs 3AJL 3PC 7JM 7OMR 7REM 8AGM 8CRO 8FED 8LPN 8NAH, HKs 1EE 1QQ 3ASJ 3BAE 4CKJ 4EX 5BIR 5KX ØBKX, HL9s KK WI, HMs 1BL 1GD 1GO 1GP 2GR 3PR 4FW 4GF 5EE 5GF ØB, HPIs AC AH AU RV, HSs 1AHW 1ALW 1EE 4AGZ, HZ1HZ, JAs 1MCB/C21 3LWA/JD1, JD1s ABX AHC YAH, JF1XPU, JHs 1BBT 2AEY, JR1DRF, JT1AN, JWs 4EJ ØAU, JX1AP, JY9GR, Ks 2MH/KL7 5UTH/KH6 5LWL/YV6, KA1CQ, KCs 4AAD 6SK 6SX, KGs 4AA 4FG 4FU 4FV 6AAY 6JAR 6JBO 6JBS 6RA 6SW, KH6s AQ CE COB HKM HSW IJ RS, KL7s AIZ AX FA HIY, KP4s AST DMA/VP7 DPN UW, KS6s DH ER, KV4s CI GP HW, KX6s BB BU EB GS LA, KZ5s BB BH KP MS NC PW PY RP VV, LAs 1H 2B 5Q 7TH 7Y, LUs 1DNU 1HDC 2DKG 3AU 3DRK 3DSI 3EX 3WBB 5HFI 6AB 6DKX 6SC 7TD 7WH 8AJG 8EE 9FAN, MP4BIN, OAs 4AHA 4AX 4MS 4NCT 4XK 6GV 6NCT, OD5EJ, OEs 3RHA 5KE 8AA, OHs 1AA 1TN 2BDP 2HK 5UQ ØAB ØRJ, ONs 4VO 5FG 5TW, OXs 3AY 3JW 3YY 3ZO 4CT 5BT, OZs 1LD 1LO 5CV 5KF, PAØs GN VU, PE2EVO, PJs 2ARI 2CW 2HA 2JW 2VD 7VD 8AA 8NLO 9BN, PZs 1AA 1AH 1AJ 1AP 1AV 1CQ 9AB, SKs 5AL 6CF, SMs 3EAG 5AYY 5CBN 6BNX 6CST 6CWK 6FYJ 7CE 7CZR 7EAN, SVs 1DO 1CH ØWTT, TA2EA, TFs 3AB 3AW 5TP, TGs 4SR 9CD 9DS 9KJ, TIs 1AAC 2CF 2PZ 2WD 2WX 3BVF, TJ1s BG EZ, TT8AC, TU2DQ, UAs 1ADH 1ZAY 2EC 2FAO 2FAW 3LBF 4HDH 6AL 6LAU 6LO 9CCW 9CEM 9MAX 9OBK 9WBO ØAG ØCAC ØCBS ØFAQ ØFBF ØFBO ØJA ØKAF ØKAN ØKAR ØLAM ØSY ØZBB, UB5s BAW DV EAT HS IB IF IS LE LL MCH MZ ND SY, UC2s AAH AAW LAM OQ WAN, UD6s DFF DHQ DHU DHW DO DJU, UF6s CQ CX FAG FC, UG6s AW GAF GBC, UH8s BO HAK HAL YAA, UI8s AAC AAN IZ LAC LAG OB OK, UJ8s AB AE SAB SAC SAJ, UKs 1ADK 1ZAM 2FAE 2GAA 2GAM 2GAN 2GAZ 2PAF 2PAT 2WAM 2WAN 3MAV 3XAA 3XMC 4FAE 5EAQ 5ICF 5JAG 5QAA 5QAE 5KAA 5VAB 6AAU 6YAA 7BAD 7NAA 8OM 9AAN 9ABA 9LAG ØCAT ØIAC ØZAA, UL7s BG GAY GW HD NAO QF SJ, UM8s FM MAG NAC QAB, UO5s OBD PK, polar UPOL21, UP2s NK SA, UQ2s GBJ GCQ GW, UR2TAX, UT5s AA LE MD RF SO SY, UVs 9AX 9CD ØEN, UWs 4AT 9AI ØIN, UX3s B R, UY5s DV PA PR, UZØZAC, VE8s AX BT BW DJ DT MD, VKs 1EO 1NR 1VK 2AHK 2AMB 2BER 2BQQ 2EO 2HK 2NS 2SA 2SG 2WC 3BED 3FC 3FS 3MH 3MR 3OP 3RW 3VJ 4PB 4YP 5FM 5KO 6CT 6GU 6HD 6RO 6RS 6WT 6ZE 7GK 8HA 8ZZ 9MH 9RH, VOIs AA KE, VPs 2GI 2KQ 2KX 2LAW 2LL 2LX 2SAB 2SAH 2SF 2ST 2SU 2ME 2MW 2VBU 5GR 5RF 7BA 7BL 7NP 7RA 8DK 8NI 9GD 9GR 9HH 9HI 9HT, VQ9M, VR1s AA PA, VSs 5MC 6AW 6DD 6DO 6FB 6GM, VU2s DX IN KV OA QV RM, WAs 2FBI/6Y5 ØKXJ/6Y5, WB4BUQ/8R1, XEs 1EEI 1FE 2AAG 2AAI 2BC 2OE 2UDC, XW8s BP FB, YA1OS, YB7AAU, YJ8s BD EE, YK1OK, YN1AA, YOs 2AHJ 2BB 3AC 4AG 5KAI 6EX 6MZ 7AHD 8AIO 8MC 9AEI, 9APJ 9YE, YSIs AG PRT, YVs 1AD 1AOT 2ABS 3YD 4AGP 4AOO 4BE 4NQ 4UX 5BFZ 5BRN 5CKR 5KL, ZB2AW, ZC4BI, ZEs 2JS 5JJ, ZFIs GS KW SB VD ZK2BD, ZLs 1AAD 1AGE 1ALP 1AMM 1AMQ 1AQ 1BHI 1DI 1PJ 1VD 2AAP 2AFE 2AFN 2AI 2CH 2IR 2OD 2MM 3AUT 3BH 3BN 3DR 3GQ 3KK/c 3SX 4CP 4GA 4IE 4NH 5AL, ZPs 1AA 5AL 5EC 5EG 5VG, ZSs 1GJ 1RY 1XG 2MI 3AK 5KI 5LB 6BT 6DW 6FN 6KT 6OS 6WF, 3B8DA, 3D2FO, 4K1s A D, 4S7s AB BX BZ DA EJ, 4U1ITU, 4X4s NJ VE YM, 4Z4LI, 5B4CZ, 5R8s AC AG BD, 5T5s CJ FP, 5U7AZ, 5W1AU, 5X5NK, 5Z4s IP KL, 6W8BL, 6Y5s DB ED EE SR, 7X2AH, 8P6s AE AG AZ DR ES EW, 8R1AE, 9G1HE, 9H1s BB BX, 9J2s NC WR XZ, 9M2s BE CJ KA RB, 9L1GC 9V1s OK OP QO RF, 9Y4s I TR and VU, plus almost countless Germans, Italians, Englishmen, Bulgarians, Czechs, Poles, Hungarians, Yugoslavs, Brazilians and Japanese who seem to make their headquarters on 40 cw these days. Even Novices 'way up-band get into the 7-MHz cw act, WN6SWM reporting QSOs with a curious BY9, HK3ASJ, JAs 1DUH 7XAX/mm ØYAK, JE1CKA/C21, KG6AAY, PY7s JE PO, UWØIN, VK9MH, ten more VKs, ZLs 1SV 2CH 2MM 5AL, ZM1AIZ and two Mexicans. WN2EOO settled for KZ5NG, while WNØGTJ captured ZL1SV and others. How does so much DX squeeze into so few kHz? Good old-fashioned i-f selectivity, operator skill and the fantastic fashion in which well-keyed, stable, pure-dc cw signals cut the mustard. If you would keep loading your DX logs through the sunspot minimum in years ahead, a time when more and more amateurs jam into limited lower-frequency bands, oil up your paddles, OMs. QRM? You haven't heard anything

FPØXX (K1DRN) collected 729 QSOs from St. Pierre in mid-July and reports that "first FP8!" comments are still common. Vern missed only Hawaii, Maine, Mississippi and New Hampshire while logging much overseas DX. K1DRN praises FP-land hospitality but notes transportation to and from the islands growing less available.



KH6HDB, in great DX demand from remote Kure isle, answered seven thousand callers in his first few months there. Gene anticipates making it twenty-K before he shuts down next June. *(Photo via WA3HUP)*

yet. Our lower bands are substantially shared with commercials, you know, and they're just beginning to join the downward rush.

† † †

W h e r e :

NORTH AMERICA — All hail our "QSLers of the Month" saluted for unusually snappy confirmational comebacks: CP1JV, DJ0JE, F6ASR, FG7XL, FP8DH, GC3EML, HA5KBM, HR1RSP, JAs 1MCU/C21 1WSA 7HQP, JD1ACH, JH1BNC, K5LTH/KH6, KH6AAY, KV4HW, OK2BGT, PJ2HA, PY1DRT, SM0PX, VE6AYU, VK8AW, WA3HUP, ZL1SV, 5B4AO, 5T5LO and 5U7BA. These dependables appear in commendations from "How's" correspondents W4WFL, WAs 3SWF 6CPP, WB4TFH, WNs 6OSS 0GTJ and VE7BAF. Any creditable quickies out your way? . . . HALP! W1OPJ still seeks suggestions on snaring cards from FG7KP, VP2VW; K2HYM hungers for YN1CW's affidavit; WA3ERG is anxious about FY7YQ of 1970, TU2s AF BK '72; WA3SWF yearns for the pasteboards of CR6AI, FY7AM, KS6EM, 4X4NJ, 5Z4NM; WA6CJL hunts hints on A35FX '72, CR9BK '72, CT3AW '72, FM7WU '71, KW6VM '70, PJ7VL '71, SV4RP '71, TT8AC '72, UK8MAA '72, VP2s ED VAO, YS2FM, '71, ZK1AA '70, 9Q5QR '70; WN6OSS is stymied by CX2FD, FM7WG, PJ2JW, TI2LA, TY1ABE, VP9HI, XE1TI, WN4ZYF/KV4; WN0GTJ needs nudging toward KS6CY, VP9LL, ZD8AF, ZF1WB; and VO1KE wonders why AIR and NSS left him off their list. Any 'alp? . . . Be advised that WA1MJH, doing missionary work in Guatemala, is the authentic TG7DH. Use of the call by others is spurious even though QSLd. (F2BO/W1) . . . We're willing to act as QSL aides to DX ops in need. (G. Harris, 348 Oswego St., Park Forest, IL 60466; also W5QWH, WB5HVY) . . . Some QSLers of the Month who made this SWL happy are Ws 3AQN 3CRE 3HAX 3IZ 5IW 6NHF 8IMZ 0MU, Ks 4DBT 4TJ 7HYW, WAs 1JLV 2JOV and 0YWI. Merry Christmas to them all! (C. Knoblock) . . . WA5UHR advises he has received no FM7WU logs for two years. (WA6CJL) . . . Mailed out five hundred FP0XX QSLs via bureaus in August. (K1DRN) . . . About two dozen Cubans and ten Angolans worked without one QSL so far. (WA3SWF) . . . ZF1VD QSLs, all ten pounds of 'em, were cleared out by October. (WCDXB) . . . QSLs for VAs usually go to VEs of the same suffix. (LIDXA)

EUROPE — SM5CAK of SK5AJ's staff suggests moves of possible benefit to past "Halp" supplicants. They might try parenthesized sources if not already solicited: BV1US (W4SUF, K2MZM or WA2CFG), CE0AE (WAs 3HUP or 5PUQ), DJ6QT/5U7 (W2GHK), FY7YG (WA4GQM), HB0XUK (W4JKO), JW4LN (LA4LN), JX6RL (LA8AG), JD1YAA (JA1WU), KA1IW (W1JAJ), KA8KO (K6TWT), KR6PO (WA9AOI), KW6EJ (W7HBI), OJ0SUF (OHs 2BHU or 0AM), OY9IV (W3HNK), PZ1BX (WA5SOG), SV0WOO (W3MNE), TI2PZ (K0DQI), TJ1BF (WA4WTG), TU2AF (3V8AF via REF), TZ2AC (W2GHK), VP2GBC (VP2GW), VR1PA (WA6HF), VQ4RF (W4MCM), XT2AC (W2GHK), VS5RG (VE7IG), ZD3Z (OH2NB), ZD7DI (G3JBQ), ZE1CU (K9BNF), ZF1DX (K6KDS), ZF1KV (WA0QOI), 3B8CR (G3LCJ), 3V8AH (SM7BZD), 5N2AAZ (trace ex-5Z4KY), 5V4JS (5N2AAJ), 5X5NK (G3s LQP or ZUK), 8P6BU (WB2UKP), 9H1CZ (9H4C), 9H1R (WB2IEC) and 9L1GC (G3DYY) . . . DK4TP still welcomes QSL inquiries for last year's C31FV activity. (DXNS) . . . QSLing for our October Liechtenstein work will be 100 percent direct or via bureaus. (HB9s AJC NL) . . . No current connection with Andorra QSLing here although cards arrive for various C31 stations. What gives? (W2OEH) . . . My September remark about Russia's QSL bureau was really intended as pro-CRC. The only bureaus that seem faster than Box 88 are Germany's DARC and England's RSGB. Perhaps the absence of alternate direct routes to U-stations is the real problem. (VO1KE) . . . No logs here for SP5PWK-3Z5PWK — sorry. (W7HKI) . . . LA1H's records for QSOs since June '70 have not come through to W2GHK's DXotM staff. Go direct. (K4KH)

ASIA — DK5AR, erstwhile awards manager for Afghanistan's Camel Drivers Radio Club, may be able to relay your QSLs to former YA operators. The Kabul CDRC bureau is no more. (DXNS) . . . AS1PN logs from August 12, 1973, are in the hands of W1JFL with earlier records possibly forthcoming. (WCDXB) . . . QSLs sent to the Delhi VU2 bureau will not reach me. They should go directly to my Port Blair address and all will be answered on receipt. (VU7GV via W4UMF) . . . UF6HS & Co. send forth those 4L6A signals from UD6-land, QSLs to go via the usual Box 88 route. (VERON) . . . JY3ZH's QSLing to W/Ks is much more economical via me than through JR1RDE. (K6AQV)

AFRICA — K9KXA assumes my QSL chores as of July 1, 1973, expecting the customary s.a.s.e. (self-addressed stamped envelopes) from W/K applicants, s.a.e. plus IRCs (International Reply Coupons) from others. (EA8CR) . . . Effective September 23, 1973, I am Stateside QSL manager for 9G1GG of Takoradi. (WA2MVQ) . . . Lagging log receipts delay QSLing for ZS6ME. Patience, please. (W5QPX)

OCEANIA — Though sometimes exasperatingly slow, QSL bureaus are essential for DX operators on the move. I change QTHs so frequently that direct-sent cards may never catch up with me. The zooming cost of postage now makes our international bureau system more valuable than ever. (ZL1SV via W7JQB) . . . Hundreds of cards for VK0JM arrived here but I have no connection with his QSLing. (VK3XB)

SOUTH AMERICA — Seekers after confirmations from PQ0MI, PT0MI and PY0BRL, operated from Fernando de Noronha, St. Peter &

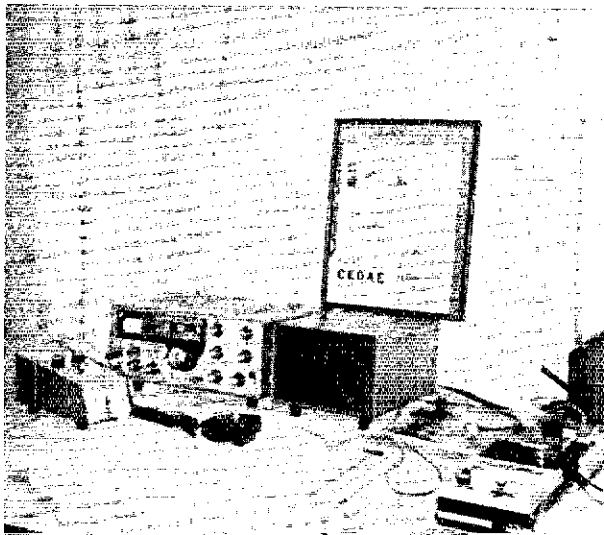
Paul and Trindade isles respectively, might consult with Brasilia's PT4AM. (DXNS) . . . Don't give up on CX7CO. His QSL came through in twenty months. Be persistent! (WA6CJL) . . . Now to specifics in the "How's" mailbag, well aware that each suggestion be necessarily neither "official," complete nor accurate. Just might nail you down a new one though. Like so:

C21KM, Box 29, Nauru Island (or via ZL1AIH)
CM2AF, Box 18001, Zona 18, Havana, Cuba
CM6OB, P. O. Box 12, Sagua Lagrande, Cuba
CP5AO/6, J. Cossio, Box 690, Cochabamba, Bolivia
CR8AM, P. O. Box 22, Dili, Portuguese Timor
DA2DX, Capt. R. Harris, 1st Sig. Bn., APO, New York NY 09227 (or via W3HNK)
DJ9KR, U. Bihlmayer, Gartenstr. 14, D-74, Tubingen, Germany
DM2DUK, Box 9, Ilmenau, E. Germany
DM-DT3QO (via DM2ATD)
DU8BA, P. O. Box 244, Zamboanga City, P.I.
EA6CF, Cas. 34, Palma de Mallorca, Balearic Is., Spain
EIØCL, P. O. Box 73, Athlone, Eire
EP2EO, S. Mortazavi, Box 1000, APO, New York, NY 09205
ex-EP2TC, R. Cleve, W4TRP, P. O. Box 4051, Falls Church, VA 22044
FL8CH, B.P. 1552, Djibouti, F.F.A.I.
Gs 3BID/HBØ 5CS/HBØ (to Gs 3BID 5CS)
HBØs AIC NL (to HB9s AIC NL)
HH2OEA, J. Silva, P. O. Box 1304, Port-au-Prince, Haiti
HI8XFL, Apto. 1343, Santo Domingo, D.R.
HI8XVM, Box 880, Santo Domingo, D.R.
HP2XY, P. O. Box 1013, Colon, R.P.
HR3AC, A. Cameron, Aptdo. 47, La Ceiba, Honduras
HZ1TA, Box 195, Riad, Saudi Arabia
JY6s KAI KGL KGO KSJ KST KZN, P. O. Box 30, Al-Karak, Jordan
JY8LE, Box 1352, Amman, Jordan
KA6WS, via OARC, APO, San Francisco, CA 96331
KZ5QRN, Box 5028, Coco Solo, Canal Zone
OK4s 1Z/mm NH/mm (via OK1IBF)
OK4PEN/mm (via OK2BRR)
PY3CKZ, Box 3143, Porto Alegre, Brazil
SM7CRW, J. Winbladh, Storgatan 18, S-38060, Farjestaden, Sweden
VE3EMF/VP7 (to VE3DFU)
VK9FV, B. Stevens, Box 204, Port Moresby, Papua
VP2SU, A. Samuel, P. O. Box 142, Kingstown, St. Vincent, W.I.
VQ9s B/f BP/f M/f R/f (to VQ9R)
ex-VR4EJ, P. Butler, 28 Muller Rd., Zillmere, Queensland, 4304, Australia
WAs 2FBI/6Y5 ØKXJ/6Y5 (to WAs 2FBI ØKXJ)
YB3CW, P. O. Box 59, Surabaja, Indonesia
YK1OB, P. O. Box 162, Damascus, Syria
ZF1GW/VP7 (to WB4NXR)
ZK1DX, P. O. Box 269, Rarotonga, Cook Islands
ZL1SV, N. Hardy, Box 489, Wellington, N.Z.
ZP5WO, Apto. 1321, Asuncion, Paraguay
5U7BA, Box 877, Niamey, Niger
5V7GE, P. O. Box 196, Atakpame, Togo
7Q7JD, J. Downey, P. O. Box 340, Lilongwe, Malawi
9M2PV, Box WD-100, Tapah, Malaysia

A51PN (via W1JFL)
C31HF (via DJ9NA)
DL6UH/HBØ (to DL6UH)
DM8THI (to DM2DUK)
DM9AHH (via DJ4AH)
EA8CR (via K9KXA)
EIØWPO (via EI5P)
EL8A (via OZ6HS)
F8TH/HBØ (to F8TH)
FØAVG/FC (to DK5OS)
FG7TD (via F6BFA)
FP8AO (to W2JNO)
FP8EF (via K4RHU)
FPØII (to WB2MAN)
FPØKX (to WB2KXY)
FPØLQ (via FP8AP)
FPØSS (to WA2EXP)
HC8SB (via GRC)
HL9KP (via WAØVYZ)
IØAHV/IA5 (to IØURK)
JD1AHQ (via JH1DTC)
JX9TM (to LA9TM)
JY3ZH (see text)
K2LZQ/OHØ (to K2LZQ)
KG4FI (via DK4TP)
ex-KL7HJE (to WA6TWF)
KV4FQ (via K4HHD)
LA1H (see text)
OK5ØR (via OK3EA)
PA9ZZ (via DCØKO)
PJ9GIW (via K4CDZ)
PYØAA (via PY5AA)
SK9WL (via SM7CRW)
SP5PWK (see text)
SY5MA (via W4KA)
TG7DH (see text)
TJ1BG (to WB4KPZ)
TU2EF (via WA6CEB)
ex-TY1ABE (to F6BYZ)
TY8ABB (to TU2BB)
VA7WJ (see text)
VK9MC (via K6ZDL)
VK9RY (via JH3HPX)
VKØJM (see text)
VP1SYL (via W5NOP)
VP2AAK (via K4RHL)
VS5MC (via DK5JA)
VS9MS (via G8HYM)
W6LUV/KB6 (to W6LUV)
WA5VKJ/LX (to DA2DX)
XF4YK (to XE1J)
XP1AA (via W1NXZ)
XP1AB (via OX3LP)
YA1CDRC (see text)
ZF1WF (via K4CDZ)
3D6AF (via K6KII)
3D6AM (via W2LGU)
3V8DM (via VE6HN)
5B4BK (via OE2SCL)
5B4FF (via G4RS)
9G1GG (via WA2MVQ)
9M2CJ (via MARTS)
9M8JP (via WB6BGQ)
9V1QO (via DJ3AZ)
9X5VZ (to I5VEC)
9Y4VU (via W3EVW)

The foregoing data are your Christmas gift from Ws ICW 1OPJ 2GT 2OEH 4UMF 6AM 7JQB, Ks 2HYM 5QPX 9KXA, WAs 2MVQ 3SWF 6CJL 8TDY, WB2MAN, WNs 6OSS ØGTJ, KH6GHZ,

CEØAE, lately on the mainland as CEØAE/6, greets you in Chilean Scout garb. Father Dave's former Easter Island station shown here qualified for one of the earliest Five-Band Worked-All-States certifications awarded by ARRL. He hopes to be back in action from the island in the near future. *(Photos via WA3HUP)*



VU2CAN and XYL Mary try Lockheed Amateur Radio Club gear with W6JEP looking on. Marie and OM W6DDB are responsible for assisting in the licensing of innumerable newcomers to hamdom out west. The visitors from India recently completed LARC's famed amateur radio course. *(Photo by WB6NCJ)*

VE7BAF, VO1KE, OK1NH, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, N.72T, England), International Short-Wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15 5JE, England), Japan DX Radio Club *Bulletin* (JA3GZN), Long Island DX Association *DX Bulletin* (K2KGB), Newark News Radio Club *Bulletin* (M. Witkowski, Rt. 5, Box 167, Stevens Point, WI 54481), Northern California DX Club *DXer* (Box 608, Menlo Park, CA 94025), Southern California DX Club *Bulletin* (W6EJJ), VERON's *DXpress* (PAØs INA TO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). Any return offerings from your log?

Whence:

Just a few addenda this month as space allows. ARRL's W4WFL/1 reports WA8IJI, VK3CZ and W5RTQ as recent additions to the 160-meter WAC roster. Refer to November's "How's" for scoop on the 1.8-MHz Tests now under way, and good luck in the League's annual 160-Meter Contest due to pop December 8th-9th. Also don't fail to take a whack at ARRL's new 28-MHz competition described in last month's issue. . . . There's a fat and furious Arkansas DX Meet slated for Fort Smith's Hilton on the 8th of this month. For details and reservations buzz W5WZN. . . . The name and call of Don Mix, W1TS, are inextricably entwined with all the essence and flavor of ham radio. Thorough comment on his passing will be found elsewhere but we are bound to record here our own appreciation of delightful long association with this quietly enthusiastic wireless legend. Don was, if anybody ever was, truly an amateur's amateur. QST

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1AWD, Albert R. Pierce, Jr., Marion, MA
W1AWY, Virgil A. Hatch, Brewer, ME
K1CEG, Bertram A. Perry, Springfield, MA
W1DTX, William R. Curtiss, Meriden, CT
WN1OIM, Richard M. Elliott, Norfolk, MA
WA1QGF, Henry "Ray" Alexander, Jr., Newington, CT
W2ARL, Irving D. Perry, Summit, NJ
WA2EPH, John B. Sanford, Norwich, NY
W3GQV, Melville W. Spencer, Hollywood, MD
W3IDP, Robert R. Cox, Kensington, MD
K3NUB, John G. Calter, Glenolden, PA
W4BE, Charles W. Davison, Orlando, FL
W4DFZ, Grover W. Gnewuch, Vero Beach, FL
W4EAM, Herman L. Long, Salisbury, NC
K4EP, Jerome F. Smith, Richmond, VA
W4FX, Powell May, Knoxville, TN
W4HC, Laurance P. Wilhelm, Savannah, GA
W4JG, Millard F. "Tom" Eakle, Harrisonburg, VA
WB4KGA, Louis F. Raeder, Springfield, VA
W4ORE, Dewey J. Dyer, Thomaston, GA
K4OYV, James D. Dunn, Phoenix City, AL
W4SYV, *Louis H. Swayze, Decatur, GA*
WA5BBN, R. C. Bolger, Longview, TX
K5ZDW, John Rose, Dallas, TX
W6FP, Dick Carpenter, No. Hollywood, CA
W6FPA, Harold H. Shugert, Whittier, CA
W6GHP, Dan J. Cortopassi, Roseville, CA
W6PWF, Edward L. Smith, Carmel, CA
WB6UWK, Frank B. Tower, Santa Cruz, CA
WB6WSD, Clifford L. Secrest, Anaheim, CA
W7ACF, Stephen M. Fox, Sun City, AZ
W7LJO, Edwin J. Becker, Salem, OR
K7UYS, Carl F. Flora, Camano Island, WA
W7ZP, Joseph P. Vogt, Salem, OR
WA8AFA, Oscar J. Ward, Ashville, OH
Ex-W8AXL, Allen C. Kauble, Clyde, OH
W8ISQ, Russell J. Bidwell, Conneaut, OH
W8KJU, Clayton V. Spotts, Jeromesville, OH
W8QAZ, Charles W. Cramer, Canton, OH
WA8RYJ, Richard K. Thiede, Addison, MI
W9AZK, Harold J. Vaughan, Chicago, IL
WB9CBX, Arthur Baptisti, Jr., Nashville, IN
K9FUJ, Dixon N. Burkdoll, Ft. Wayne, IN
W9MW, Joseph G. Charpie, Indianapolis, IN
WA9SNC, Francis T. Brewer, Streamwood, IL
WØDMA, Alva A. Smith, Cafedonia, MN
WØDMX, Ralph Stuffleheem, Centerville, IA
WAØMBN, Burdette J. Jones, Waterloo, IA
WØNKR, Kenneth H. Cooper, Greeley, CO
VE1IE, Harley B. Richardson, Grand Manan, NB
VE3AX, Lloyd H. Alford, Lakeside, ON
VE3CM, Christopher M. Spooner, Willowdale, ON
VE7BVE, Veronica M. Spencer, N. Vancouver, BC
VK3DM, James R. Goding, Main Ridge, Australia

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* W5TVB

The Case for Moonbounce

IN SEPTEMBER this column published a correspondent's view that moonbounce contacts should be disallowed for Worked All States credit. Basically the view centered upon the claimed difficulty of erecting the necessary large antenna within the confines of an average urban location. Replies came quickly; by mail, telephone and personal contact. The consensus was, by 20 to 1, that moonbounce contacts should be credited toward WAS. It was interesting to note that the majority of those responding who had no immediate interest in EME still supported moonbounce credit.

I am of the opinion that the possibilities for moonbounce were played down in the early years through the promotion that overly large (whatever constitutes *large*) arrays and kilowatt-plus amplifiers were necessary. It is probably that this was fostered, in the main, by the then state-of-the-art vacuum-tube receiving systems. Indeed that was a problem, but system noise figures have now been lowered by at least 3 dB, with the better transistors and antenna-mounted preamplifiers, which in turn has reduced the necessary size of the antenna.

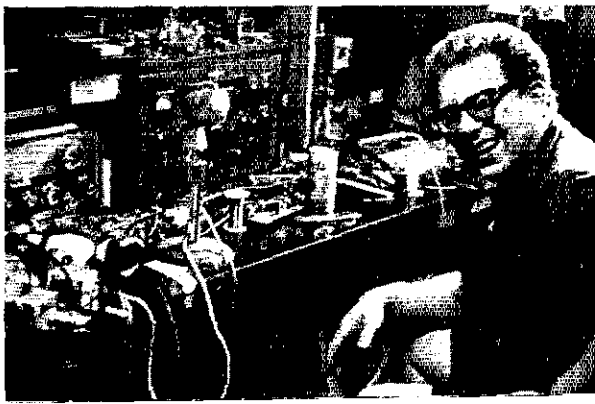
I'm not suggesting that two stations, each armed with a pair of stacked Yagis and kilowatts, are going to be successful in working one another. But the fact remains that contacts have been made with even lesser systems on *one end* of the circuit. Stations such as that put together by Bob Sutherland, W6PO, make moonbounce contacts possible for some operators who would not have had a chance ten years ago. And Bob's array is not that large – a 160-element collinear – when you consider some of the arrays used in years past. Bob has taken the time and effort to make every part of his 144-MHz system work properly. His neighbor, Joe Reisert, W6FZJ, has done a similar job on 432, with a 120-element extended collinear, in a backyard smaller than many I've seen. Reported in these pages have been contacts made with four Yagis atop a New York apartment building, and other less-than-optimum setups. WØDRL, Topeka, Kansas has built a 20-foot dish for less than $80, and with 300 watts input has worked moonbounce on 432. WØEYE built an 18-footer with hand tools, and worked W6FZJ on the first try. Similar situations can be verified.

Should these operators be penalized? I think not! To single out moonbounce for no EME credit would be as reasonable as to say no to other propagation modes such as meteor, tropo, aircraft and lightning scatter, aurora, ducting, sporadic *E* and so forth. Eliminating EME contacts for WAS purposes could result in the curtailment of moonbounce activity, and one thing amateur radio does not need now is the curtailment in any progressive vhf or uhf activity! All continents, with the possible exception of South America, are now represented on the two most popular EME bands, 144 and 432. Key moonbounce operators in this country tell me the outlook for EME has never been brighter, and that they are being swamped with information requests.

I recall writing this column seven years ago that K6MYC and VK3ATN showed that *amateur* 144-MHz moonbounce was practical. A moonbounce contact is still news and I hope that those making them will document their work for us in full detail. Further encouragement will cause moonbounce contacts to become as routine as 500-mile troposcatter is now on 144, and help put to rest the belief that EME is a "big-gun" game played by a select few.

To adopt a phrase, "It has come a long way, baby." And this is just the beginning.

*Send reports and correspondence to Bill Smith, W5TVB, ARRL, 225 Main St., Newington, CT 06111.



Tony, K5PJR, of Oklahoma City, runs a kilowatt on 144 to a 40-element collinear array and 50 watts to a 20-element collinear on 432, but says he is now interested in 1296. He would like to hear from others so interested within 300 miles of Oklahoma City. We see that he has the makings for a balun on the desk.

2-METER STANDING

K1HTV	36	8	1310	K5PIK	29	9	1330
K1ABR	35	8	1478	W5LO	29	7	1325
W1AZK	34	8	1412	W5SXD	25	6	1265
WA1FFO	32	9	2624	W6GDO	18	5	1326
K1WHT	31	8	1300	W6PO	16	8	8000
K1UGQ	30	8	1370	W6WSQ	16	4	1390
K1WHS	29	8	1300	K6QEH	13	4	2580
W1VTU	29	8	1296	K6HAA	13	4	1380
W1JSM	29	8	1100	K6JYO	13	4	1240
K1BKK	28	7	1275	K6HMS	11	4	1258
K1PXE	28	7	1250	WA6JRA	6	3	2591
K1MTJ	26	7	1250	W7JRG	28	6	1320
W1FZA	25	9	2750	K7NII	25	5	1290
W1HDQ	24	7	1040	K7ICW	18	4	1278
K1RJH	22	7	1450	K7VTM	10	6	950
W1MX	18	6	850	W8KPY	42	10	2050
K1JIX	18	6	800	K8AXU	38	8	1275
W2AZL	38	9	2500	W8IDU	36	8	1150
W2NLY	37	8	1300	W8YIO	36	8	1100
W2CXY	37	8	1360	W8IDT	36	8	1150
W2ORI	37	8	1320	K8DEO	35	8	1200
W2BLV	36	8	1150	K8HWW	32	8	1125
K2RTH	34	8	1215	WA8PIE	32	8	1000
WA2EGK	33	8	1340	W8NOH	31	8	1165
W2CUX	33	8	1334	WA8LLY	28	8	820
WB2WIK	32	8	1080	W8TIU	24	8	1000
WA2CJK	31	8	1160	W8KBC	24	7	900
W2CRS	30	8	1270	K8ZES	22	8	675
K2CEH	27	8	1200	K9SGD	42	9	1300
W2CNS	27	8	1150	W9AAG	41	9	1200
K2DNR	27	7	1200	K9AAJ	41	9	1200
WB2SIH	25	6	1000	K9UIF	41	9	1150
WA2EMB	23	8	1335	W9YYF	41	9	1050
K2BWR	23	7	1350	W9BRN	36	9	1260
WA2PMW	23	6	1000	W9PBP	34	8	820
W2DWJ	23	6	860	K9HMB	33	10	1820
WA2UDT	22	7	1020	W9JGV	32	8	915
WB2YQU	22	6	850	K9UNM	32	8	850
WB2BXB	21	6	915	W9JDJ	29	8	1000
K2YCO	21	7	750	WA9QZE	28	8	960
W3RUE	36	8	1250	KØMQS	46	10	10605
K3CFY	36	8	1237	WØLER	44	9	1440
W3BHG	35	8	1260	WØDQY	41	9	1300
W3GKP	32	8	1108	WAØCHK	40	9	1120
W3BDP	29	8	1225	WØLFE	40	9	1100
W3LNA	26	8	970	WØRLI	36	9	1293
W3OMY	26	8	800	WØEYE	35	9	1380
K3CFA	25	8	1200	WØENC	35	9	1360
W3TMZ	24	8	1000	WØEMS	34	10	1320
W3HB	23	8	1310	WØLCN	33	9	1100
W3ZD	22	8	950	WØDRL	27	9	1295
W3TFA	21	8	1342	WØMJS	26	8	1118
K3OBU	21	7	930	VE1ZN	7	2	500
K3QCQ/3	20	7	900	VE2DFO	37	9	10605
K4GL	40	10	2340	VE2YU	32	8	1200
W4HJQ	39	9	1150	VE2BZD	23	7	1309
W4WNH	38	9	1350	VE2HW	18	6	800
W4HHK	38	9	1280	VE3ASO	37	8	1290
K4EJQ	37	8	1125	VE3BQN	37	8	1250
K4IXC	36	8	1403	VE3EZC	33	8	1283
W4VHH	36	8	1100	VE3AIB	29	8	1340
W4CKB	35	8	1440	VE3EVW	29	8	1100
K4QIF	35	8	1225	VE3DSS	27	8	1200
W4FJ	34	8	1150	VE3CWT	27	7	1072
W4AWS	29	8	1350	VE3EMS	27	8	1100
W4ISS	29	8	1000	VE7BQH	12	3	7920
W5UGO	43	10	1398	KH6NS	3	2	6000
W5ORH	42	10	1507	SM7BAE	1	1	11055
W5RCI	42	9	1289	VK3ATN	3	3	10417
K5BXG	41	10	1394	ZL1AZR	2	2	11055
W5WAX	39	10	1370				
K5WXZ	38	10	1450				
W5HFV	38	10	1285				
W5AJG	33	9	1360				
W5UKQ	33	9	1290				

The figures after each call refer to states, call areas, mileage of best DX. Revised December 1973.

Season's Greetings

With the Holiday Season in full-swing, Tilton, WIHDQ, and your column editor exten all readers and their families the warmest *Season's Greetings. And a big "special thank y* to the wives for the understanding, and perl tolerance, that allowed the new horizons to be during this year now ending in the World Abov

Ed and I appreciate deeply the considera extended us through this year, and in the past, we look forward to 1974.

Have a good one, VHFers!

WAS Boxes Updated

Again this month appears the latest WAS scores reflecting totals reported through Oct 17. Undoubtedly there are some errors; let know if yours is incorrect.

There are more changes this month than previous listing I can recall, and there are some records. KØMQS extended his 144-MHz total new record high, reaching 46 states worked, latest being KH6NS via moonbounce. I bel Dick needs but Alaska, Washington, Oregon Idaho to complete the first 144-MHz WAS, many fellows are betting that Dick will do the K4GL becomes the first in his call area to wor ten U.S. call areas and 40 states from the W4 A moonbounce contact with W6PO was the me *On 220 MHz, K9HMB leads all comers with* states worked, in nine call areas, and a moonbounce is responsible. K2UYH has t national honors from K2ACQ on 432, reachin states in nine call areas, and a best distance of 2 miles. *WA2LTM* leads the country on 1296, 15 states worked. K2UYH and K2JNG are behind with ten states each.

Agree or not, moonbounce has become name-of-the-game for working all states on MHz and higher frequencies, without resortin satellite relays.

Oscar 7

Amsat's Oscar 7 is now scheduled for a sp launch, which allows time to still prepare fo many features. Among those to be offered 432-to-144 repeater, with an input passban 432.125 to 432.175 and output passband cove 145.925 to 145.975 MHz. Power output will b either 3.75 or 14 watts PEP selectable command. A 200-milliwatt beacon will operat 145.980, a 0.4 watt beacon on 435.10, and a watt beacon on 2304 MHz. Oscar 7 will also aloft a two-to-ten repeater similar to the on Oscar 6. It will have an input passband of 14 to 145.95 MHz, repeating signals between 29.4 29.5 MHz, with a power output of 2 watts PEP

Oscar 7 is an international effort, with eq ment being built by amateurs in the United St *Germany, Australia and Canada. See future is* of *QST* for further details of Oscar 7 as the la date approaches.

OVS and Operating News

50 MHz DX doldrums set in followin unusual summer *E* season and as one pundit "the summer is over and the DXers are co their heels." WA1DFI, in Massachusetts, September was quiet except for the "schedu contest aurora on the 9th, between 1945 and GMT. He found 1s, 2s, 3s, 4s, 8s, 9s and VE2 VE3 stations workable. WA2OAF says he returned to six meters after being off for

summer. He is running a kilowatt and has 5 elements 75 feet high, in Ringwood, New Jersey.

WB2LAI/4, Virginia, reports the Sept. 9 aurora produced many contacts between 2030 and 2230 GMT, from New England to Indiana. He also caught an E_s opening Sept. 5 to Florida. WB4BND, Miami, reports Sept. 25 *E* to W2s, Oct. 14 to W5s for two hours, and Oct. 16 to 8s and 9s. Hoppy says, "nothing appears doing towards South America."

K5ZMS/5, San Antonio, reports hearing backscatter Sept. 25 on a Florida station, from a 150° azimuth. While calling WB4WXZ, Ray was answered by JA2ICE/MM off the coast of Ecuador. Shortly after the contact between K5ZMS and JA2ICE/MM, W5QDB called the JA and K5ZMS heard what were apparently LDEs (long-delayed echoes) on several transmissions, around 2100 GMT. On Sept. 9 and 13, WA6IYX, San Antonio, noted the *F*-layer muf near 45 MHz from South America, and apparently from the South Pacific.

K7ICW, Las Vegas, says September was classical for the lack of openings, but Al used scatter for regular contacts with W7FN in Washington and the Los Angeles gang. WBØEVL, Minnesota, ended the summer *E* season with nine states worked on two-way fax. And WBØIWG, Minneapolis, worked the Sept. 9 aurora between 2045 and 2315 GMT, covering the U.S. from New York to South Dakota, and as far south as Missouri and Kansas.

144 MHz activity in September was highlighted by the Sept. 9 aurora. K1HTV, Connecticut, worked several 9s and KØMQS, Iowa, for a fine bit of aurora DX. Rich says K1BKK, W1AIM and W1GGM/1 are keeping rare Vermont active. Most of Rich's time lately has been devoted to the Oscar program, but Rich notes that he hopes those using the satellite for two-meter transmitting will likewise turn their attention to two-meter receiving. Probably so, Rich, cause if nothing else, Oscar 7 may produce the desired results, and perhaps that will be projected to 432 in the future. WA1FFO, Connecticut, reached 32 states worked by way of a meteor-scatter contact with WB4MJY, South Carolina, and is working on new 432 equipment. W4WNH/8 says K8III worked W6PO via moonbounce Sept. 23, using a 145-foot high 80-element collinear. That should be some tropo scatter array also.

In Oklahoma, the Tulsa gang of W5WAX, K5BXG and K5WVX worked the Sept. 9 aurora. W5WAX says fm simpley activity is increasing with stations using good power and large antennas. In Oklahoma City, K5PJR and W5ORH worked WB6KAP/Ø near Pueblo, Colorado over a 550-mile tropo scatter path. WB6KAP/Ø had use of a 60-foot dish for a few days. Signals were typically 10 to 15 dB out of the noise. WB6KAP/Ø was also heard by W6PO on moonbounce.

W8KBC, Dayton, Ohio, enters the states-worked boxes with 24 this month. He has done well. Nine months ago he was on 2 meters with one watt fm and a *Ringo*, now he has a kilowatt and an 80-element array with switchable polarization. Lou worked the Sept. 9 aurora for contacts with Virginia, North Carolina, Vermont and New Hampshire. K9UNM, Fort Wayne, Indiana, heard 19 states and VE2 and 3 during the aurora, adding one new state, W1GGM/1, Vermont, to reach 32 worked. That was all done with 50 watts of dits and dahs.

From Minneapolis, WØLER reports a "local" aurora Oct. 3, working Wisconsin, Minnesota and South Dakota. On the 8th a duct formed into

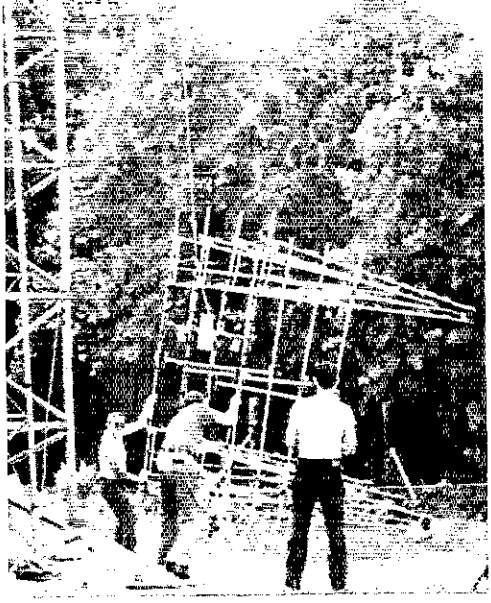
220- and 420-MHz STANDING

WA1MUG	15	5	450	W2OMS	16	5	537
K1PXE	13	6	700	W2DWJ	16	4	570
W1HDQ	13	5	450	K2OVS	15	5	734
K1JIX	12	4	600	K2LGJ	14	7	650
W1AZK	10	3	375	K2YCO	14	6	675
K1BFA	10	3	225	W2CNS	14	6	525
K2CBA	19	7	2650	WA2EUS	10	4	280
W2DWJ	15	5	740	W3RUE	19	7	850
W2CRS	14	5	600	K3IUV	18	5	720
K2RTH	13	5	960	W3UJG	9	4	400
K2ONR	13	5	600	K4QIF	22	7	1065
W2SEU	13	5	325	W4FJ	22	7	995
W3UJG	14	5	460	K4EJQ	19	7	800
W3RUE	11	6	480	W4HJZ	15	5	560
K3IUV	11	4	340	K4SUM	15	5	462
W4UCH	9	5	543	W4VHH	15	4	750
K4IXC	5	3	1115	K4GL	11	5	720
K4GL	4	2	485	K4NTD	9	2	963
W5RCI	10	5	910	K4IXC	4	2	800
W5ORH	6	4	1178	W4AWS	4	2	750
W5AJG	4	2	1050	W5RCI	19	6	880
WA5MFZ	3	3	1100	W5ORH	15	5	1200
WB6NMT	10	6	2650	W5AJG	8	3	1010
W6WSQ	6	4	1178	W5UKQ	6	2	590
W7CNK	6	3	923	K5UGM	5	2	956
W7JRG	5	3	959	W5SXD	5	2	850
K7BBO	5	3	940	W5GVE	5	2	963
K7ICW	4	2	250	WA6HXW	6	4	7500
K7HSJ	3	2	400	W6FZJ	6	5	7506
W8PT	11	6	660	W6DQJ	4	2	360
K8HWW	10	5	550	K7ICW	4	2	225
K9HMB	20	9	1785	W7JRG	3	2	420
WØEYE	12	5	950	K8DEO	24	8	775
WAØQLP	4	2	923	W8YIO	22	7	650
VE2YU	8	3	300	K8UQA	21	7	890
VE2HW	5	2	325	W8HVX	19	7	660
VE3AIB	7	4	450	W8CVQ	13	7	625
				W8MNT	13	7	600
420 MHz				W8RQI	10	6	425
				WA8VHG	10	6	625
K1PXE	18	7	1210	W8QOB	8	5	500
K1HTV	17	5	610	W8FWF	8	5	450
W1AJR	16	5	680	W9WCD	22	9	1725
WA1MUG	15	5	740	K9HMB	21	8	836
K3EAV/1	14	6	700	WA9HUV	19	7	780
K1BFA	13	5	710	W9JIY	15	6	550
K1JIX	13	5	620	W9AAG	15	5	800
W1SL	11	5	400	K9AAJ	12	5	425
WA1JTK	11	4	715	WØDRL	23	8	1210
W1HDQ	11	4	380	WØLER	18	6	1000
K2UYH	24	9	2500	WØLCN	13	4	700
K2ACQ	24	8	925	KØTLM	10	5	700
W2AZL	21	7	1000	WØYZS	9	4	650
K2CBA	20	8	2670	WØEYE	12	4	1700
W2CLL	20	6	790	VE2HW	6	3	750
K2RIW	19	6	812	VE3DKW	19	7	940
K2VDK	18	6	750	VE3AIB	9	5	600
WA2EMB	18	6	720	VE3EVW	9	5	520
WA2FGK	17	6	745	VE3EZC	7	5	510
K2ARO	17	6	740	VE7BBG	1	1	1125
W2BLV	17	6	732				

The figures after each call refer to states, call areas, and mileage of best DX. Revised December, 1973.

VE3EVW used the Sept. 9 aurora to work state number 29, K4JQU in North Carolina. Monty says the buzz was quite strong, and also he worked stations from Maine to Minnesota.

Nebraska, allowing several contacts between stations in that state and those in Minnesota and Wisconsin. John also now has 48 states worked through Oscar.



This array of eight channel 7 through 13 log antennas now rests 200 feet high at W5KHT, near Oklahoma City, as part of Bob's meteor and tropo scatter propagation research. Left to right: W5TVB, a non-ham helper, and W5KHT.

1215-MHz STANDING

K1PXE	7	4	500	K4QIF	12	5	551
K9AQP/1	7	3	300	K4NTD	2	1	350
WA2LTM	15	6	770	K5PUF	1	1	290
K2UYH	10	5	520	W5AJG	1	1	235
K2JNG	10	4	305	K5LLL	1	1	235
W2OMS	8	5	537	W5HPT	1	1	235
WA2VTR	6	4	330	W8YIO	5	4	551
K2YCO	5	3	525	K8UQA	5	3	390
K2OVS	3	2	135	WA9HUV	5	3	525
K3IUV	7	4	320	W9JIY	5	3	300
K1SFF/3	7	4	260	W9WCD	3	3	770
W4VHH	2	1	350	W9JTP	3	2	165
W5LDV	1	1	290	VE3HW	1	1	260

432 MHz has much moonbounce activity underway. K2UYH, New Jersey, and W5ORH, Oklahoma, each added one state with their Oct. 13 moonbounce contact. K2UYH was using his 28-foot dish, but the interesting aspect of the contact is that W5ORH used but two Yagis, aimed at the horizon. W5ORH was copied well in New Jersey, and the only weak link in the system was possibly Jay's receiving, which needless to say, has been improved. What this all means is that there are probably more 432 operators who have *EME* capability, when scheduling stations like K2UYH *and W6FZJ. K2UYH says that Bunky, K4EJQ,* Tennessee, has returned to 432 with a fine signal. Al says many possible 432 aurora contacts went by the wayside during the September contest, as most attention was directed toward 144 MHz. K1UYH worked WA1MUG and K8UQA, both with excellent 432 buzz signals.

W6FZJ, San Jose, has reached six states on 432, the latest being Oregon. Joe says he has run out of states within normal tropo range, leaving *EME* as the only route for more.

K8UQA, Ohio, has added two states on 432, one being KØAWU, an 890-mile tropo haul Aug. 27. David now has 21 states on 432 and enters the 1296 box this month with 5 states and a best DX of 390 miles. On 1296 he runs 125 watts to a 7-foot dish. Receiving is through a pair of BFR-90 preamps and diode mixer. WA9HUV, near Chicago, has his 2304-MHz system working and is preparing for 185-mile schedules with W9JIY at Indianapolis. QST

SET

(Continued from page 57)

in conjunction with a radio club or other interested amateurs. It will take some work, but the reward in *leading a group to better emergency preparedness* will be gratifying. Write Hq. for a copy of the 1974 SET Bulletin for details.

Special Considerations

For purposes of the test, the precedence (R, Q, P or EMERGENCY) should be preceded by the word "TEST." As further assurance that a simulated message will not be construed to be the real thing, use the words "TEST MESSAGE" as the first two words in the text of any emergency, priority or inquiry message. For a discussion on the proper use of precedences, see Traffic Talk, pages 68-69, September 1973 *QST*

To prevent SET messages from "dragging out" beyond the SET period, the handling instruction HXB is used on all SET messages which, liberally interpreted, means: "Cancel message if not delivered within the SET period; service originating station."

If there is a single recurring fact evident in all Simulated Emergency Tests, it's the lack of emergency-powered fixed stations. ECs and net managers are urged to stage emergency-powered-only sessions. Now is a good time to wire up the old generator that's under the workbench in the garage. Fire up the QRP rig to be sure it still works. Check the batteries. Or arrange to borrow a generator for the SET; you'll know where to get one (and be known) if the situation arises when you will need it. In an emergency, there is no greater feeling of uselessness than that which confronts a skilled operator with elaborate equipment, deluxe antennas but no power!

Whatever your primary interests are in amateur radio, we hope you will take the time to participate in the SET. Experience has shown that when real emergencies develop, most all amateurs are willing to assist. Yet, history has also demonstrated that amateurs without experience in organized communications may be more of a detriment than help. Don't let other interests prevent your familiarity with emergency procedures. Join in the 1974 SET. CU SET. – *WA1HCM*

Operating Events ..... *de W1YL*

DECEMBER

1-2 *College Bowl Contest, Delaware QSO Party, Lone-Star QSO Party, Telephone Pioneers QSO Party*, p. 112 Nov.

1-15 *French stations using prefix HW*, started Nov. 15, commemorating the first transmission of 1MO-8AB.

1-30 *PJ Activity Month*, p. 112 Nov.

5 *W6OWP Qualifying Run* (W6ZRI, alternate) 10-35 wpm at 0500 GMT on 3590/7090 kHz. This is 2100 PST the night of Dec. 4. Please note that dates are always shown at least 2 months in advance and times are always the same local "clock time," i.e. 9 PM local Pacific time. Underline one minute of the highest speed copied, certify copy made without aid and send to ARRL for grading.

7-9 *160-Meter Contest*, p. 59 Nov. *EA Contest*, p. 112 Nov.

11 *WIAW Qualifying Run* (10-35 wpm) on 1,805 3,580 7,080 14,080 21,080 28,080 50,080 and 145,588 MHz. This is 2130 PST (9:30 PM EST) the night of December 10. Underline one minute of top speed copied, state no aids used (typewriters OK), sign and mail to ARRL with your full name, call (if any) and complete mailing address.

