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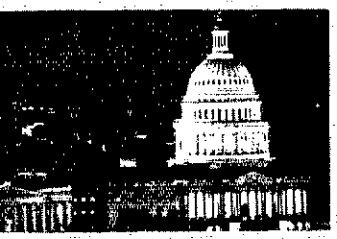
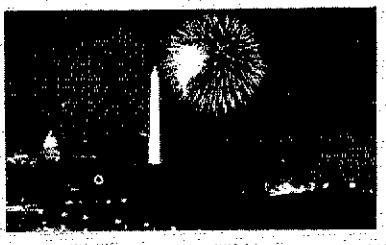
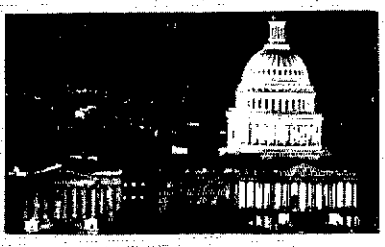
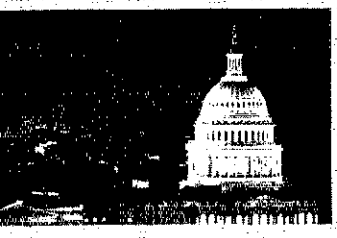

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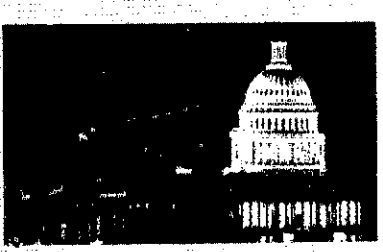
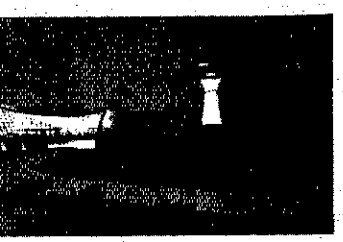
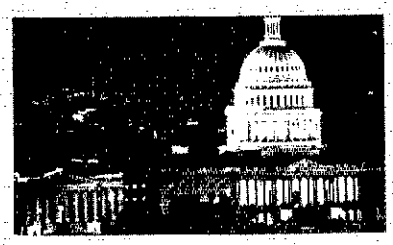
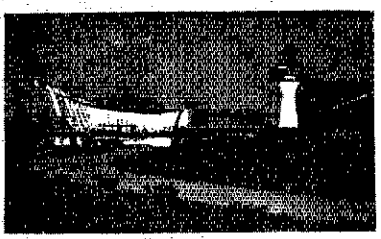
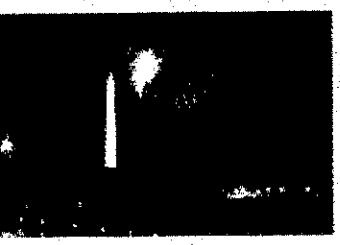

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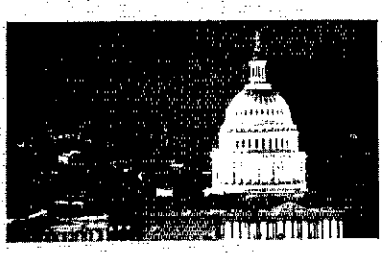

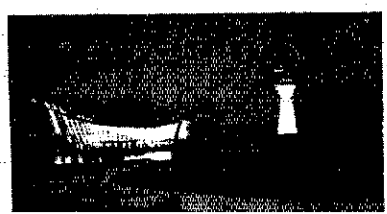


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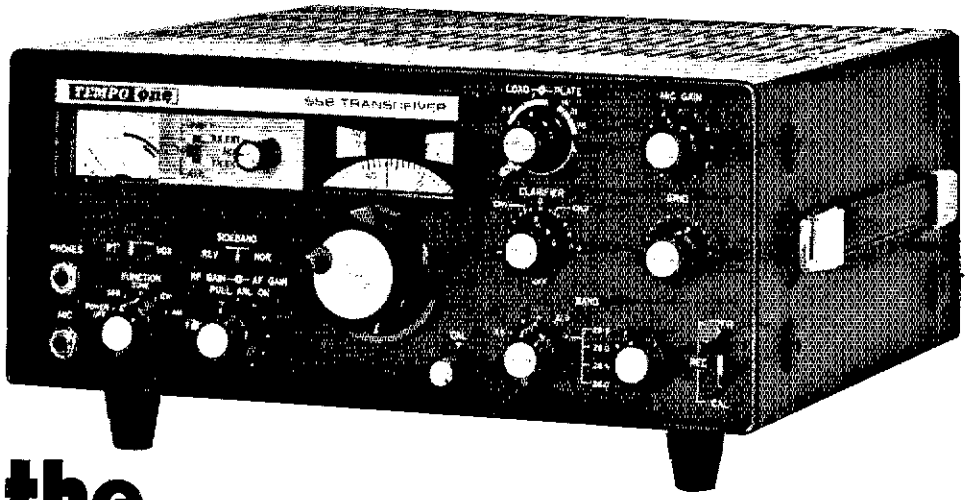

the tempo "ONE"

SSB TRANSCEIVER

. . . a proven name, a proven value. 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.

SPECIFICATIONS

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: 1/2 μv 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 DC "ONE" below.

TUBES AND SEMICONDUCTORS: 16 tubes, 15 diodes, 7 transistors

TEMPO "ONE" TRANSCEIVER	$399.00
AC/ONE POWER SUPPLY 117/230 volt 50/60 cycle . . .	$99.00
DC/1-A POWER SUPPLY 12 volts DC	$120.00

Prices subject to change without notice.

The Tempo line is available at select dealers throughout the U.S.

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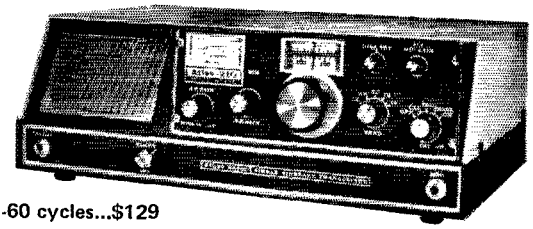
The same outstanding performance, reliability, and compact size as the Atlas-180 . . . Only 3½ in. high, 9½ in. wide, 9½ in. overall depth, and only 7 lbs. total weight . . . Operates directly from 12-14 volts D.C. All solid state, modular construction . . . No transmitter tuning (special Braille dial available for blind operators at no extra cost).



FREQUENCY RANGES, Atlas-210:3700-4050, 7000-7350, 14,000-14,350, 21,100-21,450, and 28,400-29,100 KHz, Model 215 deletes 28,400-29,100 band, and instead covers 1800-2000 KHz.
POWER RATING: 200 watts P.E.P. input and CW input. *On 10 meters the power rating is 120 watts.
PLUG-IN DESIGN, for quick removal from mobile mounting, and insertion into AC Console as illustrated.
PRICE: Model 210 or 215...$599 • AC console, 117V 50-60 cycles...$129 • AC console, 117-230V...$139 • Mobile plug-in kit...$44

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QST

September 1975

Volume LIX Number 9

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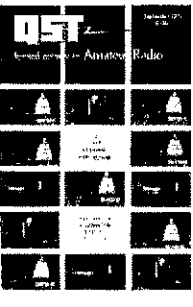

OUR COVER

In the midst of the Bicentennial celebration, what better place for a National Convention than suburban Washington, DC? See you there!

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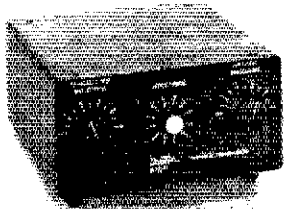
QUALITY and PERFORMANCE



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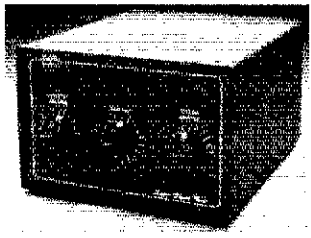

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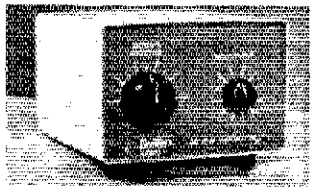

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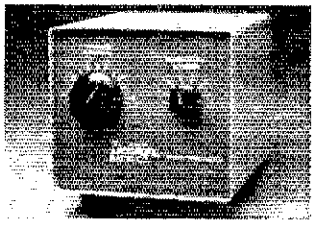
Here's an antenna tuner for 80 though 10 meters, handles full legal power and matches your 52 ohm transceiver to a random wire antenna. 80-10AT is yours for only **$59.50**



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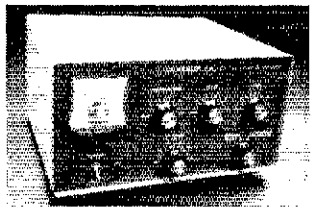