15-16 *10-Meter Contest*, p. 58 Nov.

15-23 *Space Net VHF Contest*, p. 174 Nov.

23 *HA5-WW Contest*, p. 174 Nov.

27 *WIAW Morning Qualifying Run*, 1400 GMT (this is 9 AM EST). Same frequencies and details as under the Dec. 11 listing.

31 *Straight-Key Night* (SKN), starts at 8 PM your local time on New Year's Eve, ends 3 AM local time on New Year's Day. Rules require use of a straight key. Aim at 7030/3530, but spread out as necessary. Call SKN and ragchew. Following SKN, please send a list of the calls of the stations you worked plus your "vote" for the best straight-key fist heard that night. Include suggestions for improvement of the event next year. Reports should be mailed by Jan. 7, please. CU SKN!

JANUARY

2 *W6OWP Qualifying Run.*

5-6 *VHF SS.*

9-10 *DX-YL to Stateside YL Contest cw*, p. 174 Nov.

12-13 *CD Party, cw.* This is a quarterly event open to all ARRL appointees and officials, notified separately by bulletin. (The July Parties are open to all ARRL members.) The event starts at 2300Z January 12 and ends 0500Z January 14. Contact your SCM, p. 6, to see if you can qualify for an appointment. *CW QRP Contest*, sponsored by the DL Activity Group, single op, from 1800Z-1500Z on 80-40-20 and 21 or 1.8 MHz. Open to all, input must be below 10 watts. Fifteen hours of operation permitted, take 6 hours pause in two parts at most. Call CQ QRP and exchange RST and QSO no./input (1-9). Add x if the TX is crystal or VXO. QSOs with all stations valid. In the case of non-contest stations worked, it is not necessary to receive a serial or input. QSO points: own country 1, own continent 2, DX country 3. Three additional points for a QSO with another QRP station (4-6 points). If one or both stations in the QSO used less than 3 watts input or crystal, both double their points (8-12 points). Each country in your own continent counts 1 multiplier, each DX country 2 multiplier points (PER BAND). Use the ARRL DXCC list except that call areas in JA PY VE VK W and ZS are additional. QRO stations follow same rules but input is not limited and only QSOs with QRP stations will count. Logs by Feb. 15 to Hartmut Weber, DJ7ST, D-3201 Holle, Kleine Ohe 5, Germany. *YU DX Contest*, 2100Z Jan. 12 to 2100Z Jan. 13, cw on 80 meters only. Only one contact permitted with a station. Send RST plus QSO no., starting with 001. QSOs between stations of the same country count 1 point, between stations on the same continent 5 points and QSOs with YU stations 10 points. Multipliers: count 1 for each DXCC country (including your own) and each YU prefix. Both single and multiop. categories (club stations are considered multiop.). Appropriate awards. Log with summary must be postmarked no later than March 15 and sent to the SRJ Contest Committee, Box 48, 11001 Belgrade, Yugoslavia. Include the usual signed statement. Participants should compute their scores and duplicate QSOs should be clearly marked in the log. In the case of 3 or more non-indicated duplicates, participants will be disqualified. SRJ Contest Committee decisions final.

15-17 *OOTC QSO Party*, cw, starts/ends 2300Z. Freqs.: 3530-3570, 7030-7070, 14030-14070, 21030-21070, 28030-28070. Logs go to G. G. MaConomy, W6BUK, Space 45-36770 Florida Ave., Hemet, CA 92343. (Phone dates Jan. 29-31.)

16 *WIAW Qualifying Run.*

19-20 *CD Party, phone.*

23-24 *DX-YL to Stateside YL Contest* phone, p. 174 Nov.

26-27 *Simulated Emergency Test*, rules this issue. *French Contest, cw*, sponsored by the Reseau des Emetteurs Francais, from 1400Z Jan. 26 to 2200Z Jan. 27 (phone Feb. 23-24). Send RS(T) and QSO no. Three points for each QSO with F and DUF country stations. One point for each different department (2 figures, 95 departments), and each different DUF country worked per band. Total points for QSOs X total multiplier points all bands equals final score. Note that during the contest period stations in HB, 4U1, LX, ON (and 9Q, 9U and 9X), are actives for the contest. QSOs with these stations are good for the contest points and multipliers (22 HB Cantons, 10 ON Provinces, 4U1, LX, 9Q, 9U, 9X). Send your logs to the REF, Traffic Mgr. Lucien Aubry, F8TM, rue Marceau, 91120 Palaiseau, France.

29-31 *OOTC QSO Party phone*, starts/ends 2300Z. Freqs. 3895 7230 14280 21355 28600. See Jan. 15-17 listing for additional details.

FEBRUARY

2-3 *DX Competition phone.*

2-10 *Novice Roundup.*

7 *W6OWP Qualifying Run.*

8-10 *QCWA QSO Party.*

9-10 *Ten-Ten International Net QSO Party.*

10 *Frequency Measuring Test.*

16-17 *DX Competition, cw.*

23-24 *YL/OM Contest phone* 1800Z-1800Z. All operators invited to participate, all bands. Crossband not permitted, net contacts do not count. OMs call CQ YL, YLs call CQ OM. Exchange QSO no., RS(T), and ARRL section or country. Entries in log should show band worked at time of contact, time, date, transmitter and power. (ARRL section list available for s.a.s.e. to YLRL v.p., or check p. 6 this issue of QST.) Phone and cw are separate contest requiring separate logs (cw March 9-10). One point for each station worked (YL to OM, or OM to YL). A station may be worked just once, regardless of band. Multiply the no. of QSOs by the no. of different ARRL sections/countries worked. Contestants running 150 watts input or less at all times may multiply these results by 1.25. Copies of all logs showing claimed scores and signed by the operator must be postmarked no later than March 25, 1974 and received by the YLRL vice president Chris Haycock, WA2YBA, no later than April 25, 1974 or they will be disqualified. Cups for 1st place phone and cw, YL and OM; certificates to second and third place plus call areas, etc. No logs will be returned. Send complete entries to Chris Haycock, WA2YBA, 361 Roseville Ave., Newark, NJ 07107. *French Contest* phone, see Jan. 26-27 listing. *Vermont QSO Party.*

March 2-3, ARRL DX Competition phone.

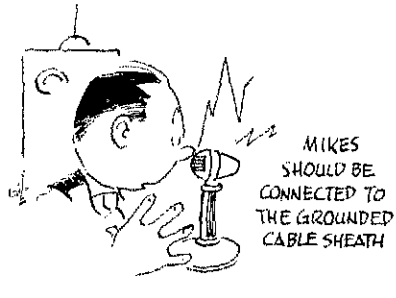
March 9-10, YL/OM Contest cw, rules under Feb. 23-24 listing.

March 16-17, ARRL DX Competition cw.

March 18, CWA High-Speed Qualifying Run.

June 8-9, VHF QSO Party.

June 22-23, Field Day.



Operating News

GEORGE HART, W1NJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.

ASST. COMMS. MGRS.: *DXCC*, R. L. WHITE, W1CW; *Hq. Station*, C. R. BENDER, W1WPR; *Contests*, F. D. NISWANDER, WA1PID; *Public Service*, W. C. MANN, WA1FCM.

SCM Procedures. We covered this subject in some detail back in '69 (Jan. issue), but there continues to be much misunderstanding and lack of information about it – how SCMs are elected, what they are supposed to do, their privileges and responsibilities (the two always go together), and what to do about it when or if an SCM doesn't do his job.

Many have said that the procedures are far too complicated and ought to be simplified. It is true that they are complicated, for a number of reasons we shall go into in a moment. Simplification is always possible, of course, but usually involves sacrificing something that may be valuable; so simplification measures have to be carefully considered. For the information of everybody concerned, let's conduct a question-and-answer forum on SCM function procedures, using most-asked questions or most-misunderstood-procedures as a basis.

1) Who elects the SCM? The full members of the section. (A full member is an ARRL member in the U.S. or possessions or Canada who is also a licensed amateur.)

2) How often are SCMs elected? As often as a vacancy occurs, but at least every two years.

3) How do members know that an election is coming up? Election notices and results are included in each Feb., Apr., June, Aug., Oct. and Dec. *QST*, in this department of the magazine. The notice gives full information on how to file a petition and lists all sections in which elections are pending, including a closing date for receipt of nominating petitions at headquarters and the incumbent SCM's name, call and term expiration date. The notice also includes results of elections completed, both with and without balloting.

4) How far ahead of term expiration do these notices appear in *QST*? Take a look at the election notices in this issue, see for yourself. Usually, about six months.

5) I just did take a look, and notice that some of the SCMs' terms expired before the closing date. How come? Well, they were first listed about six months before their terms expired, but no petitions were received by the closing date, so they were relisted. This continues every four months until a valid petition is received.

6) Why not every *two* months? Because the copy deadline for the issue containing the next notice is past before the closing date arrives.

7) What happens if a petition is received after the closing date? If it is the only one, it is duly processed, but the section must be relisted and a new closing date set. However, if another valid petition has made the closing date, the late one is invalid.

8) What happens when a SCM dies in office, or resigns? An Acting SCM is appointed by the Communications Manager to serve until an election procedure can be completed. A notice and solicitation for nominating petitions appears in the first available issue of *QST*.

9) I notice an SCM was recently elected in my section. How come I didn't get a ballot? Probably because there was no balloting. If there is only one valid petition on file at the closing date, that candidate is declared elected without balloting. However, if there was balloting, you should have received a ballot.

10) Suppose I just renewed my membership, do I get a ballot? Yes, if your renewal was recorded at the time the ballot run is made. We can't do it any other way.

11) Does the Communications Manager appoint an Acting SCM after an SCM's term expires but no other candidates are nominated? Not unless the incumbent SCM indicates he cannot or will not continue; otherwise, he remains SCM until a valid petition is received. When this occurs, the new SCM takes over automatically within a month after the latest announced closing date. Of course if more than one petition is received, balloting will be necessary and the old SCM will continue until the election is completed. An SCM whose term has expired is not required to relinquish the job until a successor is elected.

12) Now for the $64 question: What happens when an SCM doesn't do his job, how can he be "recalled"? Well, it "ain't easy," and it shouldn't be. You members should be careful whom you elect. But it is possible. An SCM who misses two consecutive reports gets a letter of inquiry from the Communications Manager. If he misses four in a row, the matter is called to the attention of the Executive Committee, which body alone can declare an SCM office vacant in mid-term without any action by the SCM. So far, this has never happened. The delinquent SCM has either been persuaded to resign or has gotten back on the job. Malfeasance and misfeasance are other causes, of course. They have seldom come up, and we hope in

New A-1 Operators

W5CNG W5CYI ISØAEW K5TFG DJ4FT

WIAW FALL-WINTER SCHEDULE
(OCTOBER 28—APRIL 28)

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EST, Saturday 7 P.M.-1:00 A.M. EST and Sunday 3 P.M.-11:00 P.M. EST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed Nov. 22, Dec. 24-25, Jan. 1, Feb. 18, April 12.

Times/Days GMT	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	.....	CN[6]	RTTY BULL.[3]	CN[6]	.....	.....
0030	← CODE PRACTICE (10-13-15 wpm) DETAILS BELOW →						
0100	.....	← CW BULLETIN[1] →					
0120-0200[4]	.....	.....	3.7 Nov.[5]*	14.080*	14.080*	7.15 Nov.[5]*	14.080*
0200	OSCAR[10]	← PHONE BULLETIN[2] →					
0205-0230[4]	.....	.....	3.990*	50.190*	145.588*	1.820*	21.390*
0230	← CODE PRACTICE[1] (35-15 wpm TThSat, 5-25 wpm MWFSn) DETAILS BELOW →						
0330-0400[4]	.....	.....	3.580*	.....	1.805*	.....	3.580*
0400	RTTY BULL.[3]	← RTTY BULLETIN[3] →					
0430	PHONE BULL.[2]	← PHONE BULLETIN[2] →					
0435-0500[4]	.....	.....	7.290*	3.990*	7.290*	3.990*	7.290*
0500	CW BULL.[1]	← CW BULLETIN[1] →					
0520-0600[4]	.....	.....	3.7 Nov.[5]*	7.080*	3.900*	7.15 Nov.[5]*	3.580*
1340	.....	← OSCAR[11] →					.....
1400	CODE PRACTICE[1] (5-25 wpm MWF, 35-15 wpm TTh) DETAILS BELOW						.....
1800-1900	.....	21/28cw[7]*	21/28ssb[8]*	21/28cw[7]*	21/28ssb[8]*	21/28cw[7]*	.....
1900	.....	← OSCAR[9] →					.....
2000-2100	.....	7.080*	7.290*	14.095 RTTY*	7.290*	7.080*	.....
2100-2130	OSCAR[11]	21/28ssb[8]*	21/28cw[7]*	21/28ssb[8]*	21/28cw[7]*	21/28ssb[8]*	.....
2130	.....	..... CW BULL.[1]	.....	.....	..... CW BULL.[1]	.....	.....
2200-2230	.....	7.15 Nov.[5]*	21.1 Nov.[5]*	7.15 Nov.[5]	21.1 Nov.[5]*	7.15 Nov.[5]*	.....
2230	.....	..... RTTY BULL.[3]	.....	.....	RTTY BULL.[3]	.....	.....
2300	.....	CPN[6]	7.095 RTTY[1]*	3.625 RTTY*	14.095 RTTY[1]*	CPN[6]	.....

[1] CW Bulletins (18 wpm) and code practice on 1.805, 3.580, 7.080, 14.080, 21.080, 28.080, 50.080 and 145.588 MHz.
[2] Phone Bulletins on 1.820, 3.990, 7.290, 14.290, 21.390, 28.590, 50.190 and 145.588 MHz.
[3] RTTY Bulletins, on 3.625, 7.095, 14.095, 21.095, and 28.095 MHz. Bulletins repeated when time permits.
[4] Starting time approximate, following conclusion of bulletin or code practice.
[5] W1AW will tune the indicated bands for Novice calls, returning the call on the frequency on which called.
[6] Participation in section traffic nets.
[7] Operation will be on one of the following frequencies: 21.02, 21.08, 21.1, 28.02, 28.08, 28.1 MHz.
[8] Operation will be on one of the following frequencies: 21.260, 21.390, 28.590 MHz.
[9] When an OSCAR satellite is in orbit, daily updated orbital data is sent at 18 WPM on cw frequencies.
[10] OSCAR orbital data for the coming week, on RTTY frequencies.
[11] OSCAR orbital data for the coming week, on cw frequencies.
* General contact period.

W1AW CODE PRACTICE

W1AW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

Speeds	*Local Times/Days*	*GMT*
10-13-15	7:30 PM EST dy	0030 dy
	4:30 PM PST	
5-7½-10-	9:30 PM EST SnTThS	0230 MWFSn
13-20-25	6:30 PM PST	
5-7½-10-	9:00 AM EST MWF	1400 MWF
13-20-25	6:00 AM PST	
35-30-25-	9:30 PM EST MWF	0230 TThS
20-15	6:30 PM PST	
35-30-25-	9:00 AM EST TTh	1400 TTh
20-15	6:00 AM PST	

The 0230 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To improve your fist by sending in step with W1AW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and *QST* practice text (from the issue 2 months previous) to be sent in the 0230 GMT practice on the following dates:

Dec. 7:	It Seems to Us
Dec. 11:	Correspondence
Dec. 17:	League Lines
Dec. 27:	ARPS
Jan. 4:	World Above
Jan. 9:	YL News

the future will come up even seldomer; but much depends on how carefully the members select the right man for the job.

13) How come so many SCM elections are "by default"? Is it such a hard job that no one wants it? Well, again, it "ain't easy." And in many ways it's pretty thankless. Take a look at the functions as described in the *Operating Booklet* (free to members), draw your own conclusions. It is true that the majority of SCM elections are uncontested. On the other hand, we occasionally have beauts; one, not so long ago, had five candidates, two of whom conducted extensive mail and personal-contact campaigns. The work is hard, the pay small (i.e., nil), but we do try to help out with travel and administrative expenses.

There must be dozens of additional questions that anyone interested will have, not to mention suggestions on how to improve the procedure. We're open to both.

One last word in regard to "impeaching" SCMs: There are few enough "takers" for SCM office now; if we set up easy methods to boot them out of office when they don't do everything right, or don't do enough, candidates are going to become even scarcer. The SCM is the ham *you elect* to do

the job, and he's *your responsibility*. It isn't "fittin'" for a hired employee of the headquarters to be empowered to swing an ax at him. So, take your responsibility seriously and elect the right man the first time. Then support him!

Code Practice Tapes. When someone writes or telephones Hq. requesting code practice info, we send a copy of the W1AW schedule and a list of a few commercial sources of recorded code practice material. At present, this is our only recourse. We are experimenting with ARRL-produced tapes, but the implementation of any such program is not so easy as it may sound.

W1AW code practice material is cut on RTTY tape, then run through a "RTTY-to Morse Converter." Very few amateurs possess such equipment, which took the place of our former system of using a McElroy two-hole sending head a setup compatible with what more amateurs have. The converter mentioned above uses standard five-hole teletype tape; in fact, the same tape can be used both for RTTY and CW. To use this system to produce audio tapes, for home or class use, we would have to punch the tape, run it through the converter (when W1AW not using it) and record it on audio tape, either reel-to-reel or cassette, or both, at various speeds, sequences and orders. Or, we could dig up the old perforator, the old sending head, and use these as a recording source. With the former setup, we could use existing W1AW tape; with the latter, we would have to punch our own.

Then there are other problems to consider – problems of speeds, sequences and orders, whether we would prepare tapes to individual order, make copies on request, loan tapes, etc.

In other words, this matter is still under consideration and perhaps will be for some time. Interest generated in the field and made apparent by comments received may help build a fire under it, but at the moment we don't get that many comments or requests – enough to give it a high priority, that is. W1AW *is still on there*, several hours per day, banging away with six individual kilowatts on beams, rhombics, dipoles and what-have-yous. If you can't hear us on the band you usually hear us on, try the next-higher-frequency band. If still n.g., try the next-lower-frequency band. If still n.g., put an antenna on your receiver – or a better one, anyway. Try different times of the day. If you get some QRM, don't let it throw you; QRM is a way of life in hamming.

But if, after trying all the above you still can't hack it, drop us a line to get our tape program rolling. Listening under perfect receiving conditions is a lousy way to learn the code, but it'll get you past the examiner – if that's all you want. *W1NJM.*

5-BAND AWARDS

(Updating the November 1973 listing.)

5BDXCC: (Starting with number 282), K4YFQ DK3PO K6RM W9JA.

5BWAS: (Starting with number 161), WAØUXN WØGNX.

SCM ELECTION NOTICE

To all ARRL members in the Sections listed below.

You are hereby notified that an election for Section Communications Manager is about to be held in your respective sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned are *required on each petition. No member shall sign more than one* petition.

Each candidate for Section Communications Manager must have been both the holder of amateur Conditional Class license or higher (Canadian Advanced Amateur Certificate) and an *ARRL full member for at least two years immediately prior to* receipt of petition at headquarters. Petitions must be received on or before 4:30 PM Eastern local time on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, Zip code of the candidate and signers should be included with the petition. It is advisable that a few extra full-member signatures be obtained, to insure that it will be valid.

Elections will take place as soon after the closing dates specified as full information on the candidates can be obtained. Candidates' names will be listed on the ballot in alphabetical order.

The following nominating form is suggested. (Signers should be sure to give city, street address and Zip code.)

Communications Manager, ARRL (Place and date)
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the . . . . . ARRL Section of the . . . . . division, hereby nominate . . . . . as candidate for Section Communications Manager for this Section for the next two-year term of office.

You are urged to take the initiative and file nominating petitions immediately.

George Hart, W1NJM, Communications Manager

Section	*Closing Date*	*Current SCM*	*Present Term Ends*
Idaho	1/10/74	D.A. Crisp, W7ZNN	12/10/72
N.Dak.	1/10/74	H.L. Sheets, WØDM	3/8/73
Manitoba	1/10/74	S. Fink, VE4LQ	10/10/73
Okla.	1/10/74	C.C. Cash, W5PML	12/11/73
Conn.	1/10/74	J.J. McNassor, W1GVT	4/11/74
S.C.V.	1/10/74	J.A. Hauser, WA6LFA	4/11/74
S.C.	1/10/74	I. Rubin, WB4CBJ (resigned 10/22/73)	2/1/75
Ont.	2/11/74	H.H. Shepherd, VE3DV	5/11/74
Neb.	2/11/74	V.A. Cashon, KØOAL	5/29/74
Iowa	2/11/74	A. Culbert, KØYVU	6/10/74
E.N.Y.	2/11/74	G.G. Berry, Sr., K2SJN	6/10/74
W.Pa.	2/11/74	R.b. Gawryla, W3NEM	6/11/74
E.Mass.	2/11/74	F.L. Baker, W1ALP	6/15/74
Wyo.	2/11/74	W.M. Moore, W7COL	6/25/74

SCM ELECTION RESULTS

Valid petitions nominating a single candidate were filed by members in the following sections completing their election in accordance with applicable rules, each term of office starting on the date given.

Tenn.	O.D. Keaton, WA4GLS	9/11/73
E. Bay	C.R. Breeding, K6UWR	10/10/73
Va.	R. Slagle, K4GR	10/11/73
R.I.	I.F. Johnson, K1AAV	10/12/73
S.D.	L.C. Gray, WAØCPX	11/1/73
Hawaii	J.P. Corrigan, KH6GQW	11/12/73
Wis.	R. Pedersen, K9FHI	12/11/73
Ill.	E.A. Metzger, W9PRN	12/15/73
N.Fla.	F.M. Butler, Jr., W4RKH	12/15/73

In the San Diego Section, Mr. Cyril F. Huvar, Jr., W6GBF and Mr. Horton T. Hodgson, W6TAI were nominated. Mr. Huvar received 253 votes and Mr. Hodgson received 144 votes. Mr. Huvar's term of office began September 24, 1973.

In the Louisiana Section, Mr. Lionel A. Oubre, K5DPG and Mr. Robert P. Schmidt, W5GHP were nominated. Mr. Schmidt received 223 votes and Mr. Oubre received 182 votes. Mr. Schmidt's term of office began November 4, 1973.

(Continued on page 93)

DX CENTURY CLUB

The following list contains the call letters and country totals of holders of the DX Century Club Award who have submitted confirmations to ARRL Headquarters for the period from October 1, 1971 through September 30, 1973. New Members for the period from September 1, 1973, through September 30, 1973, also appear in this list. Since the necessary space to run the complete DXCC Roster is not available (the total number of DXCC certificates issued as of September 30, 1973, was 20,616), this list contains only the calls and totals of those who have shown an active interest in their DXCC rating over the indicated 24 month period.

351
W6AM
W9BG

350
HB9I
LU6DJX
WBGKK
W2AGW
W2BXA
W4EX
W8DAW

349
WIAX
WIBIH
W3KT
W4AIT
W6CUO
W7MB
W8FWS
W8GZ
W9NDA
WØELA

348
OE1ER
W3MP
W5KC
W7KH
W9LNM
ZL1HY

347
W4GXB
W4OM
W6HX
W8BF
WØBW
WØDU

346
DL7AA
G5VT
W1HX
W2CTO
W2JVU
W2QHH
W3GAU
W3LMA
W5MMK
W6ZO
W8WZ
WØNK

345
GW3AHN
K6AN
LA7Y
ON4NC
PAØEX
VK3QM
W3EVW
W6EPV

344
DL1KB
GØKS
HB9MQ
OH2NB
VE2NV
W2OKM
W3CGS
W5OLG
W6RZE
W6GPB
W6TZD
W7PHO
W8JBI
W8LKH
W8MPW
4X4DK

343
DL9RK
IØAMO
K2BZI
K4KQ
K6QI
W1HZ
W2CYS
W4BYU
W4LYV
W4VPD
W5AO
W6ANN
W6CYV
W9HUZ

342
G2BOZ
G3AAE
G3DO
G3FKM
G3FXB
G4MJ
W1DK
W1EZ
W2AO
W2BOK
W2HTI
W2LV
W2NUT
W2RGV
W2SSC
W3RNQ
W4ML
W5ABY
W5PQA
W6CHV
W6PT
W8BT
W8NGO
W9EKC
WØKP
WØSYK

341
DJ2BW
G2BVN
K2FL
K6CH
K6NA
W1MV
W2CR
W2DOD
W2GI
W3NKM
W4QCW
W5IO
W6DZZ
W6ID
W6KZL
W6WWO
W8PHZ
W8QJR
W9JUV

340
DL6FN
IT1TAI
K2BK
W1JNV
W1NU
W2QM
W2SAW
W3WGH
W4QPM
W4PEJ
W5GR
W5UIX
W7ADS
W9GIL
W9RKP
WØMLY
WØPGI
WØQGJ

339
GI3BVJ
HB9TD
K4LNM
K6DC
LU4DMG
SM3BIZ
W1AZY
W3LMO
W5MMD
W6UAL
W6NJU
W7QF
W7SGN
WØAIH
YV5AB

338
CR6BX
G6TA
K2LWR
K6RC
W1CBZ
W1GYE
W2HO
W4JDR
W5LGK
W5EFW
W8KPL
W8ONA
W8ZCQ
W9DWQ
W9HB
W9SFR
4X4JU

337
DL7EN
LU5AQ
W1BAN
W2EXA
W2GLF
W2MS
W4LEE
W4LRN
W6RKP
W6SQP
W7AQB

336
DL1JW
DL9OH
I1ZL
K6LGE
PY1HX
W2MJ
W3GRS
W4BJ
W5FT
W6FOZ
W6OSU
W9GEE
ZS6UW

335
DL1BO
G3HCT
JA1DM
K8IKB
KH6CD
W1CKA
W2BHM
W2BMK
W2RDD
W2TP
W5GO
W5HDS
W6NMA
W8PM
W8QK
W8HOC
W8UOV
W8KBT
W8OK
W9RCJ
W9LKV
W9WYB
WØGKL
YS1O
ZL3IS

334
G6XL
HB9KB
I8KDB
IU2GY
K2DVU
K4PDV
K8LSG
W1HH
W2PDB
W2WMG
W3AFM
W4BQY
W5WZQ
W6KG
W8LY

333
DL3BK
GI3HM
K6RQ
K8RTW
OK3MM
W4IF
W4MCM
W5PWW
W5TIZ
W6ZM
W7CMO
W7QK
W8MB
WØLWG
WØNVZ

332
DU1HH
F3YR
JA1AG
JA1BK
K6KII
K7GCM
VE5RU
W2DXX
W2YY
W5GC

331
I3AT
JA2IW
K8ONV
K9ECP
K9KYF
PAØLOU
VE2WA
VE3CFG
W2CP
W4DOS
W5NW
W6OMF
W6TS

330
G2FYT
K1IXG
K2TQC
K4FZ
K9UUI
KH6U
KP4RK
OZ3Y
PY7YS
W1WDD
W4CKB
W4SSU
W5HIA
W5NUT
W5OB
W5QKZ
W6ISQ
W6UQO
W7BA
W7JG
W8KIT
W9ILW
W9MQK
W9TKD
XE1AP

329
DL7HU
F9RM
K4ICK
K6GA
K6OW
OH2LA
WA2DIG
W3DJZ
W5GJ
W5KGX
W8CUT
328
JA3UT
K2YXY
VE3AAZ
W1BPW
W3GJY
W5LCI
W6FZJ
W6REH
WB6OOP
W9HJ
WØBK

327
K6WR
OK1ADM
W1QJR
W1WY
W4BFR
W4NJF
W6AH
W8CT
W9CII
W9GB
WØAUB
WØBN
WØCJZ
YV5AIP

326
HH9MO
JA1ADN
K1SHN
K4JC
K8OHG
SM5BCE
SM7ANB
WIDGJ
WIHAS
W4IC
W5EJT
W5K1W
W7QPK
W8EVZ
K9KXK
YV5BX
ZL1AH
ZL4BO
ZS6YO

325
DL1DU
G6ZO
G8JM
HB9PI
JA6AD
K2OO
K2PXX
K6RN
OE1EE
OH2QV
W1GE
W1RLQ
W2GKZ
WA2RAU
W6ABA
W6EL
W6KTE
W8ARH
W9ZTD

324
G3IOR
K4MQG
SM5BPJ
SMØAJU
SMØCCL
W2QK
W6KMV
WA6EPQ

323
OI5DA
DJ7ZG
I9GL
K4SFI
K5AAD
K6YRA
ON4QJ
PY2PA
PY2PE
W2GQN
W2ZTV
WA2RLQ
W3HEP
W5CP
W5HF
W6OF
WA6GLD
W9QON
WØDFI

322
DJØKQ
I5UA
K6EV
OH2BH
PY2CQ
PY2SO
SM7QY
UA1CK
W1WQC
WA2HOK
WB2HXD
W4EJO
W5UR
W6JKJ
W6KZS
W6RGG
W9EB
W9QLD

321
HKMG
K2YLM
K4ED
K4YYI
K6GLC
K6OH
K9BGM
K9WTS
PY2BKO
UA3CF
WIDFP
W6CUF
W6HVN
WØCKC
YV5BOA
YV5BPJ

320
DL7AH
JA1BN
K4MZU
K5GOT
K8DYZ
OH5UQ
QN4IZ
SM5AZU
VE4OX
W1EFX
W1MM
W2PN
WB2EMK
W4HOS
W5MBB
W6EUF
W6MUR
WA6MWG
W8AVE
W9EJR
W9NLJ
YV5AHR

319
DJØPN
JA4BJO
JA4ZA
K6OM
KØUKN
WB2CKS
W4DRK
WA4WIP
W5AG
W6IW
YV5ANF

318
JA8ADQ
K4IKR
K8EHD
K8WOJ
PY4AP
VE1VR
W2IOT
W4BRB
W4DLG
W8JQ
W9WNB

317
I8AA
K1YZW
K4MPE
SM5RK
VE3MJ
VE3WT
W2LNB
W4ZXI
W6DOD
W7CSW
W8YGR
YV5BNW

316
DJ7CX
DL8NU
G3JEC
JA1MIN
K2KER
K3UZY
K6AR
K6CQF
SM6AFK
SMØKV
W2GDX
W2HH
W3CS
YU2DX

315
DL1CF
DL3OH
DL7BK
I7ZPB
JA1KSO
K2IRK
K4IWK
ON4PA
SM6CKS
VE7CE
W1MU
W2PTM
W3GF
W5LZZ
W6EJ
W6FET
W6KNH
W9ROM
W9WKU
WØCPM

314
JA1BRK
K4HJE
K5LIL
K5QHS
K6KA
VE6IP
W2NIN
W3BWZ
W3PVZ
WA3AIP
W4EEU
YV5BZ

313
DJ1YG
W1JMT
W5KGJ
W9DH
WØOAQ
5Z4KL

312
I3PRK
K2UGJ
K4IIX
OZ6MI
WA2IDM
W5PIO
WA6IPY
W9JK
W9JQD

311
SM5EC
WB2UKP
W4HA
W4RJL
W6KYJ
W8ROC
W9AZP
W9FD
WA9IVL
ZL1AV

310
F2HU
JA1ADN
JA1IBX
JA1ZZ
JA7AD
K1DRN
K4CFB
K4CIA
K4ET
K4THA
K4YPO
K4ZCP
K6HN
K9WEH
LA7KI
OH2QO
PAØVO
PY3APH
SM6CKU
VE3NE
W1AA
W1YRC
W2MUM
W2PPG
WA2HSX
WB2VAE
WB2YQH
WA4MUB
WA5JSJ
W7MI
W8DX
WA8ZDF
W9BGX
WØBL
YV5AE

309
JA8JL
K1JHX
K4RTA
K5LIW
K6EXO
VE3DBT
W1YL
W2CNQ
W4OEL
W7DY
W9LKJ
WA9NUQ
WØGNX
WØPAH
WØSMV

308
I1RB
K1KDP
K6VB
OE1FI
OZ1LO
PY1HQ
W4JVU
W4RFZ
W9IVG

307
DK3PO
HB9AHA
IØIX
JA1EOD
JA2AAO
K8IDP
KØBLT
VK3YL
W4BRE
WB6UDC
W9ZRX

306
JA3GZN
K2OUS
K4GXO
K9AWK
KØBUR
OE7UD
OH2BR
OZ3PO
PY2WB
W4AUH
W4GTS
WA4TSP
W5MUG
W6AEM
W8DCH
WØHZ
WØJW

305
JA1DFQ
JA2BTV
K3AFO
K4CFF
K6BCE
K6GAK
K6ZIF
K9YXA
OH2BC
PY1MB
VE1KG
VE3CTX
VE3DLC
VE3GMT
W1OHA
W2AZX
W2MO
WA2EQG
WA3KK
W4NBV
W4NO
WA4EDR
WA5QYR
W6BUO
W6GMF
WA6GEE
WA6YVW
W8GHN
WA8MCR
W9AG
WAØKDI
ZL1AJU

304
K4OCE
W2GXF
W2LWI
W6GB
W8ILC
ZL1HW

303
IIEVK
K4HPR
OH2VB
SM1CXE
SM5WJ
SM7BEM
YU1BCD

302
DJ2AA
DK2BI
I2LAG
W6TXL
W7LFA
W9RER
WØIDW
WØMYN

301
G6RC
JA1COA
JA8ZO
K3SGE
K4CEB
K4IEP
K4OBP
K8UDJ
OE2EGL
W1OWU
WB2VYA
W6AOP

300
CR7BC
DL3ZI
EL2CB
JA2JKV
K3ILJ
K4ADU
K4AUL
K6OZL
K8RWL
KØHUD
OH5VY
OK1MP
PY4LW
VE3GCO
W1FJJ
W1MDO
W2AWK
W2VUF
WA2BED
WA2BRI
WA2HSU
W3CRF
WA3HGV
WA3IUV
WA3KSO
W4PPW
W4GYP
W4HHN
WA4IFW
WB4KZG
W5DL
W5DRW
W5OBS
W6AI
W6ANB
W6EYR
W6FWQ
W6MUM
W7KS
W8RCM
W8SRK
W8ZCK
WB8HAT
VE3CDP/W9
W9KB
W9TKR
WØCY
WAØCPX
ZL1ARY
ZL3AAD
ZL3AB
ZS2RM
ZS6IW

299
K2AGZ
OE1HGW
W2BXC
W2QT
WA2JBV
W4ID
WA4LXX
W6AAQ
W6JKR
WA6DUG
WA9LOT

298
GM3CSM
JA2HNP
K1OZR
K5BXG
K5EVK
LA6U
SM6CJK
W1FOB
W1VAH
W2FPM
W3NB
W6BIL
W6EJJ
297
W2BRV

296
LA9CE
W4SYL
W9IRH

295
JA1RJW

294
K4EEK
PY2RW
W5KYD
WA6AUD

293
DL6KG
K6ALH
K8PYD
KH6GLU
WA1ERM
WA9LZA
WAØWKW
5H3LV

292
JA2PJC
JA4XW
K6YUI
OE1UZ
OZ5DX
PY1WJ
W1HGA
W2ER
W4UF
W7LZF
W8WT
W9OW
YU1AG

291
DJ3GG
DJ5LA
EP2TW
I8SK
JA1JRK
JA3AAW
K6BTT
K6JR
K6POC
PY1DH
W3KV
W6GC
W9EXF

290
DJ4PI
DL1MD
E8CW
E8RU
K1KNQ
K2BT
K2QOU
K4CYU
K4II
K5KBH
K6SDR
K9COS
K9PPY
OH2BAD
PY5ATL
SM6AFH
SM6CVX
VE3AGC
VE7IG/VE8
W1RLV
WA2HBN
WB2NYM
WB2PGM
W4ORT
W4ZSH
W5LJT
W5LUJ
W9MCO
W6CS
WB6DXU
WA6HRS
WB6PNB

W7GRH
W7PK
W8CFG
W8GMX
WA8FDC
W9DF
W9IGW
WØIDR

289
PY2CAB
W3KA
W4JD
W6HON
W9HZ
W9KQD

288
JA2KLT
K6LAE
W6HJA
ZE4JS

287
W3HNK
W4CRW
VE3EU
ZL1PV

286
CT2AK
JH1CJQ
K9CUY
W3AC
W6MI
YV5AK

285
JA8MS
K6UFF

284
OH2BAC
PY1LW
WA1HEN
WA4GQM
W8FAW
WA9WJE
YU3FY

283
DL1YA
K6GUY
K6PZ
OH2SF
W5EDX
W5RU
WA8PYL
W9FU
ZP5CE

282
I2SM
IT9SFZ
K4RCS
K5ZJK
OH3NY
W5ZWX
W7YBX
WB8EUN
WA9JDT

281
OE8RI
VU2MD
W2IH
W4YUU
WAØDUB
WAØNTC

280
DJ4LK
DJ5IO
DL1OT
DL3ZA
G2GM
G3JOC
K2KGB
K4MG
K5HYB
K6UJO
KØJPL
KØMAS
SP6RT
VE4XJ
W1DXB
W1EW
W1JEL
W2ICO
W3ALB
W3NV

W4WSF
W4WWG
W5NGW
W5QBM
WA5VDH
W7VRO
W8BUV
W8OA
W8QXQ
W9YYG

279
I7WL
JA6BFI
K4GSS
VE2DCY
WB2BBW
W4SII
W7AUS

278
W2ZZ
W9LNQ
WØFFK

277
K9TZH
W1DS
W3JXH
W9KNI
W9YT

276
DK1EW
G3KDB
KP4DLW
W2GHK/4
WA4DRU

275
JA1EDU
K9PQG
W2SUA
WB2ITC
W3KEQ
W8KCJ

274
W4PLM
WB6APX
W7DQM

273
KØEKR
LA6GP
VO1AW
W6OL
W9NGB
W9UX
WØYCR

272
CX1RY
DJ6RX
JA1CB
JA1HHM
JA2ACC
JA2IOD
K3OFY
K4BBK
ON5ZO
SMØMC
VE3IR
VE6ABP
W1OR
WA2BLV
W3BK
W6CDJ
W6YHT

271
CR6AI
I2EO
JH1EIG
W3HDZ
W4BKP
W4DUO
WA4HHW
WA6GFY
W9GXH

270
DL1BS
DL6QW
DL7EG
F2NB
I1BUP
JA2AH
K2SHU
K2ZRO
K1LPL/3
K4CKA
K4EKJ

K5IZY
K9VQK
KØGXR
LA5Q
OH2XF
VE4SK
W1BGD
W1ESN
WA2BCK
WB2NUU
W3RRB
W3LB
W3QLW
W3ZUH
WA3GTX
W4BA
W4VIH
WA4YVQ
W5HCJ
WA5AUZ
WB6WHM
W8NPF
W9LJU
W9PIO
WA9VGY
WA9VOL
WB9FJX
ZL1AMO

269
K2DNL
K4TSJ
SM7ASN
WB2AMO
W6CLS
W6OUN
W8GMK
W9YGN

268
K4BHG
K6HLM
OZ7KV
W9UTQ

267
F3ZU
W2ZY
W9ZWH

266
K2AHQ
K4ITA
KP4DJF
W4ASJ
WA5RTG
W8WOJ

265
KL7MF
W2UBJ
W5NBI
W7ORH
WØMAF
ZP5FC

264
F5LQ
WA7DRP

263
DJ4XA
JA2HGA
K6JB
LA9HC
VK5KO
WA2CLE
W5FL
W8CC
WA8IPL
WA9UFR

262
CR6CA
DK3GI
DL1KS
G3OZU
JA7HZ
K4WMB
K6QZ
KH6SP
SP2AJO
YV5BNR
W1KGH
W2CUC
W5IJW
W7YTN

261
JA1AAT
OZ8BZ

VE3BBH
W2FB
W4DXI
W5PAQ

260
DJ4HR
DJ5JH
I2IR
JA1DQT
JA3BG
K1IOQ
K4DXO
K4FP
K4GFI
K8TVO
K9LIH
KP4BJM
SM6EUC
W1QV
W2AH
WA2EAH
WB2PWU
W3AXW
W3BBO
WA3FGS
WA4ZYQ
W5LPO
W5QIX
WA6CXK
WA6LLY
WB8ABN
W9DDL
WA9SLD
WA9UCF
WØAO

259
K4AEB
K6BIA
K6QX
K7CVL
SM5AQB
WA1ABW
W7FTZ
YU3OV

258
KØDQI
KV4AM
W4UQ
W6ZYC

257
PY5UG
SM4CMG
W2MB
WA5SDT
W9ALI

256
SM7TO
W7CNL
WA8VEK

255
HB9AIJ
JA2AN
JH1HWN
K1UDD
OH2ES
VE3GHL
VP7NY
W6FIF
W8LAV
WAØUFS

254
SM5BFI
W2HUG
W4PGW

253
DJ5GG
SM2EKM
SM5AHK
SP3DOI
WA3ATX
W6MAR

252
CT3AN
OH8SR
PY2BZD
W3AG
W6CN
W8UM
WA8OSL
WA9SVY
XE2IH

251
G3GIQ
I1AND
K4KIN
OH2BCV
OK3HM
VE5XJ
W2DT
WB2RBG
WA5ZWC
WB6W1W
W7ZHZ
WA8ENJ
W9ELG

250
DK1YK
DL3AR
DL9II
EA6BN
F2QQ
G3AWP
G3KAA
JA3KWJ
K2AAC
K2QIL
K3SXQ
K4IF
K4YXI
K5EKD
K6LQA
K6NM
K6IWI
K8CSG
K8UNG
K9WIU
VE5IS
W1AB
W1EHT
W2BBK
W2GA
W3HTW
W3POE
W4LZ
WA4MSU
WB4DOY
W5KHP
W5KKZ
WA5UCT
W6VD
W6YUS
W8IJA
WA8IDY
WA8IND
W9VCO
W9NN
WA9ZCP
9Q5QR

249
DJ1XC
K7YWZ
KØPMZ
KØRTH
W2BXY
W8LBM
WØCDC
WØNAR

248
OZ7PH

247
JAØAZF
W1AM

246
SM7ACB
W1WLZ
WA9UFK

245
JAØSZ

244
K4CG
VK6CT
W2ABM
W4GIW
WA5VSL
W7BF
WA9QAM

243
JA1KF
SM3BNV
SM6CAW
W3QOR
WB4SIJ
WB4UYD
WA6CMX

242
JA1GLF
JA3DWI
K3SLW
K4OD
K4PVZ
K6WD
OE1CP
OH2VZ
PY1BOO
SP9ADU
VE2AYY

241
EA2CR
F2VX
HK3AVK
JA2PH
K7GYA
KØDYM
KL7BZO
KP4BJD
OK2DB
SP6BZ
VE3MZ
VE4II
W1QUS
W2YLS
WA2CCF
W3KI
WA3GJZ
WA5ALB

240
DL1LD
K4LR
K4PFK
K4SXD
K6OVJ
K6TXA
K8CMO
K9KXA
KØLEA
KP4DKZ
OH2BGD
UA3FI
VE5GG
VE5NW
WA2AUB
WA2ECA
WB2HNQ
W3IRL
W3YX
W4CZS
W4HY
W4OMW
WA5UBV
WB5BID
W5UNF/6
WA6FIM
WA6JVD
W7JWE
W7PFZ
W8PCS
W8OBG
WA8GPX
W9II
W9LVT
WA9LUD
WØIU
WØJS

239
HB9KC
VO1HI
W3TVB
W6UA

238
HB9TU
K8UHB
W1SG
W7LBD

237
DL1ES
DL7NJ
SM5BZH
W1CNU
W2GOF
W2IQH
W6DKQ

236
W2HL
W9KYZ
WØAY

235
G3IAG
JA6LLO
YU2NEG

234
K6KQN
K6SSN
WB6URS

233
HB9RX
JA2CXF
PY1EH
W4SHX
WB4GMR
YU1SJ

232
WØDMA

231
DL8OH
EA2B
SM7ANE
W2MBU
WA4KJR
ZP5GS

230
G3VBL
JA6BZI
W4WRY
WB4PUD

229
JA1HRQ
K5CLI/KH6
VU2BEO
W2HC

228
OZ1AJ
OZ7IZ
VE3DGX
W7EOI
WØHBH

227
F9TE
JA2IYJ
W4LBP

226
WA4PVD
WA5LES

225
DJ9NW
DJØYD
JA1OTX
VE2AG
W2SIM
WB2BNI
WB5BFZ
WØLPA

224
DL7MQ
HP1AC
JA2TH
K4HMX
PAØLRK
UC2BF
VE6VM
W3NNK
W6HRB
W7GSP
W8GCC
W8ODV
WØBA

223
DJ5BW
F8OP
K2VUI
K6IR
VE3GEY
W4SD
W5LW
W5ZV
W6HPG

222
EA3NI
HB9AMO
K2OLG
K4ELK
K9ZPJ
PY4ALC
SM7BWZ
SP9AI
VE2UN
WA2DHS
W3ES
W4KA
W4KJL

WA5RXT
WA5YMW
WA6FYC
WB9LJV
WØVUU

221
EA9AQ
K1AGB
K2GBC
K2QHI
K3TUP
K4LDR
OH3XZ
SP2HL
W3MDO
WA4LDM
W6RXW
W7NYO
WA9AUM

220
F3LA
G3JLB
HA5EF
HB9AOU
HB9T
JA1ILN
JA3BTR
JH1LPI
K1ZND
K2MEY
K4CDZ
K5TFG
K7NHG
K9ZXG
KH6GKD
KH6IF
KP4DIW
OE3HOW
OE5CA
PY2BBO
VE3BS
VE3BXY
VE3CWL
VE3OI
VO2GD
W2PSU
W2SZ
WA2FIW
WA2FLA
WB2GQK
W3AIZ
W3SDV
W3YHR
W4WHK
W3ZBW/4
W5FCX
W5KFN
WA5ZNY
W6UR
WA6TAX
WB6KIG
W7CF
W7OH
W7IYW
W8FXP
WA8CIA
W9BMD
W9GHO
W9LI
W9OFQ
WA9FQG
WA9OVU
WØIBZ
WØYZB
WAØTLT
ZL2ASM

219
I5TEC
K3ICA
K4NE
LA8LG
VE6TK
W2IP
WB2RSW
W4KN
W4TK
W6PHN
W6SUD
WB6MVK
WB6ZUC
W7ML
ZP5KA

218
LA8SJ
W4BBP
WA6SOV
WA8NMN

217
W1DAL
W4EZO
W6DER

215
JA1SJV
JA3EMU
JA8AIP
WØCR

214
DL6PI
KØBEA
PY2DBU
WB4BMV

213
F3YP
JA2LY
K4JS
W3GID
WA6LBP
WØSUU

212
JA1NPV
KR6IX
PJ2VD
PY1SJ
UC2AW
WA8VRB

211
JA3MGX
KØSGJ
SP5BAK
WA6INK
WØDIA

210
K8RCT
SM7CXH
W5RUB
WA8ASV
WB9GIT
YU2AKL

209
K6UQO
OK1KTL
VE3CVZ
VS6DO
WA5FMH

208
DJØMW
JA5GZ
K6UJS
OH3MF
OZ4PM
W1EBA
W5CWQ/6
W8KC
YU1ODO

207
DL7HT
JAØGRF
W2GTL
W6LV
W9HDR
YU4HA

206
DJ5AI
DK5QK
OZ7BQ
PY4AKR
SM5BFC
WA3MBQ
WA3NNA
WØEXD/4
WA5ELM
WA8TBQ
YV5BPG

205
DJ8JY
DK1HP
DK9WB
JA3MXR
KP4DKY
VE1AL
W1DII
DL6CL/W2
W4EH
W4KNW
W4WWD
W6JZU
W6MDF

W6SO
WA9YEY

204
DJ3NK
K2BG
K2UEM
HA1DI
VP9BK
W1CT
WA1HJZ
W2ECR
WB4MHK
WA9JCO

203
DK3SD
HA5DA
HI8LC
JA1WPX
JA4GZT
KA2AI
K5GUZ
PY2GF
PY5QF
VE3HD
W2DKM
WB2AIO
W3CAA
W4HU
WA9TVM
WAØOOH
4X4KM

202
DJ2XP
DJ6BN
DJ6ZM
JA1EGB
JA1ENA
K4APL
K6ZXS
K8LUH
K9BWQ
KG6AB
PY1MCZ
UT5CC
VE3GIH
VE3WB
VE4SI
W1SWX
VE2MW/W2
W2RHK
WA4KYR
W5AKI
WA5QEQ
W7KI
W9LJL
YU1AHI

201
DJ6QI
DJ3PY
DL5BR
F9AP
G8QZ
JA3IG
K1PVB
K6CNV
K6MP
KØALL
OH6NH
OZ5CV
UW3CX
UW3IN
VE3BG
W2JRP
W4OZF
WA4YBV
W5HIC
WA5WOF
W6LQC
W6VBI
WB6VZI
W7QNI
W9JVF
W9VBV
WA9WXL

200
DJ4FT
DK3ED
EA3NA
F2PO
F3CB
FM7WN
G6GH
HK7UL
I5EOS
JA1BA
JA1VNA

K2QMF
K3BHQ
K3CNN
K4FJC
K4ULE/6
K6UWD
K7DVK
K9GLI
K9IDV
KØZXE
SP5AEL
W1HRJ
W1LQQ
W1OQP
W1STW
WA1IED
W2AXR
W2AXZ
W2BZL
W2EHY
W2FWK
W2HIU
W2HN
W2TKG
W2UJ
W2ZO
WA2EYA
WA2ZLZ
WB2AOC
WB2DJM
WB2NDI
WB2PCF
WB2VET
WB2VKO
W3CDG
W3QZA
W4LF
W4MIA
W4YKH
WB4EJO
W5PD
W5RTX
W5SBX
W6IID
W6PTF
W7GYF
W7NP
W7SI
W7SEE
WA7BPS
W8MBB
W8QOL
W8YMB
W9GKJ
WB9CBY
WØTRF
WAØPRS
ZS1ACD

199
DLØIK
PY2BCQ
W1PL
WØMRN

198
K4PRT
LA1UH

197
DL9II
G5CP
OK1AGO
W2AAV
WB4FOD
W8TJO

196
EA8BK
JA6MJV
UA1CS
VO1HH

195
G3GNM
K3AMI
PY2FIQ
VE3KP
W2PLV
W8MIL
YU1QBC

194
DJ1IK
DJ4UF
K3JYZ
WA8YFW

193
F3TK

192
K1OMF
K56DY
WA3IZR

191
JA4BTY
K8UJD
YU2VAF
W9OUG

190
K4ZYU
W4ZVX
WB6RKH

189
DL9YC
EL2BZ
JA1BNW
JA3BIP
K4RDF
K8KPU
W4GEO

188
SP5HS
W2QIP
W3NL
WA4VAI
W5URG
W6REH

187
K1ASJ
K8BGZ
OK1DH
VK2BPN
W2GWT
W6AYQ
WA7EOS
W8IHD
WA8WMH
WA9FWY

186
DK9FB
JA8CDT
K7MKS
K8VRZ
W3ENV
YU2LA

185
DL1DAA
DM5SBM
JH1WIX
WA2JRD
W9AFX
WØJYE

184
K1LBB
K4FIK
K4UVH
K6CU
OF5LX
PAØJR
VE3BMV
WA2MBP
W6INH
W7GYP
W6JHV/7
W7KOI
W8KZO

183
DJ4VU
DJ4VX
HB9RB
JA1FNZ
OK1AEH
W2ELW
WA2LQZ
W3YT
WA6FIT
W8GIO
WAØOTE

182
DJ3LR
DJ4WG
K4HCT
K6RIP
K8AVR
KØKLH
KH6FQE
W1RML
W2RK
WA2BAV
W3WI

HB9ASK

177
WA3HRV
W8BQF

176
DJ9CJA
SM7ABL

175
WB2EBF
WB2IBT
WØGGG
SW1AU

174
UA4LM
UA6BV
W4IN
WB4SJG

173
E9EP
I2CZQ
JA4FM
LA8CF
SMØBPZ
PY5DRP
W3FAI
YA1OS

172
G3TOP
DL7PW
DI8FO
DL8JE
SM5KG
UV3GW
WAØEWZ

171
CX9BT
G3DLH
JW5NM
K9GSG
LA4LN
VE6FO
WB6HDG

170
I8VO
HB9ANR
K2FJ
WA1JMP
WA2VDA
W4JVN
WB4OGW
W5KOD
WAØKTA

169
HB9PQ
K9MMH
W5RY

168
EU3GK
UA4QM
W7DV
WA8TYF

167
K2DW
PY1CZR
WA3JHB

166
VE1CD
WA1EVX
W2QL
YO1NIG
YU1NTO
YU2REO

165
JA1SKE
JA3BRB
JAØAWE
JH1WKS
K2AGJ
K2TKR
K9UIY
K3YWI/9
W4KFB
VE6BU/W5
W6GKX
WB6EJV
WA8LVH
W9EVD
WB9EEE

164
DL8BB
K6CN
OH2BMG
PI2RB
SM5ACQ
SM5BRS
SM6ARH
WA1LKX
WA2MDR
WB6WOA
WA8PRR

163
DJ2IW
DJ8UG
DL7QF
JA8KB
K7EOM
W1EIC
WA2YVK
W4WOY
W4YZC

162
DK4VV
HB9ACM
JA3GSM
K2RDG
K5BBA
SV1CH
VE3ECW
VE7BLO
VE7SF
VP9GD
W1DAY
WB2GDN
W4SNR
WA5VSC
W6FOI
W7EE
W7NXJ
W9IA
W9MLG
WA9HEU
WA9YZN
YU2CBM

161
CT1SH
F3IJ
I5BOL
K4LP
K4NT
OH2LU
OK3BII
UB5LS
DL2AA/W1
W1CYB
WA2DNY
WB2DYG
WB2DZZ
WA3CSF
W4DWK
WR4NDX
W6OMA
W8WWH
W9HE
WA9RJJ
WA9ZAK
WØQWS
WBØBQG

160
A6XB
DL5QQ
EA3RF
G2AYG
HLAV
JA3AUQ
JH1AGU
JH1HDB
K1WJB
K3NEZ
K3SLP
K4EVY
K4FN
K4MRZ
K5CSK
K5YRK
K6BUU
K6DQF
K6DR
K6ELX
K6GKU
K7DXJ
K8EJN
K8HBN
K7NHV/8
K8NQP
K9HDP

KØCML
KØDEQ
KØHWB
SM4FMO
UA3GO
UA3VB
VE2ADZ
VE5CJ
VE8ZZ
VK2AOU
VO1EJ
W1HM
W1HV
W1SPK
WA1HAA
WJCML
W2IGD
I3VVN/W2
WB2ESC
WB2QKO
WB2RJJ
W3HUM
W3ZJ
WA3HSQ
WA3QFG
W4EUI
W4MOX
W4MVE
W4PGK
W4VE
W4VSV
WB4LDT
WB4PAB
W5IB
W5VZU
WB5DLX
W6AKM
W6GFB
W6IZU
W6KYA
W6OSW
W6OK
W6QXS
WA6GOR
W7TUO
WA7PEZ
W8IIE
W8ME
WA8MHW
W9HOU
W9KDX
W9OYZ
W9ROK
WA9VCK
WA9VIY
YV5CKR

159
KZ5KN
UK3XAB
W4YVK
W6RQ
WA9DIO
WA9TXL
WB9DZF
W9EZO
YU3TFA

158
K4PCL
W2JKN
WA3DMH
WB6FHT

157
W1FCC
WAØTKJ
5Z4IR

156
DL1DA
K4OYQ
KH6CCL
PY2EWZ

155
HB9ANZ
I6CCI
K6BAZ
VE6VV
W2CKR
WA2FXP
WB4PNG
W5KV

154
JA2JAB
LA4VG
VE3CSZ
W3LC
W7JAC

WA9SVZ
YU4AAW

153
DJ8SI
JA3BSD
PY1BDU
UW0IF
W3WK

152
JA2EDG
K4BHJ
K5AYA
OK1DA
WA3LJP
WA5DOS
WB9BDH
WØBWJ
WØDBC

151
F5QF
JA2BAY
JH1MTR
K2YEE
K3RDT
UW0LP
VE3GHZ
W1CMH
W8HGH
WØLWN
WBØCQJ

150
HB9DI
I1ZGA
K6RK
SM7EVM
SP9ABF
VE4OP
WØII

149
K5CWS
K6JAN
K7MKS
WØCC
ZD8RR

148
JA1NVB
WA3NXW
WB6ZHD
W9IVB

147
DJ1QX
EA7AD
JA1QER
WA2BOX

146
DW2FD
SM6AYG
VE3FLF
WA1OIO
W3CBF
W4ILL
W9KQB
W9LF

145
DK6FI
OH2ZNC
ON4EP
OZ6IS
PY2FCF
PY3ANS
VE2GS
W1MLW
W6MYP
YV5CUU
ZF2KV

144
EA7OH
UA0LH
UI8CD
W4KVC
W7CLS
WA7GOA
ZL1IB

143
HB9AAH
JA1QIJ
JA8BXC
K9QVB
KØIKZ
LX1ES

OH8OB
OK2BLI
PY1BV
SP9AQY
UG6JJ
VO2AF
W2NUS
WA2FUE
WA4QVQ
WA4SPC
W6GBY
W9KM
WB9GVW
YU4AVW
ZL1BEM

142
DL7IY
K2KXW
K4EN
K7NTW
KL7JDO
KR8BU
PY4KB
SL3BG
VE1AMB
VE3DQT
W1ND
W2QXA
W2TA
WA2LFV
WA3SRY
W4DGT
W4HGH
W4TZX
WA4EPF
G3DPX/W6
W7DQ
W7WN
WIRDN/9

141
CE3YO
DJ2YE
DK1IK
HS4AGN
I1SBU
K5DUT
OH2NM
SM6BZE
VE3BUV
VE3BZ
WA1PID
W2HWS
WB2QQX
W8QVO
W9KBZ
WA9WVW
YB3AAY

140
DJ7MX
DK2RT
DL8HI
G3RWF
I5FID
JA1INV
JA4XI
JA6MBU
K1CSB
K1DEK
K3OVT
K3YVN
K4FLV
K4IQJ
K4LBJ
K4TXJ
K4YBE
K5KNA
K6UTW/5
K6CBL
K6SE
K6ZMB
K8TMK
K9UQN
KØYVU
KH6AG
KH6CF
KL7CZ
OK1KZ
PY2DTV
VE3BVD
VE3WW
W1DMD
W1NLY
WA1NCK
WA1NSJ
W2DPL
W2HAZ
W2SLF

WJ0SJ
W2UZL
WA2RAZ
WA2RQH
WB2HJW
W3DS
WA3ASQ
WA3AXQ
WA3NAV
W4VQN
W4WXZ
WA4ULL
WB4OXD
WB4RUA
WB4TDH
W5NCB
W5RBB
WA5PPZ
WA5TYR
WA5ZRB
W6DZK
W6EGX
W6EVU
W6MPZ
WB6IEX
WB6VUZ
WB6ZPO
W8IM1
W3JZJ/8
WB8ICV
W9FD
W9MYG
W9TXE
WØKFH
WØNQ
W4ODS/Ø
WAØUAV
5Z4LS
9V1PM

139
UA9HM
VE4SL
VP9GO
W2GRR
WB2PEV
WA4VTB
WB4ONR
WB6UNS
WA7KEF
W8KYD
W8PBO
W9OGY
W9YYF

138
WA5SOG
WA7BBP
W9FBY
WAØNBZ

137
DK3ZF
I3TGT
KH6GCY
W6IUV
YU5XAG

136
HA4KYH
JA3HEG
WA7ASD

135
ON5GL
PAØGIN
WIBMR
WB8GKL

134
DJ6RK
JA8AUS
PY6HI
UA2AG
W7WMY

133
CEØAE
EA4KC
GM3UIU
JH1WDN
LA9ID
SM4DHF
SM6DBB
VE3OOR
VO1FX
W1MN
WB2VXN
W4ACY
WA6DPQ
W9YIE

132
F5HV
JA1WLO
KG6AQI
LA2S
W4RRS
WB8ISD
W9RXJ

131
I6AGB
K3OIO
KL7GRF
SM7RS
SMØCGO
SP9WY
WB2FVO
W7GUR

130
K6QPE
SM6FOS
VE3DLL
W6DII
YU3CNO
YV5CWO

129
DA1ED
G3UYM
JH1CIU
W8PV

128
JA1VZM
JA1WOO
K2VIV
K8LGY
OK1ND
WA1JKZ
WA2LDX
WA2YJN
ZF1BF
9L1JT

127
DJ5JT
G4AMJ
JA8ARA
K4CLY
K5JTN
KØMOL
W3GJH
WA3AFQ
WA4BUE
WA6TLA
W9YDX

126
DJ8EW
DL8UO
JA1KTM
JA5FYW
OH3AG
OZ6AQ
PY3CEN
SM6DUF
W2ABE
W3UI
WB4UKA
W5TFZ
W5UHG
WB5DDC
YU2CTF

125
EI3USF
JA2AYH
JR1OUU
K6UGS
K8CCV
SM6EOV
SM7JZ
UR2QD
VE3EXA
W1DKU
W1FW
WB6ENX

124
DJ9RP
DL1NG
JA6SUO
JH3HPX
K1LWJ
K3RFB
K4EPI
K5PR
K4QLO
K8QWG
SM5BZO

SM6BDW
SM7DMT
IT8SW
W4WEL/1
WA2DFC
WA2VYA
WB2FWW
W4HNK

123
DJ4IJ
HP2MD
HS1ADX
JA1VF
JA6ARW
K2DT
K4CBI
LA7BD
PAØLVK
SM5CPC
SM6EBQ
SM7DER
UV3GM
UY5ZM
WA1LIR
W3BMX
W4NZR
WA4RTX
WB4IYB
W7VCB
WA9VGS
WØEGC
WBØHCM
WBØGXU
3V8CA
9Y4KK

122
CT2AZ
DJ3OZ
DJ6OV
DJ9QG
I5LAN
K1TZD
K3TVE
LA7FJ
SMØCCM
UV3TC
WA1NHZ
W2FVJ
WB2AES
W3KLR
W5VLF
WA5OKC
W6OPF
W6WDH
WB6BKN
W7YOZ
WA9ZWL

121
DL2DA
G3AHB
HB9AHI
JA8AOX
K1ALP
K3FNB/1
K6QS
KØLHE
UAØLS
UB5JK
UK1ZAB
UW3TJ
VE3ERR
VE5HG
VR2FO
W2AFM
WA2KWB
W3NQC
W3YMB
WA3OER
W4JIK
W4UAG
WA6DWO
WB6NSI
WA7OBL
WØJKF
WØLJF
WØMHK
WA8ECB
9Q5PA

120
DK8NU
DK5ZQ
DL2WR
I5HN
F9GO
G3PYM
HB9ARL
HK4CJB

IA8BKJ
JH1MMT
K1AJ
K4AEH
K4EJO
K4FAC
K4HQI
K5TYT
K6IGG
K7CXZ
K7RMV
K8RXD
K9DDA
K9VFA
KØRQE
KA2AS
KH6HC
KR6AY
KX6GD
LA9GG
SP9BPF
VE2BRW
VE3BIZ
VE7BAF
VP8OO
W1AOP
W1EWD
W1RFW
WA1CQA
WA1HXY
WA1JWQ
WA1KKT
W2MYK
WA2UWX
WA2DZU
WB2MAN
WB2ZOW
WB2ZQV
W3CY
W3ETG
W3YXM
WA3BRW
WA3DVO
WA3KOZ
WA3LFU
WA3LHG
WA3OHF
W4BAA
W4HGX
W4QF
W4PWB
W4RMB
W4RNL
WB4ADT
WB4DBO
WB4LLT
WB4SXX
W5BZK
W5ISF
W5MDP
W5RKT
WA5HNK
WA5NOM
WA5UGF
WA5YFL
WB5BIR
W6FSO
W6PNO
W6RQZ
W6YKS
WA6QZF
W7NJ
WA7GYR
W8DSO
WA8NNK
WB8KNZ
W3IZJ/9
WA9IAA
WA9WJS
WA9YZD
WA9ZOG
WB9AAQ
WB9BUV
WØJIG
WA0GFW
WAØPFV
WAØTAS
ZL3ADF
ZP5AQ

119
EA2IA
EA5BS
I1ZMI
JA7UKS
JH1MPX
JH1OFW
JY6FC
K1JYN
K2DEB/3
K7NHV

WA2IRS
WA2KEA
WA3DWO
W4RAI
WB4VUP
W5VIP
W6ARP
W6JZS
W8LNI
WA8WAS
W9JOO
W9IR
WB9BPN
YU4OB

118
JA3MGY
K1LLU
K9NBH
OZ5LZ
SM6DKU
SVØWLF
W6AFH
YU2CAW
YU4ALM

117
DJ6JB
EA4MY
EA7KI
EA9EJ
G3VZN
WA1OYK
W6CLP
WB6KUC
WAØVDX

116
DJ4TE
K4BEU
K8SMC
OE2MCL
VE3CDK
W6WVK
WA7ISP
YV5ED

115
DL2UR
DL4IO
DL9PO
IØBAM
K3RUQ
K4KH
VE3FNM
W2IBR
W6ZS
W7YTE
W9MAF
WØLIA

114
DK3SN
JA2KKA
JA6SVP
JA8FBM
JH1IOC
KG6SW
OE1EM
W6IRD

113
DJ4LJ
DK3SH
JA1OXY
KG4AL
OH2BML
OH8IK

WA2ILM
YU3TSM
3D6AX

112
DL2TJ
DM2ARI
DM2BNI
G4AMT
I5MMC
JA3LMU
JA6FDV
K3NYI
VK2BAN
VP2AAP
WB2GUB
WA7GOO
YU2NHS
YU4EJC

111
CT2BC
DK3UG
DK4NG
DK5QH
F9ON
I1EY
JA1CMC
JA7ILL
JAØGZZ
K7AUZ/5
LA1LM
MP4BHM
OK3UN
WA6KUR

110
CN8DW
DJ1QZ
DJ6FU
DJ6HU
DK5PD
DL1JS
G3HB
HK7BDA
I2RTI
I8KGO
JA1IKA
JA1PMN
JA1SR
JL1GMM
K5OEU
OH2BMC
UB5IS
UK5MAG
UV9OC
UW3HQ
VE1AAW
VE3GUS
VE4ZM
W2DQC
W7JJI
W9HC
YV1AOE
ZL2AAV

109
DM2CZM
F3GJ
F5RS
F9CE
F9WD
HB9APF
IP1NUC
JA2DNA
K1WVX
K4ZDK/5

K9YNE
KØCMF
KX6JX
OK1ALG
OZ9EW
SVØWTT
VP9GK
W5LKF
W7MEU
WA8UBG
WA9RRN
WB9CGL
WØBGX
WØCAQ
YU2BS
YU2RKC
ZC4BI

108
DJ1YH
DK3UV
DK5ZO
DL3MP
DL3MO
DM2ARA
DM2DDN
EA7KF
G3IYO
HB9AQF
I1DSI
IS1AOV
JA1MQM
JA1IGZ
K1UKI
K2FKM
K5IZM/4
K5KLA
OH2DN
OK3RMG
OZ5CI
OZ7AN
OH8EL
OK2GBY
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WA2KWP
WA2NPD
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W8TIV
W9RJM
WB9CEP

107
DJ4XJ
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DJ9YZ
DL7QH
DLØDX
DM9ADL
HB9AJU
HB9PG
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I7CZI
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K6VI
K7GYF
KX6HC
LA7V
OK3LO
SM4IM
SM7BYU
SM7DNL
SMØEKD
SP3CDQ
SP6AEW
UA6PG
UB5MV
UI5AB

VE3BUX
VP9AD
WA5SVH
WA6OPB
4X4YM

106
DK3GL
DK3QF
DK5WL
DL5RA
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DM3VUH
DM3XI
EL8AO
G3IFE
HA6KNB
HK3BAF
HKØBKX
I6ROF
IØUY
JA1BEN
JA7AXN
K1BUR
K2EDQ
K6TL
KØEOU
KØEUZ
KP4DLY
OD5EU
OH6UW
OZ3FU
SM5RN
UA4AU
UK3YAB
UK6AAU
UK8IAA
UY5ZI
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WA2ROA
WA2YHK
W3AU
WA3INW
WA3JRG
WA3LLK
WA4KLH
WA4SDK
W6HJP
W6OWL
WBØALF
YU1DKL
YU2BQR
YU2ZR

105
DJ8UD
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DL1XY
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HA5KFZ
JA6LYD
JA7JW
JR1NRP
K3WBJ
K8IFK
K9KWK
LA9JM
OE3AX
OE5OA
PAØUR
SKØAC
SM6CSB
SM7ECX
UA3XM

UB5ZBB
UH8CS
UK5KGA
UV9DO
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WA2NGG
WA3BGC
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WB4SEO
W5PXZ
WA5ZVT
W6UVO
W7GBL
WB8IEY
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WØDRI
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ZF1WP
ZL2CH
ZS5OV

104
CX5BT
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DL2XR
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DM3UE
DM3WYF
DM4XXH
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F6ADX
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G3KPT
G3VMY
I5IAR
JA1HLP
JA2JSF
JA4GYL
JA5MG
JA7COE
JH1GTO
K1VU
K4GTO
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K1AGB/7
K9MWA
KL7GSC
LU9EAN
LZ2KML
OK1ATZ
OK3IRY
SK4DM
UA9GF
UC2WG
UF6DA
UK5LAA
UW3XX
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WB2LYB
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3C1EG

103
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HB9SO
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JA3PPR
K4YNG
KL7HGR
OZ4HW
OZ7XG
SM7AIL
UA1BO
UA3CAB
UF6HS
UG6EA
UK5WBG
UO5SA
UQ2IL
UW3IO
VE2QC
VE3AUI
VE4IU
VE6AWA
VE6LB
VE7AMD
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WB2CBO
WB2OHU
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WB4ORM
WB4WMG
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6W8GE

102
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DJ3GK
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JH1PEZ
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K4YOR
KØHIL/5
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KH6CU
KP4DMR
OE6MKG
ON8UL
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SM6PI
UA3QO
UA6OO
UA9FAI
UY5FF
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VE5JK
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VE7KL
VU2AJW
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9M2IR

101
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OH6ZJ
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WA2SSV
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WB2RKK
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YU1NPF
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ZL4CR
ZL4OL/A

100
DK4SY
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K3OIL
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KH6IAB
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LA1RR
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OK1DVK
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SP8AUT
SP9AJM
SP9CTW
SP9FFF
PY1ARE
UA1CY
UA1IL
UA2EC
UA4WAE
UAØFD
UD6CN
UK4WAC
UK5KAA
UQ2MU
UV3DU
UW3TR
UWØIW
UY5OO
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VE1ART
VE1RO
VE3DZV
VE3EWB
VE3IC
VE7BCP
VE7TK
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K4BZH
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VQ9HCS
VS5RG
VU2BEZ
VU2REG
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W1LMO
W1OPJ
W1YCO
W1YNE
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WA1GXC
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WA1IRY
WA1JLV
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WA1NNC
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WA2LBV
WA2HJM
WA2IJL
WA2SHR
WA2UKO
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WB2AWL
WB2CDP
WB2DXW
WB2GFI
WB2HIV
WB2IWH
WB2NSO
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W3QHS
W3ZSR
WA3BFK
WA3IYV
WA3MGT
WA3NMG

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WB4OVX
WB4RJG
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WB4TUX
WB4VQF
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WB6DOI
WB6IVF
WB6YPX
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W7IOG
WA7DFD
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WA7MCK
W8DET
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W8IEC
W8RBC
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WB8IGU
WB8NII
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W9SO
W9YEG
WA9HMY
WA9LEY
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WØKC
WØNG
WAØIIE
WAØTOF
WAØZRT
SV5AC
YO2OY
YU2CAL
YU3TY
YU3WO
4B7DA
4X4VI
5H3MB
5R8AB
9V1QA

Radiotelephone

349
W6AM
W8GZ

348
W2BXA
W4FX

347
W8BF
5Z4ERR

346
TI2BP
W6GVM

345
G5VT
W9NDA

344
ZL1HY
4X4DK

343
IØAMU
W7PHO

342
HB9J
W8BT

341
ON4DM
W2HTI

W8QJR

340
G3DO
W1FG

W2RGV
W3NKM
WØBW
WØCM

339
DJ2YI
G8KS
LU4DMG
PAØHBO
WIONK
W2OKM
W3KT
W4OM
W5IO
YV5AB

338
W9WHM
ZP5CF

337
G3FKM
G6TA
GI3IVJ
HB9TL
ON4DH
W2GLF
W4EEE
W4QCW
W9RNX

336
DL9OH
VE3QA

335
DL6EN
SM3BIZ
W1BAN
W4SKO
ZS6LW

334
I8KDB
W5IWM
W9LNM
4X4JU

333
DJ2BW
OE1ME
W5GC
W5PQA
W7ADS
WØGKL

331
K6LGF
K9KYF
LU9DAH
OZ7EG
W2JT
W2TP
W6CHV
W6NJU
W6RKP

330
CR6BX
DL7BA
K1IXG
K2BZT
K2FL
K4TIL
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K9LUI
SM5BCO
VE5RU
W2LV
W5LZW
W6BAF
W9ILW
XE1AE

329
EA7ID
F9RM
K9FCF
W9HB
ZS5JM

328
K4HEF
W6ZM

327
IØZV
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W9NZM
YV5AIP

326
K6WR
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325
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I6FLD
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W3DHM
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W7SGN
W9DWQ
WØGAA
WØMX

324
SM5CZY
W4NJF

323
KP4CL
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W6EL
W6YMV

322
DJ7ZG
F3DJ
I5UA
OZ3SK
PY2PE
VE3MR
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W3GRS
W8CUO
WA8AJI
WØOGI

321
F2MO
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PY7YS
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W4UWC
W6KTE
W7CMO
W8EVZ

320
EA2HX
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OK1ADM
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W2QK
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YV5BPJ

319
CT1PK
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YV5AXQ
YV5BBU

318
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W9JT
ZP5ET

317
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W4CWV
WØPGI
YV5BNW

316
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W5HJA
VE3MJ
VE3WT

315
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W5LZZ
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W6RGG
W7KH
W8ZOK
W9HPS
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WØCPM
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ZL3OY

314
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K4HJE
K4MQG
KØIKB

313
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312
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WA3ATP

311
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W6ISQ
W6KNH

310
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K1DRN
K3GKU
KH6BB
SM5HK
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W1BHP

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W3EVW
W4DRK
W5KC
W6PT
W6PFS
W8ARH
YV5EC

309
HR1KAS
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WA4MUB
WA9NUQ

308
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WA6AHF
W9DNE
WAØOAH

307
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W9TKD

306
JA1KSO
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WØSFU

305
FG7XL
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YV4IO

304
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303
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302
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WØMYN

301
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300
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W4HA
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299
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298
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294
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DK2BI
OH5VY
W4DLG

293
JA1RJW
K8GQG
W1QQO
WA6AUD

292
I1EVK
OA4BS
W1HGA
W2JLH
W6ZC
W8JQ

WAØKDI
ZL3AAD
ZL3QN
5H3LV
9M2DQ

291
CR6DU
K6BTT
W4EAL
W4TUC
WA5REB
W8LUZ

290
DJ5LA
DJØPN
EA7IR
EA8GZ
F5JA
F8SK
JA1JRK
K6AQV
PY1WJ
W3CRE
W3GE
WA3HGV
W4ELR
W4RJL
WA4GUZ
W6ARJ
W6FZJ
W8CFG
W8JFD
W9DH
W9ICF
WØYDB
WAØWKW

289
DL6KG
JA1DM
K6JR
PY2CAB
WA3IUV
WB6DXU

288
EA1IY
JA1BWT
PY1BJ
W1DO
W4NBV
W5KTW

287
F8RU
SM5BPJ
VE3CDP
/W9
W4CYC

286
K5EVK
W1YRC

285
DL6NX
SM5WI
WØBK

284
OH2BR
WA2VEG
W4RKZ
WA4GQM
W6FBT
W9QHH

283
CR7IK
CT1UA
DL1MD
K3YBR

282
F8CW
JA1AG
K1KNQ
OH2BAD
OK1MP
W2IOO
WB2VYA
W5EDX
W5KGJ
W5OBS

281
DL7AH
JA1BN

K2KGB
K6GUY
K6RMM
OE3WWB
VS6DR
W5PWW
WB6UJO
W8MB
W8WT
W9CPD
WØBN

280
CT1MW
DJ2AA
I2BH
K2QOU
K4BYM
K4MG
K8AXG
KP4CQB
W1HJB
W2PDB
W3COR
W3ICQ
W3NV
W4BKP
WA4FDR
W5CP
WB6GKK
W7EKM
W7EPA
W9HP
W9WYB
WA9IVL
WØBL
ZL1AH

279
I2PHN

278
K4IEP
K6OJO
ON5MG
UA3CT
W2AWK
W9EXE
WØGYM

277
VE2DCY
W1JNV
W9IVG

276
DK1FW
K1OZR
VE6TP
VE7HP
W2GT
W4SYL
WA5TYU
W6JKJ

275
K1QMV
K4VFQ
LA1ZU
W2GHK/4

274
DL3OH
W6HUR
W6LQC

273
CR4BS
CR7IC
DJ7CX
JA2JKV
K8PYD
KØWWX
WB2HZG
W3HNK
W7DQM
YV4QQ
YV5BPU
ZP5CE

272
JA1DFO
JA2HNP
K2BK
K3OTY
OE3SAA
VE3BSJ
W3AC
WA6RTA

271
DJ9ZB
F5VU
K2ANT
K2OUS
K9PPY
OE1MEW
W2SUA
WB4KZG
W6AOI
W8EX
YV5CIL

270
I1BGJ
I1BUP
I1UW
JA2AH
K2SHU
K3PDC
K4CFB
K6GA
PY2DSQ
W2ESC
W2SNI
WB2NYM
W4BA
W4UF
WA4WTG
WA4YVQ
W5QBM
W6CDJ
W6TTS
W7GRH
W7VRO
W8YEK
WB9RGS

269
IT9SEZ
JA6BEE
W6MBV
ZL1AV

268
JA2ACC
W2ONK
WB2IEC
WA4DRU

266
K5ZJK
OA8V
VE3AGC
VE3RDB
W4AST

265
GM3CSM
K1INO
W3IJ
W6HJA
5Z4KL

264
JH1CJQ
SMØMC
W4WSF
WB6WHM
W7YBX

263
WB8EUN
ZL3AB

262
K6CQF
K7PXI
VE7WJ
VP7NB
W2VBJ
WSWIQ
WA8PYL

261
JA7HZ
K4CKA
VE6ABP
WA7GHK

260
DJ3CN
DL8PC
JA1BRK
JA2PIC
JA7JH
K2POA
K4GFT
K4VKW
K6HTM

K6MOO
K9PQG
VO1CU
W1BAB
W1COA
W2RAD
WB2FMK
W4FUM
W9MIJ/4
WB4BAP
W5KYD
W6AXH
W6OHU
W6USG
W7GOC
W8ILC
W8NXF
WA8LUC
W9DDL
W9HZ
W9LAA
WA9VGY

259
K4AEB
K4HS

258
W4FWG

257
JA1AAT
KP4DJE
W4MCM
W9ZWH

256
DL7OD
W4UAF
/KH6
WA8VFK

255
K2LGJ
KH6GLU
W4ASW
W6ZYC

254
JA3KWJ
W1FJJ
W1KID
W2MS
W4LXL
W5ZWX

253
JH1HWN
W4WVF
W8COG
VE3GHL

252
DL3VX
K4TTA
K6RN
W5IN
W8YGR
W9KB
W9YGN
WA9SLD
WA9SVY
ZP5EC

251
CP1EW
I3ANF
K6RXZ
W6CUF
WB6WIW
WA8OSE
XE2IH

250
DK3UP
EA6BN
EP2DX
F6AUI
K4IL
K4LSP
K8CSG
KZ5JF
W1WKO
W2PBI

W3MDJ
W6BDI
W9DE
W9KXK
XE1J
ZL1ARY
9G1DY

249
DL9SV

248
JA1RWE

247
TI2GI

246
K6PZ
K9CUY
SM5AQB
WA1HEN
W8LAX
ZL1PV

245
K4KQ
W6BJB
W9HJ

244
CO2FA
DK1YK
I2AHG
K4BKF
OE1PC
VK6CT
W4BQY

243
DK1YG
JA2HGA
K9COS
K9VQK
W2SSC
W4GIW
WB9FJX

242
OZ6RT
VE3GNM
W2UBJ
W4CRW
W4PLM
W5KKZ

241
CT1ZW
E5RV
K6BCE
K7GYA
LA6RL
W1BAL
WA2CCF
W3KJ
W4BFR

240
DL5GJ
DL7FP
K3GZF
K3RPY
K4QPR
K9UH
PAØLOU
VE4BJ
VE4JK
W2EV
W2OVC
W3CDI
W3KVS
WA3BYS
W4CZS
W4ORT
WB4SIJ
W5MUG
WA5WEY
WA8GKW
WA9ZCP
YU3OV
ZL1AAS

239
DL9VS
KP4BBK
LU8DB
PY1CLI
VE3RO
WA5ALB
W7FSE

238
OZ4FA
WA6IPY
W8JXM

237
W6DKQ

236
ZS1DC

235
W7LZF
W8WOJ

234
F2VX
K4BBK
K6SSN
W2IOZ
WB6URS

233
W1JFL
WA6LLY

232
I4LX
JA1FDU
SV1GA

231
DJ9JX
K2DNL
OZ6SM
PY9AI
W6HQN
WA9WMI
YU1AG
ZE1BP

230
CN8CG
CT1MK
IA6BSM
JAØSZ
W6AFI
W6TXL
W9NLJ

229
G3VBL
I3RC
JA6LLO
K5UKN
OH3NY
WA9HPJ

228
K6YUI
WA5SDT

227
DL8OH
K5CIT
/KH6
KV4AM
WB4JLO
W8LBM
YU2NFJ

226
OZ1AJ

225
DJ9NW
K8CMO
SM7ACB
VE4SD
W3KEK
WA4PVD
WA9NFL

224
KØRTH
W4WRY
W6CN
W7GSP
WØBA

223
DL1BS
DL3OM
JA2KLT
K4BHG
K6IR
OZ8EA
UY5XS
VU2HLU
WA2CGD

WB5DJA
7XØAH

222
K3JLU
KP4DKZ
VE3DGX
W1FSN
W1MZB
W2QLH
W3AIO
W4SD
WA5SMM
W9VCQ
W9YRM
YV4WT

221
I1BRN
I3DAB
IT1JR
K4EEK
K4HMX
PY2YC
WB2MWW
WA6FYC
W8AQE
W8JJA
W8WZ
WØOVL

220
CE3OE
CR7GJ
DJ4XA
F9OW
JA1DQT
JA2PH
K2OLG
K2QHI
K3SXQ
K4QCF
K6KQN
KH6GKD
KZ5FN
ON8AW
VE5NW
VP9GF
W1EEP
WA1KYW
W2BHK
W2GA
W2WNW
WA2FCA
WA2HIN
W3IF
W3YHR
W4PGW
WA4NRE
WB4PXW
W5QHF
WA5UCT
W6HPG
WA6IAX
WB6RMZ
W7JWE
W8QBG
W9MQK
WAØHZP

219
HS1ABU
JA8ZO
K4BMS
TR8DG
WA2ELA
WB2BNJ
WB6MVK
ZF1GC

218
KL7MF
OC2BF
W3YX
WA8NMN

217
JA1KF
K6LIK
PY2BZD
SM2EKM

216
VE3II

215
LA3NI
W7FOI
ZP5GS

213
JA2IYJ
K1RAW
W2GOF
W5NQN

212
K2CJD
W2PSU
WB2RSW
WA7FSZ

211
JA3MGX
K2UFM
OZ7IZ
SK6AW
W5LLY
WA5RIG
W6FHA
W7YIN

210
DK1AQ
EA7EM
W5HCJ
W8UAR

209
OE1GHC
W6SUN
WA8ASV

208
DL2IX
I5PAC
VE6AGV
VE6FK

207
CE6EQ
JA7GDU
K8UNG
VE2YG
W7AUS
WB8HYN
WØAUB

206
K1EWI
KØSGJ
WA3MBQ
W4FOD
WA5EMH
WA9OAM

205
CE2BB
DJØUJ
HK4TA
K4TSJ
OZ5GE
PY1MO
VE6MJ
W3BK
W6DQG
W8DX

204
DK9WB
HI1PE
PY7ASQ
WA2AUB
WA3PCC
W6EH

203
CT1UD
DL6QT
I1ASM
K8SQL
KC6WS
KH6GMP
PY2GF
W2FCR
WB2GOK
WB2MQI
WB4TPU
W9PWQ
YV5BPG

202
DJØYD
DL9XN
EA8EG
LA8RJ
VE3GTH
WA1BJY
WA1HJZ
W2CCS

W2PIX
WA5AUZ
WA5QFQ
W7BKR
W7EUU
W8TWA
WB9EJV
WØHBH
WØUCK
ZL1AMN
ZL2AFT

201
DK3PZ
DK3SD
K4BNC
K9BWO
OD5AU
OW3IN
VE3BD
W3NNK
WA4YJJ
W7BRU
WA7BPS
W8SLT
W8ZNO

200
DJ3LF
DJ4FT
DK2MO
DL3VO
DL9HC
EA3SA
FM7WN
FY7AE
HK4BNC
HP1JI
HR1RF
I3CRW
I3ZOF
JA1BA
JA9BMG
K1GXU
K1OKW
K1PVB
K4AFL
K4GHR
K4UAS
K6SVL
K6ZAS
K7DVK
K7RDH
K9BTU
K9DXO
KH6BZF
OK2DB
PY2DLC
VE2DJR
VE7IL
W1IYN
W1TPK
WA1JPE
W2EHB
W2LEJ
W2MPK
WA2DXI
WA2FYA
W3AXW
W3KCS
W3OND
WA3GTX
WA4YBV
W5DRW
WA5VDH
WA5WOF
WA5ZGI
W7ILR
W7MBX
W8GMX
W8POD
W9DRL
W9GBI
W9MKA
W9RKP
WB9FBQ
ZL1BR

199
HK4CJB
K4FLY
KØPMZ
OZ1RH
W9UTQ
W9WCE

198
DJ3PY
K4CG
K6OB

OA4W
W1JNA
W5EL

197
JA8BAR
K2AGI
KX6FJ
LA7JH
WB4FOD
W7NYO

196
W6DFR

195
JA7ZF
VE6RP
4X4KM

194
WB2VKO
WA3AFX
ZP5KA

193
I1AND
SM5BFC

192
W1BGD

191
I1ZIO
JA4BTY

190
HC8GS
K7GFX
K8LJD
KØTOV
OK1AGO
W2UI
W8LAV
XE1CJ

189
W6OHS

188
DL4QG
DL5BR
JA6MJV
W2IJV

187
OE3KTA
WA9EWY

186
K8LUH
LA8LG
VE3GEY
W2PEV
W3AEB
WA6INK
WA8YEW

185
LU2CF
OH2BGD
WA8WMH
YU3TXT

184
DU1EJ
HA5FF
JA8AIP
K4DVH
W1EW
W5KXQ
W9OLO
YI8BI

183
VE2JH
VE3AIY
KP4DKY
WA2JRD
W6ZTJ
WAØRRJ

182
DK4YA
DL2VS
DL6TZ
K2GBC
LA4CM
SM5GA
VE3EWR

W1OHA
WA1BOI
WA2CLQ
W8BQV
WA8GPX

181
DJ2QZ
DLØIK
F8NI
JA2TY
VE5JS
W8PCA
WA9YEW

180
DJ1XC
G3YBH
HB9RB
I1CMA
I2ADN
I2LG
JA1HBC
K2AAC
K2OO
K4AJR
K6JWQ
KØIDC
KH6FQL
OE2WR
PY2CPK
PY4AKL
SM1AWD
W5ILR
/TI
WB2RLK
/VE1
VE3IR
W1KSN
W1RYB
WA2MBF
WB2CDF
WB2EZU
WB2KHO
WA4EZA
W4KNW
WA4NIB
W5PD
W6GIL
W6PSQ
WB6RKH
W7KOI
W9KAA
WA9FZQ
WØKH
WØMAN
WØYZQ
YV1YC
ZS6ACK

179
DL2CQ
K2QIL
K6PO
OZ8MG
W2HC
WA2DHS
W3WM
WA9JCO
WB9BXQ

178
DJ3NK
HK3LT
K8BGZ
6Y5AH

177
I2TPL
JX6RL
K9EHP
WB9BGJ

176
WA6SOV

175
HB9ASK
WA7OIW
/HR1
WA4HHW
WA4RQD
5W1AU

174
DJ9CJA
W8HD
YA1AH
6Y5LA

173
JA2CXF
LA4DM
SMØBPZ
WA1JQC
WAØVZH

172
DL6QW
G3TOE
K6TXA
KP4DIW
KS6DY
WA2DVO
WB2JSJ
W4IN
W6ITD

171
DJ1TC
DL3BH
W2CUC
W7RCF
W9WNB

170
CE8AO
DL3FC
EA8GK
K3RFH
K4EJK
ON5JF
WA3IZR
WAØEWZ

169
JA1ENA
OE3RHA
VE5SM
WA3HDU
W5LJT
WA7JCB
W9MBQ
9Y4MM

168
W4JVN

167
HP1KC
WA5YMW
9Y4MH

166
JY1
PY1MHB
W2EWI
W3MDO
W9IIX
9G1GT

165
DL7PW
K3YWJ/9
WA8LVH

164
DL7CM
K8IHT
OZ3TH
WA3JHB
WA9NJB
XE1LS

163
I1CRL
I6PEJ
JA1QER
K6SE/2
KH6HDA
VE5PB
WB2FBF
WB2VHC
W5MIG
WA6LFN
WB8HAT

162
K1IXP
K6RSY
SM6BD
VE1OC
W3MR
W5LUJ
W6BWM
W7KIL
W9MCG
WB9FAQ

161
CP1DN
I3KLF
UV3GW
VE3ZI
W1CYB
W1DAY
W1ETC
WB2PGM
W3BLC
W3OJW
WB5BID
WA7FFS
W9QFF
VE2DHF
/YV1
YV3CN
ZL1SZ

160
A6XB
CT1IC
CT1TV
DJ4ZD
G3YJI
I1AKI
JA3UKB
K2BDG
K3CBW
K4CFF
K4PFK
K5YRK
K6SX
K9LUX
KØALL
LA7AJ
PY1BOI
WA2DHF
W3IWF
W4CWO
W4GKF
WB4INC
WB4NDX
WB4NVH
W5ZV
W6CEG
WA6ROU
W7EF
WA7HCO
W8FXD
WA8MHW
W9QKL
WA9ZAK
WB9DVV
YV4YC

159
JW5NM
K3BCG
SM7ABL
DL2AA
/W1
WA2YVK
W3CUP
W4QU

158
HB9QC
OZ7KV

157
JA4GZT
K5BXG
W2CML

156
LA4LN
SM5KG
WB6EHT
WA8PRR
WA9SVZ

155
K5BBA
W8KCJ

154
EA3JK
JA3JAB
K8IQQ
WA1IFO
WA2VDA

153
I6CCI
JA1NPV
OK1KCP
VE3BMV
VE4SW

152
WB2LCZ
VE7XY
/W6

151
F5BV
JA2BAY
K6QX
LA4VG
VE3ECW
WB9BDH

150
K6RK
W9PHJ
YV4AFG

149
CT1PQ
W4VSV
WB5BLE
ZL1ALE
ZL1AJL

148
HK4BPD
KL7HFQ
ZD8RR

147
F3IJ
HB9BR
K8VRZ
W1TIV
WA5DUS
WØWAM

146
KC6BK
OZ4EZ
W6KYA
WBØBBR

145
K2ZCD
K7PJF
SM7EVM
VP7NN
W1EKG
WB2GDN
WØBWJ

144
K2HFR
LA5QK
OE3KRA
WA4UFW
WA9OFF

143
KH6CCL
K9MMH
LX1ES
W2TQK
W3KV
W6AZQ
W9NTP

142
JA1ILN
JA3FD
JA6GDG
K4IVJ
K4BKF/6
VO1CV
W6LV
W7DO
YV5CUU
ZD7KH

141
CT1RR
DJ1QE
DL4DR
KØDBN
OH2VZ
PY2FIQ
UWØIF
W4EPZ
W5HFA
W5SZV
W7ORH
WA9OFM
WØJF
5W1AR

140
DK1SL
DL9XR

JA6MBU
K3CNN
K3KHL
K3NEZ
K4MEZ
K8AVR
KR6LY
LU1SF
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WA1GNX
W2MOY
W2MSV
W2SEL
WB2HBO
LU1BAR
/W3
W3CKU
W3GIA
W3JPT
WA3LRJ
WA3RCE
W4IZX
WA4MGC
WA4IMP
WB4APP
WB4MKB
WA5YSC
WB5CBJ
W6MFC
WB6KGG
W7GXC
W7GYP
W8GCJ
W8GIO
WA9ROU
WAØLLW

139
JA1NVB
VE4SL
PAØKGS
/W2
W4ENQ

138
DJ6IN
DL9JH
EL2CH
F8BO
HC1RF
I1BRH
PY1SZ
W2QL
W7CUJ
W8NPF
WAØJBX

137
K3JYZ
K6IAN
VK2BPN
PY3ANS
WA4QVQ

136
CX1BBR
DK6FI

135
HP1AA
I3GLT
I7TGI
W4IJGH
W9YI
WA9DIO
WA9ZET
ZS1KZ

134
DK3ZF
SV1CH
ZP5NH

133
WA5FVI

132
EA4KC
JH1MTR
KA2VT
SM6OD
WA2LXP
W4EH
WA4OQO
W7SE

131
DJ6UP
K6UFT
K9MBR
W6OK

130
EA1TM
ET3JH
K6CN
K9ZXG
KG6AQI
VP9GO
W1RL
W4ACY
YV5CWO

129
JA8GZV
KL7GRE
VE3EHG
VE7GD
W9KNI

128
I1YG
PY2ATV
W4RUN
W8MJF
WB9GVW
WØHRY
ZS7P

127
DJ1LY
DL6HM
JA1WOO
VE2AYY
WB2JYM
W4REV
VE6BU
/W5
WBØCQT
YU4FDF

126
DL1KX
EA6BM
F1BDJ
JA7DT
WB4QXD
WA9AUM
WB8GKL
YV5IZ

125
PY9FI
W2ELW
W3IL
W4OMW

124
DK1RS
DK5EZ
GM3VEY
I2CZ
JA2AYH
JA3GSM
K4EJC
MP4MBB
SM7RS
UA3AAX
W4PW
WB4PLV

123
JH3HPX
K6KT
KX6GX
W1CT
W2YRK
W3NL
W4HNK
W4RTE
WB6HDG
W7KI
W9OFO
WAØQIT

122
DJ1QZ
I1LXA
K3TVE
SM5ZZ
W2OXR
WB2AIO
WB2DZZ
W3AVJ
W3KLR
WA3FFU
W9YDX
WØEGC
WAØSVD
YV3BJ

121
DL8UO
DL9TJ
I1WN
K2TKR
PY2DCP
PY7BSH
VE7AGT
WB5BKT
WB6UNS
W7AAW
WB9HAK

120
CN8GG
CT1PN
CX6AM
DA2BW
DL8XL
ET3USF
F6AEA
G3DQG
G3WQA
HK5DE
I8IN
JA1ANG
JA6SUO
K1ALP
K2ROU
K6SF
K7TIC
K8RRQ
K8TMK
K9DZE
K9GEL
K9ODE
VE3CWE
VE3FEX
VE6PW
VE7PO
G3XPM
/W1
WA1HXY
W2FWK
W2ITG
WA2MBP
WB2NRU
W3YG
W3YMB
WA3NAV
WA4LPM
WA4ZXO
WB4NKU
WB4TOB
W5OHE
W5SBX
WA5TYB
WB5DLX
W6MOS
W6PHN
WA6BCD
WB6BKN
W7NXJ
WA7OIJ
W8HXZ
W8MXO
WA8DXG
WA8UUY
WA8VXE
W9QQI
WA9IAA
WB9ETQ
WØYVA
/4
WAØWSS
WBØCGJ

119
CT1XKA
I1BJU
I2ZUW
W7EXL
WB9AAQ

118
F6AZM
F8DP
HS4AGZ
K8DTG
K8HBN
LA8NC
LU8FT
W2CKR
W5RI
WB6NSI
W7GUR
WBØGXU

117
DK3NU
DK6KA

JH1EIG	WSPBZ	GM3FDZ	LA5KO	WØIPA	VE3DQT	GC3YIZ	KR6RH	JA4AFT	ES5H	WB4IFK
K1OUX	W6YCP	HI8LC	W6CPB	ZL2APM	W4OZF	HS5AEJ	ON5OA	JA4AYU	F6AJO	WB4IGF
K6BAZ	WA6ELO	HM1EL	W9ERJ	9V4PH	W6JNQ	UT1BL	UA3GG	K2GLS	F6AOY	WB4IMG
KR6HB	WB6KNM	HS3ACH	WA9WYY		W6OWL	IØLLL	UA9MP	K3ZDN	G3SEM	WB4QWM
PY4KB	WA9HZO	HSLA	YV3UF	106	W8EXJ	JA1GTF	VE6LI	K4AI	HK4BZO	WB4SII
W4GFO		I2PTQ	3B8CZ		WA8JZY	JA2ISF	W1CMH	K7NOS	JR1IGA	W5GIW
WB6KUC	112	I3GZI			YN1FP	JA3MGY	W1CWG	LA7RB	K1ATE	W5HJC
ZL1DO	I5HN	I5MMC	108		JA3OP	JA4AYN	WA1LJJ	OH2BMC	K3CI	W5PDG
	IØMOM	I8CPK	DJ9FK		DM2BUD	JA8AXL	WA1LXL	SV1EN	K3YVN	W5QNQ
116	JA1DIO	JA1SKT	DK1YP		HB9AQF	JH1OTN	W2HGY	UI1AZ	K6TVL	W5RKT
OZ4TA	JA1KTM	JA3VRS	DK4QG		119SPI	CX5B1	K1BUR	OA4WM/2	KU7BX	W5RMC
SM5AHK	JA1WSA	JA6SVP	DL1CJ		JA4XH	DK3SF	K1WVX	WA2KAQ	YV1A1O	WA5AUA
SM6DSS	JA2UYS	JA7WS	JA1UVQ		JR1ISH	DK4CR	K5CFL/4	WA2YPD	VE2GS	WA5IVO
K2LQQ/1	JA8ARA	JA8EAT	JA0UZZ		K2LQQ/1	FT3RS	K7CUZ	WB2MBP	VP2VAP	WA5OXK
VE4GL	OZ5JR	JR1HUA	JR1INZ		K3NYI	F6AXS	K9BGL	W3IHY	VP9GD	WA5RIV
W7QD	VE2ADZ	K9IDO	W1WQI		K3OVT	F6BQE	K9UQN	WA3ALO	W1PNH	WA6EOL
W9KM	WA1IWQ	LA2CQ	WA2ROH		K6JAD	FP8DH	WA4KLH	W2AXR	YO1RI	W6JGL
	WB2YIB	LA2ZN	WB2GUB		KP4GI	HRAK	WB4NXR	W2COK	ZF9HCS	WA6OPP
115	WSQKR	OE1NV	WB4ISZ		LU8DMS	I7CZI	SP6DXB	W5SPD	VS6CY	WA6GEH
DK3GY	W5VJP	OH2BU	WA5ZWC		OE4WPB	IA1VZM	UAØDG	WA5ZDF	WA4RXS	WA6PDE
EA9EJ	W6JZS	VE3DSW	W7HNI		UA1LL	K2VUI	VE4IE	WB5EGQ	WB4ORN	WA1GZY	WB6OFX
JH3EHY	W7LVII	VE7AT	W8IGY		W6UUL	K4AFH	W2LF	W6LRI	WA5SKP	WA1IRM	W7UG
JY6FC	W6IIM/8	VK3AKZ	WA8NNK		W9HC	K4DV	W2NHV	WA6PKN	W6EQY	WA1JLV	W7YKN
PY1BQK	WØOBJ	WIDIS	W9CTY		YV1YD	K4HHA	WA3QEJ	WA6QHQ	WA6WWC	WA1KVC	W7ZIB
W2EVJ	WAØTAM	WB4PNG	WB9CFP			OK2BLI	WA4TST	WB6AUQ	WB6VNR	WA1PEL	W7ZSL
W2IBR	ZD8KO	WA5ZNY	YV5DTH		105	VE8OO	WB4WMG	W7AIW	WA7GOO	W2AI	WBØEM
WB4PAB	9H1BG	WA5ZRB	9X5WJ		DA2QW	W1UYL	WB6IMA	W9AMO	WB8IAY	W2ELH	WBTQP
		WØICI			DK2BM	W4WOY	W8BEH	W9LGV	W9FXZ	W2GED	WA8MNF
114	111	7Q7WW	107		DK4PA	W4YWX	W9LJL	WA9KGO	WØDAK	WB3LMG	WA8WKQ
DL8ZY	AP2KS	9G1WW	DL6SW		DL2SV	W4ZAA	W9PHZ	WAØUXN	WAØMHB	/W2	W9EXM
JH1CJU	DK3SH		G4AMJ		DL7BX	WB4PBE		WAØVZG	XE1WF	WA2ALQ	WA9LOT
JH1IQC	DJ7PD	109	I1CYJ		DL7DG	W5IEA	102	WAØWEF	YS1CCK	WA2GYB	WA9YNE
JR1RDE	HFY	DJ3KD	IPIMIK		EA7AD	W6KLM	CT2AZ	ZF1WE	ZD8H	WA2LWX	WB9AIB
K4QM	JA7ILL	DK3MA	K6MQT		G3WLV	WB6FCT	DA1JP	ZL1BKE	9H1CV	WB2DEF	WB9DRF
KG6SW	K8SMC	F6AUB	KG4AL		HF8F	WB9BPN	DA1SU	ZS6BLK	9V1QJ	WB2GUQ	WØAKT
VE4NC	KG4EW	HBA	KH6EEU		I3CJ	ZP5TU	DK2XV	5B4FS		W3PLX	WØGMO
W4HLY	OE1ZNC	HMSO	OZ3CE		I6CQC		DL3VV		100	W3ZSR	WAØNYU
W6IRD	TI2AAC	I3VER	UB5DE		JA7LZG	103	F6BS	101	CP3AB	WA3LRX	WAØQLH
W9YIE	WA1OQC	I8KGO	VE3CVZ		K1EAB	DJ1CO	HB9APF	EA8FS	DJ2RB	WA3OTZ	ZB2A
	W6GWY	IPIONE	W2VMH		K6SIC	DJ3ZJ	HCWT	EL2BU	DJ4QC	UI8AGT	ZL4CR
113	W8WWH	JA1IKA	WA2PBC		LA2IM	DJ7RX	I6DRF	DK1LL	DK1FB	'W4	ZS1ANT
DK4EE	YV4AGP	JA2LHG	W8QGP/4		LA3NN	DJ8VJ	JA3PPR	DK4YG	DK5IO	W4JXF	5R8AH
DK5SZ		K2VIV	WSPW		PY3AFO	DK1ZH	JA8DWU	DU1GJM	DL9XW	WA5IJD	9X5VA
PY2DBB	110	K4ZDK/5	WA6OPB		PY8RW	DK3ZC	JH1AGO	F6BTQ	EI8BY	WA4DPV	9Y4RB
UB5JK	DJ3FC	K9HLW	WØEIA		VE3BNV	DU2EL	KG4EL	HC2RW	F3LT		

Op News

(Continued from page 86)

ARRL AFFILIATED CLUB HONOR ROLL

In these days of raising requirements in one place and lowering them in another, the affiliated club that can maintain its ARRL membership at 100% deserves some special recognition. Headquarters bestows such recognition twice a year in the form of an honorary listing in *QST* and a special certificate.

Each year, as annual affiliated club questionnaires are received, those showing that *all* their members are also ARRL members are noted and put aside for this special honor. The list below are those clubs who are 100% ARRL according to questionnaires so far received. If your club is 100% ARRL, was not listed in June, and is not listed below, it means we do not have your questionnaire form yet; fill it out and send it in, so you will make the listing of 100% ARRL Clubs in June, 1974 *QST*. Ladies and gentlemen, our Affiliated Club Honor Roll!