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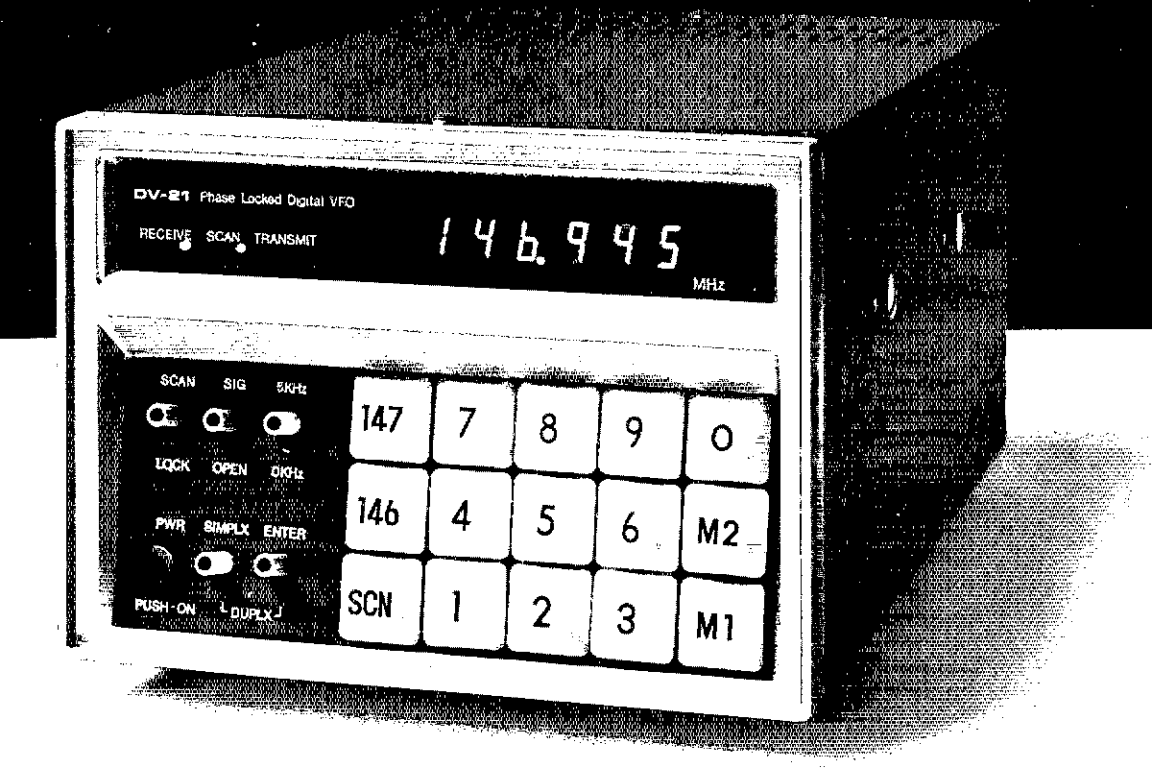

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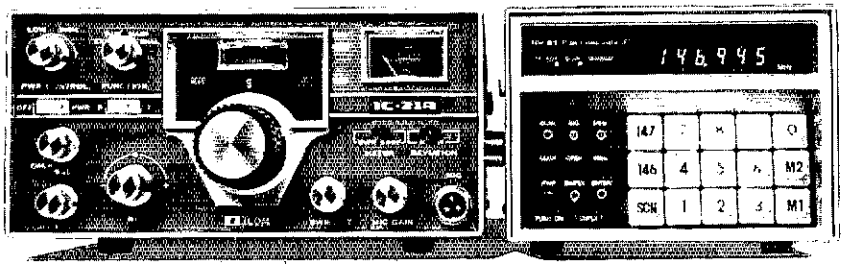
The perfect companion for your IC-21A, the DV-21 is an all new unique digital VFO to complete your ICOM 2 meter station. The DV-21 will operate in 5 or 10 KHz steps over the entire 2 meter band. It can also scan either empty frequencies, or the frequencies being used, whichever you select. Complete, separate selection of the transmit and receive frequencies, is as simple as touching the keys. When you transmit, bright easy to read LEDs display your frequency. Release the mic switch, and the receive frequency is displayed. There are also two programmable memories for your favorite frequencies.

You won't believe the features and versatility of the DV-21 until you've tried it. It's new, and it's from ICOM.



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Section Communications Managers of the ARRL

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 VHF PAM. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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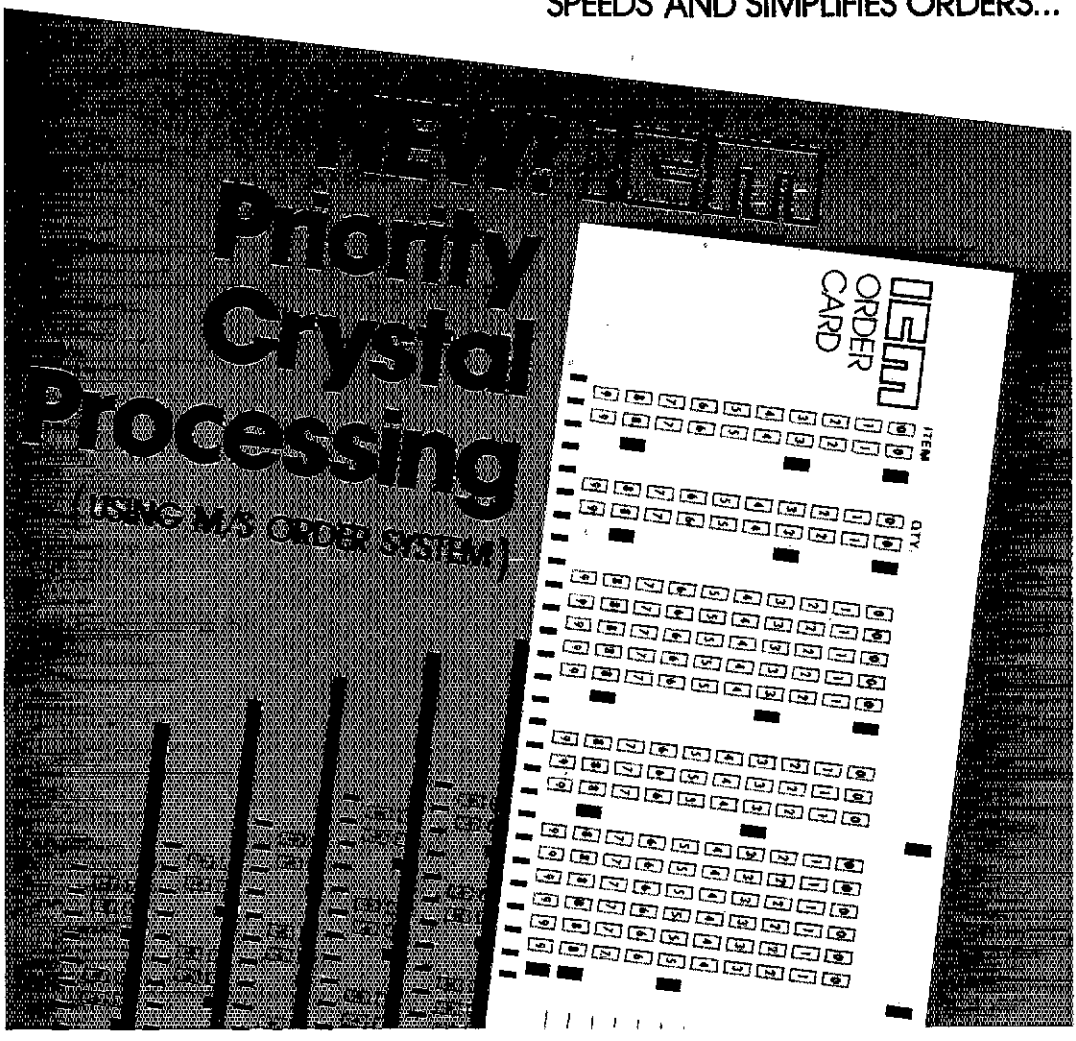

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the 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.

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

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"It Seems to Us..."

WARC Preparation

SOMETIME IN 1979 members of the International Telecommunication Union (ITU) will meet in Geneva, Switzerland, for a World Administrative Radio Conference (WARC). This will be the first conference since 1959 at which the entire table of allocations, from 10 kHz to whatever the upper limit may be by then, will be under scrutiny. There have been far-reaching changes in communications technique and method since 1959, and as a result there may possibly be some benefits for the amateur radio service but there will also certainly be some heavy pressures. Whether we gain or lose depends in part upon how well we prepare ahead of time.

Amateur radio's preparations are international in scope and are being coordinated through the International Amateur Radio Union, for which the League serves as the headquarters society. We're often asked by individual U.S. amateurs what's happening on the home front and what they can do to help.

The United States has already begun its official preparation for this conference. A couple of years ago the Spectrum Planning Subcommittee (SPS) of the Interdepartmental Radio Advisory Committee (IRAC) requested the various services to study their future needs and establish preliminary positions for the amount of spectrum that would satisfy those needs. Such a position was prepared by an amateur radio service committee consisting of W3OKN, W4BW, K4GTS, and W1RU.

The Office of Telecommunications Policy (OTP), which is charged with the responsibility of establishing the overall U.S. position in advance of a telecommunications conference, has established an ad hoc committee under the chairmanship of Mr. S. E. Probst. This ad hoc committee has members from all agencies of the U.S. government which are users of or have a responsibility for telecommunications, including FCC. The ad hoc committee will have the task of resolving all of the desires of the various users in the United States, both civilian and government, into one coherent whole, a position which the U.S. delegation will attempt to have other governments accept at the 1979 WARC.

Right now the FCC is engaged in determining the needs of the civilian users of the spectrum in the U.S. Working groups representing the land mobile services, microwave users, hf fixed service, the amateur service, and so on, are developing the requirements of each individual service, which will finally be resolved by FCC into one position representing the civilian users in the U.S., to then be coordinated by OTP's ad hoc committee with the needs voiced by the U.S. government agencies.

The League is monitoring the working group meetings of all of the various civilian users, but obviously we are most interested in the progress of the Amateur Radio Service Working Group, whose chairman is A. Prose Walker, W4BW. The first meeting of this Working Group was held in Washington on May 8th. The 40 or so amateurs who were present at that first meeting, five of them representing ARRL officially in one capacity or another, are a veritable "who's who" in amateur radio, and one of our crew who has attended working group meetings of a number of the other services believes that no other working group has such a fund of real talent participating in these preparatory meetings. But, after all, isn't that what you'd expect of the amateur radio service!