Arkansas DX Association, Little Rock, AR
Bandhoppers Radio Club, Ferguson, MO
Buffalo Area DX Club, Buffalo, NY
Carnegie Tech. Radio Club, Pittsburgh, PA
Connecticut Wireless Assoc., Bristol, CT
Dalton ARC, New York, NY
Fountain City Radio Club, Knoxville, TN
Golden Triangle DX Club, St. Petersburg Beach, FL
Iskra, Inc., Madison, IN
Lamar College Engineers ARC, Beaumont, TX
Miami Valley Amateur Radio Contest Soc., Clayton, OH
Mid-South DX Association, Memphis, TN
Mueller Brass Co. Employees Brass Pounders ARC, Port Huron, MI
National Trail Amateur Radio Club, Inc., Altamont, IL
Niagara Frontier DX Assoc., Snyder, NY
North Augusta-Belvedere ARC, North Augusta, SC
Northern New Jersey Radio Assoc., Englewood, NJ
The Orange Amateur Radio Club, Orange, TX
Peoria Area Amateur Radio Club, Peoria, IL
Radio Operators Assoc. of New Bedford, Fairhaven, MA
Richmond Amateur Radio Club, Richmond, VA
Rome Radio Club, Inc., Rome, NY
Ten-J Amateur Radio Club, Kansas City, MO
Three Rivers Radio Club, Wahpeton, ND
Top of Panhandle Amateur Radio Club, Booker, TX
Tri-State Amateur Radio Club, Steen, MN
Twin City DX Association, Bloomington, MN
West Jersey Radio Amateurs, Burlington, NJ
West Side Amateur Radio Club, New Orleans, LA
Wichita Amateur Radio Club, Wichita, KS
Windblowers VHF Society, Fair Lawn, NJ
Worldradio Staff ARC, Sacramento, CA

CLUB COUNCILS & FEDERATIONS

(Updating the June listing)

Michigan Council of Amateur Radio Clubs; Merton A. Henry, K8ETU, Pres.; 4626 Stillwell Ave., Lansing, MI 48910

Northern Virginia Amateur Radio Council, Inc.; Stuart Meyer, W2GHK/4, Chmn.; 2417 Newton St., Vienna, VA 22180

Puget Sound Council of Amateur Radio Clubs; James J. Grinton, K7VNI, Secy.; 1718 E. Sunset Dr., Bellingham, WA 98225

San Diego County Amateur Radio Council, Inc.; Sam C. Dear, K6BWT, Chmn.; 13031 Papago Dr., Poway, CA 92064

QST

Strays

Stolen Equipment

The following ham radio equipment was stolen from a car at the Ramada Inn, Grand Ave., in St. Louis Missouri on Monday, Sept. 24th: TR4C, serial No. 34159; AC4 power supply No. 39278; homemade antenna tuner; 50 feet, coaxial cable; advanced operator and station license. Contact, R. L. Wilcox, WBØHDS, 1519 E. Elm St., Springfield MO 65802.

Cornell Amateur Radio Club, W2CXM receiver, Drake 2-B serial no. 13487B was stolen. Contact: Michael Dominiak, WA2DHS, 10 Parkdale Dr., Lancaster, NY 14086.

Station Activities

All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE SCM/SEC, Roger E. Cole, W3DKX RM: W3EEB. PAM: WA3GSM. Frequency change – Del. 2-Meter Net is now on 145.025 Mon. 7:30 local time ssb or am and the Del. 6-meter net is activated Sun. at 10 A.M. local time on 50.15 MHz. WA3RGB is a new Advanced Class operator on 40 with an HW22-A. The New Castle County Council has tabled the Amateur Antenna Ordinance for re-writing. Ten amateurs showed up for the Council meeting with W3KFT, W3EGN, K3YHR, W3DQ and W3DKX speaking in favor of the ordinance. Councilman Schneider from Wilmington was the only Councilman openly against the amateur position. This is the first inning of a long ball game. Let's fill the council chambers at the next presentation. Del. Army MARS has a new duplexer and antenna in operation on 2-meter fm. Sept. PSHR: WA3DUM 61, K3KAJ 53, WA3SKP 39. DTN QNI 173, QTC 67. Traffic: WA3SKP 101, WA3DUM 77, K3KAJ 64, W3DKX 39, W3EEB 39.

EASTERN PENNSYLVANIA – SCM, George S. Van Dyke, Jr., W3HK SEC: W3FBP. RMs: W3EML, WA3QLG, K3MVO, K3PIE. PAMs: K3BHU, WA3PLP. OVS reports from WA3HIT, W3ZRR, WA3EEC, W3CL. OO reports from W3KEK, K3RDT, WA3EEC, W3KCM, W3MFY, K3NSN, W3CL. OBS reports from WA3AFI, WA3EEC, W3ID, W3MFY, WA3QOZ. PSHR: WA3ATQ, WA3QOZ, W3ABT, K3DZB, WA3MQP, WA3PZO. K3OIO. BPLs: W3CUL, K3NSN, W3VR, W3EML, WA3ATQ, K3PIE.

Net	*kHz*	*Operates*	*QNI*	*QTC*	*RM/PAM*
PFN	3960	5:30 P M-F	528	630	K3BHU
PFTN	3610	6:30 P Dy	53	13	WA3QLG
EPA	3610	7:00 P Dy	443	519	K3PIE
EPAEP&TN	3917	6:00 P Dy	356	103	WA3PZO

W3GPO is really keeping K3WBI active on both the MARS and ham bands. The Civ Exec. at FA now is WA3VHG and will be on VHF FM. Nice report from W3EML on TCC activities. Got a nice report from K3PIE on EPA activities. The late session needs more check-ins. K3NSN really active on the missionary nets and phone patches. WA3OGM helps out on 3RN on week ends. WA3ATQ now has two shacks, ask her about them. W3ABT at U of P very active and expanding to 2-meter fm. K3DCB expects his XYL to deliver a new boy with key in his hand! WA3CKA says he didn't realize 100 countries were so many for DXCC! The Mt Airy VHF ARC now has a repeater going on 220 MHz. WA3IYC is rebuilding. WA3QLG says they need more QNI in PFTN. W3ATJ got the big A ticket! W3BNR still on the go around country. W3KEK now full time CW until he learns to use one of those new voice gadgets. WA3EEC operated as G5BEK during the summer. W3ID and WA3HIT are doing a fine job keeping the local ARPSC nets going. W3ATJ running code practice on 50.75 MHz daily from 7-9 P.M. for upgrading licenses. W3EU says 160 cw still going strong. W3GMK has finally gotten parts to repair his rig. W3PST says he has a new office address. By the time you read this there will have been an election and you will have a new SCM for EPA. I want to thank all of you at this time for your support in the past and hope that you will support the SCM. So until we cross paths on the airways again sometime 73 & 30. Traffic: W3CUL 2173, K3NSN 1854, K3PIE 641, W3VR 631, W3EML 583, WA3ATQ 252, WA3QYY 235, WA3PZO 192, WA3QOZ 161, W3ABT 159, K3DZB 155, K3OIO 115, K3DCB 105, WA3CKA 93, K3MVO 65, WA3MQP 47, WA3OGM 42, K3BHU 28, W3MFY 20, WA3UKZ 19, W3ADE 15, W3AXA 14, W3VA 13, W3CL 12, W3WRE 12, K3KTH 6, WA3IYC 5, WA3RCD 4, W3HK 3, WA3QLG 3, W3ATJ 2, W3BNR 2, WA3BJO 2, WA3EEC 1, W3EU 1, W3GMK 1, W3ID 1, W3KCM 1, W3KEK 1, W3LC 1, W3OY 1, W3PST 1, WA3RKJ 1, WA3RKH 1.

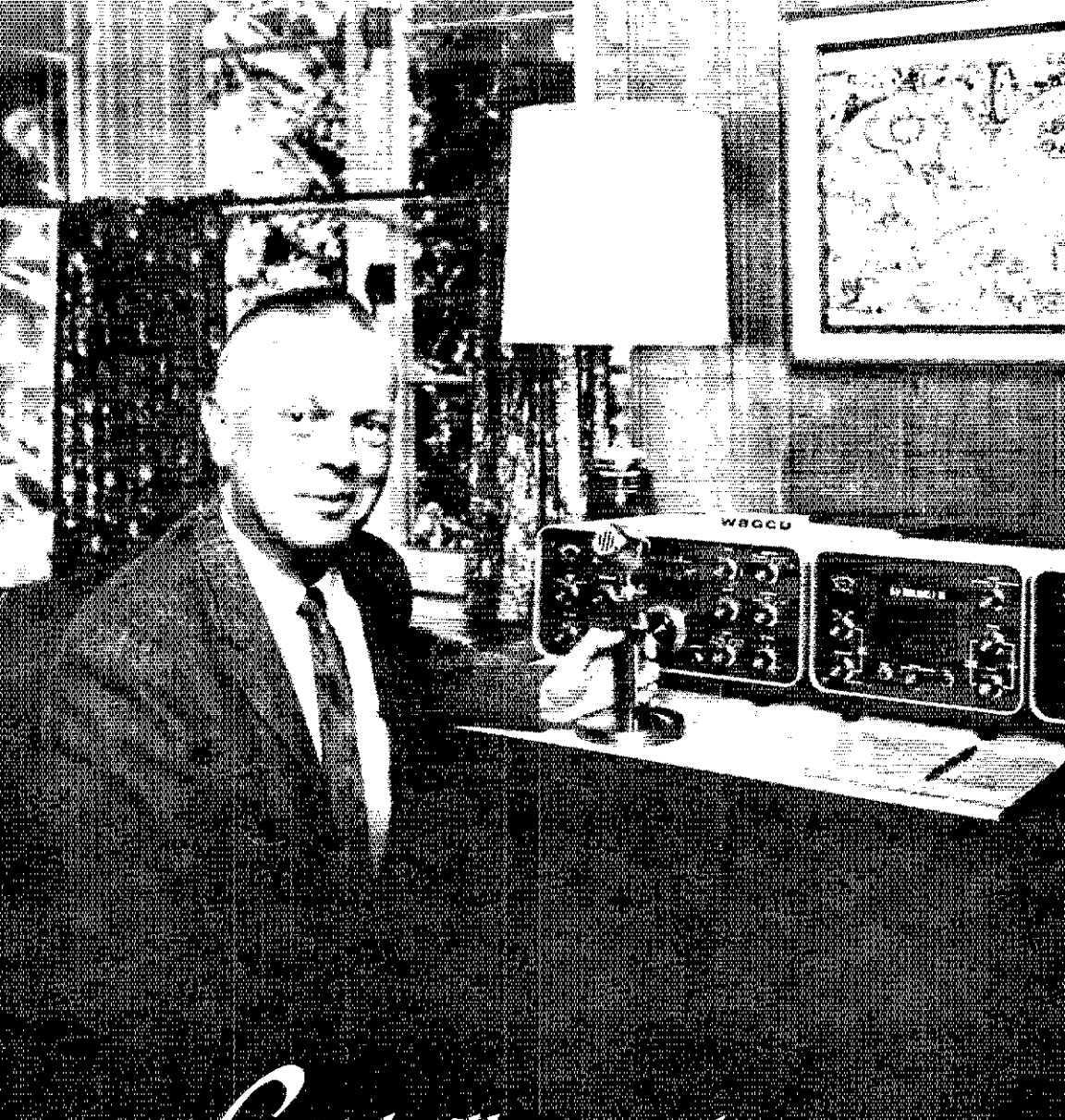
MARYLAND-DISTRICT OF COLUMBIA – SCM, Karl R. Medrow, W3FA – SEC: K3LFD. RM: W3QU. PAM: K3TNM. NCM: W3LDD. The big Sept. news is ORS WA3MSW winning the John Gore Memorial Scholarship for 1973 awarded by the Foundation for Amateur Radio Washington. Congrats. W3IMZ reports a traffic total of 4, but through Oscar 6 yet! Says it is a real challenge and exciting. Good going. WN3VGV made 22 points in PSHR, and WA3IYS had an Aug. total of 34. W3CSZ is making stirring noises after all these years. WA3QDH finds the Univ. takes a bit of doing after a most active year on the bands. K3TNM is one busy fellow with extra curricular activities. K3TEZ has Rockville on the cw map. W3FZV is enjoying the new QTH. K5FMF/3 runs a mean MDD net. WA3AFQ has a couple more antennas on that only balun now, and he passed his Extra Class exam. Congrats. WA3OIA is all business these days. W3LDD reports 3 counties to go and they are way out west. W3ADQ celebrated his birthday and is active at a young 84. WA3LIV is secretly planning a trip to the warm climes this winter. WA3IYS is again on a full time heavy course at school. W3QU cites WA3DUM, WA3RVU, W3QU and W3EEB as top MDD brass. The MEPN toppers are W3ADQ, W3LDD and WØYLU/3 with W3ECI and W3JON close behind. W3FOR completed his contacts for WAS. W3CDQ enjoyed the convention at Reston. WA3RCI made BPL the hard way. W3BHE is doing his part to preserve 220 MHz and reports a new Cumberland Novice WN3VKH. W3EWP is active with the Md. Mobileers Club. WA3EOP is doing all his work on tone and reports Md. was represented 30 out of 31 times on D3RN. WA3RJS is now experimenting with QRP rigs. W3EOV is back from his travels with all kinds of activity. W3JPT is quietly getting ready for the contests, and maintaining the AMSAT skeds. WA3RVU is taking on bigger jobs as NCS. WA3OHF reports from San Diego his permanent home. WA3HRV, K4POL, K3EST, K4CFB and W3BWZ will lead the PVRC SS teams this year. MDD met 59 times QTC 290, QNI average 7.1. MEPN met 22 times QTC 99, QNI average 24.1. MDCTN met 26 times QTC 83, QNI average 17.8. MDD meets on 3643 kHz daily at 7 and 9:45 P.M. local. The fone nets may be found daily on 3920 kHz at 6 P.M. local time. Traffic: (Sept.) WA3RCI 526, WA3EOP 281, W3QU 175, WA3QIA 145, WA3KVU 95, WA3AFQ 83, W3FA 81, WA3QDH 62, WA3MSW 61, WN3VGV 61, K5FMF/3 59, WA3IYS 45, K3TNM 32, W3BHE 29, W3LDD 28, K3TEZ 28, W3EOV 27, WA3IIV 20, W3EWP 11, W3ADQ 9, W3FZV 9. (Aug.) WA3IYS 344, K5FMF/3 44.

SOUTHERN NEW JERSEY – SCM, Charles E. Travers, W2YPZ Acting SEC: W2YPZ. PAM: WA2TRK. RM: W2JI.

Net	*Freq.*	*Time(PM)*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJSN	3730	8:15 Dy	18	47	17	WA2TRK
NJPON	3930	6:00 Su	5	86	21	WB2FJE

Princeton RC reports 7 new members and the tower has been painted and set up ready for a very busy season. RM W2JI reports 2 QSLs needed for DXCC. W2ZI contacted K4JKH formerly of Trenton now Vero Beach, Fla. Both stations were using vertical antennas with great success. W2HX our own Mercer Co. CD officer was recently presented with the ARRL 50 year Plaque. Best wishes "BB" for the future. Cherry Hill HS East ARC elected officers for the year 1973-74. WB2FNK, pres.; WB2FLK, vice-pres.; WN2PKW, secy.-treas.; WB2DMI, sergeant-at-arms. The club plans to sponsor theory and code classes during the coming year. The club is also represented in SNJ Navy-Marine Corps MARS, WB2FNK, WB2ELK and WN2PKW are members. Gloucester Co. ARC will have a very fine program entitled "By Way of Light" presented by a team of experts from the Bell Telephone Labs. WA2AIH passed the Advanced Class exam. Recent appointments include Valley RA, W2ZQ, WA2GMH as ORSs; AREC appointments to WA2GMH and WN2LZB. Let us get ready now for the coming SET with a very large group. Consult your SCM who also is acting SEC. WA2SEA is doing an FB job as EC for Gloucester Co. and reports 28 full time members and activity on 6 and 10 meters with regular drills. This is the kind of program that prepares for emergencies. Send in your requests NOW. W2YPZ will soon have a fifty foot tower installed. Traffic: WB2VEJ 166, WA2TRK 93, K2EFA 48, W2ZQ 42, WB2FNK 35, WB2FCD 31, WB2SFX 17, W2YPZ 16, W2JI 8, W2IU 7, W2CDZ 5, K2PWK 5, WA2NZJ 3, W2ORS 2.

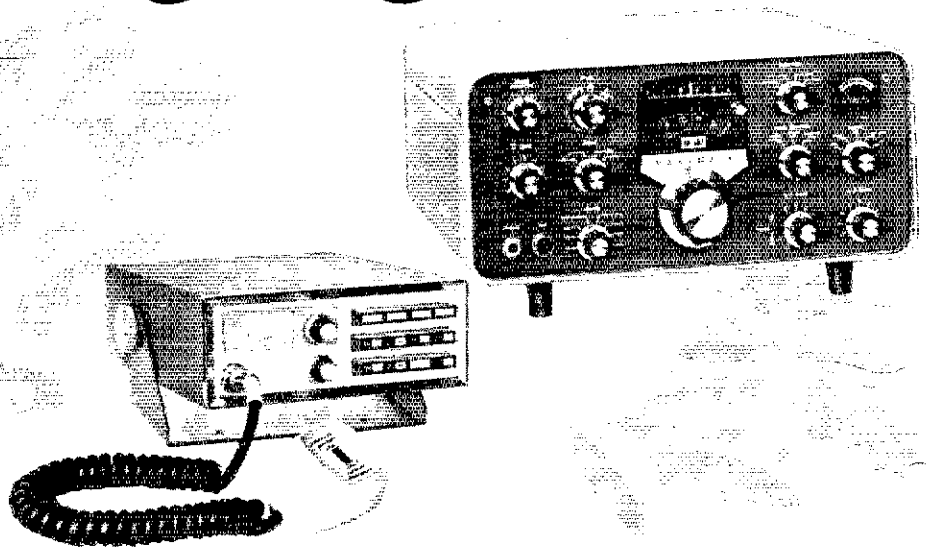
(Continued on page 98)



Goodwill toward men is the essence of amateur radio

David W. Nurse, W8GCD
President, Heath Company

Season's Best...



HEATHKIT HW-202 2-METER TRANSCEIVER . . . 179.95*

The ultimate Christmas kit for the 2-meter buff. All solid-state design can be completely aligned without instruments. Has 36-channel capability with pushbutton selection of 6 transmit and 6 receive crystals. Ten to 15 watts transmission into an infinite VSWR — indefinitely, without failure! Needs no automatic shut-down — continues to generate a signal regardless of antenna condition. Output at the built-in speaker is typically 2 watts at less than 3% total harmonic distortion. Receiver section utilizes MOSFET front end; IC IF; dual conversion, 10.7 MHz and 455 kHz via a 4-pole monolithic 10.7 MHz crystal filter. You get excellent overload and adjacent channel rejection, improved impulse noise rejection and built-in hash filter. Optional HWA-2202-2 tone-burst encoder, 24.95*, gives pushbutton selection of four pre-selected tones. 12-volt operation. Kit includes microphone, mobile mount, crystals for simplex on 146.94. Mailing weight 11 lbs. Encoder, 1 lb.

HW-202 SPECIFICATIONS — RECEIVER — Sensitivity: 2 dB SINAD* (or 15 dB of quieting) at .5μv or less. **Squelch threshold:** 3μv or less. **Audio output:** 2 W at less than 10% total harmonic distortion (THD). **Operating frequency stability:** Better than ±.0015%. **Image rejection:** greater than 55 dB. **Spurious rejection:** Greater than 60 dB. **IF rejection:** Greater than 75 dB. **First IF frequency:** 10.7 MHz ±2 kHz. **Second IF frequency:** 455 kHz (adjustable). **Receiver bandwidth:** 22 kHz nominal. **De-emphasis:** −6 dB per octave from 300 to 3000 Hz nominal. **Modulation acceptance:** 7.5 kHz minimum. **TRANSMITTER — Power output:** 10 watts minimum. **Spurious output:** Below −45 dB from carrier. **Stability:** Better than ±.0015%. **Oscillator frequency:** 6 MHz, approximately. **Multiplier factor:** X 24. **Modulation:** Phase, adjustable 0-7.5 kHz, with instantaneous limiting. **Duty cycle:** 100% with ∞ VSWR. **High VSWR shutdown:** None. **GENERAL — Speaker impedance:** 4 ohms. **Operating frequency range:** 143.9 to 148.3 MHz. **Current consumption: Receiver** (squelched): Less than 200 mA. Transmitter: Less than 2.2 amperes. **Operating temperature range:** −10° to 122° F (−30° to +50° C). **Operating voltage range:** 12.6 to 16.0 VDC (13.8 VDC nominal). **Dimensions:** 2¾" H x 8¼" W x 9⅞" D.

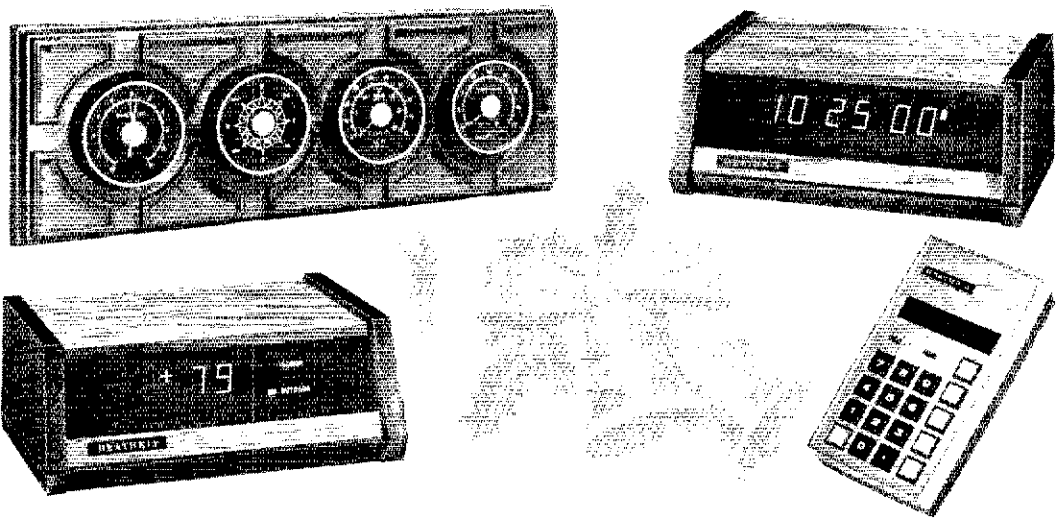
*SINAD = $\frac{\text{Signal + noise + distortion}}{\text{Noise + distortion}}$

HEATHKIT SB-102 80-10 METER TRANSCEIVER . . . 385.00*

The most popular kit-form transceiver ever produced. Has solid-state, factory-assembled and aligned master oscillator for quick stability, accurate tracking. Plus front-panel selection of built-in 2.1 kHz SSB or optional 400 Hz crystal filters; built-in CW side-tone; built-in VOX; full coverage of 10 meters; complete metering facilities. Mailing weight, 24 lbs. HP-23B AC power supply, 19 lbs., 51.95*. HP-13B DC supply, 8 lbs., 69.95*.

SB-102 SPECIFICATIONS — RECEIVER — Sensitivity: Better than 0.35 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. **SSB selectivity:** 2.1 kHz minimum at 6 dB down, 5 kHz maximum at 60 dB down — 2.1 nominal shape factor — 6 to 60 dB. **CW Selectivity:** (With optional CW filter SBA-301-2 installed) 400 Hz minimum at 6 dB down, 2.0 kHz maximum at 60 dB down. **Input impedance:** Low impedance for unbalanced coaxial input. **Output impedance:** Unbalanced 8 and 600 ohm speaker, and high impedance headphone. **Power output:** 2 watts with less than 10% distortion. **Spurious response:** Image and IF rejection better than 50 dB. Internal spurious signals below equivalent antenna input of 1 microvolt. **TRANSMITTER SECTION: DC power input:** SSB 180 watts P.E.P. continuous voice. **CW:** 170 watts — 50% duty cycle. **RF power output:** 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 ohm non-reactive load). **Output impedance:** 50 ohms to 75 ohms with less than 2:1 SWR. **Oscillator feedthrough or mixer products:** 55 dB below rated output. **Harmonic radiation:** 45 dB below rated output. **Transmit-receive operation: SSB:** Push-to-talk or VOX. **CW:** Provided by operating VOX from a keyed tone, using grid-block keying. **CW side-tone:** Internally switched to speaker in CW mode. Approx. 1000 Hz tone. **Microphone input impedance:** High impedance. **Carrier suppression:** 50 dB down from single-tone output. **Unwanted sideband suppression:** 55 dB down from single-tone output at 1000 Hz reference. **Third order distortion:** 30 dB down from two-tone output. **Noise level:** At least 40 dB below single-tone carrier. **RF compression (TALC):** 10 dB or greater at .1 ma final grid current. **GENERAL: Frequency coverage:** 80-10 M amateur bands. **Frequency stability:** Less than 100 Hz per hour after 10 minutes warm-up from normal ambient conditions. Less than 100 Hz for +10% line voltage variations. **Modes of operation:** LSB, USB and CW. **Visual dial accuracy — "Resettability":** Within 200 Hz on all bands. **Electrical dial accuracy:** Within 400 Hz after calibration at nearest 100 kHz point. **Dial mechanism backlash: Less** than 50 kHz. **Calibration:** 100 kHz crystal. **Audio frequency response:** 350 to 2450 Hz +3 dB. **Power requirements:** HP-23B or HP-13B supplies. **Dimensions:** 6⅝" H x 14⅞" W x 13⅜" D.

from Heath to you



NEW HEATHKIT ID-1290 WEATHER STATION . . . 89.95*

Add professional weather monitoring capability to your station. Has Uni/Mag® barometer for 2½ times greater pointer deflection; 8 wind-direction compass points that light-up in combination to give you 16-point resolution; wind speed indicator with 2 switch selectable ranges, 0-30 and 0-90 mph; dual-sensor thermometer with switch selection of indoor and outdoor temperatures. All solid-state circuitry. Kit includes weather cup and wind vane assembly for mast mounting, handsome simulated walnut housing. Mailing weight, 9 lbs., 50′ cable, 5.95*, 2 lbs.; 100′, 9.95*, 4 lbs.; 150′, 14.95*, 6 lbs.

NEW HEATHKIT ID-1390 DIGITAL THERMOMETER . . . 59.95*

Solid-state digital circuitry continuously monitors indoor and outdoor temperatures. Switches let you set thermometer for alternate display of indoor/outdoor temperature at 4-second intervals, for constant display of either indoor or outdoor temperature, and for readout in either degrees Fahrenheit or degrees Centigrade. Includes 85′ cable and 2 sensors. Mailing weight, 5 lbs.

HEATHKIT GC-1005 ELECTRONIC ALARM CLOCK . . . 54.95*

Count-down the year's end with solid-state digital accuracy. Six-digit clock displays hours, minutes and seconds on highly visible cold-cathode readout tubes. Gentle "beeper" alarm can be set for 24-hour cycle, features snooze switch for seven more minutes of sleep. Can be wired to display time in conventional 12-hour, or international 24-hour format. Mailing weight, 4 lbs.

NEW HEATHKIT IC-2006 POCKET CALCULATOR . . . 69.95*

Battery-powered calculator kit is less than 1″ thick, yet performs all math functions with results up to 8 digits. Features constant key for repetitive multiplying and dividing; ⅛″ LED display with no distorting magnifier. Sophisticated IC and related circuitry mount on single circuit board for neat assembly. Case is attractive matte-chrome and black. Includes operations manual containing sample problems and valuable reference tables. Uses 9-volt battery or optional AC converter (Model GRA-43-1, 1 lb., 3.95*). Mailing weight, 2 lbs.

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AM-290R

WESTERN NEW YORK – SCM, Richard M. Pitzeruse, K2KTI
Asst. SCM: Rudy Ehrhardt, W2PVI. SEC: W2CFP. The NYSTN i
in operation Mon. through Fri. on 3728 kHz from 5:00 to 5:4
P.M. local time. This net is a training net managed by W2RUF. It
purpose is to train amateurs in traffic techniques, particularl
regarding the National Traffic System. All amateurs are welcom
and encouraged to participate. WN2SHN is well on his way – afte
receiving his ticket on Aug. 4, he now has 29 states on 40 cw. He
the son-in-law of K2YCO. W2MTA has re-tubed the SB line and nov
finds it has output. WB2NRS and WA2PIN were just wed and ar
honeymooning in Tex., Ariz. and Alaska. WA2TPC and WA2WG
did an FB job in their initial NCS of the NYPON. WA2MRZ o
Marilla enjoys his new FT-101. WA2AOG and W2EPZ, both
Albion, boast new antennas. W2MIF, a real homebrewer, made th
HV capacitor for his final out of glass. WA2TLB has a new Swa
500C. ESS handled 88 messages with 317 check-ins for Sept. NY
meanwhile handled 283 messages with 544 check-ins. Both nets ar
suffering from a lack of traffic. Fellas and gals, don't be afraid t
solicit messages from your friends and neighbors and don't be afrai
to originate traffic on your own. Originations are what is required
we are to build traffic back up to what it should be. Mor
originations are essential. WA2BCK, WA2EKW and WA2MPC hav
built copies of the WA1BYM memory keyer. WA2SON an
WB2GTB also have new antennas up preparing for the contes
season. Sorry to report the passing of W2CG. I am receiving few
reports than I should be seeing we have over 100 appointees in th
section. Many of the reports being received are from nor
appointees, which is fine. But part of the conditions for holding a
appointment is monthly activity reports to the SCM. Over the nex
few months I will be reviewing appointees activities and will tak
appropriate action where required. As per the most recent ARR
ARPSC Bulletin, WNY stands in 6th place (out of 74) in the traffi
standings, 18th place last year and 21st place in 1966). We ranke
13th in AREC standings compared with 34th the year before an
39th in 1966. As you can see, we've come a long way – lets not los
it. Every report received by the SCM indicating activity helps ou
standing in the Field Organization. Traffic with * indicating PSHR
(Sept.) W2OE 512, WA2AYC 307, WB2ADW* 267, W2RUF* 21
W2FR* 195, W2MTA* 149, WB2VND 67, W2MSM 60, WA2PU
53, WA2TLB 53, WB2JRX 49, WA2TPC 39, K2UIR 39, W2FZ
38, W2PVI 37, WA2HSB 29, K2QUV 28, K2KTK 23, W2ROF 2
WB2JWM 19, WB2NRK 18, W2RUF 18, WA2LUF 16, W2EAF 1
W2PZL 14, WA2MPC 12, WA2ABL 10, WA2NPQ 5, WA2GLA
W2CFP 2. (Aug.) W2OE 444.

WESTERN PENNSYLVANIA – SCM, Robert E. Gawryl
W3NEM – SEC: W3KPL. PAM: K3ZNP, RMs: W3KUN, W3LOS
WA3PXA. WPA CW Net meets daily on 3585 kHz at 7:00 P.M
K3SN meets daily on 3585 kHz at 6:30 P.M. Both local time. It
with our deepest regrets that we announce the Silent Keys
K3HGS and ex-K3QHR. WN3ITS is now a General Class with th
call WA3ITS and so is WA3SPG. SPG also received his 15 wp
ARRL Code Proficiency endorsement sticker to go with his Gener
license. K3LVO assisted W3ZX in Sullivan County and WA3LJ
operated mobile from a dozen counties during the Penna. QS
Party in Sept. The annual Swap & Shop was a big success at the Sk
View ARC this year. The Foothills ARC again resumed their cod
and theory classes this fall and winter with W3ATQ and WA3NR
doing the instructing. The Nittany ARC has an Activity Conte
ready to go into operation with 20 different categories generatin
points. Top winner for 1974 receives a trophy and 2nd and 3r
place winners receive a plaque. Very interesting! Interested clu
write NARC, PO Box 60, State College, Pa. 16801 for detail
Congrats to WA3GLJ for having worked and verified all 3079 U.
Counties. She is an XYL too! Penn State U. ARC officers '73-'7
are WA3JIH, pres.; WA2JHT, vice-pres.; WA3UBJ, secy.; WA3UBK
treas.; WA3IHK, station dir. PSHR for Sept.: K3ZNP 54, W3LO
39, W3YA 34, K3CB 34, W2KAT/3 34, WA3SWF 34, WPA had 3
sessions, 395 QNI and 240 QTC during Sept. W3NEM had n
problems and only QNI WPA 2 times in Sept. and none in Au
Traffic: WA3SWF 360, K3CB 176, W2KAT/3 172, W3YA 11
W3LOS 81, WN3TTS 81, K3ZNP 65, K3CR 51, W3KUN 5
W3NEM 46, WA3HJO 36, WA3IYA 36, K3HCT 28, WA3LDA 2
K3SMB 18, K3VOV 17, W3ATQ 15, W3SN 15, K3SJN 5, WA3IM
5, W3ELZ 4.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – Asst. SCM
Harry J. Sruder, W9RYU. SEC: W9AES. PAMs: WA9LDC an
W9PDF (vhf). RM: W9MUC. Cook County EC: W9HPG.

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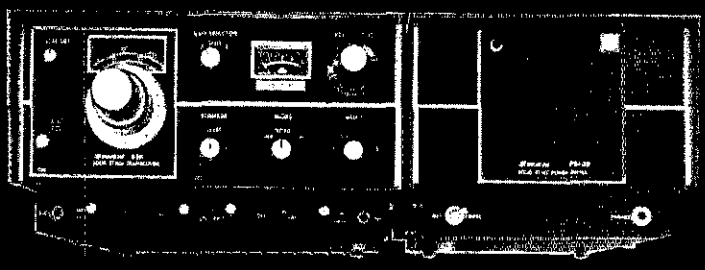

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A-2515 Receiver 59

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PS-1 AC supply 9
CLB 6m mob. conv. 15
TX-62 VHF Xmtr 75

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418 DC sup./mod. 35
Interceptor Rec. 225
22'er FM series 25 219
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75A-3 Receiver $269
75A-4 (ser. #513) 325
75A-4 (ser. #1713) 349
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75A-4 (ser. #3801) 395
75S-1 Receiver 325
75S-3B Receiver 595
R-390 Receiver 695
312B-4 Stn. Cont. 169
KWM-1 Transceiver 239
KWM-2 Transceiver 595
KWM-2/blanker 695
312B-5 PTO cons. 375
516F-1 AC supply 75

COMM. TECHNOLOGY
Magnum Six RF Speech Processor (wired for Drake) $89

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2A Receiver $159
2AQ Spkr. Q-mult. 25
2AC Calibrator 9
2B Receiver 189
2BQ Spkr./Q-mult. 25
2BS Speaker 9
2C Receiver 189
2CS Speaker 9
2CQ Spkr./Q-mult 29
2NT Transmitter 109
TC-6 6m xmit conv 175
R-4 Receiver 275
R-4A Receiver 289
R-4B Receiver 339
MS-3 Speaker 12
MS-4 Speaker 15
R-4C Receiver 399
SC-2 2m Conv. 69
4NB Noise blanker 39
SC-6 6m Conv. 59
CC-1 conv. console 39
CPS-1 Supply 12
SCC-1 VHF calib. 19
SCC-4 xtal calib. 19
TR-3 Transceiver 339
AC-3 AC supply 65
DC-3 DC supply 75
TR-4/NB Xcvr 479
TR-4 Transceiver 419
DC-4 DC supply 89
T-4X Transmitter 299
T-4XB Transmitter 375
TR-22 2m FM Xcvr 159
L-4B Linear Amp 575
ML-2 2m FM Xcvr 219
MN-2000 ant. match 149
5NB Blanker 49

DYCOMM
500-C 2m FM amp. $ 39
500-E 2m FM amp. 49

EICO
753 SSB Xcvr $119
752 DC supply 49
717 Keyer 49

ELMAC
AF-67 Transmitter $ 49
PMR-7 Receiver 49
PSR-612 DC supply 19

GELOSO
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G-209 Ham band Rec. 99

GLOBE/GALAXY/WRL
6-2 VFO $ 34
Galaxy 300 Xcvr 139
PSA-300AC/clock 49
VX-1 VOX 9
Galaxy V Xcvr 239
Galaxy V Mk II 259
Galaxy V Mk III 279
AC-35 AC supply 65
DC-35 DC supply 65
AC-400 AC supply 75
RV-1 Remote VFO 49
VX-35 VOX 9
CAL-35 calibrator 9
SC-35 Speaker 12
DAC-35 Dlx. console 69
CAL-25025 kHz cal. 12
F-3 300 cy. filter 24
2000 Linear/supply 275
Duo-Bander Xcvr 99
Duo-Power 300 69
GT-550 Xcvr 325
SC-550 Speaker 19
RV-550 Rem. VFO 59
RF-550 Wattmeter 49
GT-550A Xcvr 375
SC-550A Speaker 15
RV-550A Rem. VFO 69
AC-210 AC-DC supply/booster 19
R-530 Receiver 549
SC-530 Speaker 25
AC sup. for rejector 4

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Comm II 6m $ 75
Comm III 2m 99
Comm IV 6m 119
901A AC supply 39
910A 6m Xcvr 199
911A AC supply 39
GSB-201 Linear 199
GSB-201 Mk III 249
GC-105 2m Xcvr 119

HALLICRAFTERS
S-38A Receiver $ 39
SX-71 Receiver 59
SX-101 Mk III Rec. 139
SX-101A Receiver 179
S-108 Receiver 79
SX-110 Receiver 99
SX-111 Receiver 139
SX-117 Receiver 189
S-120 Receiver 29
SX-130 Receiver 139
SX-146 Receiver 175
R-46 Speaker 9
R-46B Speaker 9
HT-32 Transmitter 199
HT-32A Xmtr 225
HT-32B Xmtr 289
HT-37 Transmitter 179
HT-40 Transmitter 59
HT-41 Linear 175
HT-44 Transmitter 169
HT-46 Transmitter 219
SR-150 Transceiver 275
SR-160 Transceiver 169
PS-150-120 AC sup. 75
PS-150-12 DC supply 65
SR-400 Transceiver 475
HA-20 Remote VFO 149
P-500AC AC supply 89
PS-500A AC supply 75
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FPM-300 Xcvr 395
MR-300 AC supply 15
SR-42 2m Xcvr 89
SR-42A 2m Xcvr 99
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HQ-100A Receiver $139
HQ-110 Receiver 109
HQ-110C Receiver 119
HQ-110A Receiver 139
HQ-110AC Rec. 149
HQ-110A/VHF 199
HQ-140XA Rec. 129
HQ-160 Receiver 189
HQ-170 Receiver 149
HQ-170C Receiver 159
HQ-170AC Rec. 199
HQ-170A/VHF 259
HX-50 Transmitter 175

HEATHKIT
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MT-1 Transmitter 39
SB-300 Receiver 209
SB-301 Receiver 229
SB-303 Receiver 289
SC-2 2m conv. 25
SC-6 6m conv. 25
HS-24 Speaker 9
DX-20 Transmitter 29
DX-60 Transmitter 59
DX-100 Transmitter 89
HW-16 Transceiver 49
TX-1 Transmitter 99
SB-10 SSB adaptor 75
HX-10 Transmitter 179
HA-10 Linear 175
HX-30 6m Xmtr 149
HW-12 75m Xcvr 75
HW-22A 40m Xcvr 85
HW-32 20m Xcvr 75
HW-32A 20m Xcvr 85
HW-101 Xcvr 269
HW-16 Transceiver 99
HW-17A 2m Xcvr w FM adaptor 149
SB-100 Transceiver 325
SB-101 Transceiver 349
SB-102 Transceiver 375
SB-400 Transmitter 225
SB-200 Linear 219
SB-610 Sig. monitor 69
SB-620 Scanalyser 119
HG-10B VFO 39
HW-29A (Six'er) 34
HW-30 (Two'er) 39
GP-11 DC supply 9
VHF-1 (Seneca)6-2 89
HP-13A DC supply 54
HP-10 DC supply 24
HP-13 DC supply 49
HP-20 AC supply 24
HP-23 AC supply 49
HP-23A AC supply 54
HRA-10-1 calibrator 7
HO-13 Hamscan 69
SB-650 freq. counter 169
HW-17A 2m Xcvr 119
SB-500 2m Xverter 175

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Phone Patch 19

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R-599 Receiver $249
T-599 Transmitter 299
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TS-511S Xcvr 289
PS-511S power sup. 79
VFO-5S5 Rem. VFO 79

KNIGHT
R-100 Receiver $ 59
R-100A Receiver 69
S-10 calibrator 7
T-150A Xmtr 69
V-44 VFO 19
C-577 speech comp. 9

LAFAYETTE
HE-45B Xcvr $ 75
HE-61 VFO 19
HA-460 6m Xcvr 75
KT-320 Receiver 59
HA-225 Receiver 79

MOSLEY
CM-1 Receiver $ 99

NATIONAL
NC-98 Receiver $ 89
NC-155 Receiver 119
NC-183 Receiver 89
NC-190 Receiver 139
NC-270 Receiver 125
HRO-50T-1 Rec. 125
NCX-3 Xcvr 169
NCX-5 Xcvr 325
NCX-5 Mk II Xcvr 349
NCX-B AC supply 75
NCXA AC supply 75
NCXD DC supply 75
200 Transceiver 279
AC-200 AC supply 69
NXC-500 Xcvr 239
NCL-2000 Linear 375
AC-500 AC supply 75

P & H
LA-400C Linear $ 69

POLYTRONICS
PC-2 2m Xcvr $129
PC-62 6-2m Xcvr 149
PC-62B 6-2m Xcvr 199

RME
6900 Receiver $169
VHF-126 converter 75

RAYTRACK
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REALISTIC
DX-150A Receiver $ 89

REGENCY
HR-2A 2m FM Xcvr $169
HR-2S 2m FM Scanning Xcvr 239
HR-6 6m Xcvr 169

ROBOT
Model 70 slow-scan Monitor $249

ROBYN
Digital 500 Xcvr/supply $475

SBE
SB-33 Transceiver $189
SBI-DCP Inverter 25
SB-34 Transceiver 279
SB2-XC calibrator 12
SB2-MIC Mike 9
SB-144 2m FM Xcvr 179

SIGNAL/ONE
CX-7A with standard & deluxe CW filt. $995

SINGER
PR-1 Panadaptor $ 79

STANDARD
SR-C851T 2m FM $289
SR-C826M 2m FM 199
SR-C806 2m FM 99
SR-C146 w/case 169

SWAN
SW-140 Xcvr $ 75
SW-175 Xcvr 75
250 6m Xcvr 229
250C 6m Xcvr 339
270 Transceiver 229
260 Transceiver 299
210 6m VFO 59
400 Transceiver 169
406 VFO 49
420 VFO 59
NB-500 Blanker 49
117B AC supply 65
412 DC supply 75
117B AC supply 59
350 Transceiver 279
SW-117C AC supply 75
512 DC supply 75
22 VFO adaptor 19
500 Transceiver
500C Transceiver
117XC AC supply
14-117 DC supply
14A DC module
14X DC module
117X Basic AC sup[ply]
NS-1 noise silencer
FM-1210A 2m FM
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AF-800 CW aud. filt[er]
Mark I Linear
VHF-150 Amplifier
1200-W Linear amp.

TMC
GPR-90 Receiver

TAPETONE
XC-50 (14–18)

TEMPO
502 2m Amp.
Tempo One
AC-One

TEN-TEC
PM-2A Transceiver
PM-2B Transceiver
PM-3 Transceiver
PM-3A Transceiver
Argonaut
250 AC supply
210 AC supply
TX-100 Xmtr
RX-10 Receiver
S-30 Signalizer
KR-5 Keyer
KR-40 Keyer

UTICA
650A 6m Xcvr/VFO

VARITRONICS
PA-50A 2m Amp
FM-20BM AC supply—amp
HT-2 Mk II 2m FM walkie-talkie
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WATERS
359 Compreamp

YAESU
FTDX-400 Xcvr
SP-401 Speaker

10/10/73

NEW EQUIPMENT SPECIALS & CLOSEOUTS

Due to the low prices and limited quantities of the merchandise listed belo[w], prices are for "Payment in Full With Order — No Trade".

CLEGG	reg.	NOW
22'er FM series 25	$384	$269
22'er Mk II AM	389	269
FM-27B New Demo	479	379
FM-21 220Mc FM Xcvr	299	199

COLLINS	reg.	NOW
75S-3B Rec.-New display	$1101	$880
32S-3 Xmtr-New display	1330	1064
351D-2 mob.mt.-New display	137	137

COMCRAFT	reg.	NOW
CTR-144 2m FM/AM Xcvr	$489	$389

R. L. DRAKE	reg.	NOW
L-4B Linear-New Display	$825	$649
TC-6 6m xmt. converter	278	248
CC-1 Converter console	49	49
CPS-1 Power supply	30	19
SCC-1 VHF calibrator	27	26
ML-2 2m FM AC/DC	329	249
TR-22 6 ch 2m FM Portable	219	179
AA-22 Amplifier & Preamp	149	129

EICO	reg.	NOW
751 AC supply - kit	$ 79	$ 49
751 AC supply - wired	109	79
752 DC supply - kit	79	49
752 DC supply - wired	109	69

GALAXY	reg.	NOW
RB-550A Rotor & control box	$229	$179
R-530 Receiver — NEW	895	795
R-530 Rec. — New Display	895	745
GT-550A New Display	595	450

HALLICRAFTERS	reg.	NOW
SR-400A 80-10m Xcvr	$995	$795
PS-500 AC supply	129	100
FPM-300 80-10m Xcvr	625	535

HENRY	reg.	NOW
2K ULTRA — New Display	$845	$745
3KA — New Display	1080	980

HY-GAIN	reg.
HB254 4 stacked 2m Halos	54
400 Rotor	229
TH-6DXX torn carton (repaired)	189
14-AVQ torn carton (repaired)	55

KENWOOD	reg.
R-599 Receiver	$ 389
T-599 Transmitter	429
CC-69 6m Converter	31

LINEAR SYSTEMS (ADCOM)	reg.
350-6 6v DC supply	$125

MOSLEY	reg.
CL-33 shipped to customer in error	$151

PENWOOD	reg.
100F-24H 24-hour clock	$ 16

ROSS & WHITE	reg.
FM-144-10J 2m FM Xcvr with tone encoder	$329

SBE	reg.
SB-36 Transceiver — New	$969
SB-5V Scanvision Monitor and Camera — New	999
SB-144 2m FM - new display	259
SB-450 450Mc FM Xcvr	399
SB-2MIC Mike (dynamic)	16

STANDARD	reg.
SR-C826MA — New Display	$398
SR-C14U — New Display	599
SRC-146A hand-held — Demo	289

SWAN	reg.
fm-2X 2m FM Transceiver	$299

VARITRONICS	reg.
PA-50A 2m FM Amp 12v	$129
FM-20BM Base Amp/supply	235
FM-20M Mobile Amp	150

* — with 90-day A.E.S. warranty

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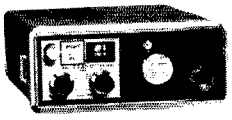
TR-22 Portable 2m FM Xcvr.	219.95
AA-22 Rec./Xmtr. Amplifier	149.95
MMK-22 Mobile Mount	9.95
AA-10 10 watt 2 meter Amplifier	49.95
AC-10 supply for TR-22/AA-10 TR-72	39.95
Extra crystals for TR-22, TR-72 each	5.00
DSR-1 Digitally synthesized Receiver	2195.00
Rack panel adaptor for DSR-1	125.00
2C Receiver	$295.00
2AC Califrator for 2C	18.75
2CS Speaker for 2C	22.00
2CQ Speaker Q-multiplier for 2C	49.00
2NB Noise Blanker for 2C	26.95
R-4C Receiver	499.95
4NB Noise Blanker	65.00
Filters: 250, 500 cycle; 1.5, 6.0 kHz	50.00
MS-4 Speaker for TR-4C, R-4C, SW-4A	22.00
TR-4C Transceiver for 80-10 Meters	599.95
34PNB Noise Blanker	100.00
RV-4C Remote VFO for TR-4C	110.00
FF-1 Crystal cont. adapt. for TR-4C	46.95
AC-4 AC supply for TR-4C, T-4X	99.95
DC-4 12vdc Supply for TR-4C	125.00
MMK-3 Mobile Mounting kit for TR-4C	6.95
MC-4 Mobile Console for TR-4C	69.00
2NT CW Transmitter	175.00
T-4XC SSB Transmitter	530.00
L-4B Linear Amplifier	825.00
MN-4 Antenna Match Network	99.00
MN-2000 Antenna Match Network	195.00
W-4 RF Wattmeter (2-30 Mc)	61.95
WV-4 RF Wattmeter (20-200 Mc)	73.50
C-4 Station Control Console	395.00
SW-4A AM Shortwave Receiver (tube)	335.00
AL-4 Loop Antenna – BC Band	29.00
AN-5 Short Wave outdoor antenna	8.80
TV-42-LP 100w Low-pass Filter	8.95
TV-1000-LP 1000w Low-pass Filter	18.75
TV-300HP High-pass Filter	6.95
LN-4 Line Filter, 120v, 5 amp	8.00
Crystals for 2C, R-4C, SW-4A, T-4XC	5.00
Fixed-Frequency Crystals	7.50
729SRD Microphone with plug	19.95
SPR-4 Programable Receiver	579.00
ACCESSORIES FOR SPR-4	
SNB Noise Blanker	$ 65.00
DC-PC DC Power Cord	5.00
TA-4 Transceive adaptor for SPR-4	25.00
SCC-4 Crystal Calibrator	20.00
RY-4 Teletype adaptor	10.00
DIAL Crystal Selector - plain	2.35
CRYSTAL KITS FOR SPR-4	
Aeronautical Overseas – 7 crystals	$ 32.00
Amateur Bands – 6 crystals	27.00
Citizens Band – one crystal	5.00
Marine Bands – 11 crystals	49.00
MARS – 5 crystals	22.00
Teletype Commercial – 4 crystals	18.00
Time & Freq. Std. WWV – 5 crystals	22.00

TR-72



TR-22

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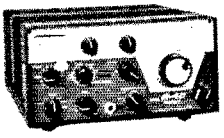
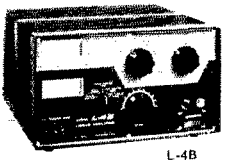


R-4C



L-4B

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TR-72 2m FM	$20 Bonus	TR-4C Xcvr	$50 Bonus
R-4C Receiver	$40 Bonus	C-4 Console	$40 Bonus
T-4XC Xmtr	$40 Bonus	L-4B Linear	$100 Bonus

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Account Number:
Expiration DATE
*Master Charge Interbank number (4 digits)

Name:

Address:

City & State:

☐ Send used gear list

Net	*Freq.*	*GMT/Days*	*Tfc*
ILNN	3720	0100 Dy	no re
ILN	3690	0300 Dy	248 A
		2330 Dy	227 S
Ill PON	3915	1430	38
Ill PON	146.8	0200 MWF	1
Ill PON	50.28	0200 M	
NCPN	3915	1300 MS	to
		1800 MS	
IEN	3940	1400 Su	no re

New officers of the Sangamon Valley Radio Club, Inc., (Springfi are W9FKJ, K9KZN, WB9BPE and WA9PLL. New ECS appoi are: W9ELP, WB9JWH, WA9UQC, WB9CEB and K9PVE. W9I has renewed as OO. K9ZIV is now on 160 at 1,805 MHz. column's sympathy to W9RL on the loss of his XYL. WB9LUY new General Class licensee in Meredosia. W9MUC received hi wpm code proficiency award sticker. WB9HAD worked twenty countries with his new 20-meter beam. WA9ZPL has been sele the winner of the 1973 Richard C. Chichester Scholarship av (administered by the Foundation for Amateur Radio). WN9FC now WB9FCW. The Starved Rock Radio Club has announced their annual Hamfest will be held at the Fair Grounds at Prince Mark your calendar now for this change. In Mar. of 1974 they celebrate their 40th year of ARRL affiliation. New Novices their code and theory classes include WN9MYE, WN9M WN9MSG, WN9MMP and WN9MMO. The Jefferson Junior School ARC is now an air force MARS youth training group call AFC9JFU. The Egyptian Radio Club has received their repe call WR9ACA and a secondary standby repeater with call WR9A WB9DBN passed his Advanced Class exam. WA9WMI's new QT Mesa, Ariz. K9KQR now settled in Libertyville, Ill. Plans are b considered for the organization of a Daytime Ninth Regional This will be a phone net meeting early evening and will be daily. Contact WB9AHJ for information or remarks. WB9FWO WB9DFD have been appointed ORSs. W9HSD has left Champ and moved to Wichita, Kans. W9KRR has been transferre Atlanta, Ga. W9NXG reports that his traffic count in June should be 271, not 27 as reported. K9MWA is the only recipie the BPL award this month. Traffic: (Sept.) K9MWA 428, W9I 260, W9MUC 150, WB9JPS 149, W9OYL 129, W9AES W9UNQ 52, K9AVQ 72, W9JXV 70, WA9LDC 54, K9ZTV WB9FWO 34, W9KR 24, K9RGL 14, WB9HAD 13, W9KRR W9PRN 12, W9RYU 12, WB9ELP 11. (Aug.) W9KRR 193.

INDIANA SCM, William C. Johnson, W9BUO – S WA9YXA, RMs: WA9EED, W9HRY, WB9KVN, WB9LHH, PA WB9FOT,(vhf) W9HWR, W9PMT.

Nets	*Freq.*	*Time(Z)/Days*	*Tfc.*	
ITReN	3910	1330-2300 Dy 2130 M-S	495	WB9
QIN	3656	0100-0400 Dy	282	WB9
IPON	3910	1300-2130 Su 200 S	16	WB9
IPON VHF	50.7	0100 M-W-Th	16	WA9
IPON CW	3712	0000 Dy	37	WB9
IPON SSB	50.2	0200 Dy		WB9
Hoosier VHF			2	W9

With deep regret I report the passing of WA9MWT. Indianapolsi had two speakers at their fall meeting Sept. 14; D.H. Horner mg Amateur sales for R.L. Drake Co. On Sept. 28 the Central Div Dir. W9HPG. W9HPG was at the IRCC meeting Oct. 7, at American Red Cross Bldg. in Indianapolis. New officers for I are WA9OHX, pres.; WB9FOT, vice-pres.; K9RPZ, secy.; W9I treas.; W9HWR, W9RTH, dir. WB4ZDU will be on the air at Del Univ., W9YJ. W9BUQ was Guest Speaker at the Grant Co Hamfest. RCA ARC has 100% AREC membership. K9APH has the air. Congratulations to W9BDP on completing 50 yea membership with ARRL. K9HDP, WA9EED received Medallions. W9GX back on the air lightning struck, W9BUQ of air because of lightning. The Hoosier "500" Award will be issu the Indiana Radio Club Council by the Hoosier Amateur Wor Klub, Inc. For more details contact WA9OHX or W9RTH. Hamfest will be at Lafayette, the third Sun. in Aug. 1974 Tippecanoe Amateur Radio Assn. as host. QIN Honor Roll: K9 W9EI, WA6UMZ/9, WB9KVN, K9HYV. Operator of the M WA6UMZ/9. BPL: WA9CAC. Traffic: WB9EAY 206, WB9 189, WB9CAC 183, W9EI 181, K9HPD 178, K9EZX 166, WB9 136, W9EWH 133, K9HYV 77, W9QLW 74, K9RWQ 72, K9 49, W9BUQ 47, W9UEM 47, WA9OAD 37, K9EQT 34, W9DK W9KX 32, WA9OHX 32, WA9TJS 32, K9CBY 30, K9IU W9DZC 20, K9RPZ 20, K9PSL 17, WB9BAP 15, WA9OKI W9PMT 15, K9JQY 12, W9HWR 11, K9ILK 8, W9RTH 8, W9 8, WB9BEE 6, K9DIY 6, W9BDP 4, W9KWB 4, W9UOZ 4,

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Down to $429.95. . .The FM-27B Transceiver During Clegg's 1-Month Factory Authorized Holiday Sale!

CHECK THESE SPECIFICATIONS

GENERAL

POWER REQUIREMENTS: 12 to 14 VDC
Current Consumption at 13.5 VDC:
Receive: 4 amps squelched, 1.2 amps unsquelched.
Transmit: 6 amps max.

DIMENSIONS: 7 3/8" x 3 1/2" x 9 1/4" deep; 4 lbs. net weight.

RECEIVER

TUNING RANGE: 146.00 to 148.00 MHz, continuously tuneable with reset capability of approx. 1 KHz to any frequency in range.

SENSITIVITY: .35 µv max. for 20 db quieting; .1 µv for reliable squelch action.

SELECTIVITY: 11 KHz at 3 db; Less than 30 KHz at 70 db. Adjacent (30 KHz spaced) channel rejection more than 70 db.

AUDIO OUTPUT: 2.0 watts (min.) at less than 10% THD into internal or external ohm speaker.

TRANSMITTER

TUNING RANGE AND CONTROLS: Same as RECEIVER.

POWER OUTPUT: 25 watts Min. into 50 ohm load. P/A transistor protected for infinite VSWR.

MODULATION: Internally adjustable up to 10 KHz deviation and up to 12 db peak clipping.

During December only, you can save $50.00 on the purchase of THE 2-meter rig, the Clegg FM-27B. The only 2-meter transceiver with any combination of transmit or receive frequency from 146 to 148 MHz, the FM-27B needs NO ADDITIONAL CRYSTALS. It gives you built-in total coverage, reliability, and dependable performance. Take advantage of this one-month factory authorized special and start 1974 with Clegg's 2-meter leader. Act today. Call us now so we can wish you a happy holiday or give you more information.

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DAKOTA DIVISION

MINNESOTA – SCM, Casper H. Schroeder, WAØVAS – Tri-State ARC hosted the 3900 Club at the Club's quarterly ey meeting at the Blue Mound at Luverne, Minn. 85 wer attendance. Vice-Dir, WAØCPX addressed the group as did SCM. Officers of the 3900 Club are WØSRR, pres.; W vice-pres.; WØFZO, secy.-treas. KØRSL of Beaver Creek was c of the meeting. A fine program for the XYLs also on the age WAØUIB has a new Tempo One rig and is again active on the MSN (Minn, Sr, CW net) – no report. MJN (Minn, Jr, CW ne sessions 17, QNI 48, QTC 5, high 6, high 2, low 1, low 0, av 2.8, average 3, NCS WAØYAH, WAØTFC, WBØBDH, TEN WBØCNM. MSPN (Minn. Section Phone net) Noon Net KØFLT sessions 30, QNI 781, QTC 157, high 37, high 29, low 15, l average 26, average 5.2. Evening Net, WAØVYB PAM – session QNI 1034, QTC 90, high 49, high 14, low 21, low 0, average average 3.0. PAW (Piconet All Day Watch) WAØYVT Mgr. – 3321, QTC 214, 155 hours, phone patches 54, average per 21.43. Traffic: WAØVAS 1053, WBØHQX 587, WAØYVT KØCSF 150, KØZRD 144, WAØVYB 133, WBØFTL 96, WA 92, WAØVTZ 92, WAØONE 87, WØBUC 79, WBØFVY 64, K 50, WØIYP 43, KØFLT 38, KØEDS 36, KØPIZ 22, WAØURV KØJLW 21, WAØCCA 18, KØZXE 18, WBØCYM 13, WAØYAE WAØJPR 11, KØWXH 10, WØIRJ 9, WAØUIR 5, WAØMM KØSXQ 5, WØUMX 4.

NORTH DAKOTA – SCM, Harold L. Sheets, WØDM – WAØAYL. OBS: KØPVG/Ø. RM: WAØMLE. OO: WØBF. WØ doing well with his teletype. WØJWL moved his antenna and well on 2 meters while KØCLD added another element to his WBØEBZ is on 40 meters, WBØFUO is working on a solid stat receiver while KØGRM is busy with a signal genetator. WØZV his 20 meters up on the tower. WAØSUF is on 2 meters wi HR2A and eleven-element beam. He was able to work the City repeater on a good opening. WØBF has atleath-202 in car! Reports the Bismarck repeater is operating still waiting for license. Grand Forks hams are reorganizing and rebuilding repeater there. WØECX spent some time in the hospital. W went fishing. By now the YL WX Net will be operating on 3994 0730 A.M. WAØGRX will announce the net control stations a WAØRWN will work with her. WAØMLE again made the PSHR going! KØPYZ worked on his quad. So did the gang at WØ They put up a 2-meter antenna on top of their tower.

Net	*kHz*	*CDT/Days*	*Sess.*	*QNI*	*QTC*	
Goose River	1990	0900 S	5	81	3	W
RACES	3996.5	1830 M-F	20	422	29	WB WA
PON	3996.5	0900 S 1830 S-S	15	276	23	WB

Traffic: WAØMLE 185, WAØSUF 81, WBØBHJ 20, WØDM WBØBMG 14, WAØJPT 8, WØCDO 4, WØMXF 3, WBØLDT 2.

SOUTH DAKOTA – SCM, Ed Gray, WAØCPX – WAØR Sioux Falls has been appointed as SEC. Loren operates HF as v VHF. The Mitchell ARC Repeater has received its new WRØACB. It is on 34/94 COR. The Sioux Falls ARC el WBØHIM, pres.; WBØBHL, vice-pres.; WBØICM, secy.; WØ treas. WNØLJM is a new Novice. WBØAMK and WAØTKX ar on two meter fm. As we move into another busy net season a v thanks to the net controls and net managers. Net reports: Mo Net – 492 QNI and 68 formals; NJO – 557 QNI and 28 fo Early Evening – 442 QNI and 8 formals; Late Evening – 142 and 38 formals; SDN CW active. Traffic: WAØROK WAØNZA 139, WØHOJ 108, WØMZI 30, WAØRIQ 10, WAØN

DELTA DIVISION

LOUISIANA – SCM, Louis A. Muhleisen, Jr., K5EVA – K5SVD. RM: W5GHP. PAM: WA5NYY. VHF PAM: WA5 Thanks to State Senator Joseph Tiemann, W5DNU, and ou K5SVD, for their tremendous efforts concerning "Ham Plat La. Amateurs across the state will be able to continue to pu ham plates for the next two years for the usual $7.00 fee. also to the ARCs of the greater N.O. area especially the JA the fine job that they did with the N.O. hamfest. It was a success and enjoyed by all. I previously reported erroneousl K5LXZ, K5DZE/5, WA5YRM and WB5FXF were elected o of the La. Tech ARC. They are in fact the new officers of the formed Ruston Area Amateur Radio Club. My apologies fo Thanks to K5DPG who recently presented a program on Ar Radio, before 150 students of New Iberia Junior High S Congrats to the OARC which is now League affiliated. Congra

400% MORE SSB OUTPUT

WITH A MAGNUM SIX

A QUALITY RF SPEECH PROCESSOR

Collins 32S KWM	$139.95
Heath SB100/HW100/SB400	139.95
Drake TR4/TR4C	159.95
Drake T4X/T4XB/C	154.95
Yaesu FT101	139.95
Yaesu FTdx 400/401/560/570	144.95
Kenwood T-599/TS-511	139.95

To Order: Specify model. Add $2 for shipping in U.S.

- The human voice is a "raspy" signal with high peaks and long, low valleys. If used to modulate an SSB transmitter directly, the low power of the valleys limits the average power output to 12-15% of the transmitter's PEP rating. Operating above this level, the peaks overdrive the transmitter, cause band splatter and poor quality.
- MAGNUM SIX is the first successful RF speech clipper available. Installed in the IF strip, it "mows" the peaks and discards the clipping harmonics without distorting the voice. This allows the level of the valleys (the average power) to be raised up to 6 db. Astounding signal strength improvements – 1 to 1.5 "S" units – have been reported! Some have even reported improved voice quality!!! The ARRL handbook confirms that RF speech clipping is clearly the best way to increase SSB talk power.
- MAGNUM SIX operates like a "time scavenger". Average power is increased merely by causing transmission to occur at slightly below, but never over, rated values more of the time. By increasing the duty cycle, MAGNUM SIX pushes the average output from 12-15% PEP "way up" to 50-60% PEP. Operationally this is impressive because of the clean 6 db signal strength improvement. Equipment-wise this is roughly equivalent to operating at continuous AM, or a little below continuous keyed CW ratings. Tube lives are thus not shortened below rated values. On the other hand, they'll no longer be "loafing" on SSB either. So why not

PUT YOUR TRANSMITTER TO WORK FOR THE FIRST TIME IN ITS LIFE. A MAGNUM SIX CAN ADD MORE POWER TO YOUR STATION PER $ THAN ANY OTHER DEVICE: LINEAR, ANTENNA OR OTHER SPEECH PROCESSOR.

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to WA5ZZA who has earned BPL for the 3rd time this m
GNOARC has moved from their quarters in the ITM BLdg.
now located in the new Causeway Plaza Bldg. As most of you
our RM, Robert Schmidt, W5GHP, is the new La. SCM. It has
very rewarding for me to fill in as SCM, and I hope that eve
will give to Bob the same support and cooperation that was all
to me. Don't forget the Delta Division Convention to be he
Lafayette Mar. 1, 2 and 3. I hope to see you there. Traffic: W
274, WA5ZZA 250, WA5EID 44, WB5ERQ 20, K5DZE/
W5EA 6.

MISSISSIPPI – SCM, Walker J. Cotley, W5NCB – Asst.
Gene McGahey, WA5JWD. SEC: WA5EHI. RMs: WA5
WB5EIN. PAMs: W5JHS, WA5KEY. Big turnout for the M
summer picnic at Choctaw Lake. Thanks to all those who did t
work. W4WBK has arrived at new QTH in Calif. WB5FML
WAS no 40 and enjoys TCC. Tombigbee ARC has DX project
to acquire a generator and tower for emergency use. "BE
PARED" is the word. The average check-ins on MSBN are down
300 so far this year as compared with 1971. Let's turn this tre
soon. Check in your nets often. WB4RCF was elected new m
CGCHN. WA5VVV did fine job as retiring mgr. K5YTA
WB5FML made PSHR. Will miss WB5GNR off to SF As
military tour. Congrats to WAØYRY/5 and WAØGVO/5 wi
harmonic. Glad to see W5SBM back in the traffic business.
Christmas and Happy New Year to all.

Net	Freq.	Time(Z)/Days	QNI	QTC	
MTN	3665	0045 Dy	108	88	WA5
MNN	3733	0100 TThS	–	–	WB
GCSBN	3925	0030 DY	–	–	W
CGCHN	3935	0100 Dy	1553	173	WB
MSPON	3970	2345 MS	257	26	WAØG
MSBN	3987.5	0015 Dy	921	45	WB5

Traffic: W5WZ 89, WB5FML 81, W5SBM 76, W5EDF 67, WA5
66, W5NCB 64, K5YTA 26, WAØGVO/5 21, WB5DCS
WB5BKM 14, W5BW 12, WB5BUF 8, WA5EII 4.

TENNESSEE – SCM, O.D. Keaton, WA4GLS – SEC: WB4
PAMs: W4PFP, K4MOJ, WA4OWW, WA4NEC. RM: W4ZJY.

Net	Freq.	Time(Z)/Days	Sess.	QNI	QTC	
TPN	3980	1145 M-F 1300 SSuH	30	1451	86	W
TSSBN	3980	2330 M-S	27	1288	84	K
TTPN	3980	1040 M-F	23	476	19	WA4
TPON	3980	2330 Su	4	108	7	WB4
TN	3635	2300 Dy				WB4
TNN	7135	2300 Dy	13	44	19	WB4
TTVHFN	50.4	2300 MWF	14	115	0	W
TTVHFN	146.2	2300 TTh	9	34	0	WB4
TTTMN	28.7	0100 WF	9	61	0	WB
MTTMN	28.8	0100 TTh	9	51	0	W4
KVHFN	50.7	0000 F	4	15	0	WB
ACARECN	146.28 146.88	0000 M	4	74	0	WA4

W4ZJY has resolved his difficulty which caused his resignatio
has been re-instated as RM, welcome back Dave. K4MZ
recently appointed an Official Observer. Certainly glad
WB4YCV has settled and ready to resume his CW activities
mgr. Delta Division Director Max Arnold is back from his s
resuming his efficient handling of his many responsibilities. T
K4CNY 181, W4OGG 97, W4ZJY 74, WB4NIR 43, WB4D
WA4GLS 18, WA4AVD 16, W4CYL 16, WB4MPJ 13, W4P
K4SIV 8, WB4DYJ 6.

GREAT LAKES DIVISION

KENTUCKY – SCM, Ted Huddle, W4CID – SEC: WA
Endorsements: W4BAZ and K4HOE as ORSs; K4TXJ and K
as OPSs; K4TXJ and WA4JQS as OOs.

Net	QNI	QTC	Net	QNI
KRN	225	25	KYN	346
MKPN	695	47	kNTN	194
KTN	1113	25	KPON	86

The ARTS Club in Louisville recently elected W4CTZ as the
pres. W4VQA is back on 432 ssb. Anyone need a sk
Kentucky? Don expects to be on ATV this winter. W4IQZ a
his Extra. Don't forget our annual SET planning and
meeting coming up in Jan. We intend to make this a general
meeting and it is tentatively set for the third week end of
Louisville. Traffic: W4BAZ 226, WB4ZMK 134, K4UNI
WB4YQS 104, WB4BYV 76, WB4LIL 74, WN4ZMG 70, W4C
WA4VZZ 64, WB4WCM 61, WB4FOR 60, WA4GHQ 57, WI
55, WB4AUN 48, WA4AVV 32, WB4VRG 28, WA4EA

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W4CDA 23, WB4RFN 23, K4YZU 21, WN4ECB 20, W4OY
WA4NNZ 12, W4IQZ 11, WB4YAF 10, WB4NHO 4, WB4ZSA

MICHIGAN SCM, Ivory J. Olinghouse, W8ZBT – S
W8MPD. RMs: W8JYA, W8WVL, W8RTN, K8KMQ, W8
WB8IML. PAMs: W8GVS, W8NDJ. VHF PAMs: K8AFM, WA8W

Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Sess.*	
QMN	3663	2300 Dy	241	297	60	W8
WSBN	3935	0000 Dy	747	96	30	W8
BR/MEN	3930	2230 Dy	770	116	30	W8
UPEN	3920	2230 Dy	672	68	35	WB8
GLEPN	3932	0230 Dy	801	170	30	WB8
PON	3955	1600 Dy	949	298	30	K8
PON/CW	3645	2400 M/S	152	38	26	K8A
MI-6M	50.7	0000 M/S	160	30	21	WA8
MI Now	3720	2230 Dy	114	38	29	WB8

The S.W. MI weather net held 4 drills with 44 QNI, K8ZWR
W8CVQ and WA8WVV report the S.W. MI 2-Meter nets h
sessions QNI 120 and 2 QTC. I regret to report W8EYO and W8
as Silent Keys. WB8HQS is now at Houghton Tech. Co
WB8HVO is getting a VE call. The Detroit News has a new col
"Ham Radio." The EARL Club is starting a 2 fm net. WB8NA
new editor of the EARL Bolt, WN8LCN felt so good about a P
Service Award that he passed his General Class exam. WN8QW
new YL in Milford, W8TWT has new TR-22, WB8JYO passe
Extra Class exam and also got married. W8ACW was activate
NCS for a canoe race net and also for the Powder Puff D
Cherryland ARS elected the following for 1973-74, WB8PLQ,
W8UIY, vice-pres.; WB8EYL, secy.; W8TVT, treas. WA8ZDE
the U.S.A.F., and is stationed in Fla. He can be heard on 40 m
WB8NII has a new HW-101 and a vertical antenna. K8AEM
WA8UIG attended the first ARRL Technical Symposium an
Roanoke Division ARRL Convention and had a good time. K8
is trying very hard to get the Michigan Wolverine VHF 6-meter
net going, had 3 sessions in Sept, with 19 QNI. Net time is
GMT Mon. Traffic: K8KMQ 271, WB8ITT 251, K8DYI
WA8WZF 162, W8GLC 123, W8ZBI 120, K8LNE 100, W8IB
WB8MJI 72, WB8EBG 70, WB8NCD 70, W8TZZ 63, W8OW
WB8IML 61, WA8PJM 57, W8NDJ 55, K8LJS 50, W8UES
K8SIZ/8 45, WB8DKO 45, WA8OJI 39, W8IXJ 38, K8GXV
W8MO 36, W8NOH 35, W8GVS 32, WB8HIB 27, WA8RXI
WA8EAR 24, WB8DJS 23, WB8ELO 21, W8LOI 20, W8EU
W8RTN 20, K8JED 19, WB8LWW 16, WB8DRT 14, WA8ENV
W8VXM 12, K8BWC 11, WA8LXY 11, K8MJK 11, W8VIZ
W8UUN 10, WB8NII 10, K8PYN 9, K8AYJ 8, WB8EK
WB8GWK 8, WA8MDK 8, K8WRJ 8, WA8WVV 8, K8AI
WA8CUP 7, W8KGG 7, W8WVL 7, K8ACO 6, WB8APN 6, W8
6, W8YIQ 6, W8BPQ 5, K8OHA 5, WB8MIG 5, WB8PLO 5, K8
5, W8UIC 4, K8IIY 4, WB8PHN 3, WB8KWL 3, W8EZL 2, W8
2, WN8ONX 2, W8PGW 2, WN8ONW 1, WA8RXI 1.

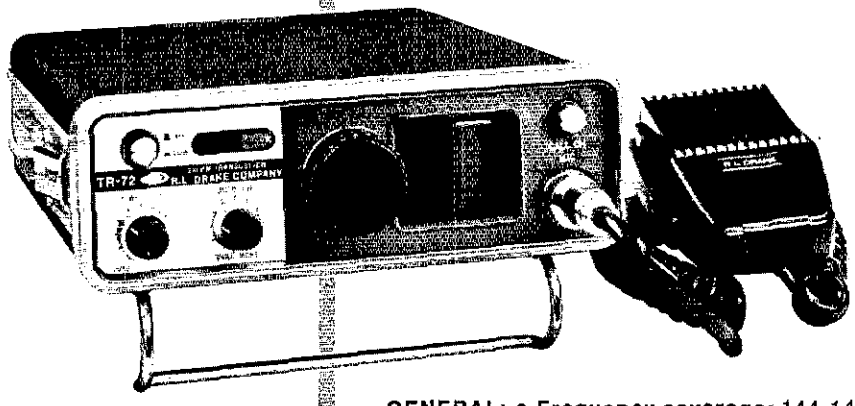
OHIO – SCM, William F. Clausen, W8IMI – Asst. SCM: Ker
L. Simpson, WA8EIX. SLC: WA8COA. RM: WA8WAK, P
K8UBK, WA8YLW. VHF PAM: WA8ADU.

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time(Z)*	
OSSBN	2361	1053	79	3972.5	1530/2100/2345	K8
RN				3577	*2345/0300*	*WA8*
O6MtrN	345	104	30	50.16	0200	WA8
OSN	187	59	28	3577	2310	WB8
ONN	184	63	30	3740	2330	WN8
BNRTTY	138	34	30	3605	2300	K8

New appointees: PAM WA8YLW; K8IDI EC Columbiana
WB8JGW EC Hancock; W8YGX EC Richland; K8SGX
Ashtabula/Geauga; W8GSR EC Medina; WB8KZD OPS; K8IQE
WA8ZUQ OVS; WB8NAB ORS. Renewals: WB8
OVS/ORS/OPS; W8DPW OO; K8TDT OVS; WA8ROK
WA8RUO OPS. Thanks for a job well done to W8OE, who re
retired his long time position as EC of Mahoning, Trumbul
Columbiana Counties. ORS W8WEG visited GB2RN and GB2
London. W8JBP reports that Toledo area ARES/RACES
participated in a CAP drill with WB8IJU, K8AAV and K8DTL har
traffic. ORS WB8KZD has a new 40 wpm code proficiency st
The annual 8th Region ARPSC Conference at Cincinnati was
success with WTNJM as main speaker – plan to attend this
next fall in the Detroit area. Ohio Army MARS Director W
reports a membership of 165 with 91% active. Apricot Net o
promoted ham radio at adult education programs at Cleveland
University Hgts., and Rhodes High School. K8ONA's Plain
column tells of QRP activity in Ohio and the "Milliwatt" h
published by K8EEG of Alliance. I visited the Warren ARA t
them celebrate the conclusion of another DX hamfest. Central
ARPC served in a Cancer Society fund-raising project. WB

NEW DRAKE TR-72

2-Meter FM Transceiver



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showed the Indian Hills Radio Club how commercial PC board made. The Inter-City (Mansfield area) RC has been working repeater. Massillon ARC's newsletter says that six club mem joined two from Canton and provided communications for the S Co. Bike-a-thon. The Miami Valley EM Assn. provided munications services to the Cancer Society and the Mul Sclerosis Society. *The annual Simulated Emergency Te* scheduled for Jan. 26/27. Contact your Emergency Coordi now and offer to participate. If you don't know who your E contact WA8COA or W8IMI. Let's keep Ohio number on emergency preparedness! Traffic: WA8MCR 786, WA8YLW W8ENI 266, W8PMJ 263, W8CUT 232, W8QCU 228, W8MGA WA8WAK 138, WA8HGH 121, W8GVX 120, WB8JGW W8QZK 113, W8SUS 104, WB8AYC 103, K8MLO 96, K8UBK WA8DWL 86, W8ID 85, WB8KXV 81, WA8SED 78, WB8KZI WA8VWH 68, WA8ETX 66, WA8TYF 65, W8FGD 62, W8VNI WB8NRC 46, W8LZE 45, W8MOK 39, WA8SSI 38, W8OE WB8HUP 32, WB8LNM 29, WA8ADU 23, W8BHL 21, WB8I 21, WA8KPN 15, W8NAL 15, K8BYR 14, WB8KEO 13, WA8I *13, W8IDCX 12, WA8ETW 12, WA8JSW 12, W8ARW 11, K8JD* WA8UPI 11, WA8ZNC 11, K8BNL 7, WB8GGR 6, K8CK W8ETU 3, WA8FSX 3, W8WEG 3, W8KOI 2, WB8FIC 1.

HUDSON DIVISION

EASTERN NEW YORK – SCM, Graham G. Berry, K2SJ Asst. SCM/PAM: Kenneth Kroth, WB2VJB. SEC: W2URP, WA2FBI, WB2IXW and K2DN for RTTY. Nets: NYS two sessions at 0001Z and 0300Z on 3.675 MHz (NCS at 20 wpm); daily at 2300Z on 3.590 MHz at 10 wpm; Novice Training Net below for special notice. NYSPT&EN daily at 2300Z on 3.925 Hudson Div. P/R Net 2nd and 4th Sun. at 2200Z on 3.925 MH discussion of P/R and mutual help – all welcome. RTTY dai 2330Z on 3.613 MHz. New EC wanted for Columbia Coun volunteers please contact W2URP. Liaisons to 2RN wante daytime SSB NTS Net – contact W2MTA for details. All No wanted to join Novice Training Net for top-drawer training in tr handling Mon. through Fri., 2200Z on 3.728 MHz – slow sp Mon., Wed. Fri. Others tue. and Thur. Write W2RUF in WNY *full details on ground covered, speeds etc. (also open to higher* licensees who want to take up traffic work). And an EC for Put County, as usual! New appointments: Sorry to lose WA2RSW a Rennselaer County for business reasons, but glad to WB2ROT as his successor – keep in touch if you're in Re County. K2MME as OO, Class IV. For information on Westch ARA's annual dinner Dec. 15, contact WA2GKB. If you're in York on first Thur. NYRC meets at West Side Y at 8:00 P.M. ENY'ers welcome. Second call for RPI club (W2SZ) is WB2Z Schenectady ATA heard Lt. Col. K.E. Wagoner, CAP. New Roc had visit from WA1ABV from Hq. on beam antennas. Harm Hills heard W2LH and W2EEO on antenna basics. Communica Club of New Rochelle, assisted by Westchester Repeater members handled huge parade of firemen celebrating 50th niversary of Uniformed Firemen's Assn. with 100 plus piec apparatus, marching bands, etc. W2DPV and K2JQB in charge. *Mt. ARA officers for '74 are WN2EQD, pres.; WN2GLV, vice-* WN2NDI, secy.-treas. Best wishes to one and all for the co holidays, see you in 1974. Welcome back to section for long *traffic handler WB2NKN. Traffic: W2GPH 98, WA2PJL* WB2EOO 34, W2SZ 25, WA2IQQ 24, K2SJN 22, WA2RF WB2SON 20, W2URP 19, WA2FBI 10, WA2ZWS 8, WA2E WB2BXL 5, WN3UUH/2 2.

NEW YORK CITY AND LONG ISLAND – SCM, Fr Brunjes, K2DGI – Asst. SCM: John H. Smale, WB2CHY, K2HTX, RM: WB2LZN, PAM: WA2UWA, VHF PAM: WB2R

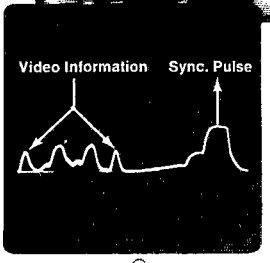
*NLI**	*3630 kHz*	*1900/2200 Dy*	*WB2LZN*
NLS*	3730 kHz	1830 Dy	WA2NVJ
VHF*	145.8 MHz	1930 MTWThF	WB2RQI
NLI Phone*	3928 kHz	1730 Dy	WA2CXY
Clear House	3925 kHz	1900 Dy	WA2VYT
All Svc.	3925 kHz	1300 Dy	W2OE
Mic Farad	3925 kHz	1100 Dy	W2OE
NYSTPEN	3925 kHz	1800 Dy	WB2QAJ

*Denotes section nets; all times are local. Congratulations t following ARRL members who are new Life Members: WA WA2PBG, WB2CIT, K2STT, K2OPT/Ø WA2OKN, WB W2TVN. Ole' K2EP is now a resident of Casselberry, Fla. j our other former section members in W4-Land. Congratulatio WB2LYB for winning Fla. QSO Party High CW trophy. Our nets NEED all hands for the traffic volume this month. If yc dabble or are just interested in traffic please check into any Section Nets to help lend a hand in this Public Service. H needed in all Counties of our section, particularly in the Ot

2nd generation slo-scan system

Venus slo-scan TV monitor

Actual unretouched photo taken from the Venus SS2 using a Polaroid Color Pack II Camera mounted on the Venus P-1 Camera Adapter



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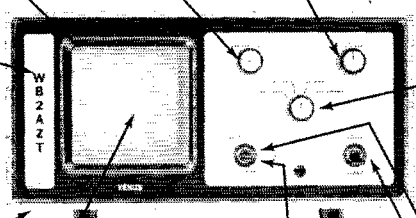

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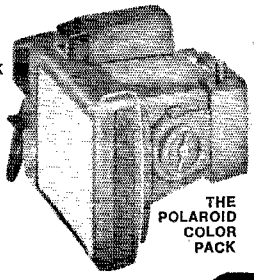
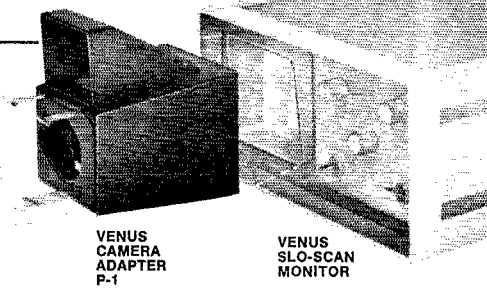
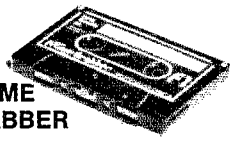


THE POLAROID COLOR PACK



VENUS CAMERA ADAPTER P-1

VENUS SLO-SCAN MONITOR



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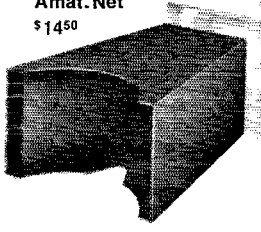

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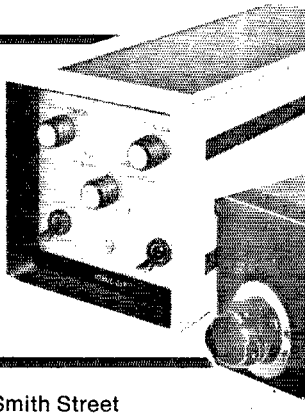

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Nassau. See above listing for traffic nets and times. Congratulatio to WB2CHY on earning CP-20 certificate from ARRL. WB2LKK sporting a new Tempo One receiver these days. WA2HMM is lookin for amateurs that are also involved in Community Auxiliary Poli work in the Nassau Suffolk area. WA2JZX is knee deep in t equipment these days. W2PF celebrated his birthday at t Southwestern Convention in Oct. The New York Radio Club h changed its meeting place to the West-Side YMCA, 5 West 63rd S in the George Washington Lounge. Meeting time is 8 P.M. the fi Thur. of the month. Congratulations to the Huntington V.H Society on their ARRL affiliation. K2DGI joined a large contingc of section members at the N.E. Convention in Hyannis, Mass. wh all had an enjoyable time. Don't forget ours in July '74, it's not t early to plan for your club or group to attend. WN2STR w surprised when his first contact was with WB2CHY the fellow w gave him his Novice exam! K2DGI is running a newly built G Synthesizer on 2-meter fm. WA1CM ARRL Asst. Communicatio Mgr. spoke at the Suffolk County RCs Oct. meeting. Nassau Cour is planning a Senior Citizen Wireless Club for "Over 50" amateurs. you are interested and can give a hand in helping organize the c and classes, please contact Oscar Esparza (ex-CO6OK) Progr Development Supervisor for Senior Citizens Activities, Spec Activities Center, Eisenhower Park, East Meadow, N.Y. 11554. K2DGI. SCM N.Y.C., L.I. (page 6 QNI). The Best of the Holi season to all, and a Happy New Year! Traffic: (Sept.) WB2LZN 2 W2EC 104, WB2OYV 87, WB2CHY 38, WB2LGA 38, K2JFE WB2DAR 16, K2EV 16, WA2PLI 14, WB2AEK 12, K2HK WA2KXE 8, W2PF 8, W2EW 7, WB2BYY 4, W2GP 4, WB2FIC WA2LJS 3, WB2EKK 2, WA2HMM 2, WA2JZX 2, W2DBO (Aug.) WB2RQE 13, W2LW 5, WA2KXE 5.

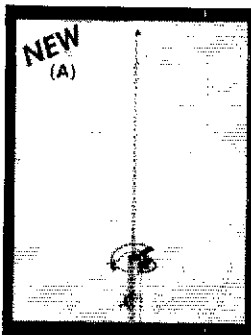
NORTHERN NEW JERSEY – SCM, John M. Crov WA2UOO – SEC: K2KDQ, RM: W2ZEP, PAMs: K2KDQ WA2EVH.

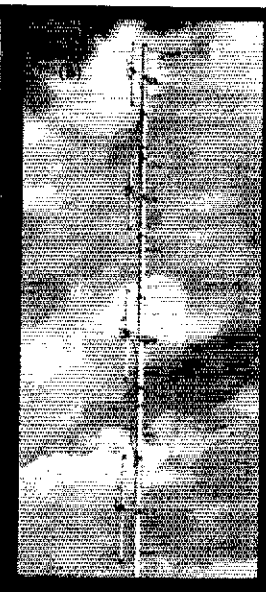
Net	kHz	Time (PM)	Days	Sess.	QNI	Tfc.	
NJN	3695	7:00	Dy	30	437	220	W2Z
NJN	3695	10:00	Dy	30	363	84	W2Z
NJSN	3730	8:15	Dy	18	47	17	WA2T
NJPN	3950	6:00	M-S	28	461	132	WA2F
NJPON	3930	8:00	Su				WB2I

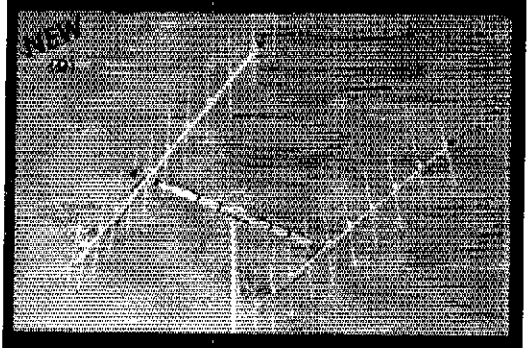
Appointment endorsements: WA2EVH as PAM; WB2CST, WA2 WA2RYD, WA2UOO as ORSs; WB2CST, WA2FVH and K2C OPSs; W2CVW, K2DFE and K2KDQ OVSs; and W2BVE as O Former SCM W2ZZ well on the road to recovery from m surgery. OO reports from W2DYS, WB2TFH, W2TPJ, K2UK K2BML. The Kearney ARC Net has the services of WA2SLR as N WB2HWW is operator at W3AB1 while an EE major at the Univ Penna. WA2SHF has a new 80-meter dipole. K2SBW passed Second Class Commercial License and won Ocean County in the QSO Party. WB2HSD is building a memory keyer. The Waldv AREC Net now meeting Sun. 9 P.M. on 21,111 kHz. WA2EXX on 2-meter fm. WA2UDT operated WA2KHL/2 during the S VHF Contest. WA2CWS working 20-meter DX. W2ANG is q active on 75-meter ssb from the mobile. WA2EPI has a new sta in the form of an SB301, SB401 and SB220. WA2QNT active K3CR. WB2HJW has acquired a Swan 500 and 203BA. W addressed the Whippany Bell Labs ARC on the subject of broadb 80-meter antennas. WA2IUI demonstrated the uses of amateur r to the Board of Directors of the North Hudson Chapter of American Red Cross. W2CVW won the high speed code cop contest at the ARRL N.E. Convention in Hyannis. WB2CFT pa the Advanced Class exam. Congratulations. WA2IHA has a Yaesu fm rig. WA2RYD finally qualified for WAS. K2EK can out OO duties as well as working 2 fm from the car. WA2SRQ WA2UOO have finally received their new Drake C-Lines. WB2 has returned to NNJ after a year at MIT. Traffic: (Sept.) WB2 299, W2ZEP 147, WB2CST 124, WA2SHF 110, WA2EPI WA2BSU 45, WA2UOO 38, WB2UCS 36, W2CU 33, WB2FWW WB2NOM 28, K2ZFI 26, WA2EXX 25, K2OOJ 22, WA2OPY WB2RJJ 17, W2CVW 16, WA2CWS 13, WA2DIW 12, WA2CCE WA2DWB 10, W2WOJ 9, WA2CAK 8, WA2QJU 8, WA2RY WB2HJW 2, WB2HSD 1, WA3MYS/2 1. (Aug.) WN2CSX WA2CWS 2.

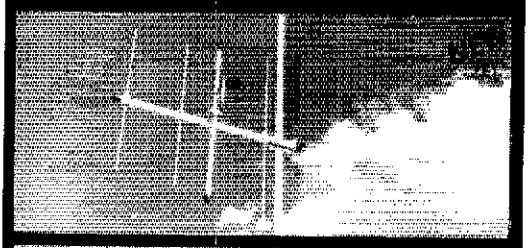
MIDWEST DIVISION

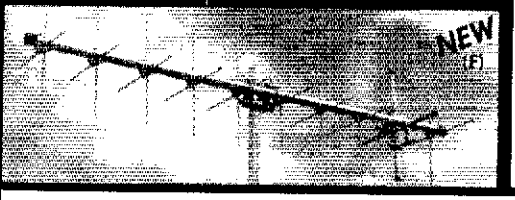
IOWA – SCM, Al Culbert, KØYVU – SEC: KØCLL, WØBQ acquired an HW-101, which should help make Mason City a more accessible. Sorry to note the passing of WØZLC of Cli The Cedar Rapids gang received some more positive publicity providing 2-meter coverage of a recent 100 mile bicycle mara Best wishes to WAØAIW who is retiring. WAØDYZ is back on t portable and has a new Drake R4C receiver. Congratulatio











Cush Craft

2 METER FM ANTENNAS

NEW FROM THE WORLD'S LEADING MANUFACTURER OF VHF/UHF COMMUNICATION ANTENNAS

(A) FM GAIN RINGO: The most popular — high performance, half-wave FM antennas. Give peak gain, and efficiency, instant assembly and installation.

AR-2	100 watts	135-175 MHz		**$14.50**
AR-25	500 watts	135-175 MHz		**18.50**
AR-220	100 watts	220-225 MHz		**14.50**
AR-450	100 watts	420-470 MHz		**14.50**
AR-6	100 watts	50-54	MHz	**19.50**

(B) 4 POLE: A four dipole gain array with mounting booms and coax harness 52 ohm feed, 360° or 180° pattern.

AFM-4D	1000 watts	146-148 MHz		**$46.50**
AFM-24D	1000 watts	220-225 MHz		**44.50**
AFM-44D	1000 watts	435-450 MHz		**42.50**

(C) FM MOBILE: IMPROVED Fiberglass ⅝ wave mobile antenna with new molded base and quick grip trunk mount. Superior strength, power handling and performance.

AM-147T 146-175 MHz mobile **$26.95**

(D) POWER PACK: A 22 element, high performance, vertically polarized FM array, complete with all hardware, mounting boom, harness and 2 antennas.

A147-22 1000 watts 146-148 MHz **$56.50**

(E) 4-6-11 ELEMENT YAGIS: The standard of comparison in VHF/UHF communications, now cut for 2 meter FM and vertical polarization. 4 & 6 Element models can be tower side mounted.

A147-4	1000 watts	146-148 MHz		**$11.95**
A147-11	1000 watts	146-148 MHz		**19.95**
A220-11	1000 watts	220-225 MHz		**17.95**
A449-6	1000 watts	440-450 MHz		**11.95**
A449-11	1000 watts	440-450 MHz		**15.95**

(F) FM TWIST: A Cush Craft exclusive — it's two antennas in one. Horizontal elements cut at 144.5 MHz, vertical elements cut at 147 MHz, two feed lines.

A147-20T 1000 watts 145 & 147 MHz **$39.50**

IN STOCK WITH YOUR LOCAL DISTRIBUTOR

Cush Craft CORPORATION

621 HAYWARD STREET
MANCHESTER, N.H. 03103

KØHTF upon receiving his Education Specialist's degree this summer at Drake. WØNFL is ready for the winter 160-meter season with a new 90-ft. tower supporting his skywires. Am most pleased to report the official "burying of the axe" with the formation of one Iowa 75-Meter Net which has two sessions rather than the former system.

Net	QNI	QTC
Iowa 75 Meter (noon)	1346	121
Iowa 75 Meter (eve)	920	24
TLCN	139	46

Traffic: KØDDA 317, KØAZJ 141, WAØAUX 131, WAØVZH 53, WA3PWL/Ø 39, WØLCX 35, WAØTAQ 34, WBØDBG 17, KØYVU 15, WØBW 12, WØWSV 10, WBØTFW 6, WØMOQ 6, WAØZVF 2.

KANSAS – SCM, Robert M. Summers, KØBXB – SEC: KØJMF. PAMs: WØGCJ, WBØBCL. RM: KØMRI. VHF PAM: WAØTRO. We all will miss the Silent Key of WØGWY. Our deepest regards to his family. WØCY has been working Oscar 6 since last June and just reported to AMSAT: 41 states confirmed – DX worked include: G,GM,LA,XE,8P6, VE,PJ9,KH6,KL7,FP8. The Tornado which tore up Clay Center and area surrounding, left quite a trail of activity by Kans. amateurs. I hope by next month all the information has been formulated so we can get a few details into this column. Sorry that I was not available at the time, the XYL and myself were on the East Coast. We will have a listing of all the events received from ECs and anyone else sending in reports. Sept. Net activities: OKS ONI 556, QTC 287; OKS SS QNI 271, QTC 293; Mid-States Mobile Monitor Service QNI 1356, serving 61 mobiles, handling 101 phone calls or patches and 118 QTC of which 40 were of emergency nature during the tornadoes, KSBN QNI 734, QTC 77; KPN QNI 222, QTC 23. Let me hear from you often. Traffic: WØOYH 270, WBØGVR 228, WNØJIO 190, WNØJFJ 173, WØHI 144, WNØHZZ 144, KØMRI 109, WNØITR 108, WBØIBM 107, WAØZTW 90, WØCHJ 80, WØOF 77, WØPB 75, WBØFGV 64, WØNEE 62, WBØCZR 61, WØGCJ 50, WØMA 48, KØJMF 41, KØBXF 39, WAØKDP 39, KØUVH 25, WBØCUY 24, WØFDJ 20, WAØSUV 20, WNØKWI 16, WAØSRQ 16, WØRBO 15, KØYIA 12, WAØOWH 6, WAØSXR 2, WAØWJX 34.

MISSOURI – *SCM, Larry S. Phillips, KØVVII – Asst. SCM,* Clifford E. Chamney, KØBIX. SEC: KØBIX. New appointments: KØAHL, WAØFKD, KØLVR, WØOTF, KØTVO as ECs; WØLAP as OPS/OVS; WBØFKY as OPS/ORS; WØEOE as EC/OPS; WAØRAD as PAM.

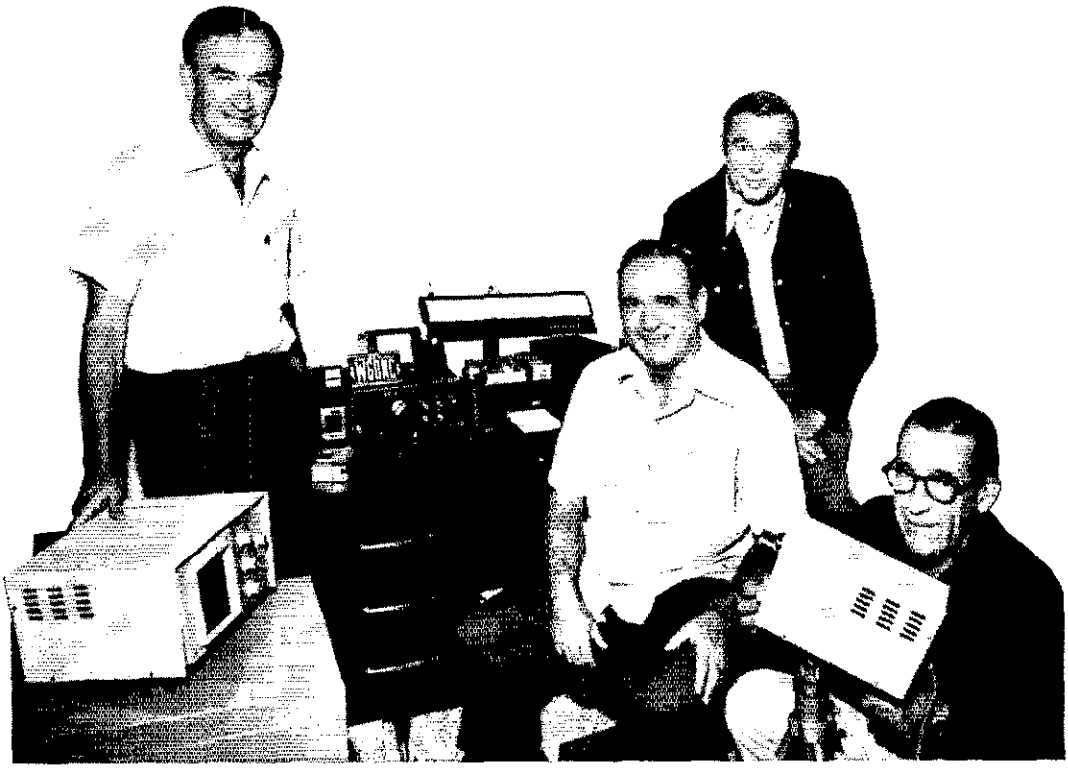
Net	Freq.	Time(Z)/Days	Sess.	QNI	QTC	Mgr.
MOSSB	3963	2300 M-S	25	1017	140	KØPCE
MOPON	3963	2200 M-S	25	675	60	WAØTAA
HBN	7280	1705 M-F	21	297	28	WØGQE
MEN	3963	2230 MWF	12	232	11	WØNUT
MON	3585	0000 Dy	30	214	118	WØBV
MON 2	3885	0245 Dy	30	158	77	WØBV
PHD	50.45	0130 T	4	71	11	WAØKUE
MOAREC	3963	2245 M	4	51	0	KØBIX
MOCN	7273	1705 M-F	15	59	10	WAØRAE
MSN	3703	0030 M-S	5	8	3	KØBIX

I would like to thank the amateurs who turned out for our first AREC planning meeting for this section. We had 24 ECs report this month with a total of 119 members active. Congratulations to WØKNF and KØRWG as new asst. ECs. All college club stations are invited to report in to the Missouri College Net on 7273 kHz at 1705Z. For chess fans WØFFF and WAØWQA are hard at play on 7273 after the MOCN Net. With regret I report KØPKA as a Silent Key. Congrats to new General Class WAØGYX. Anyone interested in an AREC or EC job are invited to contact KØBIX. Traffic: KØON 972, KØAEM 192, WØBV 183, KØBIX 144, KØVVH 63, WØOU 57, WAØVBG 57, KØPCK 54, WAØEMD 42, WØRTW 34, WBØCE 32, WAØTAA 29, WØEPI 28, WAØYNC 23, WAØFKD 18, WAØKU 13, WØRTO 12, WBØFOM 11, WØGBJ 11, WAØWQA 8, KØAHL 6, WØFOE 6, WAØEMX 4, WBØFKY 3, WØCBL 2, WØJKF 2, WAØJO 2, WAØCXI 1.

NEBRASKA – SCM, V.A. Cashon, KØOAL – Asst. SCM: Velma Sayer, WAØGHZ. SEC: KØODF. New appointments: KØSFA as OBS and WØWKP as OBS. Endorsements: WAØBOK and WAØOQX as ECs; KØHNT, WAØLRQ and WAØBOK as OPSs.

Net	Freq.	GMT/Days	QNI	QTC	Mgr.
NEB I	3700	0000 Dy	54	10	WAØGH
NSN I	3982	0030 Dy	932	20	WAØLO
NEB II	3700	0245 Dy	20	8	WAØGH
NMN	3982	1230 Dy	1272	21	WAØJU
WNN	3950	1300 M-S	409	7	WØNI
AREC	3982	1330 Sn	225	1	WØIR
CHN	3980	1730 Dy	1080	29	WAØGH
SHN	3950	1830 M-S	169	1	WØDI
NAN	3989	2000 M-F	281	9	WAØAU
NSN II	3982	2330 Dy	1223	20	WAØLO

Meet the 2 meter SSTV Gang.



From left Bill Arrasmith, W6TEZ, Judge William Ritzi, W6ONC, Judge Pearce Young, WB6HWY
Byron Paul, WA6RNG (Executive Producer of the New Dick Van Dyke Show)

that's right... 2 meter SSTV

Shown above are four hams who have had so much fun working SSTV on 2 meters and 220 that we asked them if they'd make a few comments about it for one of our ads.

We went up to Los Angeles (where they all operate) and chatted with them a bit. They all agreed that one of the biggest enjoyments of working 2 meter SSTV is the new dimension it adds to 2 meters, far more interesting and creative than operating radio alone.

They noticed a steadily increasing SSTV activity on 2 meters, observing that there must be 50 or more operators working SSTV on 2 meters or 220 in LA alone.

One observed that working DX doesn't offer the challenge it used to, since you can buy all the power you want, ... "So where's the challenge. SSTV is the new challenge!"

They work a schedule once a week or so, and have little problem in raising SSTV contacts. "In fact, everytime we get on the air," Judge Ritzi noted, "we have break-ins from a lot of hams wanting to know more about SSTV."

And a bit of information that hadn't occurred to us; their families really get interested in SSTV. They all enjoy it, and often work together preparing the art work and pictures for the production of their 'TV' shows.

We were very grateful for their comments, and, for the time they gave to us. Thank you gentlemen.

We can't guarantee that you'll appear in one of our ads when you begin working SSTV on 2 meters, but we're pretty sure we can guarantee you as much enjoyment as our "2 meter SSTV Gang" from Los Angeles.

For details, and complete literature on Robot's SSTV equipment just write to us.

See you at SAROC.

MODEL 70A MONITOR **$295**
MODEL 80A CAMERA **$295**
MODEL 61 VIEWFINDER **$239**

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All Robot equipment carries a one-year warranty. Four easy ways to purchase: cash, C.O.D., Master Charge, BankAmericard

ROBOT RESEARCH INC. 7591 Convoy Court, San Diego, CA 92111 Phone 714 279-9430

Ak-Sar-Ben RC held their Hamfest/Steak-Fry in Sept. at Missouri Valley Park in Missouri Valley, IA. Regretfully WØBOQ and WAØEMC have joined Silent Keys. WBØLBI new ham in Gordon and WBØHYR in Imperial. Speedy recovery to WØPQP, KØHNT, WAØJUP and WØLOD. WAØGAT has new crank-up tower. WØDMQ spent several weeks traveling VE-Land, made a few hamfests along the way and attended the Calgary Stampede. Nice hearing KØUWK, WAØSCP, WØCXH and WØFZZ back on the air. WAØGHZ took over NEB and is doing all in her power to keep the net from folding. More participants are needed. West Nebr. Tech ARC preparing to erect 20-meter beam tower. Final preparations have been made for Midwest Division Convention at Lincoln. Traffic: WØHTA 74, WØGEQ 51, WØHOP 30, WØSGA 30, WAØCBJ 29, WØDMY 19, WØFOB 19, WØAFG 18, WAØQEX 14, KØDGW 12, WAØPCC 11, WØVYX 11, WAØEEI 10, WØJDJ 10, WAØOQX 10, WØNIK 8, KØSFA 8, WØWKP 8, KØJFN 7, KØOAL 6, WØGKK 4, WAØJIH 4, KØMUF 4, WØMW 4, KØODF 4, WØLFJ 3, WAØYGZ 3, WØIRZ 2, WØLWS 2, KØPIK 2, WØRJA 2, WØYFR 2,, WØLCE 1, WAØLOY 1, WAØRSK 1, WAØGHZ 10, WAØGAK 1.