For the Amateur Working Group, eight committees were established. Those committees and their chairmen are: Basis and Purpose, Herbert Hoover, III, W6APW; Military Liaison, Gen. Earle Cook, W4FZ; Liaison with other services, John Kelleher, W4ZC; ITU Rules and Regs., Technical Criteria, and Sharing, Fred Friel, W3FU; Allocations, 10 kHz to 4 MHz, John Serafin, W2QD; 4 to 27 MHz, Merle Glunt, W3OKN; 27-1215 MHz, Co-chairmen Robert Haviland, W4MB and Katashi Nose, KH6IJ; and 1215 MHz and up, Charles Dorian, W3JPT. (Not just incidentally, all ten chairmen associated with the Amateur Working Group and its committees are ARRL members, and five of them are Life Members.) Each of these committees is now meeting by mail (although the Basis and Purpose committee

(Continued on page 96)

League Lines . . .

The Freedom of Information Act now permits access to certain information that previously was unobtainable on any factual basis. For example, Postal Service Form No. 3542 is filled out by the mailer of a magazine to indicate the number of copies of a publication placed in the mail. This form is now available upon request to the appropriate postmaster. Inspection of recent photocopies of such forms indicates the following monthly circulation figures for four amateur radio magazines that are of some interest to the readers of this page:

June CQ	--	26,400
July 73	--	38,261
July HR	--	43,170
June QST	--	115,282

These figures do not include any possible newsstand sale.

Some members are misinterpreting the item in July League Lines regarding multiple-year memberships. The maximum term allowed at the special rates is five years. A two-year membership saves you $1.00, three years saves $3.00, four years saves $5.00, and five years, $7.00. Interested in saving more? Write for a Life Membership application!

Every amateur who works DX, even only occasionally, should have one or more stamped, self-addressed envelopes on file with the ARRL QSL Bureau in his or her call area -- see the listing on page 82, this issue. The bureau is run by unpaid volunteers who in the main do excellent work. One of the biggest handicaps they have is a large pile of unclaimed cards -- please help them to help you by keeping at least one envelope on file.

The Wheaton Community Radio Amateurs have recently published a fine four-page pamphlet titled Amateur Radio, the most thrilling hobby in the world. It points out the difference between CB and amateur radio, what amateur radio has to offer, and how to obtain an amateur license. If you or your club would like a copy for local reproduction, send sase to K9GHR, 362 Hawthorne St., Glen Ellyn, Ill. 60137.

In an effort to speed up the handling of license applications, FCC has established a series of p.o. boxes for its offices at Gettysburg, Pa., 17325. Last month we told you about amateur applications going to Box 1020. For your further info -- aircraft applications go to Box 1030, ships and boats to Box 1040, and restricted radiotelephone operator permits to Box 1050. At deadline, no box number had been announced for CB.

Did you catch the fantastic 144-MHz opening July 20? If so, VHF columnist W3KMV would like to hear about it. Some early information appears on page 79 of this issue.

We've heard from several members about telephone company crackdowns on "foreign attachments" to phone lines, so it's worth mentioning that in most parts of the U.S. the connection of a phone patch must be made through an interconnecting device leased from the phone company. Reason? There's concern that indiscriminate connections might put lethal voltages on the lines, endangering telephone company personnel.

Many thanks to the hundreds of members who have filed comments with FCC, either individually or through their clubs, in support of the League's consensus position on restructuring. A recent visit to the FCC public reference rooms revealed that comments filed in the last several weeks were running strongly in favor of the ARRL position. In fairness, we should report that we spotted some comments that were opposed -- three, to be exact! A summary of the League's filing begins on page 48.

Joe Johnson, WA3SFY, has been selected as the new Chief, Rules and Legal Branch, Amateur and Citizens Division, FCC, replacing John Johnston, K3BNS, who had moved over to the Chief Engineer's Office, FCC. More details next month.

HARMONIC TVI

A NEW LOOK AT AN OLD PROBLEM

BY DENNIS C. RASMUSSEN,* W6MCG, AND
DON R. GERUE,** K6YX

THE CURES for TVI problems caused by transmitter harmonics are not black magic. A basic equation can be used to determine if your station is potentially a TVI source because of harmonic radiation. Use of the equation and fine details are explained here. A simple calculation, low-pass filter data, and recommendations for minimizing harmonic radiation are also included.

The information presented deals only with harmonic radiation, as it is the only significant cause of TVI that can and must be corrected at the transmitter. Harmonic interference can be anything from slight herringbones on a single channel to severe picture and audio distortion on several channels. It is the amateur's responsibility to correct the problems arising from harmonic radiation. Other forms of TVI, such as audio rectification and fundamental overload, which may appear on all channels in severe cases, are generally the result of receiver deficiencies, and must be corrected at the receiving end.

The information and recommendations given here are based on actual cases and results of tests made by the Santa Barbara Interference Assistance committee. This group was formed by several members of the Santa Barbara Amateur Radio Club to help all radio services in solving interference problems and to improve ham radio's image in the process. Some of the numbers in the tables are engineering judgments. Others are exact. Combined they provide an expression to determine the amount of harmonic suppression needed at a transmitter site to eliminate harmonic interference or reduce it to an acceptable level.

* 1251 N. Ontare Road, Santa Barbara, CA 93105.
** 3667 Montalvo Way, Santa Barbara, CA 93105.

The following factors affect the tolerable harmonic levels:

T_P – transmitter power output,

T_A – transmitter harmonic attenuation,

G_T – gain of the transmitting antenna at the harmonic frequency,

G_R – gain of the TV receiving antenna at the interfering frequency,

S_A – attenuation (path loss) from the transmitting antenna to the receiving antenna,

S_S – TV signal strength at the TV receiver input,

S_R signal-to-interference ratio at the TV receiver needed to preclude visual or audio interference.

Table I – TV Channels and Amateur Band Harmonics

Channel	*Freq. Range*	*Picture Carrier Freq.*	*40 Meters*	*20 Meters*	*15 Meters*	*10 Meters*
TV I-F	41-47	42	– –	(3rd) 42-43	(2nd) 42-43	– –
2	54-60	55.25	(8th) 56-58.4	(4th) 56-57.3	– –	(2nd) 56-59.4
3	60-66	61.25	(9th) 63-65.7	– –	(3rd) 63-64.35	–
4	66-72	67.25	(10th) 70-73	(5th) 70-72	–	–
5	76-82	77.25	– –	– –	–	– –
6	82-88	83.25	– –	(6th) 84-86.4	(4th) 84-85.8	(3rd) 84-89.1

Table II — Transmitter harmonic Levels, dB down

Harmonic	*2*	*3*	*4*	*>4*
Typical Exciter	35	30	<45	<45
Very Good Exciter	40	40	<50	<50
Good Linear Amp.	45	40	<45	<60
Better Linear Amp.	60	50	<60	<60

The relationship between these factors, when expressed in dB, is

$$H_R = (T_P + T_A + G_T + G_R + S_A) - S_S + S_R$$

where H_R is the further transmitter harmonic reduction required (in dB).

Finding Required Harmonic Attenuation

The first step in determining H_R is to find the harmonic relationship between the bands you use and the frequencies of the weaker TV signals in your area. The harmonics of the hf amateur bands that fall in the lower vhf TV channels are given in Table I. Then, for each combination of amateur band and TV channel concerned, determine H_R, using the following information:

T_P – peak transmitter power output in dB above 1 mW. 25 watts is 44 dBm. Add 3 dB for each doubling of the power (1000 watts is 60 dBm).

T_A – transmitter harmonic attenuation, can be estimated from Table II, or specifications given for commercial transmitters can be used. Harmonic radiation figures are usually better than specified.

G_T – conservative estimate 0 dB, or use Table III.

G_R – estimate relative bearing from the TV antenna to the amateur antenna, and use Table IV.

S_A – estimate distance between the antennas, and use Table V for path loss for the TV channel concerned.

S_S – TV signal level from Table VI for TV channel and distance to TV station. For under 50 miles, use Class A; for over 50 miles, use Class B.

S_R – signal/interference ratio required can be as high as 40 dB, with an operating frequency whose harmonic is within 1 MHz of the picture carrier frequency, or as low as 20 dB, if the harmonic is more than 2 MHz from both picture and sound carriers. 35 dB is suggested reasonable value.

Sample Calculation

Let us assume a station operating on 15 meters with 1-kW PEP output. The third harmonic (in Channel 3) is down 40 dB. The antenna is a triband beam pointed at the TV antenna, with a separation of 40 meters (130 feet). Fringe-area reception applies. The numbers are:

$T_P = +60$ $G_T = 0$ $S_A = -40$ $S_R = +35$

$T_A = -50$ $G_R = -10$ $S_S = -56$

$H_R = (+60) + (-50) + (0) + (+10) + (-40) + (-56) + (+35) = +71$

The indicated need for 71 dB of additional attenuation confirms our hypothetical situation as a particularly bad one: fringe-area reception with a signal very close to the TV receiver noise level.

Assuming good engineering design for minimum harmonic generation and adequate shielding to prevent radiation of harmonic power that is always present in any transmitter, the way to reduce harmonic radiation further is to use a low-pass filter. A good filter will offer at least 50 dB of additional attenuation, when used with a well-designed transmitter working into a proper load. This should be enough to solve most harmonic-TVI problems. With a situation like the above worst-

Table III

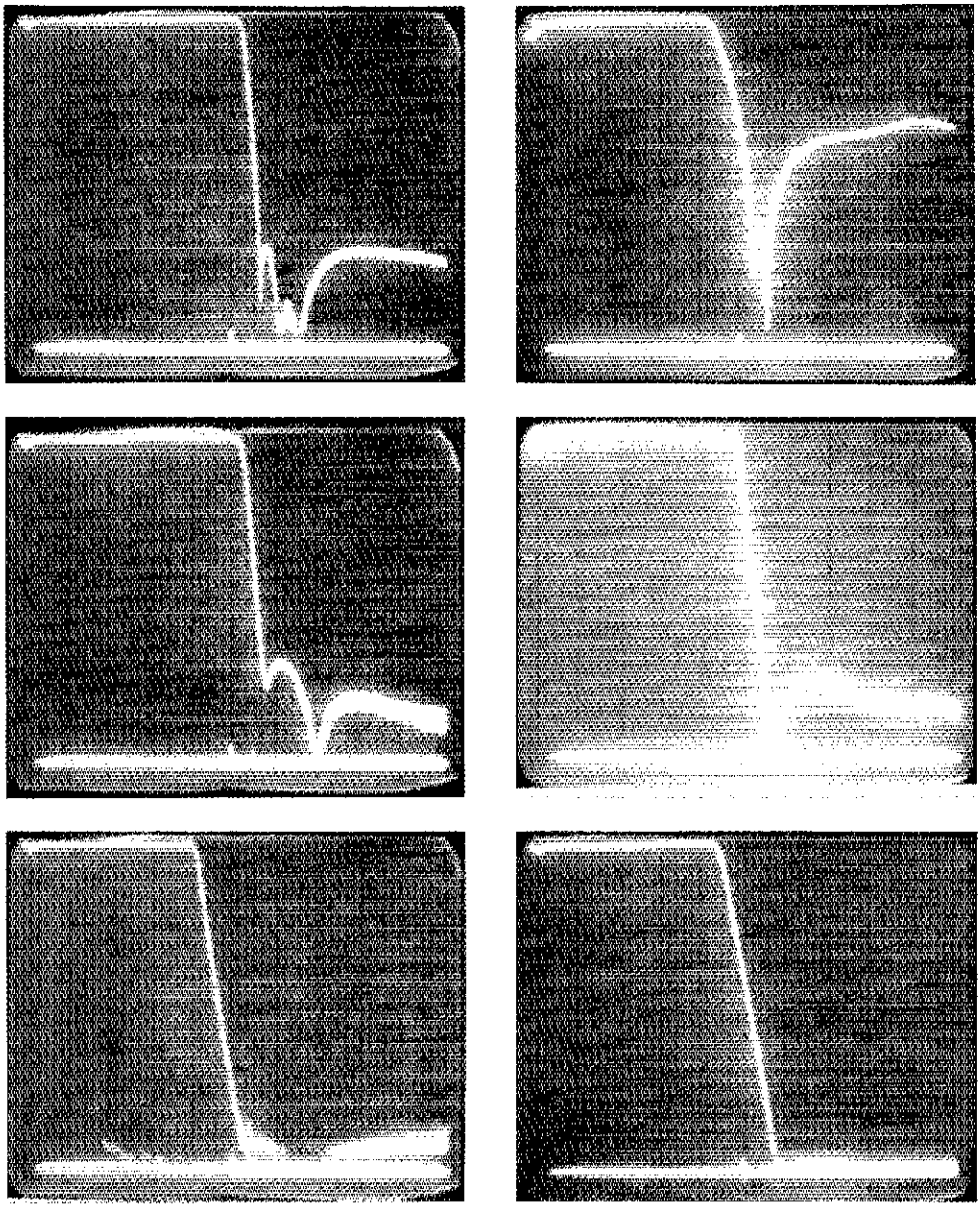
Transmitting Antenna Gain, dB, Worst-Case Direction.

TV Channel	*2*	*3*	*4*	*5*	*6*
20-15-10 meter Beam or Multiband Vertical	<–5	<0	<0	–	<0
15-10-meter Beam	<–5	<0	–	–	<0
20-meter Beam	<–10	–	<0	–	<–10
20-meter Dipole	<–10	–	<0	–	<–10
40-meter Dipole	<–5	<0	<–5	<–5	<–10

case conditions, relocation of the amateur antenna or, in some instances, raising it well above the plane of residential TV antennas, may help. Operation at reduced transmitter power levels should be tried, though this does not always result in lowered harmonic-power radiation. The reverse may be true, depending on transmitter operating conditions.

Low-Pass Filter Data

Frequency response curves taken with several manufactured low-pass filters are given below. This information was obtained with a Hewlett-Packard 8553B/8552A Spectrum Analyzer and 8443 Tracking Generator. Based on these curves, none of the filters tested is suitable for use with a



Spectrum analyzer response curves for low-pass filters designed for the amateur hf bands. Clock-wise, from upper left; Drake 1-kW filter, PAL 1-kW filter, Johnson 1-kW filter (adjustable), Barker & Williamson No. 425, 1-kW, Drake TV 42 LP (100 watts), and Drake TV 100 LP, also 100 watts. Grid increments are vertically 10 dB; horizontally, 10 MHz.

Table IV

TV Receiving Antenna Gain, dB, vs Angle to Transmitter

	315-45°	45-135°	135-225°	225-315°
Fringe-Area Antenna	+10	<−10	<0	<−10
Lower-Grade Antenna	+3	<0	<0	<0

signal-to-interference ratio at the TV receiver needed to preclude visual or audio interference

Table VI

TV Received-Signal Power

TV Channel	*Class B*	*Class A*
2	−55 dBm	−34 dBm
3	−56 dBm	−35 dBm
4	−57 dBm	−35 dBm
5	−58 dBm	−37 dBm
6	−59 dBm	−38 dBm

Table V

Path Loss, dB, Transmitting Antenna to Receiving Antenna

Distance in Meters	*10*	*20*	*30*	*40*	*50*	*100*
44-MHz I-F	25	31	34	37	39	45
TV 2	27	33	37	39	41	47
TV 3	28	34	38	40	42	48
TV 4	29	35	39	41	43	49
TV 5	30	36	40	42	44	50
TV 6	31	37	41	43	45	51

Loss in dB = $10 \log 10 \frac{\lambda^2}{(4\pi)^2 D^2}$

D = Distance between antennas

λ = Wavelength in meters

50-MHz transmitter. The marker (not visible in all the scope photographs) was set to 54.0 MHz. Most of the filters are M-derived designs, characterized by a high rate of initial attenuation and a broad peak in the stop-band response. The B&W filter, lower right, exhibits no peaks in the stop band, a characteristic of a constant-K filter design.

The filter should be selected on the basis of attenuation needed in the TV channels and the maximum transmitter power level. The Drake TV 100 LP and TV 42 LP filters are rated at 100 watts of output. All others are rated at 1 kW of output or more. Of the filters tested, only the Johnson is adjustable. We recommend that no change be made in the factory settings, unless you have equipment required to assure the desired response, or to restore the original response. Any change in SWR or other characteristics when the filter is installed is most likely the result of mismatch somewhere else in the circuit. Check the filter while operating the transmitter into a good dummy load.

A filter attenuation of 60 dB is the equivalent of a harmonic power reduction of one million to one, but a low-pass filter attenuates only the harmonic power that flows into it. Ineffective shielding of the power amplifier or exciter, or power supply leads that are not filtered properly, can nullify the effects of the best filter made! The filter should be mounted as close to the transmitter as possible, preferably by a direct mount to the transmitter or amplifier. All rf units of the transmitter should be well grounded. A properly installed ground rod is recommended. Water pipes and similar objects may turn out to be grounded poorly, or even not really grounded at all. Several large-diameter grounds of different lengths will be effective over a wide frequency range.

Using the information given, you can determine if your station is potentially a TVI source. If you find that it is, there are several methods of reducing harmonic radiation, assuming good design and installation, the low-pass filter being the most effective. A good filter and adequate shielding and grounding should provide sufficient safety margin for interference-free operation, as far as harmonic problems are concerned. Most other forms of TVI must be corrected at the TV receiver. QST

Strays

The League Headquarters building is open to visitors Monday through Friday, 7:30 A.M. – 5 P.M. on a "drop-in" basis, (except April 12, May 27, July 4, Sept. 2, Nov. 28 and Dec. 25) and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U.S. 5, the Wilbur Cross Highway. (For W1AW visiting hours, see the schedule in "Operating News.")

An Alternative Method for Phasing Crossed Yagis for Circular Polarization

BY KATASHI NOSE,* KH6IJ

CIRCULAR POLARIZATION for amateur satellite work is usually obtained with two Yagis on a common boom with their element planes perpendicular to each other, fed with equal voltages 90 degrees out of phase. The phase difference is usually obtained with a delay line, making the feed to one antenna a quarter-wavelength longer than the other. The writer described such an antenna in *QST* for January, 1973.[1] A simpler method makes use of equal lengths of line to crossed Yagis spaced a quarter-wavelength apart along the boom. Advantages of this method are that ready-made Yagis and stacking harnesses can be used, and better balance is obtained. The principal disadvantage is that polarization sense cannot be changed without switching bays.

Criteria for Circularity

One way to visualize a circularly polarized wave is to consider its instantaneous effect on a capturing dipole, rather than thinking of the wave as a continuously twisting ribbon in space. Cross-polarized dipoles should have infinite rejection but in practice they do not because of stray pickup and radiation from residual cross-members.

A linearly polarized antenna will pick up a circularly polarized wave and vice-versa, but without the 3-dB theoretical benefit of pickup from the other plane. If both radiator and receiving antenna are circularly polarized, their senses must agree otherwise the quadrature voltages are out of phase at the feed point. The goal for good circularity is no more than a one-dB difference between extremes of polarization.