NEW ENGLAND DIVISION

EASTERN MASSACHUSETTS – SCM, Frank L. Baker, W1AEF – Note that I have a new address: 65 Beechwood Rd., Halifax 02338. SEC W1AOG received reports from ECs: WA1s QEK, DXI W1BAB; K1s NFW, ZUP, CCW. It was good to meet so many of you at the Hyannis Convention, also to see so many of the ARRL Directors, including our Canadian Director, WN1OIM. W1GDP are Silent Keys. W1BTL writes from Denmark. Our sympathy to K1ZZY on the death of his wife. W1SZB moving to P.I. I. WA1PLN moving to Nova Scotia. K1DXY in West Germany. W1WK spoke about Satellite Oscar at the South Shore Club. W1EIH discharged from USAF, now a physician and on the air with a Swan-260 W1PEX made BPL. Ex-K1WQG writes from Tex., waiting for a W5 call. K1OQX, mobile, has 158 and 155 confirmed for DXCC. W1AAO writes he gets on 40, W1MPP and K4RO celebrated their 25th anniversary by getting married again by W1LIM. K4VII ex-W1GM writes and says hello to all. W1MD had XF3LK, D2WTC CP8AB at his QTH. W1NF had eyeball QSO with W5LFL on Sky Lab. W1ULJ active again with a Heath 2-meter fm rig. W1NJL visited W6DGH. WN1RTD made BPL, needs K7 for WAS. W1CE has a KW after 38 years. WA1HGL is Asst. mgr. for MPON on 50.63 at 0030 GMT. WA1PGY has 45 for WAS. WA1ROG has General. WA1MXV back to school at SMU. EC WA1NRT has a station at CP Hq. WA1REF has a TR-2200 on fm and active on 20 cw. WA1SJR won copying Bee at Hyannis. PSHR: WN1RFD, W1CE, WA1s PGY MSK, MXV. W1AOG suggests all EC's should have an antenna at their hq. for 75 meters; many nets in N.E. are on this band, 3945 especially. W1FHS feeling better. New officers of Town of Barnstable RC: WA1MWL, pres.; WA1NZW, vice-pres.; W1LES secy.-treas.; W1s AED, ARU, dir. WA1IFF reports Pea Soup Net is on at 0200 GMT Tue. nights. VE2VW has two sons going to Harvard. Congrats to WA1s KZT, NRV upon receiving the "Ham of the Year" award at the Hyannis Convention. W1BB got married. YO3EY visited W1PL, K1VKW/4 in GA. W1ABC is the new PAM for 2, WA1SJR new ORS. Endorsements: W1CE as ORS; W1OMN as EC; W1NJL as ORS/OPS. Capeway RC met at W1ANB's. T9 RC met at W1IIB's QTH. Chelmsford ARC had a field trip to Millstone Radar Facility in Westford; classes started Oct. 7 for Novice and Tech. DL2AA spoke at the Massasoit ARA on operating in Europe and they held an auction. Framingham RC had a talk by Mr. C. Chandler on Electronic Bugging and Debugging.

Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Mgr.*
NEEPN	3945	0830 Su	115	5	K1EPI
EM2MN	145.8	2000 M-F	107	79	WA1OWC
EMN	3660	1900/2200 Dy	312	156	WA1MSE
NENN	3720	1830 M-W-F	48	12	K1PNI

Traffic: (Sept.) W1PLX 605, WN1RFD 395, WA1MSK 227, WA1GL 163, WA1OWQ 112, W1CE 101, WA1PGY 78, WA1ROG 70, WA1MXV 53, WA1NRT 52, W1EMG 31, W1ABC 25, K1EPI 24, WA1IFF 10, WA1EYY 9, WA1FNM 8, WA1REF 8, WA1SJR 1 (Aug.) W1QYY 108, W1EMG 61, WA1NRT 57, W1PJ 14, WA1HGC 9, K1EPI 8. (July) WA1NRT 53, (June) WA1NRT 50.

MAINE – SCM, Peter E. Sterling, K1IFV – STC: K1CLI PAM: K1GUP. RM: W1BIG. W7CWY now operating from Belfast and hopes to have a W1 call soon. WN4EIR of Pensacola, Fla. now operating from Freeport, Maine. I am very sorry to report the passing of W1AWY of Brewer. He will be missed by many hams in the state. The Kezar Lake ham picnic was held Aug. 5. The affair was well attended as usual and weather was perfect. W1CTR and XYL visited W1GWT, WA1FLG and W1CZ during their Aug. vacation. W1HHO has gone to IBM school in New York. W1QI

moved to Steuben, hopes to be active soon. 127 hams attended the Abbott Hamfest, a good time was had by all. The Barnyard Net reports 27 sessions, 803 check-ins, 2 traffic for Aug. (Sept.) 25 sessions, 692 check-ins, no traffic. New hams in Maine are WN1SHP, WA1SHH, WN1SIM, WN1SKL, WN1SLB. Congratulations, fellows. Still looking for news, any tidbits are welcome. The Streaked Mountain 28/88 repeater is still down for its fall checkup. Traffic: (Sept.) K1TEV 1, (Aug.) WA1NKE/1 10, K1TEV 9.

NEW HAMPSHIRE – SCM, Robert C. Mitchell, W1SWX – SEC: K1RSC. RM: W1UBG. The new RM for Alaska is KL7HRK alias WA1JTM, KG6JBS and numerous other calls. W1CMV runs the astronomy group on Wed. nights between 3950 and 3960 at 2300Z. W1DXB, WA1JSD and WA1LHH were in the VE/W contest. W1JSM worked his 30th state on 2 meters plus 25 countries through Oscar. He would like other NH stations to work Oscar. W1EUJ has moved his new forty-four-element beam to 160 feet. K1AEG has a new camper for mobile work. W1UBG's NHVT Net report shows 134 check-ins and 109 traffic for Aug. compared to 69 and 47 for Sept. WA1SCF was NCS of D1RN for 5 sessions. W8AQ visited W1UBG after many pleasant QSOs. Don't forget the NHVT Net now meets at 6:30 P.M. local on 3685 kHz. Not much news this month. Merry Christmas and a Happy New Year to all. Traffic: W1UBG 82, K1YMH 66, WA1MXT 61, WA2SCF 13, K1PQV 11, W1MHX 6, W1CMV 6, W1BYS 4, W1SWX 2, WA1JSD 1.

VERMONT – SCM, James H. Viele, W1BRG – SEC: W1VSA.

Net	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
VTSB	3909	2300 M-S 1230 Su	534	158	WA1HGL
VTPO	3909	2300 Su			K1BQB
Carrier	3935	1400 M-S	381	9	W2DSK
Green Mt.	3932	2200 M-S			W1JLZ
Vt. Phone	3932	1330 Su			W1KKM

1973 International Field Day at Charlotte was usual big success. New officers of Burlington ARC are W1FIS, pres.; WA1OLW, vice-pres.; K1RMI, secy.; W1BRG, treas. Trophy winners in 1973 Vt. QSO Party were: out-of-state, K4YXJ, Miami, FL and Vt. section, W1AYK, Starksboro. Thanks to Peter Kragh and all who participated. K1CEG, formerly of Burlington, was buried there in Sept. More VT stations needed on VTSB net. Many requests for VT schedules to complete WAS. If you are willing to help, either phone or cw, let your SCM know and he will advise interested stations. Traffic: (Sept.) WA2DGZ 25, (Aug.) WA2DGZ 61.

WESTERN MASSACHUSETTS – SCM, Percy C. Noble, W1BVR – SEC: WA1DNB. CW RM: W1DVW. 75 Meter PAM: WA1ITL. UHF/VHF PAM: W1KZS. WMEN held 5 Sun. sessions with QNI 83, traffic 15. AREC Repeater WA1KHC (13/73) now holding formal sessions Mon.-Fri. at 5:15 P.M. K1SSH resumed activity as Worcester Co. EC. WMN held 30 sessions with QNI 165, traffic 129. WMPN held 20 esssions with QNI 210, traffic 21. Berkshire Co. ARFC held two sessions (Repeater K1FFK) with QNI 24, traffic 2. All nets quite active – see previous issues for frequencies, days, and time of operation. New AREC members: WA1RLP, WA1MYK, WA1MJE operated from KJ3BSA during Boy Scout Jamboree. W1ZPB suffered terrific damage to all his equipment by near hit during lightning storm (all equipment was grounded and unplugged too!). Now using 2-watt rig and QSO Europe is easy! OO K1VHC has a new SB-303 receiver, he sent out 10 notification forms. CMARA says the club now has 76 members. HCRA reports with regret, the passing of K1CEG. The monthly meeting featured W1HDQ. NOBARC says the participating members received sincere thanks from the Executive Dir. and the secy. of the Pittsfield Red Cross Chapter for their excellent work during the W. Stockbridge tornado. Voice of Lincoln says many members assisted the Audubon Society in its Hawk Watch. In addition to WA1KHC: WA1KGQ, WA1KHA, K1FFK and 75 m. Good technical articles in their bulletin. Traffic: (Sept.) W1TM 151, W1DVW 104, W1BVR 74, WA1LNF 66, WA1OUZ 35, W1KK 22, WA1LPJ 22, WA1MJE 13, WA1QON 9, WA1FBE 6, W1KZS 3, WN1QHR 1. (Aug.) WA1MJE 8.

NORTHWESTERN DIVISION

ALASKA – SCM, Roy Davie, KL7CUK – Net participation is increasing. A new CW net called AKW Net meets on 3745 kHz 7 days a week 0400 GMT. Net mgr. is KL7HRK. Give it a try, enjoy some good cw QSO with old friends. Emergency planning is progressing as planned by SEC KL7HFM and EC KL7JDO for Kodiak area. KL7BJW is the new OO for Central Alaska. OBSs are really getting out the information to the field. Anchorage repeater is back on. KL7HOH reports that Anchorage has an autostart TT

Net on 145.5 MHz. It uses am with narrow shift AFSK. The antenna is vertically polarized. Keep your reports coming in. KL7GCH has a new vertical on 75. KL7FKO and others got in on a search for a two and half year old boy lost in the Anchorage area. KL7DG is active on 7085 and 14085 kHz with QRPP at 0500 and 0800 GMT. The Kodiak Snipers Net had 189 check-ins for 26 days of Sept. Congratulations. Traffic: (Sept.) KL7GCH 18, KL7HER 4. (Aug.) KL7GCH 11, KL7HMU 8, KL7HER 7, KL7HRK 3.

MONTANA – SCM, Harry A. Roylance, W7RZY – Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR. W7OIO has been in the hospital and sure glad he is out. W7DEO reports RTTY is being planned for 2 meters in Great Falls. New hams in Butte are WN7VXK, WN7VXL, WN7VXM and WN7VXN. K7BON and WA7QBN are the editors of an FB monthly news sheet with facilities to buy and sell ham gear. Several of the two meter repeaters are down at present. K7CCZ is on two with one of the phone company rigs as is W7OTJ and WA7MTH. Montana Traffic Net 784 check-ins, 31 formal traffic and 19 sessions. The IMN had 60 check-ins, 22 pieces of traffic and 19 sessions. The Spark Gap Society of Eastern Montana College is active with school starting. WA7HAG spending the winter in Las Vegas. Appointments for this month are K7LTV as OO; K7CHA as asst. SCM and OVS; W7RZY as OVS; WA7IZR as EC and PAM; W7JRG, W7OIO as OVSs; W7TYN as SEC and OVS; K7PFQ as EC. Traffic: WA7KMP 13, WA7KHM 2.

OREGON – SCM, Dale T. Justice, K7WWR – SEC: W7HLF. RM: K7GGQ. PAM: K7RQZ. Section net reports: WA7RWM reports for AREC Net for Sept. sessions 30, check-ins 379, traffic 7, contacts 44, K7OUF reports for OSN sessions 30, check-ins 131, traffic 110. W7FFE reports for Nuclear Net sessions 5, check-ins 25,

Net	*kHz*	*Time(Z)/Days*
OSN	3585	0245 Dy
BSN	3908	200/0130 Gy
AREC	3993.5	0300 Dy
OEN	3980	0200/0300 Dy
Nuclear	50.25	1730 Su

Also, the Portland area AREC net meets on 145.35 (am) and 146.64 (fm) at 0330Z Tu-Sat, simultaneously. K7ZYE had a nice write-up in the Springfield News. Traffic: (Sept.) K7IFG 193, K7OUF 171, W7ZB 127, WA7JUH 56, WA7NWV 55, K7QFG 45, W7DAN 33, WA7MOK 16, K7WWR 10. (Aug.) K7NTS 155, W7DAN 16.

WASHINGTON – SCM, Mary E. Lewis, W7QGP – SEC: W7IEU. RM: W7JWJ. PAMs: W7PWP, K7OUV. VHF PAMs: K7BBO, K7ERD.

Net	*Freq.*	*Time(Z)*	*QNI*	*QTC*	*Sess.*	*Mgr.*
WSN	3590	0145	280	209	30	K7QZA
NTN	3970	1830	1396	157	30	W7PWI
WARTS	3970	0200	1376	178	30	W7QGI
NSN	3700	0200	244	117	30	WA7OCV
NWSSB	3945	0230	928	129	30	K7OUV

Correct NTN's Aug. report to QNI 217 and QTC 84 per WA7OCV. W7IEU newly appointed SEC is trying a 460-ft. end fen antenna. Will have SET drills on second AREC net each month. W7DKJ/7 Tacoma ARC with 37 operators operated a ham station at Puyallup Fair. W7VF/7 Bremerton ARC operated a ham station at Central Kitsap Mall in Silverdale for Amateur Radio Week; ops were W7DAZ and WA7KGT and WA7OBS. K7PFR has restarted the A4-F2 net on 145.35 at 0400Z on Mon. If you operate FAX and or RTTY here is your net. WA7BDD has moved from Hayden Lake, Id. to Spokane, Wa. W7DNU has returned to Tacoma area from WA6-Land, and K7AWB has returned to Spokane from Ore. Welcome back fellows and Joan. W7JFR and WA7UJI are taking their trailer on a trip to Mexico. K7NWS/7 Boeing Employee Amateur Radio Search & Rescue group had two call-outs this month to assist sheriff depts. with radio communications for lost hikers, one in Miller River Area near Skykomish and the other in Mount Christo, both very rough terrain. If 58 years indicate a devotion to a cause then W7OS of Tacoma is devoted; that is the number of years he has enjoyed our great hobby. W7OS has been doing some research and he said Tacoma RC is rated oldest such organization in the world. Traffic: (Sept.) W7PI 414, W7DKJ/7 329, WA7OCV 255, K7OZA 167, W7DPW 119, W7GYF 99, W7QGP 81, WA7BDD 71, W7BUN 54, W7APS 53, W7PWP 31, W7BQ 27, K7OXL 26, W7IEU 23, W7IFR 18, W7AXT 17, W7QCV 10, W7AIB 3. (Aug.) K7OZA 72, W7AIB 6.

PACIFIC DIVISION

EAST BAY – SCM, Charles R. Breeding, K6UWR – SEC: WB6RPK. This is my first activities report as SCM. See page 6 fo

QTH. Keep the reports coming. Our thanks to WB6DHH for his fine work as past SCM. The Alameda County Emergency Corps is really on the move. Those interested contact WB6RPK. The Hayward Club holding Novice classes and meetings are on the 2nd and 4th Fri. at 24400 Amador St., Hayward. The Mt. Diablo ARC also has Novice classes. Contact VE2AQV/W6 at 689-5093. Regular meetings are held at the Red Cross Bldg. in Walnut Creek on the 3rd Fri. New Novices in Fremont are WN6YCD and WN6YCE. Congratulations. Congratulations also to WB6YBE on his new General ticket. W6IPW back after a month in Europe; back from Itlay is W6FDV. W6QVI reports trying all kinds of new wire antennas with good results. Traffic: WB6VEW 11.

HAWAII – SCM, Lee R. Wical, KH6BZF/K8HQR – SEC: KH6BZF. RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. *SRC: KH6FOX. QSL Mgr.: KH6DQ.*

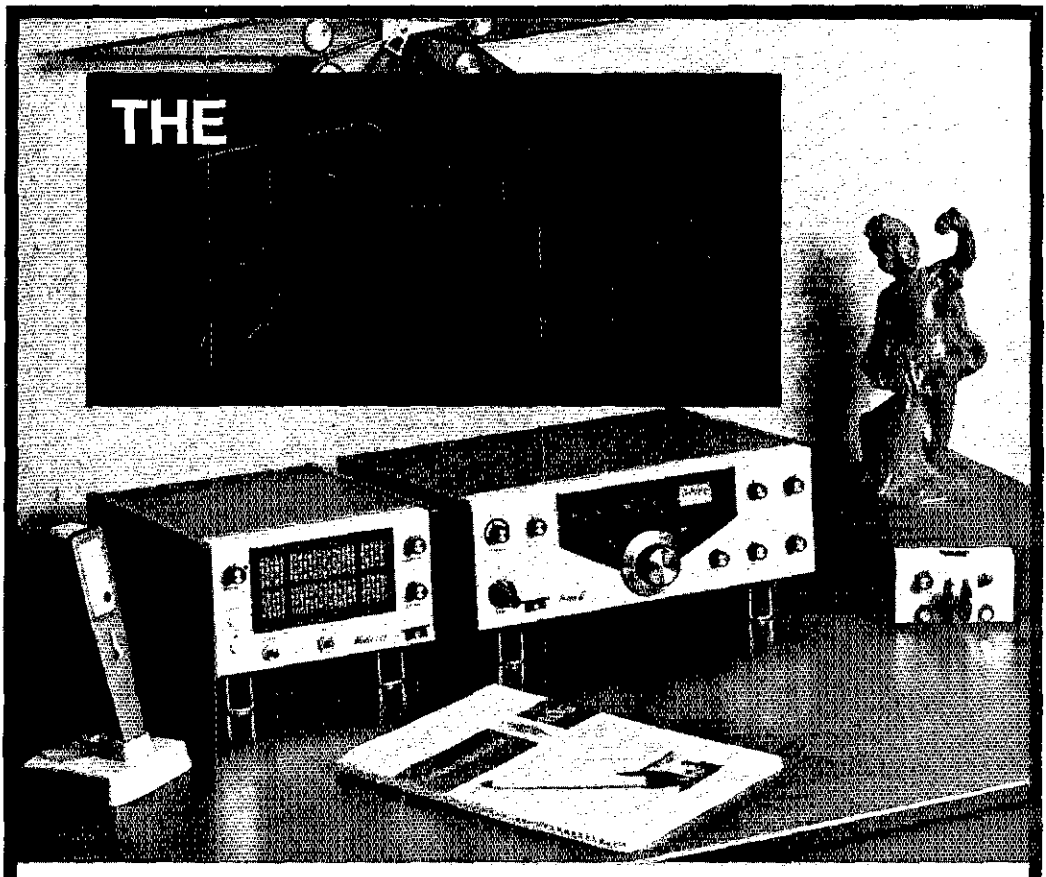
Vets	*MHz*	*Time(Z)/Days*
Hey Bruddah	21.295	2000 S/Su
Friendly	7.290	2030 All
Confusion(patches)	21.400	2330 MWF
Pacific Interisland	*14.305*	*0800 All*
S.E. Asia	14.320	1230 All
Moonbounce	21.430	2200 S
Marine Corps	21.430	1900 All
Calif/Hawaii Tropo	14.225	0400 All

Circle your Calendars – upcoming – don't forget 1974 ARRL SET Jan. 26 through 27 1974. Contact your SCM for details. He's listed on page 6. Be prepared. Remember: preparedness is something no emergency should be without. KH6BWT has returned after another sojurn to the Mainland. He touched base with ex-Hawaiian, WØPAN, who's the Dak. Division Dir. Newsworthy note: Big Al, W6MHA has retired from work and the Confusion Net which he's run for so many years so effectively. He has applied for W7GYR his old call and relocated on 7 acres near Sandpoint, Idaho. W6FZJ and *KH6BZF are still doggedly trying to break through on 432 MHz* Cal/Hawaii Tropo. Ditto K6YNB and KH6BZF on 220 MHz. KH6GHZ reports he put up a new Hy-Gain 18AVT/WB. KH6DE reports he's enjoying his retirement. I'm presently achieving my WAFET award. (Worked All FET's). May 1 wish you and your families *all the Best of Holidays and "MELE KELIKIMAKA" to all.*

NEVADA – SCM, Harold P. Leary, K7ZOK – SEC: WA7BEU. After 8 weeks WA7TYY received Advanced Class license. W7OK is chasing DX on 20 meters. WN7WMZ and WA7WMY are new calls in the Las Vegas area. W7JRW is installing new tower. K7ZQV recently passed Extra Class exam. WA7ECT commutes to Hawaii on job. K7JPC is building new 2-meter final. W7VYC has new position at Stardust. K7NOM is looking for contacts on 220 MHz in Reno area. Hams at UNR better be good. WA7KQS is on Police there. WA7OZP and WA7KCD have HW-202 on 2 fm. WA7RPS is student at UNR, also WA7OZG. W7IAD and others assisted with communications at Reno air races. K7VYT is teaching Radio Broadcasting at Reno HS. W7IZI and XYL WA7TTH recovering from Red Rock fires. Send reports to SCM by first of month. Nevada CD net meets at 1900 local time on Mon. Traffic: W7ILX 83, WA7TYY 10.

SACRAMENTO VALLEY – SCM, Norman A. Wilson, WA6JVD – SEC: W6SMU. The RAMS conducted a successful garage sale with *proceeds to help finance their annual dinner dance. Congratulations* to WB6MDP on his Extra Class ticket. Tom reports working on a QRP WAS with 2 watts and has added an external VFO to his Swan for DX work. The seven-element 15-meter yagi at WA6OWH now assists him with his new appointment as an OO. Any more volunteers? W6NJU/6 is now on the air with an 80-meter dipole. W6NHA has been retired in favor of K6ZY. WA6JVD is building a 10-meter amplifier preparatory to the new 10-meter contest in Dec. (see rules in the Nov. issue). W6TID and W6TFH have started a code and theory class at McClellan AFB. W6KYA placed first in Calif. in the New York QSO party and along with several other SV stations were very active in the Calif. QSO party. The Sacramento ARC meets each second Wed. at 8 P.M. in the Red Cross Building located at 13th and G St. in Sacramento. Traffic: WA6OWH 4, K6KWN 2 WB6MDP 2.

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6JPU – After many years of faithful service WB6TFU has resigned as EC for Fresno County, because of other commitments. Thanks for a job well done. *W6YFP has accepted the job as EC for Fresno Co.* W6PSQ has 197 countries. WA6WXP has reached the 300 mark. W6FZJ made a very interesting talk at the Fresno ARC on Sept. 14 1973. WA6BUH is busy keeping the 34-94 repeater on the air. W6YEP is also assisting in keeping the various repeaters on the air. *W6UBK is mobiling on 40 meters. WA6NIF heard on 2 meters fm.* The Fresno ARC assisted the Kerman Festival with com



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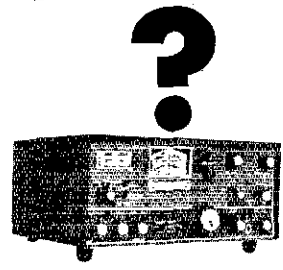

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munications. The Delta Amateur Radio Club is using 146.52 as a simplex channel on 2 meters fm. WA6UAA is editor of "The Arc" the Delta Amateur Club's paper. W6BWM chasing DX. K6OER recuperating from a broken hip. W6OWL has a new Clegg 2-meter fm transceiver. I would like to take this opportunity to wish each and everyone of you a very Merry Christmas, and may it be the best ever. WB6HEF now located in Lodai. WA6RXI has a new 14XB and R4B. WA6SCE reports not doing so good in Reno and Las Vegas. Traffic: WA6SCE 53, WA6RXI 9, WA6CPP 1.

SANTA CLARA VALLEY – SCM, James A. Hauser, WA6LFA – SEC: WA6RXB. RMs: W6BVB, W6RFF, W6RSY made BPL this month. W6YBV and W6DEF made the Honor Roll. W6BVB reports that NCN had 689 QNI, 324 pieces of traffic in Aug. W6RFF and yours truly are both QRL with business. Another father-son combination in the section W6MMG and son WA6NDN with a new General. Congrats! Traffic: W6RSY 687, W6YBV 188, W6BVB 141, W6RFF 78, WB6IYA 68, W6NW 62, W6DEF 52, W6AUC 43, WA6HAD 29, W6QNB 15, W6KZJ 6.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Chuck Brydges, W4WXZ – PAM – WB4JMG. VHF PAM: K4GHR. RM: WB4ETF. Over one thousand attended the Roanoke Division Convention at Reston, Va., over 40 at the banquet. ARRL Pres. Dannals, W2TUK and former Ambassador Armin Meyer, W3ACE were featured speakers. The father & son team W4OFO/WB4UOU continue a fine job covering Eastern NC. A new HW12 is in UOU's mobile. The Mt. Pisgah Repeater (WA4BVW 16-76) handled urgent traffic for campers in Western NC. The Asheville area also had good 2-meter openings to the Carolina Coast. WB4ZTT now Extra Class and will be active from Charlotte. The Charlotte ARC (W4CQ) had a mini-Field Day and picnic at Lake Norman. The Cape Fear ARS News featured, in addition to club activities, a copy of the National Electrical Code on Grounding which ALL of us should read – SWITCH TO SAFETY. New officers for the Cary ARC are K4FBG, pres.; WB4AXO, vice-pres.; WB4MGB, secy.-treas. A new 10-meter Emergency Service Net is on 28650 kHz Wed. nights at 0100Z for the Hickory area, check with WB4AVG. WN4FWB is active on the NC Novice Net. The NCNN now on 3720 kHz at 9 P.M. local. A bulletin for NCNN is being issued by WB4UOP and after 10 QNI Mike will send you a Net Certificate. The Carteret-Craven ARC had newspaper coverage on the history of their group and on their installation of officers meeting. WB4ICF now KA6SD on Okinawa and looking for old buddies on 20 meters, 14320 to 14330 kHz. The EC for Wayne Co. WA4DLF is doing a fine job organizing that area, many thanks. And many thanks to the Greensboro and Charlotte groups for nominating me for SCM, I hope I am worthy of your confidence. Merry Christmas and Happy New Year. WA4JCS has a new gal harmonic. Traffic: (Sept.) W4WCG 127, K4MC 93, W4OFO 7[illegible] WB4UOU 51, W4WXZ 38, WB4OXT 30, W4ACY 23, K4EZH 2[illegible] WB4AVG 17, K4KH 13, WA4KWC 12, K4VBG 9, W4EHF [illegible] WB4HDS 6, WN4FWB 3, WA4VNV 3. (Aug.) WB4TNB 10, WB4VSA 11, K4KH 3. (July) K4KH 3.

SOUTH CAROLINA – SCM, Joseph Rubin, WB4CBJ – WB4CBJ has resigned effective Oct. 22. The following written by *SEC WA4ECJ as temporary asst. SCM. Complete section records* not being available at this time, all appointees are asked to continue serving and to stand by for endorsements until we can get new permanent leadership. An interim SCM will be appointed by HQ pending an election. Urgently needed: One or more experienced hams willing to work hard to pull this section together. Several candidates and a spirited campaign would be a healthy sign that rigor mortis has not yet set in. Don't let apathy paralyze our section. This is no time for blushing-violet modesty, for if we can't govern ourselves, someone else will surely do it for us. See Oct. QST editorial re elections, and apply it to our SCM situation. K4LNJ and WB4KNB as RM and PAM respectively are asked to bend every effort toward improved liaison. All section members are hereby called upon to help. Don't wait to be asked, Volunteer! The OO especially needs you. W4PED advises the N. Augusta repeater is on the air, 146.13 in, 146.73 out. K4LNJ reports 11 Union Countians active on 146.97. Glad to hear K4PQJ back with SSBN again. Welcome the following new hams: WA4FDK, WA4GFL, WN4FGR, WN4FGR and WN4FSJ. WB4VZN ran into a deer on way to Key *Hill hamfest. No injuries. Damage to car $300. Deer got away. SSB* shows trend of fewer stations but more traffic. It's Sept. total is 7[illegible] check-ins with 117 messages handled.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A. Martin, Jr., W4THV. SEC: WA4PBG. RMs: WA4SMR, W4SQ

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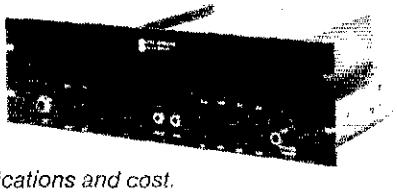

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W4SHJ, K4EBY, PAM: W4HIR. The Convention at Reston was excellent – our thanks to NOVARC. Regret that WA4EPH had to resign as mgr. of VFN. Congratulations to K4ZRX and XYL on new harmonic. Vienna Wireless Society sponsoring Cystic Fibrosis Collection and considering sponsoring an Explorer Scout group. W4HU spent three weeks in West Africa. Loss of Mod Squad to school is hurting the nets. Look for WA4CGX/4 moving to Norfolk from Jacksonville, Fla. W4JUJ received "Wheat City" award from Brandon, Manitoba. W4DM reports slowly getting active again. WB4WLK has graduated from raingutter to 150 foot wire. New PVRC officers: W4YZC, pres.; K1LPL/3, vice-pres.; WB4BGY, secy.; W4WSF, treas. W8VDA/4 says he can hear more than he can work with new 2-meter preamp. W4MK reports band conditions improving. VSBN/VSN QNI 822/217, QTC 240/95. RM WA4SMR has VSN on computer! K4VIG back on air after rig problems. K4JM reports visiting CO 4RN and EAN. Counties WA4WQG 3055, W4JUJ 2895. Ex-PAM WB4RZW with WB4KSG getting K4KDJ back on at VPI.

Net	*kHz*	*EDST/Days*
VSMN	3947	0715/16.30 M-F
VSBN	3947	1800/2200 Dy
VSN	3680	1830 Dy
VN	1680	1900 Dy
VFN	3947	19.30 Dy
VRN	3625	2000 Dy
VPON	3905	2215 D

Traffic: (Sept.) W4SQO 335, K4KNP 210, WB4SGV 190, W8VDA/4 170, K4IAF 145, W4UO 117, WA4SMR 106, K4JM 104, W4YZC 79, W4KFC 36, K4GTS 41, K4KDJ 34, K4EBY 33, WA9MWF/4 32, W4TL 30, K4KA 29, K4GMH 28, WA4PBG 28, WB4KIT 25, K4VIG 21, WA4EPH 16, K4KDJ 15, WA6RSH/4 9, W4MK 6, W4KX 4, WA4WQG 3. W4DM 2, WB4WLK 2. (Aug.) W4SQO 120, K4EBY 17, K4GTS 14.

WEST VIRGINIA – SCM, Donald B. Morris, W8JM – SEC WA8NDY, RMs: W8HZA, WB8BBC, PAMs: W8DUW, W8IYD, CW Net Mgr.: W8HZA, Phone Net Mgr.: WB8DQX. CW Net, 3570 at 0000Z daily and Phone Net, 3990 at 2300Z. Congratulations to W8DUV on receiving the 1973 Roanoke Division Public Service Award which was presented by Harry Dannals, Pres. of ARRL during the Convention at Reston, Va. Charleston's new repeater WR8ACD operating 28/88. W8HZA has new 14AVQ vertical. WN8MKL has his General and WB8MZI passed his Advanced. New Novice WN8QYN in Weirton. W8HAX in new location, ideal for VHF plans 220 MHz operation. Through Oscar 6, W8MIS made contact with a boyhood friend, now W7ZC, from whom he had not heard since 1919. It is with regret, I report the passing of WA8SLG an RD-403, Army MARS, 2-meter vhf unit was stolen from WBJM's car. CW Net in 27 sessions with 49 stations passed 55 messages and the Phone Net, hit an all time high, with 28 sessions, 466 stations and 200 messages. The 8RNN was active with 17 stations passing 3 messages. Traffic: K8QFW 53, W8HZA 47, W8IWX 47, W8MKL 39, WB8DQX 32, W8JM 28, WA8YCD 15, W8DUV 7, WB8KZH 7, WB8BSN 5, K8TNY 5, W8ETF 4, WA8KCJ 4, W8CZT 3, WA8PCM 3, WA8OKG 3, WA8RUO 3, K8ZDY 3, WB8CPU 2, W8CUL 2, W8CWY 2, K8LSN 2, WB8MAV 2, W8NBG 2, K8NNK 2, WA8TOM 2, K8BCF 1, WA8CRW 1, WA8IAX 1, K8IXO 1, WA8KGU 1, WA8PHS 1, WB8SOK 1, WA8SSM 1, WA8UIH 1, WA8WCK 1.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Clyde O. Penney, WAØHLQ – SEC KØFLQ. RM: KØOTH. PAMs: KØCNV, WAØWYP, WAØYGO, WAØHWP and WØUCR provided emergency communications service for WAØSHM/Ø and his mother who was in need of oxygen during a recent trip through the Denver area. Through their efforts, the necessary oxygen was obtained at a suburban fire dept. The lady was then moved to a local hospital by ambulance, and her son WAØSHM/Ø was directed to the hospital via 2-meter radio, as he became separated from the ambulance in heavy traffic. It is with deep regret that we add KØUOM to the list of Silent Keys. He is a old timer in this area, well known to all, and will be sorely missed. Net traffic for Sept.: Columbine QNI 840, QTC 42, informals 16; Late net traffic for Aug.: CCN QNI 207, QTC 93, 31 sessions, SS QNI 194, QTC 96, informals 34, 31 sessions, 565 minutes. Traffic (Sept.) WØWYX 987, WØLQ 151, WBØISZ 138, KØOTH 11, WBØHCK 72, KØSPR 66, WBØDME 51, WAØYGO 44, WØLAL 3, WØLW 36, WØJRW 29, WBØCCB 26, WØSIN 26, WAØTMA 2, WØDSW 25, WØNZL 18, WAØZPP 18, WØBV 9, WAØYED 7, KØCNV 3. (Aug.) WØWYX 997, WAØYGO 36, WAØNFO 7. (July) WAØYGO 25, WAØNFO 8.

NEW MEXICO – SCM, Edward Hart, Jr., W5RE – SEC W5ALR. PAMs: W5PNY, W5DMG. RMs: W5UH, WB5CSO. Ne

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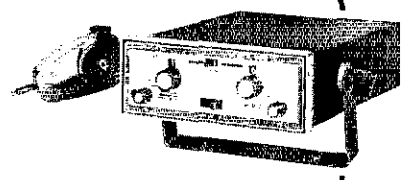

GTX-200 **$269.95***

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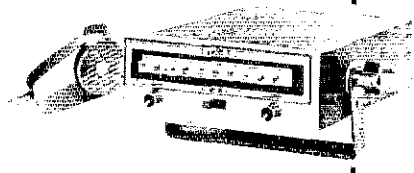

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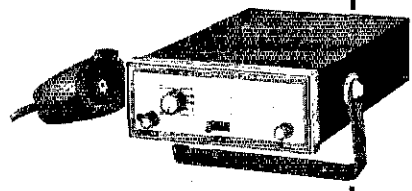

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Mexico Road Runner Net meets 0600 local time daily on 3
Sept. results QNI 495, QTC 27, OST 15. New Mexico CW Net m
7:30 P.M. daily on 3585 kHz. QNI 132, QTC 85, W5PNY of
Alamos is trying to get a daytime traffic net going. Presently
TWN net meets on 7230 at 4:30 P.M. local time but is subjec
change. If you do not hear the net contact W5PNY or W5RE for
latest information. W5HJ was *hurt in a tall from a tree in Ardm*
Okla. He is recovering nicely at this time. Tom is very well know
the Rocky Mountain Division as a former Vice-Dir. W5TLK
W5RE are out of town more than in. Now W5PDY will be av
The repeater will soon be back on Mt. Taylor after rebuildin
meet FCC regs. It is not licensed as yet, but will be on 34/94 w
licensed. Traffic: K5MAT 171, WB5CSO/5 131, K5KPS 90, W5
58, W5DMG 51, W5UH 46, W5PDY 21, WB4WXX/5 16, W5TLE
WA5OHI 5, W5MIY 4.

UTAH – SCM, John H. Sampson, Jr., W7OCX – SEC: W7G
RM: W7UTM. BUN meets daily at 1830 GMT on 3575 kHz,
check-ins, 88 minutes. UCN meets daily at 0130 GMT on 3
kHz, 263 check-ins, *88 minutes. The Utah ARPSC Net meets*
and Sun. at 1400 GMT on RACES frequency of 8987.5 kHz
welcomes additional check-ins. The new daylight TWN ne
support from Utah. This is a daily SSB traffic net at 2230 GMT
7230 kHz. K7WYT has earned the BUN certificate and WA7V
and WA7MEL have earned UCN certificates. W7UTM has b
checking into 9 different nets. The Ogden ARC was host to W0S
our Division Director, at the club's annual steak fry. Check brou
the club up to date on ARRL affairs. WA7BSG filed 226 Intru
Watch reports. W7HKC not active during daytime now becaus
employment change. K7TMK/7 looking for a communications n
W7IQU editor-in-chief of the monthly UCN bulletin and urges
members to supply him with information for the bulletin. K7C
has 10 states to go on ten meters for his 5BWAS. This is the time
the year when all outside amateur radio installations should
inspected and if not already so, made safe against the ravages
winter. Traffic: W7UTM 201, WA7OAD 86, W7OCX 84, WA7M
58, WA7WIB 42, K7CLO 16, WA7HCO 14, W7IQU 13, K7TM
13, W7FYR 6, W7GPN 6, WA7OAR 4, W7HKC 3.

WYOMING – SCM, Wayne M. Moore, W7COI – SEC: K7NC
PAMs: W7SDA, WA7NHP, K7YUG. OBSs: K7NOX, W7SI
WA7FHA, K7YUG. Nets: Pony Express Sun. at 0800 on 3920;
daily at 1830 on 3597; Jackalope Mon.-Sat. at 1215 on 7260
3920; Wx Net Mon.-Sat. at 0630 on 3920; PO Net 1900 Mon.-
on 3950. K7KMQ got married this summer and WA7GOV
married in Sept. W7LCI has passed his Extra Class exam. W7V
has a new 2-meter transceiver – this goes with his new
WA7NHP does a good job running portable from his new mo
home at different locations. Don't forget the 1974 hamfest to
held the third week end in July and hosted by the Laramie grou
looks like they will do a fine job so, plan now to attend. Traf
W7SDA 190, W7TZK 131, K7VWA 109, WA7HAB 7, K7SLM

SOUTHEASTERN DIVISION

ALABAMA – SCM, James A. Brashear, Jr., WB4EKJ – S
W4DGH. RM: W4HFU. PAM: W4RQS. The Mobile ARC
honored recently by the Mayor of Mobile addressing the clu
guest speaker. They also had a presentation and demonstration
SSTV given by WA4OSR and WN4CVP. K4UMD reports he has
a little trouble with his TR-4, WB4SVH has his HW-202 going
enjoying 2 meters, K4JK report is during the last FMT he missed
cycles (off 7MCs). WB4UNM has a new T4X and trying ssb.
Huntsville ARC recently had K4BYM, mgr. of the W4/K4
Bureau talking on the bureau operations; and RM W4HFU talke
NTS. K4BPY was chmn. for a 2-meter transmitter hunt rece
held in conjunction with the Huntsville ARC annual pic
WB4LPT declared the winner with K4FLY as second, DK
taking a trip through the Western U.S. before returning to Germa
I regret to report the death of K4OYV; he will certainly be mi
by all his friends. K4HR has been helping out on AFNM and
appreciate it. We could use many more stations checking in t
around the section (3,573 *at 7:00 P.M. local time*). Christmas
New Year's messages should increase the net activity, so join
you don't like CW, W4RQS would like to hear you on AFNM, 3
at 6:30 P.M. local time. For Novices, call other class license hol
too just keep the speed down! the slow speed CW net AFND n
at 5:30 P.M. local time. If you need information on the loca
opposed to section) net in your area, check with your EC or
Welcome to K4HNY to our section. Had a short 2-meter
recently with W9MLI/M4. Hope everyone has a Merry Chris
and a prosperous 1974. Appointed K4HNY as OPS, OVS and
Remember HD? Has your secy. (or a club officer) reported to

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WB4ADT 24, WA4AJA 13, WB4FJP 9, WB4KSL 8, K4MC
K4KCP 4, K4UMD 4, K4HJM 1.

GEORGIA – SCM, Ray LaRue, W4BYG – Asst. SCM/RM: J
H. Boston, III, WB4RUA, SEC: K4EOQ.

Net	*Freq.*	*Time(Z)*	*QNI*	*QTC*	
GSN	3595	0000/0300/1130	487	119	WB4R
GSHN	3975	0100	883	37	K4V
GEN	*3718*	*2300*	*146*	*12*	*WB4T*

WB4TVU, WB4RUA and WA4BAA made PSHR for Sept.
Albany Repeater 22/82 now WR4ADM. The Albany group has
persons enrolled in new code and theory classes at the Ju
College. W4JM has a new TR-22 on 2 meters. WB4WMT rep
50/144 MHz skip was quiet, he and W4LZW are monito
144.110, Dixie Six Meter SSB Net QNI of 83 for the month. T
meet Sun./Wed. 50.110 at 9 P.M. EDT. WA4BRO says he
WA4BRP are now General Class. Congratulations! WB4AEG rep
the Coosa Valley EM Net meets on the Rome repeater 34/94 nig
at 2130 local and Sun. on 3950 kHz at 1330 local. WB4AEG is
OBS and OPS. The Stone Mountain HamVention was a real pleas
Everyone seemed to have a great time. Welcome to W9KRR/4 to
Atlanta area. W4LRR reports Atlanta 2-meter net meets 145.35
0115; WB4PYL is on 144.110 wb. WB4TVU urges QNI
nightly. W4BIW, W4BYG, WB4YDZ, WA4VWV, WA4AQP
valed communications for the Scottish games at Stone Moun
Oct. 20. Keep those cards and letters coming in with activity rep
and items of news. Send before the 5th of the month. Address
page 6 QST. Traffic: WA4BAA 93, W4EEP 67, K4OSL
WA4VWV 39, WB4RUA 26, K4JNL 22, W4AMB 21, WB4TVU
W4BYG 18, K4ODB 16, W4CZN 15.

NORTHERN FLORIDA – SCM, Frank M. Butler, Jr., W4R
SEC: W4IKB, RM: WA4BGW, RTTY: WA4WIW, P
WA4IZM/75, W4SDR/40. The Daytona NTS needs your supp
contact W4WCG on 7233 kHz at 2000 GMT, MWF. The Dayt
Club has a new meeting place. WB4WTL uses call WB4TCW w
attending FTH at Orlando. WB4WHK renewed ORS. W4LSR
stay in hospital. WB4IER now Mgr. of FPTN. WN4CUG active
Wildwood. The Citrus ARA holds classes every Fri.; K4HBV ha
General. K4IZT earned FAST Net Certificate! K4IFM is re
transplant from W8-Land. WA4MHS looking for 6-meter cw Q
from New Port Richey. The Jax. NOFARS sponsored a Homeb
contest, plus an auction. WB4VYU is Editor of Balanced Modula
also new mgr. of TPTN. New officers of Suwannee Chapter QC
are K4WJ, W4UCF, W4WVH and W4SZ; W4FYF is Net
K4ZED again active on QFN. WB4OMG has a 1-44 on 449.1
and looking for QSOs. WA4MUC new Bradford Co. CD Dir. W4V
appointed EC of Jefferson Co. WB4UPJ/4 Mgr. of QFTN. Repe
reps. from Tallahassee, Panama City, Fort Walton and Pensacola
to exchange ideas and form frequency coordinating group. K4
joined 75-meter ssb nets from Panama City. WA9QVT/4 claim
trouble, still had top traffic total this month! W3ZVT/4 and W4
aided ecology project in Fort Walton. WB4AHG, W4MFY, W4M
and others took part in search for two lost children at Eglin A
Pensacola held its first annual 2-meter fm transmitter hunt; win
were WB4JCV, WA4NKN/4 and W4RKH. *WB4ZPC was the bu*
WB4KGW joined 2-meter fm gang. W4FTF hosted the FPA
fishfry at his new QTH. Traffic: (Sept.) WA9QVT/4 215, KØBA
174, WB4UPJ/4 138, WB4OMG 115, W4SDR 100, WB4VYU
WB4IER 95, WA4FYU 77, WA4IZM 43, W4RKH 43, WB4SK
K4IZT 37, W4LDM 37, WB4NJI 34, W4NGR 31, W4AFT
WB4ADL 16, WB4DXN 16, WB4ZOC 16, K4CVO 12, WB4FJY
K4EZE 8, WB4ZPC 8, WB4VAP 6, WA4VZF 6, K4FLV 5, W4I
W4BKC 4, KØECG/4 4, K4FCZ 3, WA4NAP 3, WA4AO
WB4IKP 2, (Aug.) W4NGR 32, WB4PSJ 11, W4VLK 8, K4DB
WB4WTL 1.

SOUTHERN FLORIDA – SCM, John F. Porter, W4KGJ –
SCM: Woodrow Huddleston, K4SCL, SEC: W4IYT, Asst. S
W4SMK, RMs: WB4NCH acting CW and K4EBE RTTY. P
W4OGX. WB4AID received Public Service Award for his earthq
traffic work. He has a regular sked with YN1JMP three tim
week. The following received net certificates: WB4HVF
WA4CGQ, Tropical; WA2GIN/4, FAST Net. WB4FLW takes o
job of EC for Broward Co. Good luck Ted. OO reports rec
from W4FRL and WB4INC. We regret to report W4DFZ beca
Silent Key Sept. 9. The three station set up of the Dade Co
ARPSC in the basement of the North Miami City Hall is wo
out fine. AREC is providing Emergency Communications
RACES has closed down operation. Seven members of th
ganization are also members of QFN, the all Fla. CW Net. WA4

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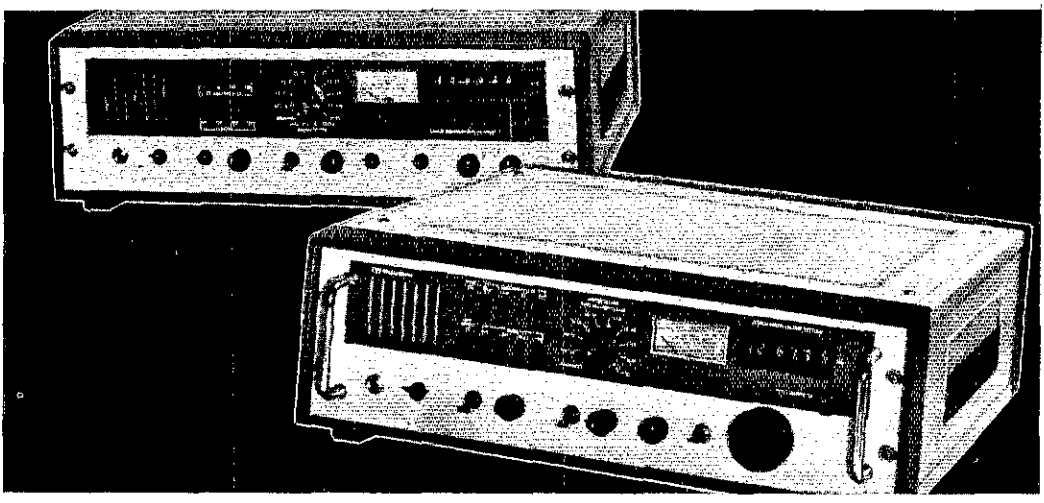

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son of WA4HDH, is studying Medicine at Univ. of Southern Fl
Sorry we missed the Tampa Hamfest. Understand a big time was ha
by all. The Hamfest was sponsored by several of the area club
Good show fellows. This will be next to my last report to th
section. I will not be running for office again. Plan to retire in '
and leave the state. Two good men are running for the offic
K4SCL and W4LLP. We wish them both luck in the election. Sor
if some of your reports did not make it in this month's report, V
had to leave on vacation on the 5th. Late reports will appear in ne
month's write up. Traffic: (Sept.) WA4SCK 304, WB4AIW 26
K4SCL 261, K4WKY 184, WB4GHD 170, W4FFF 102, W3AIZ,
58, W4LYT 57, W4DQS 50, WB4AID 40, WA4HDH 34, WA4GE
26, WB4TRI 26, K4BLM 18, W4GDK 18, W4NTE 14, W4TJM 1
W4SMK 11, W4KGJ 9, W4BCZ 8, WB4QID 7, W4BKC 4, WB4QF
4, W4EHW 2, W4LK 2. (Aug.) WB4AIW 73.

WEST INDIES – SCM, Pedro J. Piza, Jr., KP4AST – The Coa
Guard Ham Radio Club KP4CGB will soon be on the air with
four-element Quad and a Drake line. They have quite a few Novic
proficient at ew. WA1DNM/KP4 is getting ready on 6 meters. Den
you should get something on 2 meters fm where the action
KP4ANG has a 2-meter amplifier, KP4RD, GP, BSH, DDO, M
W1OOP/KP4, HI8CCA/KP4 are newcomers on 2 meters fr
VP2VAI/KP4 worked Santo Domingo from Monte del Estad
KP4AST works HI8 at will with his 2 meters forty-element beam
170-ft. high. Traffic: KP4WT 56.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Gary M. Hamman, W7CAF – The Hualap
ARC won the blue ribbon for their booth at the county fair
Kingman. The Coronado Trail ARC is again active with offic
K7HGH, pres.; K7YBB, vice-pres.; W7RSV, secy.-treas. K5F
coordinated the club's participation in the Greenlee County Fair
Duncan where two rigs were operated and over 200 contacts we
made from WA7ITE/7. The Tucson Repeater Assn. with K7PQI
pres. operates WR7ABM and meets on the 2nd Sat. each month
7:00 P.M. at the downtown YMCA. The Catalina ARC w
WA7OOS as pres. is meeting again on the first Wed. at 7:30 P.M.
the Old Terminal Bldg. Tucson Airport. A repeater site on Mt. C
has been licensed as WR7ABL with K7NOK, W7WGW and W7DI
as control stations. Congrats to K7NHI on becoming mgr. of Pac
Area Net. WN7VNL is on 15 and 40 from Duncan (in rare Green
County). Section Net awards were earned by K7GLA, WA7KC
W7LLO and W7UQO. Season's greetings to all. ATEN: 30 sessio
630 QNI, 35 QTC. Traffic: (Sept.) K7NHI 135, W7PG 29, K7M
28, W7DQS 16, K7RDH 6, W7LLO 5. (Aug.) K7NHI 3
W7UQO 42, WA7CNP 31, W7PG 22, WA7KQE 15, WA7TZO
W7DQS 7, K7RDH 6, K7ZMA 6, K7HGH 2, K7GLA 1.

LOS ANGELES – SCM, *Eugene H. Violino*, W6INH – As
SCM: Leigh Jones, WB6OLD. SEC: WA6QZY. RM: W6LYY. T
summer we have had a number of change of addresses. K6ASK
now on San Gabriel Ave.in Azusa. WA6HOB is new member
AREC and resides in Pomona and now has new Advanced Cl
license. I would like to thank the many of you who have written
BCC re-220 MHz, there were many very good suggestions and I he
that they are read by the proper people. WA6DSN vacationing
the Western States in motor home with a rolling kilowatt. A
recent picnic Bob and Ellen Hopkins K6JNH were the winners
the egg throwing contest. WB6HUZ passed his General Class e
possibly the Advanced Class exam, congrats Earl. WA6VMM is
new Editor of the Ramona RC bulletin; it's good to see a
participate in club activities. W6LYC heard mobiling in Montana
ew. The JPL RC sponsored a west coast airplane test flight of Os
7. The uplink was on 432 MHz and down link on 145 MHz, congr
to W6EJJ who was project mgr. The LFRC would like to have y
old issues of CQ/QST/73/Ham Radio (only) magazines for th
magazine service. W6KMC has moved to a new home where
antennas are permitted, has been trying out attic and vent p
antennas with poor success. W6OAW and WA6IIR hearing of th
fellow co-worker W6CDM being sick and unable to put up
antenna went to Herb's house and finished the job for him. Tha
gang. W6BNO had published a list of the L.A. Dept. of Water
Power retirees who are hams, and sent them a copy. W6HUJ
moved to a new QTH and not active pending installation of anten
W6OFQ has been absent from SCN while taking South Ameri
cruise but starting to check in again. K6ASK married WB6SNQ,
father is WB6ANS, her mother WB6ANN and his own fathe
WB6KHH, how is that for a ham family? Now Bob is off the
pending new QTH. WB6UIA doing a bang up job with the Uni
RC bulletin, K6BUU boasting 175 countries confirmed and shoo
for 250. The QCWA had their fall banquet at the Petrolium Clul

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Long Beach with 166 attending. A very good turnout and as usua the food was excellent. New officers are W6YYV, pres.; W6FQ vice-pres.; W6PHE, secy.-treas. Welcome back to W6OEO returnin from South American Cruise. WB6OYN received a Curtis 1D-40 for his birthday also his 13-year-old brother now is WN6AI K6CDW reports the loss of his folded dipole in the recent win storm, going to use heavier wire next time. Another antenna fatalit at W6ED whose beam came crashing down while DXing. The Marin ARC will be on "Truth or Consequences" program in Feb., anyon interested in going along contact WA6BCO. Traffic: K6UYK 198 W6JNH 195, WB6OYN 164, WA6IDN 100, W6LYY 89, WA6BC 41, WA6ZKI 33, W6OEO 26, W6NKE 15, WW6USY 8, W6IGH 4 W6OAW 4, WB6YIZ 4.