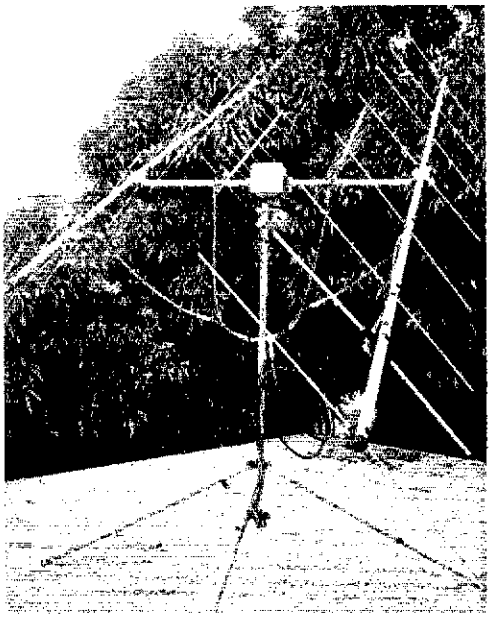
A Practical Satellite Antenna

Two 435-MHz Yagi antennas were constructed as shown in Fig. 1. Note that the parasitic elements are insulated from the boom by the plastic covering on the aluminum clothesline wire used. Epoxy glue proved to be a simple way of fastening them permanently in place. The gamma-match arrangement is described in detail in an earlier article, reference 1. The 435-MHz bays were to be added to an existing mount built for Oscar 6, so several compromises were made and evaluated. The two-point source makes aiming more critical than for both sets of elements on a single boom, but the mechanical simplicity of the method outweighs the disadvantage of trying to simulate a single point source by coaxial mounting of the Yagis.

Another arrangement applicable to some satellite antenna installations, mounting the 435-MHz elements in front of those for 146 MHz, was considered but not evaluated. This might eliminate the tunnel-vision effect due to the proximity of the 2-meter elements, but it would make the antenna

[1] Nose, "Crossed Yagi Antennas for Circular Polarization," *QST*, January, 1973. Also in *The ARRL Antenna Book*," 13th Edition, page 250.

* 4207 Huanui Street, Honolulu, HI 96816.



Circularly polarized 146-435-MHz array for use with Oscar 7. Two rotators provide for control in both azimuth and elevation. Circular polarization is achieved by mounting the antennas with their elements perpendicular to each other, and by positioning one bay a quarter-wavelength ahead of the other. The 2-meter Yagis are 5 feet apart, and the 435-MHz bays 2 feet apart.

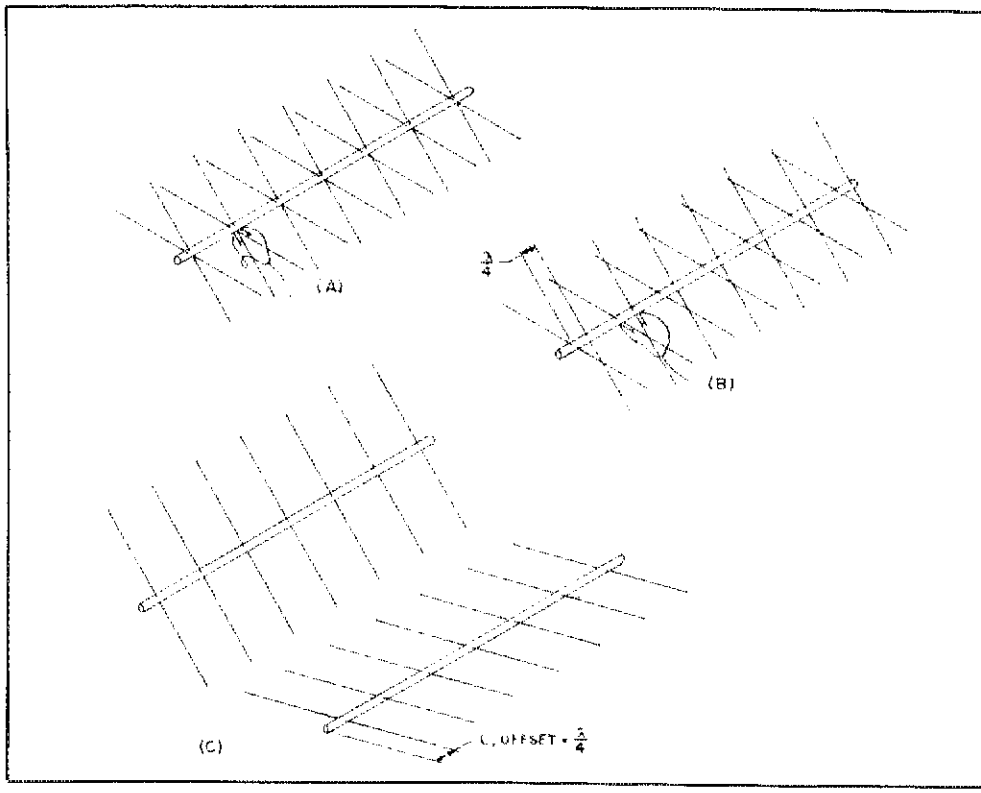


Fig. 1 – Evolution of the circularly polarized Yagi. The simplest form of crossed Yagi, A, is made to radiate circularly by feeding the two driven elements 90 degrees out of phase. Antenna B uses the same line length for both feeds, but has the elements of one bay a quarter-wavelength forward of those in the other. Antenna C has separate booms. The elements in one set are perpendicular to those in the other, and the set on the right has its elements a quarter-wavelength forward of those on the left.

system over 20 feet long, requiring more turning space than was available on my garage roof.

Measurement of Circularity

Variable attenuators (Hewlett-Packard 355D, dc to 1000 MHz) were placed in the line to measure attenuation. A 3-element pickup Yagi was used in preference to a simple dipole to keep down stray reflections. The difference in polarization is given as θ, and is defined as the ratio between E_1 and E_2, expressed in dB, in the different planes of the receiving antenna. The variations in circularity as the receiving antenna was moved off the center axis of the array are shown in Fig. 3. Except for curve A, they are identified in alphabetical order of their loss of circularity.

Curve A is for antenna A in Fig. 1, but with no delay line. (No element offset, no delay line, so no appreciable circularity or change.) Curve B shows the effect of the quarter-wavelength offset: the most tolerance to aiming error, as expected, with antenna B. Curve C is for antenna C, the two 435-MHz Yagis on booms 2 feet apart, elements perpendicular, and one antenna ahead of the other by a quarter-wavelength. The 2-meter Yagis are not yet installed. Curve D is for the same arrangement, but with the 2-meter Yagis in place, 5 feet apart on centers. Curve E is for the 435-MHz Yagis (no 2-meter antennas mounted) without the quarter-wave offset. Curve F is for condition E with the 2-meter antennas in place.

These curves illustrate a basic difference between communication by way of a satellite and the requirements for direct station-to-station work. Ordinarily there is little trouble in getting some reception from or access to a satellite. Communications failures arise more from signal variations resulting from polarization shift than from fading due to natural causes. Two considerations are thus of major importance: ability to track the satellite in both azimuth and elevation, and maintenance of circularity. Both attributes are needed for reliable communication through a satellite and are often attained at the expense of the high gain and directivity normally sought after in direct communication on the higher frequencies.

Matching and Phasing

Coaxial matching sections for feeding a pair of antennas intended for 50-ohm line are shown in Fig. 2. The main transmission line, of 50-ohm impedance, goes to a T fitting at the branch point.

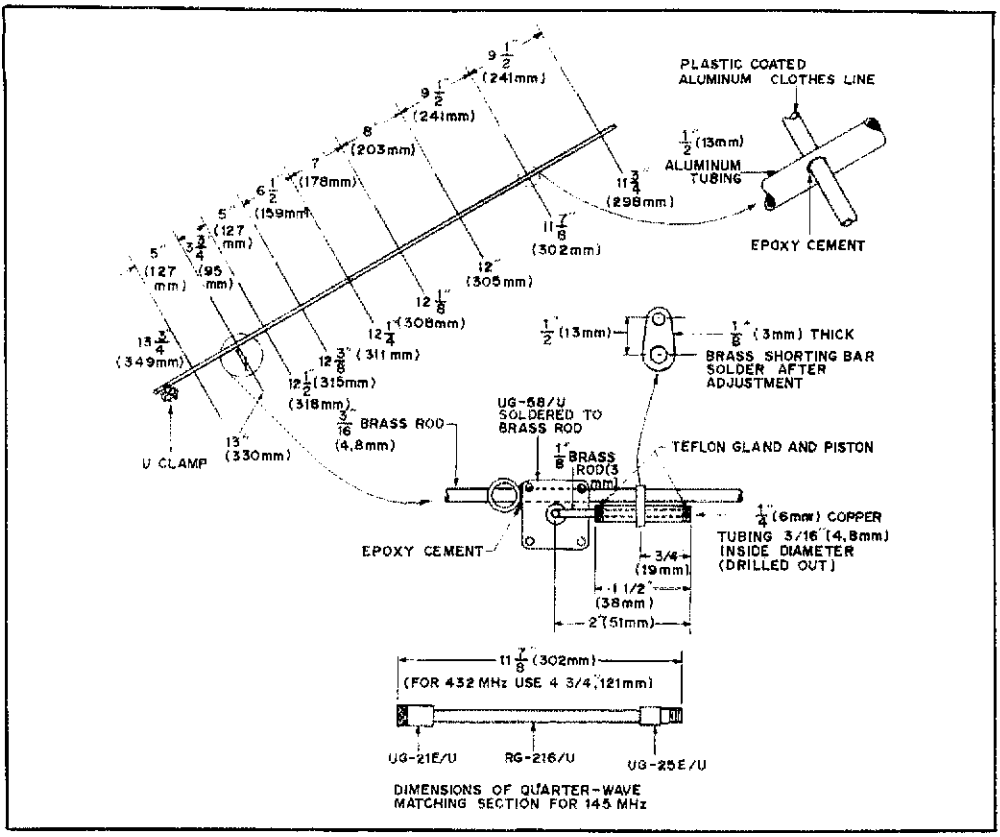


Fig. 2 — Dimensions and mechanical details of the 435-MHz portion of the satellite array.

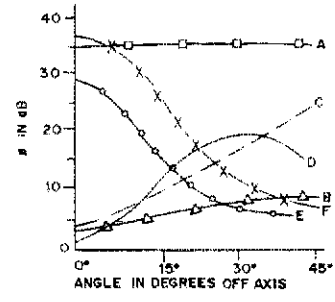
The quarter-wave Q sections are connected between the T and the two arms. The latter can be any convenient length, if the individual antennas are properly matched for 50-ohm feed, but since this may not be the case, best balance is obtained if the two flexible sections are the same length, and preferably an electrical half-wavelength or multiple thereof.

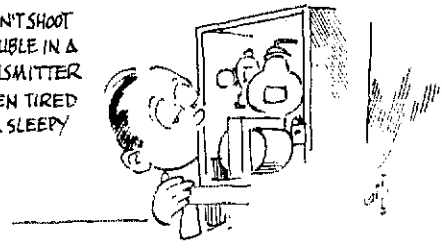
Note that the matching sections are 75-ohm line. This could run all the way from the T fitting to the antenna, if this portion of the feed is made electrically a quarter-wavelength or *odd* multiple thereof in length. This is a standard method of feeding two 50-ohm antennas from a single 50-ohm line.

Modifying the Hy-Gain 341 2-Meter Beam

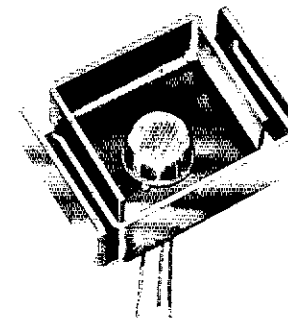
This 2-meter Yagi is apparently designed for the low end of the band. The U-shaped loop connected across the line terminals is normally 2-1/2 inches wide and 5-1/2 inches long. Shortening it to 2-1/2 inches gave a much better match at 146 MHz. Those who want maximum gain might also wish to shorten the directors by 1/4 inch. Replacement of the RG-58/U balun with one made of better coax is also recommended. QST

Fig. 3 — Comparison of polarization circularity for various antenna arrangements. See text for details.





LEARNING TO WORK WITH SEMICONDUCTORS



Part V

BY DOUG DeMAW,* W1CER AND
JAY RUSGROVE,** WA1LNQ

Part IV of this series covered network design and provided simple equations for obtaining the L and C values used in two types of L network. Frequency multipliers were discussed, and information was offered concerning the use of push-push doublers. This installment will relate to the design and assembly of a 10-watt solid-state amplifier for use with the QRP transmitter described in Part III of the course.

OUR QRP TRANSMITTER provides 2 watts of filtered rf output. Those who built and used the circuit are probably aware that it is possible to make plenty of cw contacts with equipment of that power class. In this installment we will show how to build a 10-watt dc-input amplifier for use after the existing 2-watt stage. The approximate difference in dB will be 5, as each time the power is doubled there is an increase of 3 dB. A power increase of that magnitude is significant, especially when the signal would otherwise be unreadable, or just barely Q5. Our amplifier will have an efficiency of roughly 60 percent, so at 10-watts input we can expect 6-watts output. Therefore: dB = 10 × log of P1/P2 = 10 × log of 6/2 = 10 × log of 3 = 10 × 0.477 = 4.77 dB.

Choosing an Input Network

There are several choices open to the builder in his selection of an input network for a power amplifier. Frequently the constructor is confounded by a problem discussed earlier in our course . . . the unknown quantity of capacitance within the transistor. Therefore, it becomes necessary to take an educated guess concerning the actual terminal resistances of the device used, at a given operating frequency and power level.

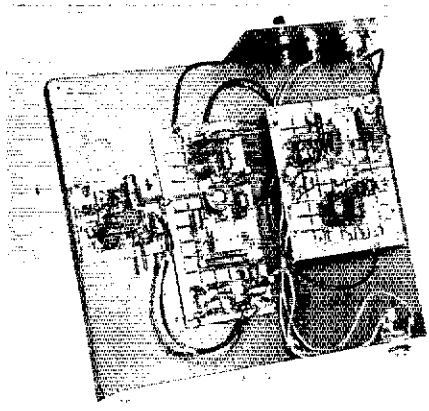
Fig. 1 shows three possible approaches to matching the driving source (50 ohms) to the input terminal of our 10-watt power amplifier. A 3-ohm resistive load is connected between base and ground in the examples. It helps establish a *resistive reference* for the network in the absence of a known input resistance. This technique is useful when the power output of the driver stage is reduced for QRP purposes. If the resistor were not present, the base impedance of the amplifier could rise considerably during low drive periods, thereby disrupting the matched condition established at maximum power input. Such a mismatch could have serious effects on the driver stage, causing it to be destroyed, bringing on instability, or both.

It can be seen that the circuit at Fig. 1B yields some awkward values of L and C, a condition which is typical when using pi or L networks at very low impedances. However, the circuit can be used if one is willing to work with the component values shown.

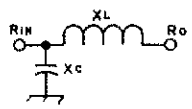
The circuit at Fig. 1C is less unwieldy because T1, a 4:1 broadband transformer, has been added between the L network and transistor base. In this arrangement the matching network, L1 and C1, transforms 50 ohms to 12.5 ohms, thereby providing more viable L and C values. The reader may wish to experiment with the networks shown. Such

* *QST* Technical Editor.

** ARRL Beginner and Novice Editor



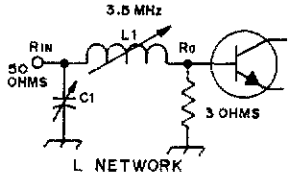
Here is a picture of the completed 10-watt transmitter. The oscillator board is at the left, the buffer/driver board is in the center, and the power-output stage is at the right of the picture. The power-output stage is mounted above the wooden chassis by means of 1/2-inch metal spacers and 1-inch long wood screws.



BASIC L NETWORK
(A)

$$X_L = \sqrt{(R_{IN}R_O) - R_O^2}$$

$$X_C = \frac{R_{IN}R_O}{X_L}$$



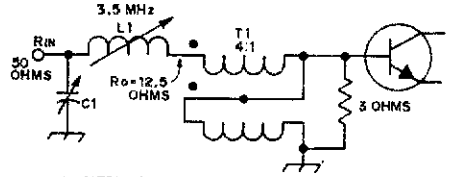
L NETWORK
(B)

$X_{L1} = 11.8$

L1 = 0.536 μH (nom.)

$X_{C1} = 12.7$

C1 = .00358 μF = 3580 pF (nom.)



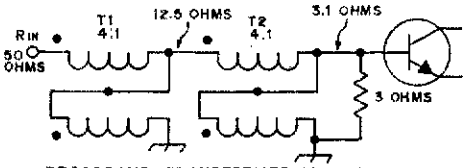
L NETWORK PLUS TRANSFORMER
(C)

$X_{L1} = 21.35$

L1 = 0.97 μH (nom.)

$X_{C1} = 28.1$

C1 = .0016 μF = 1600 pF (nom.)



BROADBAND-TRANSFORMER MATCHING
(D)

Fig. 1 — Illustration of three networks designed to match the low input impedance of the amplifier to the 50-ohm driving source.

an exercise will help familiarize the experimenter with the technique of tuning and matching. "Sloppy" networks should be used, as they will help compensate for the unknown quantity of capacitive reactance exhibited by C_{in} (input capacitance) of the transistor. The formula of Fig. 1A is suitable for L networks in circuits where selectivity is not a consideration. Since the driver stage, Q3 of Part III, has an output network that establishes adequate selectivity, Q is not a prime factor here.

Where selectivity is not of major importance, the "lazy-man's approach" of Fig. 1D is rather neat. Broadband 4:1 toroidal transformers are used in cascade to provide a 16:1 impedance step down. No tuning is required, and a frequency response of several octaves is typical. Broadband transformers are used in nearly all high-power, solid-state linear amplifiers, both at the input and output terminals. If the matching transformers are designed and built properly, and if suitable compensating networks are used, it is possible to operate such an amplifier from 1.5 to 30 MHz without the need for band-switching circuits other than that of the harmonic filter used at the amplifier output port.

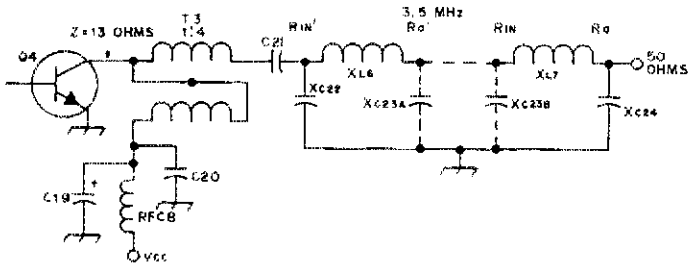
Most broadband transformers for hf-band use are wound in bifilar or trifilar fashion (depending on the type of transformer being built), and on high-permeability ferrite cores. The permeability factor of the toroidal cores is usually on the order of 950. The high μ assures ample inductance in the windings to present the required impedances, yet only a few turns of wire are needed. The fewer the transformer turns, the lower will be the dc resistance of the windings. Low series resistance is necessary to minimize the IR drop across the transformer when the collector supply voltage is fed through one of the windings.