ORANGE — SCM, William L. Weise, W6CPB — Asst. SC *Richard Birbeck, K6CID. SEC: WA6IVA. PAM: K6YCI, RM* WB6AKR, W6RNX. New officers for Newport ARS are WA6OBM pres.; W6NT, vice-pres.; WB6ZIN, secy.; WA6TVA, treas. Sorry t report passing of W6LH. Our condolences to the family. W6HAW/ received certificates for placing first for Orange section in both Ne Jerses and Tenn. QSO Parties. Congrats Duane, W6EB vacationed Northern Cal., Lake Tahoe, Reno, during Aug. meeting many ol friends. K6GMI has official sessions for DRN6 since Oct. 1. DRN meets daily on 7265 kHz at 2 P.M. local. Congrats Hal for an F job, W6VOZ will soon be mobile with his new HR2A 2-meter ri Can't figure how Bill will transmit mobile and receive on home ri th. Hope everyone had great time at the convention. The exhibi were excellent. Don't forget to send information on your clu officers for '73-'74 to SCM. K6YNB was first West Coast station have high score for country in VHF QSO party since 1961. Hig score of 29,520. See Wayne's camper and beam page 71 OCT QS Congrats Wayne. Have you checked in on DRN6? Try it you wi like it! PSHR: WB6AKR 40, WA6IVA 37, W6ISC 24. Traffi (Sept.) K6GMI 237, W6ISC 178, WB6AKR 65, K6LIA 38, W6WB 10, WA6IVA 10, W6CPB 8, W6BUK 2, W6OBD 2, (Aug.) W6F 20.

SAN DIEGO — SCM, Cy Huvar, W6GBE — Asst. SCM: A *Smith, W6INI. I want to thank all members who supported me* the recent election. My objective is to maintain and increase th outstanding activities in the section. New appointments are W6IN as Asst. SCM and W6SRS as OVS. Thanks to W6SRS for a job we done for the past two years as SCM. North Shores ARC had liqu *natural gas demo; Palomar ARC had W6NLO FM equipment tal* W6DFY displayed antique tubes. Repeater back on the a SANDRA has new call WR6ACT. El Cajon had nice program OCWA had election — K6CM, pres.; W6INI, vice-pres.; W6OS secy.; K6PM, treas. New club Pt. Loma ARC meets on 3rd Thur. 1130 Bldg., 33 NELC net on 28.6 MHz Tue. 2000, San Diego Sta Univ. ARC, WA6GRF took part in the Oscar 7 flyover. Imperi Valley ARC had elections. SOBARS had by-laws revision and t talk. WB6IKW passed Advanced Class exam. W6RHI complete 10,300 mile trip to Alaska. WB6ZRF and XYL completed annu trip to Washington State. Keep up the fine turn out on last Su each month Emergency Power Sun. Merry Christmas and Happ New Year. PSHR: W6RGF 44. Traffic: (Sept.) W6BGF 22 W6DEY 34, WR6PVH 22, WA6BDW 19, W6RHI 2, (Aug WA6BDW 24.

SANTA BARBARA — SCM, D. Paul Gagnon, WA6DEI — SE WB6HJW. RM: W6UL. PAM: K6FVQ. W6MHK has designed system to allow the blind to sense the green light at street corn and follow a path down the street. K6GHU demonstrated it for t Federal Highway Administration. W6OAL participated in the n Oscar 7 shakedown flight and recorded the 2-meter downlin W5QNY now W6PRP and WA6OKN is W6PVU. WA6GEN has a n NCX-3 and has built a keyer. K6QPH constructed a 40-meter Do *4 loop antenna for DX. W6JTA had a good traffic month and ma* PSHR. The Ventura Co. AREC activated to provide communicati for the VC Fair parade and also entered a float. WB6DHW a W6MHK were instrumental in operating a station at the fair. T had help from K6VEE, WB6OKE, K6QPH, W6PNM, WB6NNP a others. WB6PGK has returned from Ireland and is back SCN/MTN and DNTS. W6PNM spoke on FM and Repeaters at Poinsettia ARC in Ventura, Tue. at 7:30 is the WA6SIN AREC in Ventura Co. A Swapnet follows. Contact WA6UEO or WB6I for details and listings. WA6SIN repeater has a new diplexer station master antenna. W6RNZ has retired after 30 years Gov service. A new call in Oxnard is WB6WKG. W6KZL spoke on mof operation and SSTV at the Poinsettia ARC. If you are not a mem of your local club you are missing out on a lot of good fellows and good information on current happenings. Is your club a mem of the Tri-Counties Council of ARCs? We need all the clubs

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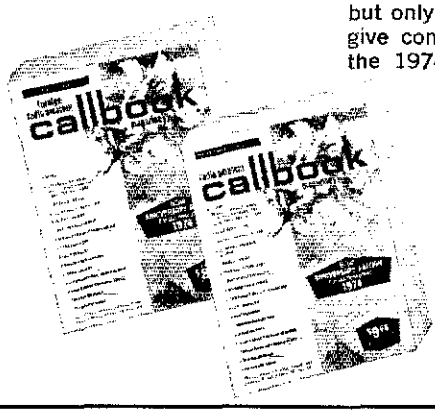

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belong for the benefit of all. We also would like representation from the school clubs. Any information on these please inform WA6DEI. If you are interested in an official appointment let me know. Did you miss your call here? It's because you didn't send me a monthly report. See you on the section net at 8 on 3945 Wed. or the SCN at 6:30 on 3600 daily. PSHR: W6JTA 53, WA6DFI 47, WA6GEN 32, K6QPH 9. Traffic: W6JTA 142, WA6DEI 109, WB6PUK 27, WA6PEF 7, WA6MBZ 4, W6JDU 2, WA6GEN 1.

WEST GULF DIVISION

NORTHERN TEXAS – SCM, L.W. Harrison, W5LR – Asst. SCM: Frank Sewell, W5IZU. SEC: K5KQM. RM: W5QU. W5HT now in Hemet, Calif.; W5FA is a Silent Key. New OO Bulletin out. Records show following ECs inactive. W5DXT, WB5EYF, K5CLH, W5MNY, WA5SMI, W5NGX, WA5MUQ, W5LOS, K5OIF, W5JVS, W5GWF, W5ZNN, W5PYL, W5CBT, WA5ERJ, WB5CYS, WB5BAM, K5AVG, WA5SRK, WA5PPF, WA5LWT and WA5CMC. Your SCM's list may be in error so please contact K5QKM for facts. He is on 3970 kHz each Sun. at 8:00 A.M. SEC bought new beam and in process of installation. W5VSD applying for OO. Many other OOs reporting this month. Form 1 cards now in most all appointees hands. If yours didn't arrive let me know. Temple ARC meets 1st Thur. each month. Two nets 3977 kHz and 145.29. W5VDO new pres.; W5JEH, vice-pres. SEC K5QKM's mailing of Aug. '73 bringing EB results. W5YK active on at least four nets. W5EW submitted three EMT reports covering his OO qualifications. He is now certified as Class I and II Observer following a training period of several weeks. W5SHN participates in 7 nets, also 66 MARS sessions. A meeting of Dallas WHOOTS is now underway and it is my understanding the subject of Brownsville will be considered. W5GSN recently ran tone patch for K5LZA Richardson covering overturned gas truck west of Abilene on I-20. DPS and ambulances were on hand in 10 minutes. Nothing heard from Irving, Midland, Abilene, Lubbock, Amarillo, Wichita Falls and Plainview. K5PUW and W5ARV gave nice OO report. WB5BNG has SB-34. No reports on 2-meter activities. Those of you interested in making PSHR please remind me. WB5AMN reports Texas Traffic Net 29 sessions, 158 messages handled and 1400 check-ins. Traffic: (Sept.) W5QU 187, W5TI 152, WA5NSJ 119, W5QWV 85, WA5BEW 67, W5SMN 65, W5GSN 58, K5QKM 48, W5SHN 25, WA5QGE 19, W5VPM 15, W5IZU 13, W5LR 13, WA5YPI 9, W5YK 5, (July) W5GSN 20.

OKLAHOMA – SCM, Cecil C. Cash, W5PML – Asst. SCM/SEC: Leonard R. Hollar, WA5ESN. RM: W5RB. Asst. RM: WB5ELY. PAMs: W5MFX, WB5CWX and K5DLL. Congrats to the emergency operators in Okla. and especially the ECs of Garfield (WA5ZOO) and Payne (W5QIV) Counties, also the Okla. State Univ. RC W5YJ being outside the disaster area as specified by the Okla. emergency plan, took over as NCS. The emergency was in Enid where 15.6 inches of rain fell in one evening flooding almost the entire city of Enid. As this goes to press the OPEN is in full operation on 3906 kHz for long-haul traffic and since virtually all telephones were out all witlun town traffic was handled via 2-meter fm. When it is all summed up my SEC will make a full report. H&W traffic flowed very smoothly. The Lawton-Fort Sill ARC starting code and theory classes the last of this month. The Okla. City American Red Cross with the help of the two Okla. City ARCs and the Alpha Sigma Delta Radio Soc., W5TC of the Univ. of Okla. The Univ. of Okla. ARC sponsored the licensing of eleven amateurs last year. Instructors at the Red Cross sponsored classes are W5JJ, W5HXL, WA5JGU and WA5LTM along with others I don't know about. W5FW and his YF W5PWN reports a very pleasant visit by an old time friend W5IGO. Members please let me hear from you at the end of the month. Traffic: W5RB 131, WB5FEY 82, W2FIR/5 37, W5EW 28, WA5JGU 24, W5SUG 24, WB5ELG 20, WB5AZS 17, WA5CUJ 17, WA5ZOO 16, WA5LWD 14, W5PML 13, W5FKL 10, K5OTM 10, K5ZDB 8, WA5OUV 6, W5JJ 3, K5OCX 2.

SOUTHERN TEXAS – SCM, Arthur Ross, W5KR – SEC: WA5YXS. RM: W5ABQ. PAM: W5HWY. OOs reporting: WA5MIN, W5NGW. OVS WB5CII working more 2 meters than ssb or cw. OP WA5VBM worked on 3 missing persons cases via amateur radio; ha been elected chaplain of Houston Chapter QCWA. ORS WA5YE has all rigs working again. ORS W7WAH/5 working with OR WA5ZBJ on vto unit for 20-A. EC WB5EMA trying for repeate license. Nice to have ORS K5EJL reporting again. ORS WA5ZBK t be on 2-meter fm by Christmas; working on HB keyer. OR WB5IOG now operating from W5YG, Rice Univ. ARC. OR WB5GZG has reverse 1V1! WB5EPD sends in first report aft getting license. OPS K5RVF operated mobile in 9 and 7 plus VF and 7 on 2-meter fm plus 75, 40 and 20. EC WB5EMA new tow rating for 5 minutes after lightning strike! ORS WB5GZG new tow

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was storm tested by Hurricane Delia and passed, WN5HHT passed General Class exam, EC W5IOP won HAL keyer at hamfest in Danville, Ill, WN5JKJ has 5 states so far, W5TUH, WA5URL, WB5FFA, W5EVL, K5DEX, WB5FMC heard regularly on 160 meters in the Corpus Christi area, WB5FDW moving out of Tex, W5LDA moving into new house, EC WA5ABA and spouse WA5FVH had big troubles getting out STEINSCOPE for Oct, – took entire family to get it out; it was worth their efforts, too. Austin Amateur Radio Club's bulletin has been named AARC OVER, W5RZY donated Collins 32V-3 transmitter to AARC but they need manual, WN5GIV won AARC's "hawg-calling" contest, W5RJA won the Audio Frequency Contest, Traffic: WA5YXS 310, K5ONW/5 225, WB5CUR 211, WA5VBM 196, WA5YEA 135, W7WAH/5 103, WB5DBK 72, W5TOP 58, WB5GVO 47, WB5AMN 45, WA5TJI 40, WB5FMA 35, WA5ZBN 35, W5ABO 29, K5LH 26, WA5ZBK 21, K5VHX 19, W5BGF 14, WB5GZG 10, WB5FPD 9, W5JVR 8, W5UKN 7, K5RVF 2, W5YG 15,

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE6FK – Asst. SCM: Mrs. Doney Booth, VE6YL, SEC: VE6XC, PAM: VE6ALQ, ORSs: VE6YL, VE6LZ, VE6WG, VE6BAT, OPSs: VE6YL, VE6US, VE6HN, VE6ASL, VE6FS, OVS: VE6MX, OOs: VE6HM, VE6MJ, VE6TY, OBS: VE6MJ, ECs: VE6WJ, VE6AGZ, VE6AW. The Convention Committee for the Canadian Division Convention in Calgary Aug. 1 to 3, 1975 is rounding into shape – many plans have been firmly decided and most key committee positions filled. I expect every member of CARA will eventually be on some committee. Information will be sent to all clubs and SCMs at regular intervals. Thanks to the following retiring appointees for their assistance: ECs VE6FM and VE6ATY; VHF PAM VE6AMC. Congratulations to VE6AW on his appointment to EC Calgary. SEC VE6XC expects to be on the air more regularly this winter, VE6FK plans to join the ranks of the unemployed about mid-Nov, NARC dir. are: VE6AOE, VE6OB, VE6AAR, VE6AXS carrying over the last year – new dir. are VE6ANW, VE6KF, VE6AMA, VE6RM, VE6VS, VE6AXS, VE6KF, pres.; VE6VS, secy. Traffic: VE6FS 29, VE6FK 24, VE6ABC 14, VE6VS 7, VE6FV 2, VE4VP 2,

BRITISH COLUMBIA, N.W.T. and YUKON – SCM, H.E. Savage, VE7HB – Report from VE8-Land. VE6LS/VE8 now in Tuktoyuktuk area. VE8NN (AYI of VE8OO) active on 20 cw. VE8OO (P.O. Box 72, Ft. Smith, N.W.T.) is now QSL Bureau for VE8. VE8s using this service are asked to forward postage money only. No SASE required. Polar Net now at 0400Z on 14160 d Thur. VE8DJ QYSd to VE3-Land, VE8CC now VE3FTL, VE8CC on loan to VE8RCS (6 months!). VE8s at Inuvik are CM, CV, CW CX (ex-VP9HA), OR, VE8MAB; (Op: John-Charles) Icebreake CCGS Norman MacCleod in area 69N x 82W assisting in resupply c northern Arctic, 65 crew members, Works 14,134 MHz USI VE8RCS periodically on 40-meter ssb, 80-meter antenna is down Daily skeds 14,165, Traffic: VE8CV 9, All foregoing reported t your B.C. SCM by VE8CV.

MANITOBA – SCM, Steve Fink, VE4EQ – RM: VE4LG, PAM VE4FO. The Winnipeg Repeater, VE4XK, is operating much bette following major surgery. VE4IA motored to VE1-Land, and VE4V and VE4VK are spending the winter in Fla. 1973-74 WARC executives are VE4VH, pres.; VE4VB, vice-pres.; VE4JA, secy VE4GL, treas.; VE4HB, past pres. Membership chmn. is VE4CG an VE4SW is QUA editor. MTN has been experimenting with a lat session, and MFPN has been maintaining liaison with Daytime NTS We welcome a new ham to our ranks – VE4QY in Transcona – ag 14! MTN: 55 sessions, 238 QNI, 100 QTC, MFPN: 30 sessions, 77 QNI, 64 QTC. Traffic: VE4PG 75, VE4OW 51, VE4TY 31, VE4RC 30, VE4LA 22, VE4IP 20, VE4CR 18, VE4JA 16, VE4FQ 8 VE4HR 7, VE4LN 6, VE4QK 6, VE4FK 3, VE4IL 5, VE4WT 5 VE4NE 4, VE4UN 4, VE4XA 3, VE4YC 3, VE4FO 2, VE4LU 2 VE4IR 2,

MARITIME – SCM, W.D. Jones, VE1AMR – SEC: VE1HJ, regret to report that VE1HE is now a Silent Key. The new executiv of the Maritime Sparkettes include VE1AMB, pres., VE1AMS vice-pres., VE1MY secy-treas. Welcome to new amateurs VE1AZ in Richibucto and VE1AZC in Bathurst. Communications wer supplied during the Joseph Howe Parade in Halifax by VE1AGT VE1AAC, VE1AWS and VE1RO. VO1CA won the Fred Ezechi Memorial Award for 1973, which is awarded to the statio considered to be the best cw operator in Newfoundland/Labrador Ham-en-any 1973 was a great success with the attendance in exces of 95. The host was ARCON at the clubhouse in Gander. For th second consecutive year ARCON has won the J.R. Smallwood an

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the G M Stirling trophies for the 1973 Field Day. The club netted a total of 3474 points for the J R Smallwood trophy and an aggregate of 496.28 for the G M Stirling trophy. VO1H, VO1KV and VO1KX makes for three generations of amateurs in one household, very cosy! Traffic: VE1AMR 119, VE1ARB 71, VE1AWS 24, VO1CA 24, VE1ZH 22, VE1AKB 14, VE1AYJ 13, VE1AWP 12, VE1AAO 11, VE1AHM 1.

ONTARIO – SCM, Hotland H. Shepherd, VE3DV – As usual, this column is being written three months in advance of your reading it, and the vital joint cooperation between CARF and the Canadian Division that was announced officially in the Oct. issue of OST and the Canadian Amateur is either successful, faltering or dead. The latter two states I will not accept because I know that the vast majority of Canadian amateurs will welcome this activity and will get behind this long overdue task and make sure it is successful. One of the first of many joint efforts was the proposal to establish the formation of the Canadian Repeater Advisory Group (CRAG) and if you haven't heard about this I suggest that you talk with your VHF group or write to VE3CFZ, Ottawa, or VE3WT, St. Catherines. Yet another project now receiving a lot of attention is a revamping of amateur radio support to the Federal EMO, but there remains much to be done. Please be assured that officials on both sides of your amateur house are working hard on this very urgent matter. The Ont. traffic nets continue to report increasing traffic totals and the very popular ONTARS on 3755 kHz 0700-1800 EST daily continues to provide a good part of southern Ont. with a central meeting point. Ont. repeater users also continue at a tremendous level, while an increase in Oscar 6 contacts is most encouraging. Active Ont. club participation in the 1974 AMSAT-OSCAR 8 is invited. Check with VE3QB. The one discouraging note in 1973 has been the low level of Ont. participation in the many operating contests sponsored by the League. Merry Christmas and the very best in 1974 to you all. Traffic: (Sept.) VE3SB 222, VE3LHF 19 VE3FQZ 193, VE3AWE 140, VE3DV 132, VE3DPO 120, VE3GFN 112, VE3GJG 89, VE3ERG 70, VE3DVE 53, VE3GT 53, VE3ASZ 23, VE3FGV 22, VE3ATR 20, VE3DU 20, VE3EHL 18, VE3FBC 11, VE3GCE 11, VE3GYQ 11, VE3DH 8, VE3EWD 8, VA3VX 7. (Aug.) VE3EHL 26, WA8ETX 9.

QUEBEC – SCM, Joe Unsworth, VE2ALE – Certifi endorsements as of Oct. 1, '73 are OPS VE2BG; PAM VE2A ORS VE2BCB; RM VE2YU; ORSs VE2ALB, VE2DLG, VE2D VE2BVY, VE2UY, VE2UN, VE2RO, VE2PJ, VE2OJ, VE2 VE2DR, VE2CP; OVSs VE2BMQ, VE2APT, VE2YU, VE2HW; Class IV VE2DCW, and issuance of OBS to VE2BYG. The follow have been cancelled: SEC VE2BDM; ECs VE2AP, VE2DK, VE2 VE2ADF, VE2AJD, VE2AQI, VE2BAIE, VE2BRO, VE2B VE2DEA and VE2DHD. In the years of 1970 and 1972 each i an appointment of a bilingual SEC was made who was on the bo of directors of RAQI the provincial organization, then why as ARPSC – LO Bulletin of Sept. 1973 should there be suc miserable report! VE2BG claims 50 years membership with AR 1923 to 1973, VE2BMI an OT is back on the air with home b gear. RAQI held provincial meeting at Drummondville on Sept. VE2ALH very active on the following nets QON, ECN 1, EAN 2. VE2HI is back after trip to Sweden, VE2BB away again on a overseas; he also is the QRN assistant Net mgr. to VE2GA. VE (Corey) has now dismantled the radio shack atop of Mont Roya Westmont, passed along a lot of antique electrical and electro apparatus. Look for the Blind One, hams Happy Gang f frequency 3,765 MHz every morning at 0800, Montreal local ti PSHR: VE2ALH 34, VE2APT 27. Traffic: VE2ALH 95, VE2 92, VE2EC 50, VE2BP 41, VE2APLF 15, VE2APT 15, VE2ATI

SASKATCHEWAN – SCM, Percy A. Crosthwaite, VE5RI CARF and ARRL are now jointly working together in helping Canadian amateur. This cooperation between ARRL and CARF stepping stone for the unity of all Canadian amateurs. VE5CU prepared a paper on "Canada EMO Working Group on Formation of the Canadian Amateur Radio Emergency Service, this paper is approved by the Federal Gov't. details will be m available. This means we will have CARES which will be somew like RACES in the U.S.A. We will not discontinue the AREC which meets each Sun. morning 9:30 A.M. on 3780. Both AREC and CARES will have their place and functions in serving needs by amateurs for the public. Traffic: VE5GL 21, VE5KZ VE5HF 6, VE5LN 4, VE5QO 4, VE5RE 4, VE5PD 2.

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READOUT	Char. Height	Maker
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☐ MAN-4	.19 h.	Monsanto
☐ 707*	.33 h.	Litronics
☐ 704**	.33 h.	Litronics
☐ SLA-1*	.33 h.	Opcoa

* Pin-for-pin MAN-1, ** Pin-for-pin MAN-4, elec. char. same

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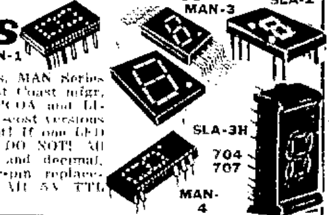

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☐ MAN-1 equal	.27	Red	Yes	20	SN7447	$4.50	3 for $12.
☐ MAN-1A equal*	.27	Red	Yes	20	SN7447	4.95	3 for $13.
☐ MAN-3 equal	.115	Red	Yes	10	SN7448	2.50	3 for $6.
☐ MAN-3A equal*	.115	Red	Yes	10	SN7448	2.50	3 for $6.
☐ MAN-3M equal*	.127	Red	Yes	10	SN7448	2.50	3 for $6.
☐ MAN-3 equal	.115	Red	***	10	SN7448	1.95	3 for $5.
☐ MAN-3M equal*	.127	Red	Yes***	10	SN7448	1.95	3 for $5.
☐ MAN-4 equal*	.190	Red	Yes	15	SN7448	3.25	3 for $9.
☐ MAN-4 equal*	.190	Red	Yes***	15	SN7448	2.75	3 for $8.
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☐ 707** (MAN-1)	.33	Red	Yes	20	SN7447	3.25	3 for $6.
☐ 704** (MAN-4)	.33	Red	Yes	20	SN7448	3.25	3 for $6.
☐ SLA-1** (MAN-1)	.33	Red	Yes	20 15	SN7447	3.25	3 for $6.

* Red epoxy case, others clear. ** Litronix and Opcoa's pin-for-pin equals and electrical specs as MAN-1 or MAN-4. *** LED "dot" missing.

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☐ 733 Diff. Video Amp	1.75
☐ 741C Frequency compensator 709 (A)	.49
☐ 747C Dual 741C (A)	1.25
☐ 748C Freq. adj. 741C (A)	.49
☐ 748CV Freq. adj. 741C (mini DIP)	.49
☐ 753 Gain Block	1.75
☐ 709-709 Dual 709C (DIP)	1.00
☐ 739-739 Dual stereo preamp	1.98
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7403	.30	☐ SN7438	.60	☐ SN7474	.52	☐ SN74107	.70	☐ SN74164	3.50
7404	.35	☐ SN7440	.30	☐ SN7475	.95	☐ SN74108	1.25	☐ SN74165	3.50
7405	.32	☐ SN7441	1.40	☐ SN7476	.55	☐ SN74112	1.25	☐ SN74166	2.05
7406	.55	☐ SN7442	1.25	☐ SN7477	1.30	☐ SN74113	1.25	☐ SN74174	2.10
7407	.55	☐ SN7443	1.50	☐ SN7478	.95	☐ SN74114	1.25	☐ SN74175	2.10
7408	.35	☐ SN7444	1.50	☐ SN7480	.75	☐ SN74121	.80	☐ SN74176	2.10
7409	.35	☐ SN7445	1.50	☐ SN7481	1.15	☐ SN74122	.85	☐ SN74177	2.10
7410	.30	☐ SN7446	1.65	☐ SN7482	.95	☐ SN74123	1.20	☐ SN74179	2.10
7411	.35	☐ SN7447	1.50	☐ SN7483	1.15	☐ SN74139	1.50	☐ SN74180	1.20
7413	.95	☐ SN7448	1.50	☐ SN7485	1.41	☐ SN74140	.50	☐ SN74181	4.50
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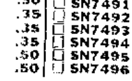

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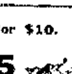

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statements made by me above are correct and complete. (signe
John Huntoon, Editor.

QST

International Friendship

(Continued from page 49)

for a week and then went home, thinking no one knew anything about it.

Well, he was wrong. What he thought was a great joke had the Jamaican Amateur Radio Association people in a rage. This did not do the cause of reciprocal licensing any great good, to say the least, let alone improve the image of amateur radio.

Then there's the story of the expedition which went to Grand Cayman some years back sans benefit of official endorsement. That may have been a matter of misunderstanding since some of the party were Jamaican licensees and until shortly before the group landed, Jamaica had handled Cayman licensing. Nevertheless, at the time of landing, Cayman was independent and handled its own licensing. The police shut them down before they ever really got started, and furthermore, taking a dim view of the whole bit, I am told, very nearly threw them off the island. Here again, flagrant disregard of the sovereign rights of another country at worst, or careless oversight of a minor technicality at best, created in the minds of officialdom in a foreign country *with a vote at the next ITU conference*, less than a feeling of great warmth for the amateur radio service.

Next, and, lest you get the impression that I think the villains come only from south of our unguarded border, let me relate in part a story told me the other day by Noel Eaton, VE3CJ, who was at the ITU Space Conference in the summer of '71, at which amateur radio got a bit of a hard time in its quest for additional satellite privileges. This is all rather fully reported in the editorial of October '71, *QST*, but in brief, this particular story, as related by Mr. Eaton, goes something like this:

In Geneva, at the Space Convention, I met one of the delegates from Ghana and because at that time there were a lot of Canadians out there helping set up Ghana's TV network, I asked him if he'd met any of our amateurs. The exchange went something like this:

The Delegate: Oh yes, a great many of them. In fact I issue the amateur licenses.

Eaton: Well, what do you think of the amateur service? I notice that your voting record so far has not been very complimentary.

The Delegate: Well, you know, I can't really support the amateur radio service because of the behavior of some individuals. One of them was a Canadian who deliberately used his radio for third-party traffic. That is illegal in our country. He even used a kilowatt linear when we're limited to 150 watts. He showed no respect at all for our regulations. Frankly, I wasn't very happy about his performance.

Eaton: Why didn't you lift his license?

The Delegate: Well, he was out here at your government's expense and you know, with all this free technical assistance I didn't feel I should start something by taking his license away.

So there you see what happened. This Ghanaian delegate, unable to enforce (for perfectly valid pragmatic reasons) his own country's regulations, took out his displeasure against all amateurs, in effect, by his negative votes at the next space conference. I am sure he didn't think of it that way, but he clearly had formed, through that

(Continued on page 148)

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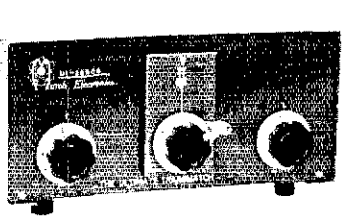

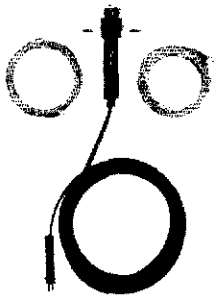

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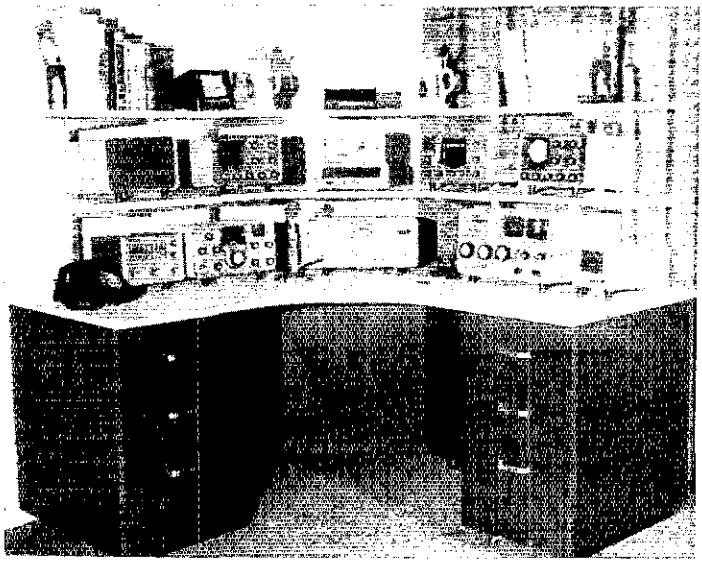

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(Continued from page 146)

experience and others not unlike it, a most jaded opinion of the amateur radio service.

Big and Little Brothers Are Listening

Lastly, let's suppose that we were all suddenly to become paragons of virtue, low power, polite operators. Abide by all our regulations or those of the country from which we're operating. There's still one other thing that can kill our image on the foreign scene, as I said earlier, in this avocation of amateur radio, when we speak, the whole world may well be listening. At the ITU conference of 1959 the question of the 7 MHz frequencies came up and vigorously debated. One of the delegates, obviously opposed to our retention of these frequencies, reached down in his briefcase it is related, and pulled out a small tape recorder. He then played a reel of excerpts of what he suggested were typical ham conversations. He had bits from vhf as well as 75 m, 40, 20, and so on. You can guess what he had – bad language, bad manners, CB space cadet nonsense and so on.

Having played these gems, he looked up at his adversaries in the debate and asked "Is this what you're trying to protect"?

I suppose the answer was an emphatic "of course not – those may be genuine, but they're the exceptions, not the rule." Nonetheless, the damage the exceptions *can* do, and *do* do, must never be underestimated. Next September I shall celebrate my 25th anniversary as a licensed and constantly active amateur, and yet I still never cease to be amazed at hearing comments, weeks, months, and years later, on something or other I may have said on the air. And it's not that I'm a controversial figure either. I am sure you all have had the same experience. But my point here is that we never really realize just who, and how many may be listening, and may be operating their little pocket tape recorders – to be used to our potential detriment later.

In short, let's discourage "Space Cadet" tomfoolery on our voice sub-band allocations. I have a notion that if this sort of thing were accomplished, (not a pious hope, I trust) we would do much to enhance our image, both at home and abroad, and at the ITU.

Even allowing for the sins of commission I've already mentioned – things for which nearly all of us have been responsible from time to time – most of us feel, I'm sure, that as North Americans we are often unfairly characterized by the rest of the world, somewhat in the stereotype of the ugly wealthy (well, comparatively wealthy), arrogant slob who has no regard for any nation or culture other than his own.

Since most of us are, in reality, rather nice fellows, we tend to feel victimized somewhat in the manner of the woman who had moved fairly recently in a certain small town and soon discovered to her dismay that she had become the subject of some very unfair and unwarranted gossip. By a

(Continued on page 150)

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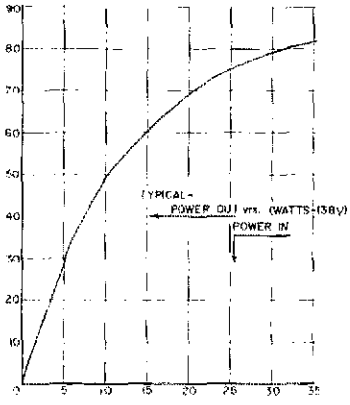

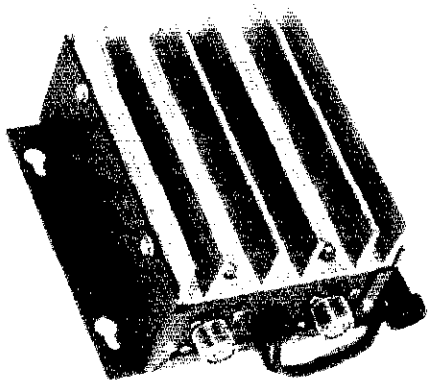

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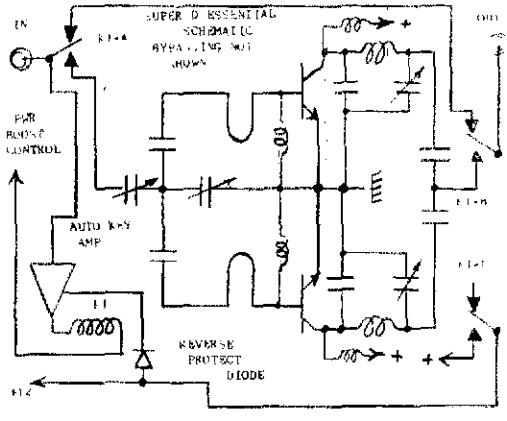

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International Friendship

(Continued from page 148)

roundabout means this woman learned that one longtime woman resident had been overheard telling a friend: "I've never met Mrs. So-and-so" – referring to the newcomer – "but from all the things I've said about her, I'm sure I wouldn't like her."

I would hate to think anybody ever reached that sort of conclusion about me, but I think it's entirely possible, on the basis of conversations they have overheard – either my own conversations, or those of others who happen to live in this part of the world and speak English with more or less the same accent as my own.

Positive Actions

But it isn't enough, in my opinion, for us merely to mend our ways by abandoning bad or sloppy habits. If we want a good reputation in the world, we must be willing to earn it. If we want to win friends through our on-air contacts, we must set out to do so deliberately.

To paraphrase the old song, we have to accentuate the positive as well as eliminate the negative.

"Operation Friendship" – if I may dub it that – can and should involve a great deal more than just watching our on-air language, minding our manners and trying to say more than the bare minimum needed to exchange signal reports.

Aren't there occasions when we could offer more assistance than we now offer – perhaps technical assistance, or some other kinds, to those we talk to overseas?

When was the last time any of us took the trouble to send along last year's call book to somebody in another country who would dearly love to have such a reference, even if it is slightly *out of date*?

And what about our techniques in the art of speech itself? Aren't we guilty of indulging ourselves too often in the use of English? Do we forget too easily how common Spanish, French, German and Italian are on the international airwaves?

There is nothing more flattering than having a friendly stranger identify you by name, and the second most flattering thing that can happen to you is to have a person who speaks some other language take the trouble to address you in your native tongue.

It seems to me there's an object lesson in this *for many of us, and it's really quite a simple one:* however haltingly you might speak the other fellow's language, it always pays to try. Even the most feeble attempt at his language is better than no attempt at all. He may find it amusing, but more likely he'll find it flattering and will respond accordingly.

Technically and numerically, we English-speaking North Americans represent the greatest and most influential force in amateur radio anywhere in the world. However, like any other kind of force, it is one that can be used either wisely or foolishly. The choice we make individual by individual and day by day as we operate on the air can make an important difference between interna-

(Continued on page 152)

International Friendship

(Continued from page 150)

tional understanding and international distrust, between friendship and enmity, and, perhaps, even between peace and war.

Given such an opportunity to be a force for good – an opportunity that is uniquely ours, we cannot, and must not, pass it up. QST

DX Test

(Continued from page 84)

testants will transmit five-figure numbers, each consisting of a readability-strength report and the three "power" numbers. Example: OZILO, with *150 watts input, might transmit* "569150" *on cw*, "56150" on phone. If the input power varies considerably on different bands, the "power" number should be changed accordingly. (Note, KH6 and KL7 are considered as DX.)

8) *Scoring:*

a) *Points:* Three points are earned for each completed two-way exchange. Incomplete QSOs will not count for contest points or multipliers.

b) *Final Scores:* W/K and VE/VO stations multiply total points earned under Rule 8(a) by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 8(a) by the sum of the number of continental states and VE/VO licensing areas worked on one band plus the number of states and VE/VO licensing areas worked on each other band.

There are 48 continental states plus VO and VE1-VE8, a possible total of 57 multipliers per band.

9) *Repeat Contacts:* The same station may be worked again for additional points if the contact is made on a different frequency band.

10) *Reporting:* Contest work must be reported as shown in the sample forms. Each entry must include the signed statement.

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Contest reports must be *postmarked no later than* April 23, 1974 to be eligible for *QST* listings and awards. All DX Competition logs become the property of the American Radio Relay League and none can be returned.

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(Continued on page 154)

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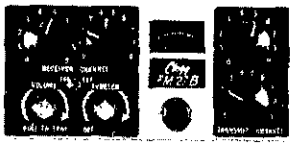

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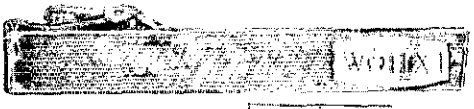

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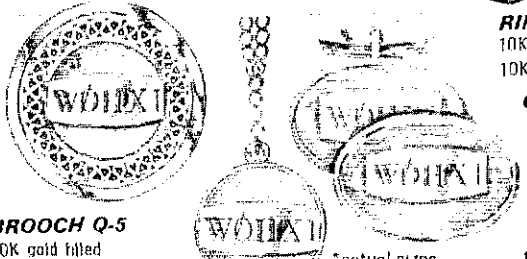

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CHARM Q-6 *$11.95*
10K gold filled w/10K gold panel (chain not included)

Send to **John Roberts Inc.** 11th & Illinois Aves. / St. Charles, Ill. 60174
Your call letters:
Check items you want Q-1 ☐ Q-2 ☐ Q-3 ☐ Q-4 ☐ Q-5 ☐ Q-6 ☐ pay by check ☐ or money order ☐
Name
Address
City
State
Zip
Illinois residents add 5% tax

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scoring single-operator cw entrant in each country, in Alaska, Hawaii and in each of the continental U.S. and Canadian ARRL sections (see page 6, *QST*) from which valid entries are received. In addition, a certificate will be awarded to the high-scoring multi-single and multi-multi station in each W/VE call area and DX country, regardless of *the number of entries received.*

b) A suitable certificate will be awarded to the operator making the highest single-operator phone score in each ARRL-affiliated club, provided the club secretary submits a listing of a minimum of three phone entries by members of the club and that these scores are confirmed by receipt at ARRL of the individual contest logs from such members. The highest-single operator cw scorer in each club will be awarded a certificate under the same conditions. Only a bona fide resident member, operating a station (his or another club member's) in local club territory, may compete for *club certificates. Secretary's letter must be received* by June 4, 1974.

c) A personalized plaque will be awarded to the highest single-operator DX phone and cw station (non-W/VE) in Africa, Asia, Europe, North America, Oceania and South America.

d) ARRL will award a gavel to the ARRL-affiliated club submitting the greatest aggregate phone and cw score by its members, whether single- or multiple-operator entries, provided such scores are confirmed by receipt at ARRL of the individual contest logs from such members. Only scores of a bona fide resident member, operating a station (his or another club member's) in local club territory, may be included in club totals.

12) *Judges:* All entries will be passed upon the ARRL Awards Committee, whose decisions will be final. The committee will void or adjust entries as its interpretation of these rules may require.

13) *Disqualifications:*

a) If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

(b) Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or other scoring discrepancies.

(c) If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest, (e.g., disqualification from the 1972 phone SS prohibits submission of an entry for the 1973 phone SS, but 1973 cw SS participation is okay).

(d) The calls of all disqualified participants will be listed in the *QST* report of the contest.

(e) Any participant on the borderline of disqualification but not actually disqualified may receive a warning letter from the Communications Manager.

(f) For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria. QST

VHF Sweepstakes

(Continued from page 55)

Rules

1) *Eligibility:* Amateur operators in any ARRL section (see page 6) operating at home, or mobile or portable *under one call*, on or above 50 MHz, are invited to take part. Yukon-N.W.T. (VE8) counts as a separate multiplier.

2) *Object:* Participants will attempt to contact as many other stations in as many ARRL sections as possible.

3) *Contest Periods:* The contest starts at 2:00 P.M. your local time, Saturday, January 5, 1974 and ends at midnight, Sunday, January 6, 1974. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the zones concerned.

4) *Exchanges:* Contest exchanges, including all data shown in the sample, must be transmitted and receipted for as a basis for each scored point.

5) *Scoring:* a) Contacts count *one point* when the required exchange information has been received and acknowledged, a *second point* when exchange has been completed in both directions. A section counts only once for multiplier credit regardless of band.

b) Foreign Entries: All contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together as one, and a section multiplier of *no more than* one may be claimed for contacts with all foreign stations contacted. Foreign stations may only work stations in ARRL sections for contest credit. Foreign stations will give their country name in the exchange.

c) Final score is obtained by multiplying total contact points by the sum of the different ARRL sections worked (the number in each of which at least one SS point has been credited) plus 10.

6) *Conditions for Valid Contact:* a) Repeat contacts on other bands confirmed by completed exchanges of *up to two points per band* may be counted for *each different station* worked. (Example: K6SSN works K7PXI on 50 and 144 MHz for complete exchanges of 2 points on each band: 2 X 2 = 4 points but only *one* section multiplier.)

b) Cross-band work may not be counted.

c) Portable or mobile station operation under one call, from one location only, is permitted.

d) A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest (with the exception of family stations, where more than one call is assigned to one location by FCC/DOC).

e) Contacts with aircraft mobiles cannot be counted for section multipliers.

f) Contacts made by retransmitting either or both stations do not count for contest purposes.

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e., able to communicate over at least a mile.)

7) *Awards:* Entries will be classified as single- or multi-operator, a single-operator station being defined as one manned by an amateur who neither

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VHF Sweepstakes

(Continued from page 156)

receives nor gives assistance to any person during the contest period. Certificates will be awarded in each ARRL section to the top-scoring amateur in the single-operator classification. In addition, a certificate will be awarded to the top Novice in each ARRL section where *at least three* such licensees submit valid contest logs. Multioperator work will be grouped separately in the official report of results in *QST*.

When three or more individual ARRL-affiliated club members compete and submit logs naming the club with which they are identified, a certificate will be issued to the leading club member. A letter must be received from the club's secretary itemizing participating members and approximate claimed scores. When fewer than three individual logs are received, there will be no club award or club mention.

A gavel with an engraved band will be offered the ARRL-affiliated club whose secretary submits the greatest aggregate score, provided such scores are confirmed by receipt at ARRL Hq. of the *individual contest logs* from such members. Only the score of a bona fide club member, operating a station in local club territory, may be included in club entries. Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted, nor can special memberships granted for contest purposes be recognized.

8) *Conditions of entry:* Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.

9) *Reporting:* Reports must be postmarked no later than February 4, 1974 to be considered for awards.

Log sheets are now available from your ARRL Hq. *Unless first-class postage is included with your request, log sheets will be sent by third-class mail.* To aid us in getting these forms to you as quickly as possible, please be sure to include with each request a self-addressed and stamped legal-size envelope containing: your full name, call and mailing address complete with Zip code. We suggest a minimum of 8 cents postage attached. This will assure your receiving 5 log-sheets, enough for 400 contacts. Using this as a guide-line you can adjust the postage according to your needs.

10) *Disqualifications:* a) If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

b) Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or other scoring discrepancies.

c) If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest, (e.g., disqualification from the 1972 phone SS prohibits submission of an entry for the 1973 phone SS, but 1973 cw SS participation is okay).

d) The calls of all disqualified participants will be listed in the *QST* report of the contest.

e) Any participant on the borderline of disqualification but not actually disqualified may

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VHF Sweepstakes

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receive a warning letter from the Communications Manager.

f) For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria. QST

Public Service

(Continued from page 73)

out of the VA Hospital in Northampton, MA. K1MAL was asked to activate the club station, K1OXT, to send message to Washington that all communications were out. K1MAL heard WØIO, the Univ. of Iowa club station, and asked them to call the VA Hospital in Iowa City, IA, who in turn would teletype Washington. – (K1MAL)

■ When a tornado lashed through the Ottawa Valley in Ontario on June 11, police were contacted and informed of the coverage that could be supplied by amateurs. VE3s BOQ BPC GCZ went on alert. By 0900 the following morning it was established that communications would not be required and the alert was called off. – (VE3BPC, EC)

■ At 2010 on Oct. 10, a natural gas main ruptured in a residential section of Lynchburg, VA, saturating the neighborhood with gas. The immediate area was evacuated and the local AREC placed on alert in case an explosion occurred. Within 10 minutes, by notice on 2-meter fm, 15 amateurs equipped with portables were mobilized. No explosion ensued and after two hours people were returned to their homes and the AREC net secured at 2200. – (W4GCE, EC Area 7)

■ *Special Events.* Fourteen members of the Rideau ARC provided communications for nurses and officials and at several checkpoints of a Walk-a-thon in Winchester, ON, on May 5. One hospital trip was necessary for an injured foot. – (VE3BPC, EC) For the eighth year, Glens Falls (NY) Area AREC supplied communications for the annual White Water Derby on May 5-6. Crews were set up at start and finish lines to relay timing information. – (K2AYQ, EC) On June 10, about 35 amateurs aided the Salute to Israel Parade in New York City with several mobiles and portables along the parade route to lend the necessary communications to keep the parade running smoothly. (WB2JSJ) Arrivals and departures for many thousands of scouts and parents at the National Scout Jamboree, East, posed many problems, but traffic was kept moving through the efforts of some 23 local and visiting amateurs on August 1-9. – (K4HNW/3) On Sept. 22, 9 amateurs assisted in Walk-a-thon in the Toronto, ON, area. Two-meter simplex operation was used between mobiles and base. – (VE3GFN, EC)

■ Thirty-seven SEC reports were submitted covering 13,034 AREC members for September. That's the highest number of AREC members reported this year, but three less reports than February's high of 40. Last September (1972) saw 39 reports representing 12,738 members. Sections reporting: Alta, Ariz, Conn, EBay, ENY, EMass, Ill, Iowa, Kans, Ky, Mar, Mich, Miss, Mo, Nebr, Nev, NFla, NTex, Ohio, Okla, Ont, Org, Oreg, SV, SDgo, SBar, SCV, Sask, SC, SFla, STex, Utah, Va, Wash, WMass, WNY, WPa. QST

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters, be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a post office box or telephone number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 50 cents per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 15 cents per word will apply to advertising which, in our judgement, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 15-cent rate. Address and signatures are charged for, except there is no charge for zipcode, which is essential you furnish. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 50-cent rate. Provisions of paragraphs (1), (2) and (5) apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking copies can be supplied.

(8) No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST *are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

QCWA Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc., Box 394, Mamaroneck NY 10543.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't, police, etc, invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P.O.Box 73, West Coram NY 11727.

EDITING a club paper? Need public relations help? You should belong to the Amateur Radio News Service. For information write: Rosemary Willis, 9276 Borden Ave., Sun Valley CA 91352.

GOOD News — SRRC Hamfest June 2, 1974 at a fabulous new site in Princeton, Illinois Fairgrounds. SRRC/W9MKS, RFD 1, Box 171, Oglesby IL 61348.

TREASURE Coast Hamfest March 9-10; sponsors Vero Beach Amateur Radio Club Inc., and St. Lucie Repeater Association, Community Center, Vero Beach FL 32960. Free Continental breakfast, speaker, Swappers row. Tickets and information write Ike Roach, K4QM, Box 3088, Vero Beach FL 32960.

SPIDERS for boomless quads. Heliare welded aluminum. Al's Antennas, 1339 So. Washington St., Kennewick WA 99336

VERY in-ter-est-ing! Next 6 big issues $1. "The Ham Trader," Sycamore IL 60178

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando FL 32806

NOVICES: Need help for General ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, PO Box 6015, Norfolk VA 23508.

WANTED: tubes, transistors, equipment, what have you? Bernard Goldstein, W2MNP, Box 257, Canal Station, New York NY 10013

OFFER $10 for Electrical Experimenter May 1913, Popular Electricity May 1908. Wayne Nelson, Concord NC 28025.

JEHOVAH's Witnesses who are amateurs write Bob Ellis WA4UQQ, 160 Lagoon Rd. SE, Winter Haven FL 33880 or call (813) 293-3595.

QSLs??? Largest variety!!! Samples 35c. DeLuxe 50c. Religious 35c. (Refundable). Sakkers, W8DED, Box 218-A, Holland MI 49423.

3-D QSLs — Far more spectacular, little more cost. Samples 25c (refundable). 3-D QSL Co., Monson 2, Mass. 02057.

TRAVEL-PAK QSL Kit — Send call and 25c; receive your call sample kit in return. Samco, Box 203, Wynantskill NY 12198

PICTURE QSL cards of your shack, etc. from your photograph. 500, $12.50. 1000, $16.25. Also unusual non-picture designs. Generous sample pack 30c Half pound of samples 60c. Raum's, 4154 Fifth St. Philadelphia PA 19140.

QSLs, samples 10c. Fred Leyden W1NZJ 454 Proctor Av. Revere MA 02151.

CREATIVE QSL cards. Personal attention. Imaginative new designs. Send 25c. Receive catalog, samples and refund coupon. Wilkins Printing Box 787-1, Atascadero CA 93422.

SAMPLES 20c. Harry Sims, 3227 Missouri Ave. St. Louis MO 63118.

QSLs 300 for $4.65, samples dime, W9SKR, Ingleside IL 60041.

QSLs "Brownie" W3CJI, 3111 Lehigh, Allentown PA 18103. Samples 10c. Catalog 25c.

DELUXE QSLs, Petty, W2HAZ, PO Box 5237, Trenton NJ 08638. Samples 10c.

DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Bolles, Little Print Shop, Box 9848, Austin TX 78757.

QSL, SWL, WPE cards. Samples 25c. Log books, file cards, decals. Malgo Press, Box 375, Toledo OH 43691.

QSLs, SWLs, WPE samples 15c. Nicholas & Son Printery, PO Box 11184, Phoenix AZ 85017

FRAME Display, and protect your QSLs with 20 pocket plastic holders. 2 for $1, 7 for $3. prepaid and guaranteed. Tepabco Box 198T Gallatin TN 37066.

QSLs, multicolor glossy; choose Globe, Eagle or straight key. Report form on back, 100 - $5.50, QSL cards not personalized, 100 — $2. Rusprint, Box 7575, North Kansas City MO 64116

QSLs. Second to none. Same day service. Samples 25c. Ray, K7HLR, Box 331, Clearfield UT 84015.
QSLs — Dime or your present card brings samples. Alkanprint, Box 3494, Scottsdale AZ 85257.

RUBBER stamps, $1.75 includes postage. NJ residents add tax. Clints Radio, W2UDO, 32 Cumberland Ave, Verona NJ 07044.

QSLs catalog. Samples 35c. Ritz Print Shop, 5810 Detroit Ave. Cleveland OH 44102

FREE samples, good designs, fast service. W7IIZ Press, Box 2387, Eugene OR 97402.

RUBBER stamps for hams — free catalog — Brock's, K9OSC, 11021 W. Jeffrey Court, Milwaukee WI 53225.

QSLs. Second to none. Same day service. Samples 25c, Ray, K7HLR, Box 331, Clearfield UT 84015.

FREE samples, good designs, fast service. W7IIZ, Press, Box 2387, Eugene OR 97402.

DXers: copying ham sentences in 54 languages get QSLs! K3CHP's DX QSL Guide — $3.95. Joe Mikuckis, 7913 Furman Pkwy., Riverdale MD 20840.

QSLs, samples — 10c. K5HYR Print, Rt. 8, Box 546, Pine Bluff ARK 71601.

C. FRITZ sends Seasons Greetings to Hams everywhere!

LICENSE Plates wanted for collection. Need amateur radio tags from anywhere. All postage reimbursed. Mail plates to Frank Sutera, 1742 Schulte Hill, Maryland Heights MO 63043.

WANTED— Receivers and test equipment made by McMurdo Silver and Guthman. George Publow, Box 969, Picton ON Canada.