There is no reason why one or more broadband transformers can't be used in a narrow-band transmitter, provided narrow-band networks are used in conjunction with the transformers to provide the desired selectivity. The cost of toroid cores versus trimmers and variable inductors is nearly the same, so the choice is often based on convenience of circuit design.

The Practical Amplifier

A representative circuit of the 10-watt PA output network is given in Fig. 2. Equations for obtaining the necessary L and C values are listed on the drawing. Two pi networks are used in series to assure good harmonic rejection. It is necessary to determine the component values of each, then to combine the networks at the center by changing C23A and C23B to a single value.

T3 is included in the design to elevate the 13-ohm collector impedance to approximately 50 ohms, as seen by the first pi-section network. The advantage in transforming the impedance to a



$R_{IN}', R_O \cong 50$ ohms

$R_O', R_{IN} = 300$ ohms

$Q_L = 4, \quad X_{C20,\,21} = 5$

$$X_{C23A} = \frac{R_O'}{Q_L} = \frac{300}{4} = 75$$

$$X_{C22} = R_{IN}' \sqrt{\frac{R_O'/R_{IN}'}{(Q_L^2 + 1) - (R_O'/R_{IN}')}} = 50 \sqrt{\frac{6}{17 - 6}} =$$

$$50 \sqrt{0.545} = 50 \times 0.738 = 37$$

$$X_{L6} = \frac{Q_L R_O' + (R_{IN}' R_O'/X_{C22})}{Q^2 + 1} = \frac{1200 + (15000/37)}{16 + 1} =$$

$$\frac{1605.4}{17} = 94.4$$

$$C22, C24 = \frac{1}{2\pi f X_{C22}} = \frac{1}{6.28 \times 3.5 \times 37} = \frac{1}{813.26} = .0012\,\mu F = 1200\,pF$$

$$C23A, C23B = \frac{1}{6.28 \times 3.5 \times 75} = \frac{1}{1648} = .0006\,\mu F = 600\,pF$$

$$L6, L7 = \frac{X_{L6}}{2\pi f} = \frac{94.4}{6.28 \times 3.5} = 4.3\,\mu H$$

$$C23 = C23A + C23B = .0006 + .0006 = .0012\,\mu F = 1200\,pF$$

Fig. 2 — Shown here is a representative circuit of the 10-watt PA output network with equations for calculating the L and C valves.

higher value is that our L and C values become more practical. That is, L becomes greater and C becomes smaller in value. It can be seen that the first pi network of Fig. 2 is designed to match 50 ohms to 300 ohms at a Q_L of 4. By choosing 4 as a loaded Q, we have ample bandwidth on 80 meters (bandwidth at the minus 3-dB points of a selectivity curve = $f_o \div Q_L$ = 3.5 MHz ÷ 4 = 0.875 MHz = 875 kHz).

An arbitrary impedance value of 300 was picked for the center of the cascaded pi networks. By raising the mid-network value higher than 50 ohms, (R_o'/R_{in}) the L and C values become more workable. There is no reason why the value couldn't be 90, 150, 180, 200, or some other ohmic value. In this example 300 was a convenient number, so it was used. The second pi network is a duplication of the first. It steps 300 ohms down to 50 ohms – the antenna impedance. Therefore, we can consider the output-side pi network as a mirror image of the input-side one . . . wherein we raise 50 ohms to 300, then 300 down to 50. By making part of C23 variable (Fig. 3), the network can be tweaked for maximum output with the amplifier operating.

In order to help familiarize the reader with transformers and networks combined, we have included T1, T2 and T3 in the practical circuit of Fig. 3. Although the schematic diagram may suggest needless complexity of design, the circuit is easy to build and operate. T1 and T2 transform the driving impedance from Q3 (50 ohms) to the terminal impedance of 3.3 ohms established by means of R11, R12 and R13 in parallel. Since the actual input impedance of the base of Q4 is unknown, the termination seen by T2 may not be 3.3 ohms. It could be less than that value because the base impedance is in parallel with 3.3 ohms. The true terminal value in ohms will vary in accordance with the transistor characteristics, frequency of operation, and drive-power amount. Maximum power transfer can be assured only by matching the driver to its load (Q4 input terminal) through the employment of a "sloppy" network of the type discussed earlier. However, the method shown in Fig. 3 will be adequate for all but the most demanding of applications.

Broadband transformer T3 steps up the 13-ohm collector impedance to 52 ohms, thereby providing practical values of L and C in the dual pi-network tank. C24 is used as a peaking control. RFC7, C19, and C18 serve as a decoupling network in the 12.5-volt collector supply line to prevent rf energy at Q4 from migrating to other stages in the

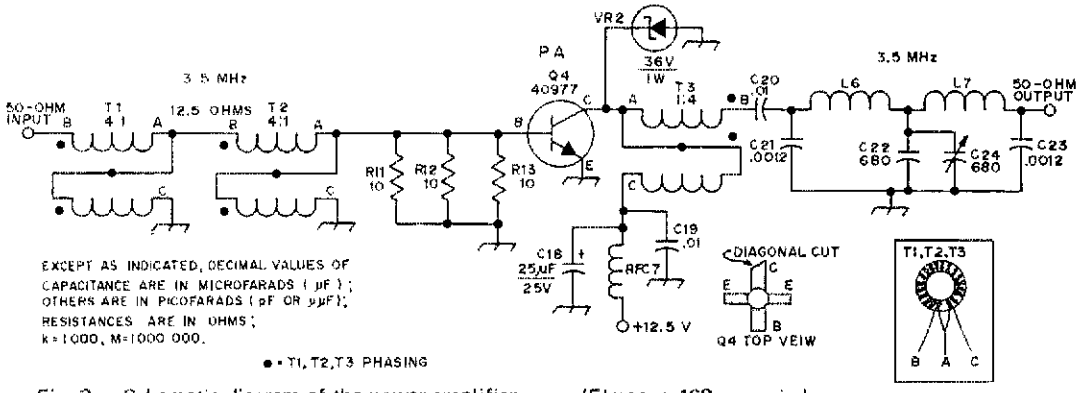


Fig. 3 — Schematic diagram of the power amplifier which is driven by the amplifier from Part III of the series. Fixed-value capacitors are disk ceramic unless otherwise noted. Polarized capacitors are electrolytic. Resistors are 1-watt composition type. The inset drawing shows which leads from the transformers are connected together.

C18 — 25-μF electrolytic, 25 volts.
C19, C20 — .01-μF disk, 100 volts.
C21, C23 — .0012 μF.
C22 — 680 pF.
C24 — 140 to 680-pF, mica compression trimmer (Elmenco 468 or equiv.).
L6, L7 — 27 turns No. 20 enam. wire on Amidon T-80-2 toroid core.
Q4 — RCA 40977 transistor.
R11, R12, R13 — 10-ohm, 1-watt composition resistor.
RFC7 — 1 turn No. 20 enam. wire on an Amidon husky ferrite bead.
T1, T2, T3 — 4:1 broadband transformer; 13 turns of a twisted pair of No. 20 enam. wire (6 turns per inch, not critical) wound on an Amidon FT-75-601 toroid core.
VR2 — Zener diode, 36 volt, 1 watt.

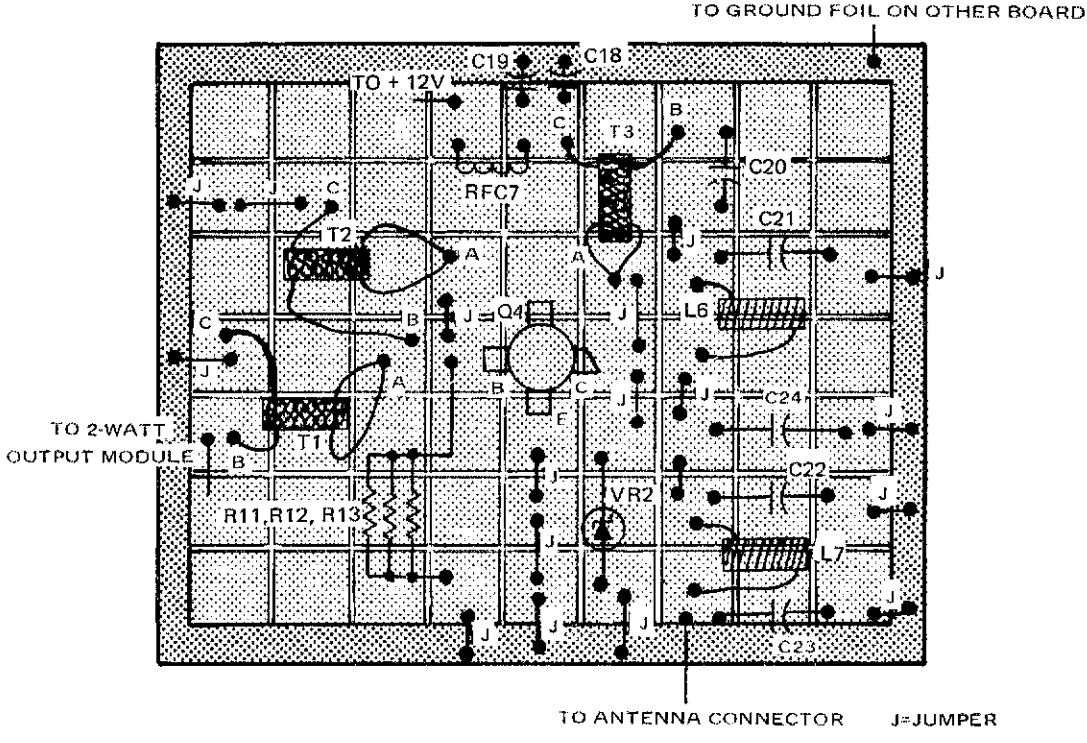
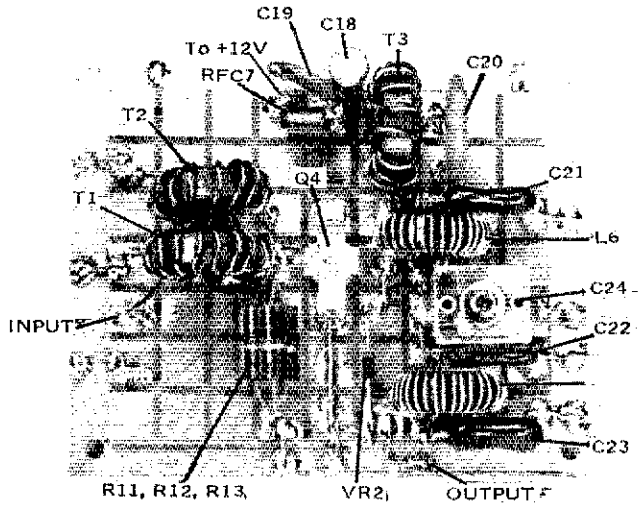


Fig. 4 — Scale layout of the amplifier board showing component placement.

transmitter, or vice-versa.