CANADIAN Surplus Catalog and flyers — $1. Etcox Electronics, Box 741, Montreal Canada H3C 2V2

DXERS: Sunrise sunset times world wide, twelve months — 50c. VE5XU, 3637 Victoria, Regina Sask. Canada

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DX-pedition XYL approved? Montserrat West Indies; beautiful house in tropical setting, overlooking Caribbean and mountains. Large swimming pool, 3 bedrooms, 3 baths, maid service. K. Hollatz, VE3FHO, Box 1077, Elmira, Ontario Canada (519) 669-5582.

WANTED— Schematic of antique Magestic 90, by Grigsby, Grunow, Co., power transformer particulars. Write, Howieson, Athelstan, Quebec, Canada JOS-1A0.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY NY 10012.

CALL Toll-free: (800) 327-7799. Ask for Bob Hoffman (Jaro Electronics Corp.) We buy all types of tubes. Top prices paid for Varian, Eimac, Amperex. Address: 412 27th Street, Orlando FL 32806, In Florida call collect (305) 843-9551.

WANTED: An opportunity to quote your ham needs. 35 years a ham gear dealer, Collins, Drake, Galaxy, Swan, Tempo, Kenwood, Clegg, Ten-Tec, Hy-Gain, and all others. Also $25,000 inventory used gear. Request list. Chuck, W8UCG, Electronic Distributors, Inc. 1960 Peck St., Muskegon MI 49441. (616) 726-3198. Telex 228-411.

MOBILE ignition shielding gives more range, no noise. Kits and custom systems. Literature, Estes Engineering, 543-A West 184th, Gardena CA 90248.

MANUALS for most ham gear made last 25 years. Send SASE for quote. WØJJK, Hobby Industry, Box 864, Council Bluffs IA 51501.

WE BUY electron tubes, diodes, transistors, integrated circuits, semiconductors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. (201) 354-2420.

WANTED: ARC-5/vhf components. Mounting racks MT-65 and MT-71. Control unit C-42, junction box J-28. Also need connectors. WB8NLM, 146 Schonhardt, Tiffin OH 44883.

CRYSTALS airmailed: general purpose, MARS — Novice, active FT-243, all frequencies minimum five, 40 m 15 m, 10 m — 99c each, 80 m — $1.59 — Cover bands inexpensively — rock solid. Less than five, 80 m — $1.75 other $1.50. Novice — with VFO or no — four bands — eight crystal package just inside bands for QSO or band limits — $9.95. General purpose: FT-243 .01% 32 pF, 3500-8600 kilocycles $1.90, (five $1.75), (nets, ten same $1.45). 1700-3499, 8601-13000 fundamentals, 10,000-30,000 overtones $2.95. Add 50c each for .005%, 75c for HC-6/u above 2000. Airmail 15c crystal, 1st-cl 10c. Free listing. Bob Woods, WØLPS, "Since 1933" C-W Crystals, Marshfield MO 65706.

MONITOR police/fire dispatchers in connection with CD, MARS, RACES work. Official directories show channels, nationwide. Catalog +10 sase. Communications, Box 56-AR, Commack NY 11725.

DO-it-urself DXpedition. Stay at ZF1SB, Cayman Is. Vertical antenna and Caribbean at your doorstep. Diving-fishing if hand folds. Write Spanish Bay Reef Resort, Box 800J, Grand Cayman B.W.I.

6-METER/2-meter 2000 watt PEP linear amplifier with 4CX1000A tube. See June 1973 QST article. $350. With 2 spare tubes. Wanted: 1296 MHz low noise xtal controlled converter with 28 MHz i-f. W4UCH.

COLLINS KWM1, 516F1 and 516E1 supplies. Mobile mount, noise blanker, DX adapter, 2.1 kc and 3.1 kc filters. Excellent condition. $450. Frank McJannet, 11557 Evanston, North, Seattle WA 98133.

HALLICRAFTERS HT37 $165. Hammarlund HQ170 $140. Two meter RCA CMC20 Carfone $75. Alan Hochberg WA3PPV, 718 Pyne Hall, Princeton University, Princeton NJ 08540.

CLEANING shack of Raytrack horizon 6 2kW PEP linear amp, Drake MS4 and TR6 power supply, Shure 444 mic, Weston 1240 DVM, Knight WR scope, Signal Gen and Signal tracer, Amphenol "millivolt" Commander FETVM, Cushcraft 3 & 5 element 6 meter beams, All items are like new, complete with all manuals. Andrew Mueller, WB9GAC, R+1 Box 203, Germantown WI 53022.

HEATH HX10 $110, SB620 Scanalyzer $80, FR4 freq meter $40, Heath Impedance bridge $75, telequipment D54 $475. WB4UZT, 271 Tollgate Trail, Longwood FL 32750.

BRAND new Clegg 66 transceiver $145. Jim LaTorre, P.O.Box 521, Lawrence MA 01842. Tel at work (617) 475-5000, X3236.

P.C.'S. Need a project for winter? Send a s.a.s.e. for list of available boards. Semitronics, Charles R. Sempirek, Rt 3 Box 1, Bellaire OH 43906.

WANTED: Swan 406 VFO. K5UPV.

WANTED: UTC CG-1C, Eimac SK-506. Specify condition and price in first letter. F. Budavari, 285 Summit Ave., St. Paul MN 55102.

R-390A. Clean, good condition electrically, mechanically — $465. Includes crating, shipping. W6ME, 4178 Chasin Street, Oceanside CA 92054.

PARTS trays — 3 for $1, 12 sections each tray. Santana, P.O. 3477, LA CA 90028.

WANTED: QSLs 1920 and before. Also ARRL Handbook before 1940. W6ISQ, 82 Belbrook Way, Atherton CA 94025.

SONEY F-83 Command Microfone wanted. Perhaps also the 800-B to go with it. Write Reveal, Lawrence Road, Dover NJ 07801.

FOR SALE: TR-3 — $320; AC-3 — $44; MS-4 — $12; Galaxy V Mk II — $215; calibrator — $9; SC-35 speaker — $10; AC-35 supply — $50. All like new. W9HF, 505 Roxbury Ct., Ft. Wayne IN 46807.

WANTED: Used Kirk Helio-Coidal antenna. Must be reasonable. W6RNC, 1841 Grape, Pampa TX 79065.

MERRY Xmas and Happy New Year from WØCVU. On the air since 1913.

MOVE-Sale: Drake Sta. R4B, T4XB, C-4, L4B, MN2000. Classic 33, Ham-M Rotor. W2MGD, 3301 Foxcroft Rd., Charlotte NC. (704) 364-8697.

CHRISTIAN Ham Fellowship now organized for Christian hams who wish fellowship with other Christian hams. Request free information on how to witness to other hams. Christian Ham Callbook, $1 donation. For free details write — Christian Ham Fellowship, 5857 Lakeshore Dr., Holland MI 49423.

SELLING very rare book: *Loomis Radio Theory & Operating*. See Oct. QST P. 101. Best offer. Romney, WB4MVE, Ellenboro NC 28040. (704) 453-8859.

SWAN 500, with 117 XC ac power supply and speaker, excellent condition — $335; Swan Mobile module, make offer. Reply WB2HJW, C. W. Vagell 41-03 Christine Court, Fair Lawn NJ 07410.

SELL: Hy-Gain 14 AVQ — $25; Heath HW22A — $50; manuals included, cash and carry. W2HJG. (201) 763-9070.

DRAKE 2NT transmitter, 2C receiver, 2CQ multiplier, mint condition — $325. R. Weber, Lakeville CT 06039. (203) 435-9598.

WANTED: HV transformer for Viking Thunderbolt. Will accept defective unit suitable for rewinding. Jim Fleming, K9FRZ, 6N705 Harvey, Medinah IL 60157.

MUST Sell, Drake TR-3, AC-3, MS-4, HD-10, digital clock, three mics, and headphones. Asking $350, complete. Also, I need a Lafayette HA-750, 6-meter xcvr, please state price and condx. For more information on above, write Lynn, WA7QYG, 378 Orchard Ave., American Fork UT 84003.

WANTED: IMTS mobile telephone. Greg Hyman, 19 Sicard Ave., New Rochelle NY 10804.

QST 1949 thru 1963, make offer by year or all. K6FJ, Box 393, Cedar Ridge CA 95924.

FOR SALE: Knight T-150A transmitter — $40; also homebrew transmitter, 80 & 40 meters, 17 watt — $15. WB4PBS, Randy Bush, Box 313, Magnolia Dormitories, Auburn AL 36830.

SELL: Collins 75S-3B — $600; Hallicrafters HT-44 w/ps — $225; HT-45 linear w/ps — $300; Johnson kW matchbox — $75; all mint w/manuals; Swan 260 transceiver, needs dc ps work — $225. WB2ETI, 42 Hudson Rd., Bellerose NY 11426. Phone (516) FL-4-6792.

FOR SALE: Two Eico 753 xcvrs with 751 ac supplies — $150 each, Globe HG303, 75-watt cw, 80-10 xmtr, with matching VFO — $75. Robert Uhrlass, WB2DXL, 438 E. 239 St., Bronx NY 10470. Phone (212) 324-5463.

SWAN 500 (mint); SS-16 filter, 14-117 supply — $425; Variac 220 V-20 A — $100; Audio osc, Hew/Packard 200 ABR — $150; Heath audio analyzer IM-22 — $35; H.V. plate xfmr, UTC — $47; 3000 V ct, 300 mA — $35; VUM; triplett 630-A, mirror scale — $45; mint vibroplex original bug — $20; wattmeter Sierra 164, 144-470 mc — $140. Jerry Dubson, W6MDH, 14638 Sylvan, Van Nuys CA 91401. (213) 785-7619.

HW-7, never used — $30, plus shipping. WA3MXE, Box 572 RD1, Mohnton PA 19540.

GOING to Tech. school, must thin ham station, for sale: "Deluxe" Clegg Venus B-meter ssb, not perfect, but can be easily. Only $230. Also have Heathkit Twoer, A1 condition only — $30. Write, Steven Couch, WBØGAK, 1815 Princeton Ottawa KS 66067.

24-hour clock — $9; 12-V dc to 120 V ac power supply, 350 watts, never used — $65; HW-7, with Superjex Headphones — $59; swap or sell, want, mobile 40-meter transceiver and transistor Ham Receiver. Ken Hand, WB2EUF, Bridgehampton NY 11932.

CLEANING house!! HT-37 — $165; SX-111 — $135; both very clean. HA-1 TO keyer, mint — $50; HW-32, HP-23, very clean — $90; HD-10 — $25; very clean. Want: 14AVQ/WB, Bird 43 w/uhf slugs. No shipping. Paul O'Brien, 96 Alton Rd., Quincy MA 02169. (617) 773-4421.

TV camera. Solid state, self-contained sync generator and microwave transmitter with subcarrier audio channel. AC or Nicad powered. Zoom lense. Instruction manuals. Spare vidicons, parts and circuit boards. W2RLG, 42 Union, Matawan NJ 07747. Tel. (201) 566-9238.

SELL: Collins 75S-3B with additional 500 kc filter, 32S-1 amp, 516F-2, Henry 2K, SBE-33 with SB-2 dc supply and carrying case. All excellent with manuals and cartons. Make offer. W7JUX, D. Fulton, 45 Eagle Crest Dr, 411, Lake Oswego OR 97034. Phone (503) 636-5991.

WILL trade Bolex H-8 professional movie camera with two lenses & Deluxe case for xcvr, similar to SB-101 etc. John Milliman, K9MDY, 1966 Laura Lane, Des Plaines IL 60018.

SELL: mint Yaesu FT-101, latest model with fan and 160 meters, about six hours air time. Warranty till December. Call 301-721-2212 anytime. J. Burch, 1610 Earlham Ave., Crofton MD 21113.

RTTY 15 teleprinter — $40, 14 typing reperf — $25; 14 tape dist. $20. Excellent, deliver within 100 miles for $75. W9FME (219) 272-2347. So Bend IN 46637.

SELL: used 20-meter Mono Band Beam, Hy-Gain 204BA with BN24 balun — $75; plus shipping. Bob Ruffer, W4LGD, 4013 Cleveland Place, Metairie LA 70003. Phone (504) 887-2967.

50-54 MHz, Hallicrafter SR-46A ac-dc, HA-26, 6 and 2 VFO, xtal positions. MR-40 mobile kit never opened — $85; mint condition W9DLW, RR 2, Box 67A, Worthington IN 47471.

HALLICRAFTERS SX-73 Communications rcvr for sale. DBL conversion, 540 kHz-54 MHz, RTTY output, w/tech. manual. Murdock Earphones — $90. Stuart, F21 Eliot HSE, Cambridge MA 02138.

DISCOUNT prices plus full warranty, call or write for fast quote on new radios and accessories. SBE144 — $199.95; Midland 13500 — $219.95; 23520 W-T — $209.95; 20% plus discount off list price Hy-Gain, Mosley, TH6DXX — $143; Classic 33 — $124; 15% plus off list, Trice, Rohn, Standard, Collins, Clegg FM-27 — $479 list, Drake, Swan, Ten-Tec, write trade-in prices; Ham-M — $99; TR44 — $59.95; Belden 8448 rotor cable 10c/ft; 8214 RG8 foam 17c/ft; Motorola HEP170 epoxy diode 2.5 A/1000 PVC 29c, $25/100 lot; Caltad kW SWR-relative power dualmeter bridge — $15.95; Free flyer. Shipping charges, collect. All items guaranteed. Madison Electronics, 1508 McKinney, Houston TX 77002. (713) 224-2668. Nite/weekend (713) 497-5683.

FOR SALE: Motorola GE, RCA FM mobiles. Hammarlund HX500 and HW170A, 2.4" refracting telescope. Radio magazines back 25 years. S.a.s.e. for details. W9DGV, 2210-30th Street, Rock Island IL 61201.

DRAKE DC-4 mobile power supply — $70. Len Kwyer, 125 Perkinswood S.E., Warren OH 44484.

QST complete first class from 1922 to date. Make offer, cash or high class rec. Art Stewart, W-4-B L N, 2117 Greenway Ave., Charlotte NC 28204.

TECH Manuals — $6.50 each; R-220/URR, R-389/URR, R-390/URR, URM-25D, USM-16, TS-382D/U. Hundreds more available. Send 50c (coin) for list. W3HD, 7218 Roanne Drive, Washington DC 20021.

HAMMARLUND Super Pro SP-600, excellent condition with manual — $250. Bernie, W3CAO, Thurmont MD 21788 or call (301) 271-2714.

WANTED: RAL-7, Navy Type CND-46156, receiver, original condition. No changes. Sam Simmons, W4NEI, P. O. Box 218, Windermere FL 32786.

QST for sale, 1942-1969, handbooks, books, send s.a.s.e. for list. W2QJA, 991 Park Lane North, Franklin Square NY 11010.

SWAN Cygnet 270B 10-80 m transceiver, mint condition, 1-1/2 yr. old. Asking $390, call or write, WA1QLK, 15 Greenough St., Brookline MA 02146, (617) 734-0661.

HEATHKIT SB-100 with HP-23 mike and speaker — $400, Regency HR-2, 15 crystals, Z-Filter, preamp — $200. Will ship or deliver. W1MBX, Prospect CT 06712, (203) 758-5858.

RANGER-1 xmitter, Hy-Gain 18 HT, Hy-Tower antenna; Johnson 250 w, matchbox, make offer all or part. K6AEV, Rt. 2, Box 23-R, Placerville CA 95667.

TRADE: HW12A for HW22A. W2UGM, 66 Columbus Ave., Closter NJ 07624. (201) 768-1884.

MAKE offer: First bid, second chance given. Two DuoBander II's ssb transceivers, both with ac-dc power supplies and Turner mikes, mint condition; LaFayette cb transceiver, 8-channel DX-100 xmtr, 40-meter Command receiver with power supply. Doc MdLeckie, W5GY, Box 128, Naples TX 75568.

HEATH SB-102 with cw filter — $340; Hallicrafters TO-1 keyer and Brown Brothers Paddle — $65; Accessories, Will ship. FOB, WB6ZGQ, 959 W. Adams Apt. 20, Los Angeles CA 90007.

FREE with the purchase of a new Genave GTX-200 at $259.95; 18 crystals of your choice, send cashier's check or money order for same-day shipment. For equally good deals on Drake, Standard, Clegg, Regency, Hallicrafters, Tempo, Kenwood, Midland, Ten-Tec, Galaxy, Hy-Gain, Cush-Craft, Mosley, Sony and Hustler, write to Hoosier Electronics, your ham headquarters in the heart of the Midwest. Become one of our many happy and satisfied customers. Write or call today for our low quote and try our individual, personal service. Hoosier Electronics, Inc., RR 25, Box 403, Terre Haute IN 47802. (812) 894-2397.

ATTENTION: 6-meter men, now selling the new Wilson antenna, 9 elements on a strong 40-foot boom. Weight 35 lbs., price — $149. A T and R Inc., WB9ETQ, Wallace IN 47988.

NEW A2518 Allied Power supply/speaker, cord and manual. Will send specs before I ship to you — $85, prepaid. WB5AKO, Phil Young, Rockdale TX 76567.

QSTs 1930-33, complete years plus fragments, 1946-53 fragments, 1954-65 complete years plus fragments, conditions vary from excellent to poor. Will wait for best offers. Chris Landis, WA6USQ, 1522 W. 222 nd St., Torrance CA 90501. (213) 328-5437.

FOR SALE: Collins 32S1, 75S1- 516F-2 power supply — $650. So. Calif. only. WB6GOX. Phone (213) 457-2471.

WANTED: A schematic for a Hallicrafters model HT-22, high-band portable transceiver. Write Perry Yantis, WN8OTH, 282 Thurman Ave., Columbus OH 43206.

MOBILE Ops: Write for info on shielded ignition systems and noise suppression components. Summit Enterprises, 36 Winchip Road, Summit NJ 07901.

DRAKE 2C, like new — $150, Heath Marauder ssb exciter — $90, good condx, both for $230. R. Shaper, WB2NKZ, 11 Polly La., Glen Head LI NY 11545. (516) 759-9644.

KENWOOD Solid-state ham band receiver, 160 thru 10, plus built-in 6 and 2-meter converters. Very good condition — $275. Philip Schwebler, W9GCG, 4536 N50 St., Milwaukee WI 53218.

DRAKE TR-4 with noise blanker, RV4, AC4, looks and operates like new — $600. WB9EIE, 804 Jordan Place, Rockford IL 61108.

I have a restorable 1947 Chevrolet to trade for two-meter xcvr or vhf linear. Will deliver 100 miles. Good running condition. W8FYF, Route 1, Box 82, Jerusalem OH 43747.

SCOPES, counters, test equipment, solid state & other computer components, military & industrial surplus — send name on postcard for free "bargain bulletin." Lawrence Instruments, Dept. Q. P. O. box 744, Sunbury PA 17801.

PRINTED circuit boards — professional quality, produced from your positive artwork — $3, or send s.a.s.e. for complete details. Copcom, 8611 Beverley Lane, Dublin CA 94566.

NEEDED: RTTY filter for CX7A or source of supply. Ray LaRue, W4BYG, 2258 Hudson Drive, Lilburn GA 30247.

WILL sell only Piersen Telegraph transmitter in the world — $1500. QST July 1963. H R Habig, 3531 Beldare Ave., Cincinnati OH 45220.

SIGNAL/One CX-7A transceiver with cw filters, speaker and a $25 complete service manual included, used less than one year, mint condition. FOB my QTH, will sacrifice for — $1550. Ray Hall, 114 Water St., Plymouth MA 02360.

HEATH SB-301 receiver — $215; SB-610 monitor scope — $70; both unmodified, excellent condition, postpaid. David Berry, 43 Kings Road, Canton MA 02021. (617) 828-0641.

SELL: Heathkit TX-1 and SB-10 — $75 each, 8 Deerfield Road, Wilton CT 06897.

W6OWP cleaning house. Wheatstone tape perforator, Boehme equipment (collectors items?) and other cw gear. Hundreds of QST, CQ and 73 magazines. S.a.s.e. for list. F. Bartlett, 423 Oxford Way, Belmont CA 94002.

DRAKE R4B, absolutely mint! Proof of recent factory alignment — $335. Galaxy Mark II, ac supply, remote VFO, VOX, clock-phone patch console, mike — $375. Bill Handel, K8SSY/6, 750 Stierlin Rd. Apt. 131, Mountain View CA 94043. (415) 965-2691.

SELL: HW-16 — $40; perfect x-tals, manual, shipped collect. Dave Fuerstenberg, 101 El Camino Real, Vallejo CA 94590.

YAESU FRDX400 SD with 6 and 2, mint with original carton — $290, Drake 2C with speaker/calibrator — $175, Viking Adventurer xtmr with modulator and xtal — $30. N. E. Garrett, 201 E. 66th St., New York NY 10021.

HALLICRAFTERS FPM-300. We've got 'em in stock. In factory sealed cartons with full factory warranties at $489. Absolutely no phone orders, reservations or sales pitches at these prices! Certified checks only. Add $5 for UPS delivery to your door. Custom Engineering Co., 102 Hill, Big Rock TN 37023.

DIGITAL frequency display for your receiver and transmitter. Detailed plans — $3. Communication Electronics Specialties, 814 Orwell Ave., Orlando FL 32809.

FOR SALE: Collins 75S-3 receiver ser. 12920 in mint condx — $425, shipped collect COD or $400, if picked up by buyer. Roger Paulson, W1UOP, P.O. Box 4, Needham MA 02192.

NOVICES: Drake 2nt with 10 crystals on 15 and 40 — $99; Heath HR-10B, new tubes, factory aligned, mint condition — $75. Mike, 2977 Mariposa Dr., Burlingame CA 94010.

SELL: Heath WB-102 xcvr, HP-23A power supply & speaker, mobile mount & power supply. All mint condition. Make offer on any or all. WB9EZS, Dennis Grams, 119 E. Pine, Stillwater MN 55082. (612) 439-4245.

KENWOOD transceiver, TS511S, PS511S — $350; Codax Keyer, B & W model 361 — $25; Lafayette base-loaded vertical — $15; extra ham magazines from 1968 — 60 QST's 73's; 31 CQ's; 64 Ham Radio's — Choice $1 each. Take them all for 25c each. Willie Murphey, Box 99, Guthrie OK 73044.

JOHNSON Thunderbolt linear, low bands, mint — $275, Knights, 121 N. McKnight Rd., St. Paul MN 55119.

SX-71 with speaker — $60; Heath HO-13 Hamscan — $60; send s.a.s.e. for list of other extra gear. K6SRM, 272 4th St., East, Sonoma CA 95476.

STUDYING for FCC Ham Ads? Try Posi-Check. New, for the first time, Posi-Check for Novice Class, covering new Novice exams. Price $3.25. New General Class Posi-Check, covering new exams, including new section on Rules and Regulations — $5; Advanced Class — $4.50. Extra Class — $4.75. All original, expertly devised, multiple choice questions and diagrams covering all areas tested over in FCC exams. Keyed answers and explanations, IBM sheets for self-testing. Each classification complete for its own class. First class mailing included. Air mail 25c extra per copy. Send check or money order to Posi-Check, P. O. Box 3564, Urbandale, Des Moines IA 50322.

SWAN 350, linear systems 400-12 dc supply, Hustler antenna with resonators 15 through 80. Special dust, waterproof base with coax fitting. Mike, cables, coax, complete mobile — $290. W4JPZ, John Penland, Box 963, Canton NC 28716, (704) 648-1901.

SELL Hallicrafters 2000 transceiver including power supply — $750. Paul Gallant, 4411 No. Federal Hwy., Pompano Beach FL 33064. (305) 941-2874.

WANTED: HW-101, HW-32A, HP-23B, state condition, price. WA7IJN, P. O. Box 822, Thompson Falls MT 49873.

WANTED: Plate transformer for Heathkit HA-10 linear. White, W5SKW, 428 West Sale, Lake Charles LA 70601.

COLLINS S-line station 75S-1, 516F-2, 75S-1 with 2 filters, 312B-4, cables & manuals. Super clean, as new — $900, FOB, free delivery in L.A. county. K6DRE, 10103 Olivia Terrace, Sun Valley CA 91352. (213) 768-2934.

FLORIDA hams: SX-101A — $150; SB400 — $175; SB300 — $125; HO13 — $50, no shipping. "Floyd" 4908 4th Ave Circle N.W., Bradenton FL 33505.

WANTED: rearmost coil module for SRR-11 or FRR-21 receiver, complete with tube and cover plate. Gibson, 2018A Virginia, Berkeley CA 94709.

COLLINS mech filters, 455, 220, 250, 500 kHz, USB and LSB sets. Crystal filters, large selection, good prices. S.a.s.e. list WB6ORT, C. Isham, 6275 Arnold Way, Buena Park CA 90620.

OLD tubes, parts catalogs, magazines, radio diagrams. Sase for list. Tech manuals for S-10R, R-100A, R-390A. WA3AGM/5, 1600 Allo Ave. 84 Marrero LA 70072.

COLLINS 30S-1 — $950; 30L-1 — $345; new with warranty in factory box Galaxy-Hy-Gain GT-550A with ac and speaker — $495; new, sealed 4CX1000A's — $95; transformer 7800 VCT 1.5 amps — $65. Alan Gray, WA2WNX, 701 Grant Ave. W. Collingswood NJ 08107. (609) 858-6643.

COLLINS S-line for sale: 75S-3C, 32S-3, 30L-1, 312B-4, 516F-2 plus many extras. Mint condition, warranty. Contact R. Dixon, WA8DKY/4, Apt. MM202, 275 John Knox Rd., Tallahassee FL 32303. (904) 385-9225.

COMPLETE S-line — $750; money order or certified check. 32S-1, 75S-1, 516F-2, 312B4, SM-1; have cartons and would ship collect for $25 additional. William Washburn, 3500 Melody Lane, Baltimore MD 21207. (301) 922-7430.

WANTED: Older Ham or SWL equipment. Will trade valuable antique and classic cameras. Write! Ed Romney, WB4MVE, Ellenboro NC 28040.

HALLICRAFTERS SX-111, rcvr, 10-80 m, manual, WWV — $130. WB2WXO, Sands Ave., Milton NY 12547.

ISOLATED cabin without electricity. Must go solid state. Sacrifice SB-300, SB-401 — $390; make offer or trade. Prefer Argonaut, KL7HNC, Box 80311 College AK 99701.

"HOSS Trader Ed Moory" says he will not be undersold on cash deals! Shop around for your best price and then call or write the HOSS before you buy! new Galaxy GT-550A transceiver, reg. $595; cash — $439; new Drake TR-22, reg. $219.95; cash — $175; Demo TR-4C — $479; Demo Swam 500CX — $429; Demo Swan 270B — $379; Collins in stock; new Rohn 50 ft. heavy-duty foldover tower, prepaid — $255; new Mosley CL-33 and demo Ham-M rotor — $215; used equipment: R4-C — $399; T4-XC — $425; R4-B — $309; Ham-M — $95; nice KWM-2 — $549; FPM-300 — $489. Moory Electronics Company, P. O. Box 506, DeWitt Arkansas 72042. Tel: (501) 946-2920.

SELL: As one unit, SB-401 xmtr and SB-200 linear amplifier. Good condition. Assembled and used by engineer. Prefer not to ship. Make offer. WA1JLV, P. O. Box 128, Portsmouth RI 02871.

NOVICES: Drake 2-NT xmtr, excellent condition, manual, hook up cords (5) 80-meter xtals — $90. WB9HSW, 3250 North 52nd Street, Milwaukee WI 53216.

SB-301 — $180 has all filters. Drake 2NT — $90 like new. Heath Seneca — $70. HW-7 — $50 new. Thomas Camm. Call (412) 443-7761 after 5 PM.

DRAKE, complete station, R4B, MS4, T4XB, AC4. All excellent. Used less than 100 hrs, must sell — $75. Don, W9FME. (219) 272-2347. So. Bend IN 46637.

HW-16. 10 crystals clean — $85, shipped prepaid. E. Rotatori, WA1PYF, 550 Winter St., Framingham MA 01701.

WANTED: final, Henry 2K3, 3K, 2K-4; SB220, similar using 3-500Z tubes. State price and condition. W9GDM, 811 N. Blanchard, Wheaton IL 60187. (312) 668-1295.

NCX-5 MKII with remote VFO and ac supply, mint — $850. J. R. Lewis, 1950 North 350 West, Sunset UT 84015. (901) 825-4054.

NOVICES: Sell HW-16 with HG-10B VFO. Great condition — $130 or best offer. WA1QWA, Box 594, QPI, Worcester MA 01609.

SELL: Collins 75A3 — $275; Collins KY30/GRT RTTY transmitter; Heathkit Marauder HX-10 — $160; Swan 240 with power supply — $160; Hallicrafters SX-71 — $70; National R-460/UR — $100; Utica 6-meter transceiver (needs work) — $40; RC-459 — $10; LM-18 freq. meter with power supply and calibration book — $60. Dennis Corsalini, WA2DFJ, 2599 Bainbridge Ave., Bronx NY 10458. (212) 364-3839.

COLLINS KWM-1 with ac power supply — $200; Eico cond Checker 950A — $20; Heath VTVM — $15. W9GIR, Vern Mills 521 Cumberland, Park Ridge IL 60068.

MOVING: must sell! S.a.s.e. brings list of antennas, fm gear, test equipment, etc. Rob, 30 Sunset Blvd. Massapequa NY 11758.

WANTED: Any regenerative short-wave receiver. Walt Joyce, W6IQM, 2118 East Q-5 Ave., Palmdale CA 93550.

PL-172 — $80; 4-1000 — $40; 4-400As — $30; 4-250As — $25; 4-125As — $20; Hammarlund SP-600 — $200; RCA rcvr SRR-13A — $100; 32S1/516F2 — $375; homebrew amplifier 4040As vanac supply — $200; Boehme-5C TTY receiving converter, all shifts, scope — $50; Vacuum variables; VACAP 42-400 pF — $30; Eimac 20-60 pF — $20; Jennings 10-30 pF — $10. G. L. Hale, K0PIV, 6334 Edward St., Norfolk VA 23513. (804) 857-1507.

SWAN 250 6 m xcvr, like new with xtal calib. and 14-117 ac/dc supplies, — $275. C. Humphreys, W6IKH, 3302 Duke Ct., Santa Clara CA 95051.

BEST offer 516E1, want 516F1 or 516F2, 312B-3. Bell Slickville PA 15684.

WANTED: Technical material model GPR-92 or GPR-90 w/ssb converter. Please state condition and price. Jay Spyack, K2EGA, 2106 Donald Place, Valley Run, Wilmington DE 19810. Tel: (302) 375-9027.

CROSLEY white porcelain tube socket, wanted for my collection. Also Kellogg brown phenolic socket. Both from 1920s. Walt Kehnert, 5209 Minnehaha Blvd., Minneapolis MN 55424.

FREQUENCY Counter, Northeastern Engineering. H.W. 525A, input plug in 10 hZ to 100 MHz — $395; Northwestern, Inc., 011 S.W. Hooker, Portland OR 97201.

WA9AUM/1 new home address: 61 Cedar Ridge Road. Newington CT 06111.

WIDE selection of unused ICs of the following types and quantities: series 700 and 800 RTL, 566; series 158 DTL, 928, series MECL 26; Signetics Utilogic, 238, Amelco High Noise Imunity Logic, 320. Lot price — $520; (25c ea). For smaller quantities, please write Computer Center, Box 3945, University Station, Laramie WY 82071.

CLEANING shark's unique vhf/uhf FM-ssb gear, also SSTV, list s.a.s.e. W4API, Box 4095, Arlington VA 22204.

DRAKE TR-4 less AC-4, MS-4, excellent condition, with manual and new finals — $325. FOB. Bernard Vatz, 2603 Skyline Dr., Huntsville AL 35810.

Hy-Gain 402BA, 203BA, Ham-M rotor, all used one month, shiny new, $99 each; 34 ft. aluminum tower, best offer. Tatar, 1625 North Park, Cleveland Hts OH 44106. (216) 229-3755.

SELL: tower — 100 ft. galvanized, self-supporting — $500; FOB, original cost — $6000; Johnson Viking 2 with VFO — $75; Johnson 275 w Matchbox with bridge — $60. Fred Liddle, W2TN, Old Forge NY 13420. PH 369-3213.

SELL: Kenwood T599 and R599 in perfect condition. Student will sacrifice both for $500. WA7RGQ, 1150 Oregon, Prineville OR 97754. (503) 447-7688.

HW-100 & HP-23 both excellent — $225. HW-12A brand new — $90, going solid state. Jerry Lorentz, W6BPL, 396 Mayellen Ave., San Jose CA 95126. (408) 1880.

FOR SALE: 28KSR, Electro-Com 250 — $350; KT-662 Synthesized transceiver (3-30 MHz) — $650; GRT-12 linear (2.5 kW output/0.1 watt in) same as Collins 204-H — $800; Invadex 2000 — $400; 32U-3 — $150; Ranger Two — $135; new Mosley CL-20 — $250; measurements 80 — $175; 65 — $175; 95 — $150; new Hy-Gain 15 m mini-beam — $30. Telerex Little-Bertha Rotating mast (75'), less foundation tube and bearing — $2000. Rohn HD-3-7-88 tower, all guying accessories - $600 (costs $1800 new). Tri-Ex HZ-47T-N — $900; KWS-1; 75A-4 — $700; 300-V — $400. James Craig, 29 Sherburne Avenue, Portsmouth NJ 03801.

CLEGG FM27B, multiple frequency switch installed — $357 delivered. Cahsier's check — money order only. Mark Evans 711 16th Ave., South, Birmingham AL 35205.

GONSET GSB-100 — $90; R-4A w/6 crystals — $280; Jerry Malone, W1FNZ, 2107 Countryclub, Ames IA 50010.

SELL: Drake R4B, very mint, used 15 hours with xtals for 160, 10 cw, 49-31 25 m s.w, will pay shipping — $345. Bob Ramborder, K7JNV. (206-789-0935). 7547 11th N.W., Seattle WA 98117.

SELL: Swan 500 CX 117 XC VX2, excellent condition — $450. WA2BOX, 332 Holbrook Rd., Lake Konkonkoma NY 11779.

DRAKE TR3, AC3, MS4 mint, excellent, manual — $400. K2QAU. (201) 889-8576.

HEATH HX-20 xmtr & ps — $95; W1AZL xmtr converter — $25; Viking kW with desk — $250; Sens. Res. Lab Stds — 75 V & 750 V dc/ac — $60 ea; Autronic Keyer — $35; FOB. W6JKJ. (408) 736-8358.

WANT: HW-18-a/HP-23A; want, HW-18-1/HP-23A; want JW-18-1/HP-23A. Edgar Bernal. 10827 Vanderford, Houston TX 77072. (713) 498-1964.

ANTENNA System: Hy-Gain TH3MK2, TR44 Rotor, Rohn 20 ft. roof mount tower, 100 ft. each RG8/U Polyfoam, rotor cable — best offer. Hammarlund HQ-170A, absolutely mint, best offer. Paul Chesiotf, WB2ZJB, 4 Ellis Rd., West Caldwell NJ 07006.

SELL: Swan 270B with dc module — $300; Collins 30L1 with rack mount adapter — $310; Hal MKB-1 keyboard, "factory wired, new — $250. Teletype 32ASR — $350. K4TML, 27 Sheldon St., Wilkes Barre PA. (717) 824-5310.

SELL: HR-10 and DX-60 — $50 each plus ship. Mike Carson, Rt 4, Box 274, Moscow ID 83843.

SB-620 Scanalyzer, factory aligned, never used — $110. David Matson, 386B Great Rd., Acton MA 01720.

FOR SALE: Heathkit transmitter SB-400, with crystal pack, (1 excellent condx — $200. Jay Rusgrove, WA1LNQ, 80 Boy St., Bristol CT 06010.

TR4, AC4, RV4, W4, 3BDQ, Cantenna, D104, 10C PTL, 335, BN86 $725. Zachary Botwinick, 4721 NW 19 Court, Lauderhill FL 33313.

WANTED: T4, S833 or 34, Galaxy III, Sony Tuner, Sell: Regency high-low scanner, WA5AAO, Box 335, LaGrange TX 78945.

For SALE: Heath function generator EU-81A — $150; Heath 2-bridge — $45; Heath IP-27 LVPS — $65; Heath Voltage Reference Source EU-80-A — $75; Dunn Transistor Characteristic plotter 331 — $25; Central 20A exciter — $50. Beckman 8175 100 MHz Frequency Counter — $150; shipped cod, manuals for Heath equip, WB2OPJ, C. L. Hine, P. O. Box 141, New Milford NJ 07646. (201) 265-3742.

SELL: KWM2-A mint, PM2 ac supply, MP1 and 516E1 dc supplies, CC-2 carrying case, mobile mount, boom mike w/earphone — $850; Waters accessories available if wanted. 75S3 receiver very good — $250; Collins R390 with CV591-A ssb adaptor very good — $400; Drake TR-3 with ac-supply, excellent — $350; Drake TR-22 well xtyled — $125; Heathkit SB-101 with ac and dc supplies; mobile mount and speaker — $350; G.E. Video tape recorder and Vikoa ST-1000 camera unused — $500. RTTY gear, tubes, parts, etc. S.a.s.e. for list of items too numerous to mention. D. W. Langston, 9643 Alta Crest, Dallas TX 75217. Phone: (214) 288-4046.

WANTED: squeeze paddle key and HBR-11 5-prong coil forms. Stan Rupert, 2424 NW 114, Oklahoma City OK 73120.

SR-150, ac & dc supplies — $225. WA2OAX, 100 Gordon Ave, Dumont NJ 07628. (201) 382-7021.

HRO60 receiver A, B, C, D, ac soils product detector plug in — $200. W9TVV, 2028 Oriole Trail, Michigan City IN 46360.

WANTED: Buy or borrow service manual for Beckman, 557 and Military FR/114 counters. O. L. Hicks, 3442, Whatley, Jackson MS 39212.

WANTED: TV2B or TV2 Swan 2-m transverter state price and condition. WA2ZWS, Suny Albany, 1400 Washington Ave., Box 1018 Colonial Quad., Albany NY 12222. (518) 457-8752.

SELL QST 1930 through 1970 complete. Best offer. W9KV, 70 N. Elmhurst, Mt. Prospect IL 60056.

HW-100 — $200; Hamtronics fm receiver kit, 6-channel adapter $55. Chuck, WA9UQO. (312)-398-7835.

SELL: Yaesu FL2000B, will ship — $245; Hy-Gain 18 HT, local preferred — $115; Hallicrafters S-108, make offer. Harry Adelman, W2JYV, 2762 3rd Pl., Baldwin NY 11510.

SELL: Heathkit SB-401; DX-60 & VFO; AR-1500; Allied 2X-190; AKAI tape recorder. WB8HWF, 546 Oakwood Ave., Newark OH 43055.

NATIONAL NC-98, mudh modified — $70 with Collins filter, $50 without; Johnson Viking II, 160 thru 10 — $40; Harvey-Wells TBS-50D with VFO, coax relay and low pass filter — $35; DX-35 with VF-1 — $25; Heath two'er — $20; also Dumont VTVM, Knight sweep generator, Precision signal generator, Model 14 TD, swap or offer. WA6SPJ, 3762 Gondar, Long Beach CA 90808. (213) 429-3124.

RTTY picture perf tapes. Error-free, chad type, fully guaranteed. Stamp for list. Joe Dickens, 601 S. Dodson, Urbana IL 61801.

FOR SALE: 30FXC Collins transmitter; 201 Gonset linear; transmitting and receiving tubes. W8OAR, 3915 Grosvenor, Cleveland OH 44118.

BIBLE translators in Africa need amateur equipment, especially used transceivers, beams, linears and split units. Please help if you can. Donations of equipment, tax deductible. Missionary Radio, Box 366, Concordia Seminary, Springfield IL 62702.

SELL: Drake TR-4 w/NB, ac supply and MS4 speaker. Very clean — $575 or offer. Swan SS-200 all transistor xcvr, PS-20 power supply and 444 mic. Just 1 month old — $850 or offer. Roy Mayhugh, 325 Short, Bishop CA 93514. (714) 873-7334.

SSTV, monitor tubes, focus magnets, yokes, 500 mA, rf ampmeters, s.a.s.e. info. Lotz, W5HCO, 750 Florida Blvd., New Orleans LA 70124.

VEN-Tec keyer KR-5 — $17.50; FR4CW filter — $600. Hardly used mint firm. Dick Myers, Browning Rd., Hyde Park NY 12538.

NEW condition Tempo One, matching power supply — $325; Heath HW32, HP23 — $90. FOB, G. S. Bean, W8KBJ, 613 Asbury Rd., Cincinnati OH 45230.

3-2-way 70 ft. crank-up, tilt-over tower, RBX-70, new cost — $900, plus, asking $400. U ship. Cubex 4 elem., triband quad, less boom, model MK III — PTDX. New, cost — $279.95, asking $120, U ship. WA2MRZ. (716) 652-7304.

QST (53-71) misc. equipment for sale. Send s.a.s.e. for list. Smukler, 177 White Plains Rd 19 E. Tarrytown NY 10591.

WANTED: SBE-34 in mint conditions, willing to pay up to — $295. HP3ZP, Box 253, David-Republic, Panama.

COLLINS 75S-3B rcvr with 200 hz cw filter, SN 17 K, excellent condx — $600. FOB Larry Lattinen, WA6JYJ, P. O. Box 14389, Santa Barbara CA 93107. (805) 969-2908 after 8 PM & weekends.

YAESU FTDX 570 xcvr with cw filter and FV401 ext. VFO., excellent condx, best offer over $500; Heath HD10 keyer — $20. WA2EKW, 2136 Niagara St., Buffalo NY 14207. (716) 873-5582.

CLOSING down station. Everything about 20 years old and all must go. HQ129X — homebrew xmitters, ARC5s, rcrx and mitters, precision scope — much more. Paul Zink, W2OSM 16 Garden Place, Westwood NJ 07675.

SELL: xmtrs — Johnson Adventurer — $25; SB-175 sideband xmtr w/ps — $50; DX-100 — $35. Gary Fritz, RFD 1, Hankeye IA 52147. (319) 427-3282 evenings.

SWAN 350 (late) with 117 xc power supply. Excellent condition with new finals — factory reconditioned spring 73 — $325. W4POG, 1520 Westshire Lane, Richmond VA 23233. (804) 285-2954.

SWAN SW-240 transceiver, never operated, mobil; linear systems Adcom 350) ACPS, speaker and hookup cable. Package deal, firm $225, cashier's check or money order, no trades. Will schedule. W. T. Scaggs, 4120 Mattison Ave., Ft. North TX 76107. (819) 737-7089.

VESELE božične praznike in srečno novo leto 1974 vošči vsem slovenskim radijskim amaterjem širom sveta W8FAZ. Jože Zelle, 1227 Addison Road, Cleveland OH 44103. QSL SARU.

FTDX570 new, only 26 contacts due to extended illness. Bought from Harrison Radio. Serial 312072. Perfect cond. going off air after 53 years due to age. Price $475. Prefer pick-up but will ship in orig. carton FOB. Ten Tec KR-20 keyer, new $35; new VF664 mike with desk stand $50; new 2 el. Hy-Gain tri-bander, take it down for $45. W+WS, Wilmington DE Tel (302) 654-1660. Call first. All checks certified or M.O. All prices firm, no trades. FTDX470 under warranty yet.

WANTED: Mech. filter 455J21 for Collins 75A4. Will pay premium. All letters answered, W3OOE, 4073 Circle Drive, Allison Park PA 15101.

RECEIVER: National, NC303, excellent for Novice or cw, beautiful condition, includes crystal calibrator and manual. Reason for selling, need the money for dental school education. Will ship by bus, FOB $140. Dolan, 1439, 5th Ave., Charleston WV 25312.

FOR SALE: Drake TR-4, AC-4, DC-3, excellent condition — $550. K0EMV, Dennis D. Walton, Keota IA 52248.

JOBS FOR HAMS

WANTED: Commercial or ham-technician wanted. Contact Rick Miller, Heathkit Elect. Center, 35 West 45th Street, NY NY.

HAM Radio Counsellor for Boys' Summer Camp in Maine. Camp Cedar, 1768 Beacon Street, Brookline MA 02146.

CW or RTTY, whichever way you go,

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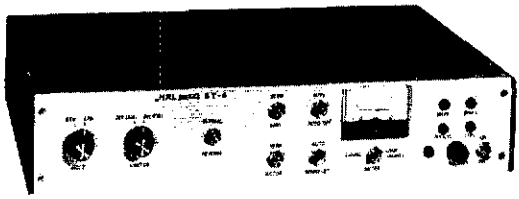

TOP QUALITY RTTY...WITH THE HAL MAINLINE ST-6 TU. Only 7 HAL circuit boards (drilled G10 glass) for all features, plug-in IC sockets, and custom Thordarson transformer for both supplies, 115/230 V, 50-60 Hz. Kit without cabinet, only $135.00; screened, punched cabinet with pre-drilled connector rails, $35.00; boards and complete manual, $19.50; wired and tested units, only $280.00 (with AK-1, $320.00).*

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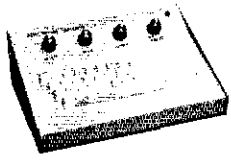
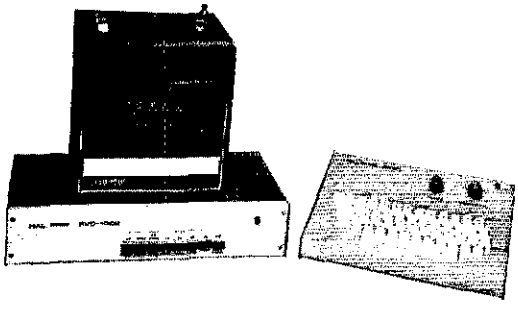
HAL ARRL FM Transmitter Kit	$ 50.00*
W3FFG SSTV Converter Kit	$ 55.00*
Mainline ST-5 TU Kit	$ 50.00*
Mainline AK-1 AFSK Kit	$ 27.50*



TOP QUALITY... WITH THE HAL MKB-1 MORSE KEYBOARD. As easy as typing a letter—you get automatic CW with variable speed and weight, internal audio oscillator with volume and tone controls, internal speaker, and audio output jack. Smooth operation; completely solid-state, TTL circuitry using G10 glass boards, regulated power supplies, and high voltage transistor switch. Optional automatic ID available. Assembled MKB-1, $275.00. In kit form, $175.00. *



NEW FROM HAL—TOP QUALITY RVD-1002 RTTY VIDEO DISPLAY UNIT. Revolutionary approach to amateur RTTY . . . provides visual display of received RTTY signal from any TU, at four speeds (60, 66, 75, and 100 WPM), using a TV receiver modified for video monitoring. Panasonic solid-state TV receiver/monitor, or monitor only, available. RVD-1002, $525.00; Panasonic TV receiver/monitor, $160.00; monitor only, $140.00.*

TOP QUALITY...WITH THE HAL RKB-1 TTY KEYBOARD. Gives you typewriter-easy operation with automatic letter/number shift at four speeds (60, 66, 75, and 100 WPM). Use with RVD-1002 video display system, or insert in loop of any teleprinter, for fast and easy RTTY. Completely solid state, TTL circuitry using G10 glass boards, regulated power supplies, and transistor loop switch. RKB-1 assembled, only $275.00.*

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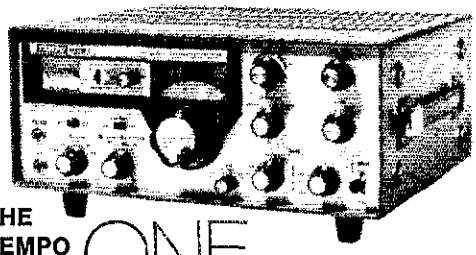
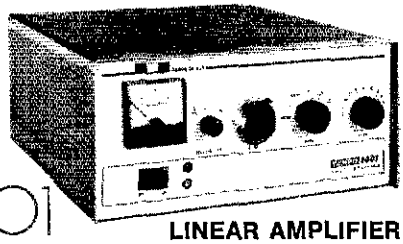


THE TEMPO ONE SSB TRANSCEIVER

Look at the specifications . . . look at the price tag . . . ask any of the thousands of Tempo ONE owners about its reliability . . . and the reason for its unparalleled popularity will be obvious. *The Tempo ONE* is now the proven ONE.

FREQUENCY RANGE: All amateur bands 80 through 10 meters, in five 500 khz, ranges: 3.5-4 mhz., 7-7.5 mhz., 14-14.5 mhz., 21-21.5 mhz., 28.5-29 mhz. *(Crystals optionally available* for ranges 28-28.5, 29-29.5, 29.5-30 mhz.)
SOLID STATE VFO: Very stable Colpitts circuit with transistor buffer provides linear tuning over the range 5-5.5 mhz. A passband filter at output is tuned to pass the 5-5.5 mhz. range.
RECEIVER OFFSET TUNING (CLARIFIER): Provides ±5 khz. variation of receiver tuning when switched ON.
DIAL CALIBRATION: Vernier scale marked with one kilohertz divisions. Main tuning dial calibrated 0-500 with 50 khz. points.
FREQUENCY STABILITY: Less than 100 cycles after warm-up, *and less than 100 cycles for plus or minus 10% line voltage* change.
MODES OF OPERATION: SSB upper and lower sideband, CW and AM.
INPUT POWER: 300 watts PEP, 240 watts CW
ANTENNA IMPEDANCE: 50-75 ohms
CARRIER SUPPRESSION: −40 dB or better
SIDEBAND SUPPRESSION: −50 dB at 1000 CPS
THIRD ORDER INTERMODULATION PRODUCTS: -30 dB (PEP)
AF BANDWIDTH: 300-2700 cps
RECEIVER SENSITIVITY: ½μv input S/N 10 dB
AGC: Fast attack slow decay for SSB and CW.
SELECTIVITY: 2.3 khz. (−6 dB), 4 khz. (−60 dB)
IMAGE REJECTION: More than 50 dB.
AUDIO OUTPUT: 1 watt at 10% distortion.
AUDIO OUTPUT IMPEDANCE: 8 ohms and 600 ohms
POWER SUPPLY: Separate AC or DC required. See AC *"ONE"* and DC1-A.
TUBES AND SEMICONDUCTORS: 16 tubes, 15 diodes, 7 transistors

TEMPO "ONE" TRANSCEIVER	$349.00
AC/ONE POWER SUPPLY 117/230 volt 50/60 cycle	$ 99.00
DC/1-A POWER SUPPLY 12 volts DC	$120.00
VF-ONE EXTERNAL VFO	$ 99.00



THE TEMPO 2001 LINEAR AMPLIFIER

Small but powerful, reliable but inexpensive, this amplifier is another top value from Henry Radio. Using two 8874 grounded grid triodes from Eimac, the Tempo 2001 offers a full 2 KW PEP input for SSB operation in an unbelievably compact package *(total volume is .8 cu. ft.). The 2001 has a* built-in solid state power supply, a built-in antenna relay, and built-in quality to match much more expensive amplifiers. This equipment is totally compatible with the Tempo One as well as most other amateur transceivers. Completely wired and ready for operation, the 2001 includes an internal blower, a relative RF power indicator, and full amateur band coverage from 80-10 meters. PRICE: $545.00

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FT-101B	Transceiver	649.00
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YC-355D	Digital Counter	289.00
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SP-101	Speaker	19.00
FV-401	External VFO	99.00
SP-401P	Speaker-patch	59.00
SP-401	Speaker	19.00
YD-844	Dynamic microphone	29.00
XF-3C/30C	C.W filter	40.00
FA-9	Fan	19.00
MMB-1	Mobile bracket	9.00

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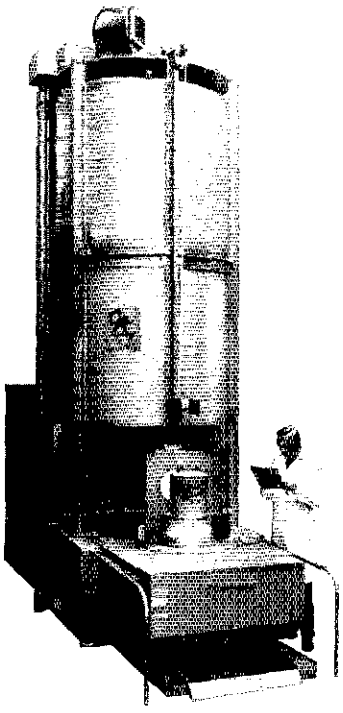

This is the world's most powerful shortwave transmitter.

This compact, single tube amplifier, located in the EIMAC facility, develops over 1300 kilowatts of 100% modulated carrier. It is quickly and easily tunable over the range of 15 to 30 MHz. Drive power at the grid of the tube is less than 5 kilowatts.

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A single amplifier stage using two EIMAC X-2159 tubes is capable of over 2.5 megawatts of 100% modulated carrier. Two amplifiers combined would make a 5 megawatt transmitter a practical reality.

The EIMAC X-2159 super-power tetrode is designed for MF and HF broadcast service, VLF communications, SSB linear service and extremely high power pulse modulator applications.

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