A Zener diode, VR2, is shown between the collector of Q4 and ground. It conducts at 36 volts, a level which is well beyond the maximum theoretical collector swing — 24 volts. Therefore, the Zener diode has no significant effect on



Photograph of the assembled 10-watt amplifier stage showing component placement. The output transistor is located near the center of the board. The input circuitry is to the left of the transistor and the output section is to the right of the transistor.

performance until the collector voltage rises to 36. VR2 protects Q4 from damage in the event a mismatch occurs between the amplifier and the antenna. A severe mismatch can cause large excursions in pk-pk collector voltage, and that could destroy the transistor. Some amplifiers tend to break into self-oscillation when the SWR is high, and in doing so can generate high amounts of pk-pk voltage. VR2 protects against that condition and will also clamp on supply line transients that may be present on the 12.5-volt source. The latter is subject to voltage spikes during mobile operation.

Construction

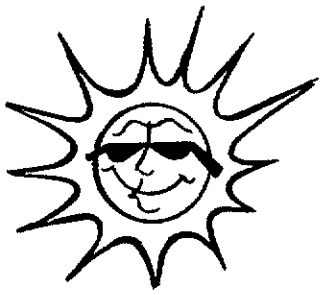
The 10-watt amplifier module is constructed on a piece of isolated-pad circuit board which measures 2-3/4 × 3-1/2 inches, and contains seven rows of nine pads. This isolated-pad board is affixed to a slightly larger piece of copper-clad board, using epoxy glue as the bonding agent.

The 40977 output transistor requires a heat sink for cool, safe operation. A simple and effective heat sink can be made from a piece of 1/16-inch thick sheet aluminum having the same dimensions as that of the isolated-pad board. Refer to Fig. 4 and locate the pad where the transistor stud will be mounted. Drill a 5/32-inch hole through the two circuit boards at the center of this pad. Place the aluminum heat sink on a flat surface and lay the circuit board on top. This will form a "sandwich" with the isolated-pad board on top, the heat sink on the bottom, and the slightly larger circuit board in the center. With a sharp instrument scribe a circle on the heat sink, using the hole through the circuit board as a guide. Next, a 5/32-inch hole should be drilled through the piece of aluminum within the scribed mark. Apply a liberal amount of silicon heat-sink compound around the hole in the heat sink. Reassemble the "sandwich" and push the transistor mounting stud through the hole so that the leads are located on the isolated-pad side of the assembly. Place the flat washer and nut on the stud and tighten securely. Builders should pay attention to the manufacturer's warning about this type of transistor, which reads as follows: *The body of the 40977 contains beryllium oxide. Do not crush, grind, or abrade that portion because the dust resulting from such action may be hazardous if inhaled. Disposal of the defective unit should be by burial.*

Each of the broadband 4:1 toroidal transformers are wound on Amidon FT-75-601 cores. A twisted pair of wires, each 15-inches long, with approximately 5 twists per inch, is required for each transformer. It is helpful to use two different colored wires when constructing the twisted pair to avoid confusion when connecting the leads to the circuit. After the appropriate number of turns have been wound on the core, connect one wire from one end of the twisted pair to the other-color wire at the opposite end of the pair.

The completed rf-amplifier assembly is mounted above the wooden chassis using four 1/2-inch metal spacers and four 1-inch long wood screws. This type of mounting provides the necessary space so that the transistor mounting stud will clear the chassis.

(Continued on page 39)



The DXer's Crystal Ball

Part III

BY EDWARD P. TILTON,* W1HDQ

AS EMPHASIZED EARLIER in this series, monitoring several WWV frequencies, or other channels where identifiable stations operate continuously, can tell the observer much about radio propagation conditions. This applies not only to current conditions, but, with some practice, to the immediate future as well. The problem here is that reception of WWV is an amateur requirement that designers of ham gear tend to give short shrift. In the years since the ham-bands-only receiver became almost standard equipment, *QST* has carried many hints on doing what the designers didn't plan on having you do. Where these are simple suggestions, they are repeated here. Constructional articles are referenced. If you do not have the issue in question, copies can be obtained from ARRL Headquarters at $1.00 postpaid, if the issue is still available. If not, photocopies can be made at 25 cents per page.

Using Collins S-Line Receivers

Having something like the 51S-1 used by the writer in monitoring at Headquarters is a great time-saver, since it makes possible quick checks on 5, 10, 15, 20, and 25 MHz, merely by moving the band switch. Not many amateurs have such devices at home. The writer's home receiver, a 75S-3, was made to bring in the 5, 10, and 15-MHz signals, by substituting suitable crystals in the first oscillator. These can be ordered by frequency, from information in the receiver manual, but if precise calibration is not important to you, the job can often be done with crystals that may be on hand, or available cheaply on flea market-type deals.

This receiver had been set up for 15-MHz reception years ago, with a crystal ordered for that purpose. A 39-MHz overtone crystal took off on its fundamental frequency, near 13 MHz, to provide for reception of 10 MHz. A surplus rock near 8 MHz gives us the 5-MHz signal well enough. Despite statements in the Collins manual, such crystals can be put in any socket. The "preselector" control is then peaked for maximum signal, regardless of what frequency its pointer then indicates.

K3JH described a neat way of accommodating extra crystals in the S-Line receivers, while maintaining the original coverage. The September 1974 issue in which this appeared is still available.

VE3AU contributed a useful Collins dodge. He lifts the 6555-kHz crystal from socket 1A in his 75S-3, and puts it in socket 1C, 2C, or 3C. With the bandswitch in the 14-MHz position, the 10-MHz signal is received at 45 on the dial. The second harmonic of the oscillator provides the injection.

WWV Converters

The same author described a two-transistor converter (part of a frequency standard setup) for reception of 10 MHz on the 3.5-MHz range of any communications receiver. This was in June 1966 *QST*, still available from ARRL stock.

George Grammer, W1DF, built a simple 6BA7 converter for 5 and 10 MHz, which uses a single surplus 8.5-MHz crystal. It's in September 1961 *QST*. Photocopies only are $1.00.

Drake and Heath Suggestions

Drake receivers can be fudged in various ways to receive WWV frequencies not provided for originally. WB6GFZ got 15-MHz reception on the 7-MHz range of a 2-B, tuning the preselector to 10. The 5-MHz signal can be copied at 4090 on the 80-meter range, with the preselector on 10.

K2OXP reports reception of the 5-MHz signal on a Drake R-4B, with the bandswitch on the 3.5-MHz range, the dial on 3.6325 MHz, and the preselector on 40. The second harmonic of the oscillator beats the signal in. Like the S-Line, these Drake receivers make provision for complete frequency coverage by insertion of crystals, but the above hints make use of the receivers without crystal changing.

Modification of the Heathkit SB-100 to receive 15 MHz is described by K6HA, in April 1969 *QST*, an issue still available from stock.

Undoubtedly there are many other ways to turn the trick with various popular receivers. All superheterodynes have image responses, and the "wrong" frequency can be peaked up on most modern receivers by detuning the preselector circuits with the front-panel control until the noise comes up on the image frequency. You can simply hunt for wanted out-of-band signals this way, or figure out the necessary frequency combinations from a little study of the receiver manual. Harmonics of the receiver's oscillators may offer additional possibilities.

* Technical Department, ARRL

Other Standard Time-and-Frequency Stations

Once you start listening for WWV on several different frequencies, to see how and when the signals come in and go out, you quickly learn that the United States is not alone in the time-and-frequency business. There are stations in many parts of the world operating on one or more of the channels used by WWV. These may be a source of annoyance at times, but for the amateur propagation observer, at least, they provide interesting diversions. There is no need to wonder how things are going to be toward much of Europe on a given morning, with RWM banging away on 5, 10, and 15 MHz, around the clock. LOL, on the same channels, helps us to keep tabs on conditions for work into the temperate zone of South America. JJY is useful for a check on the path to the Orient, a route going through the high latitudes from most of this country, and therefore susceptible to auroral-zone problems for many of us. CHU, on 3333, 7335, and 14, 670 kHz, is a good Canadian indicator.

There are several other stations on the standard frequencies that may be useful propagation indicators, depending on the observer's location and interests, but the above are most used from all we've heard.

The WWV-WWVH twins (male and female voice announcements, respectively) are also revealing. Time and again we've made note of a strong WWVH announcement, particularly in the early morning hours. This is usually an indication of low-absorption conditions on the lower frequencies and better-than-average propagation generally. It is observed to happen most markedly near the end of an exceptionally good period. When we hear a really strong WWVH, we look for conditions to deteriorate in the next 12 to 18 hours.

Lastly, don't forget WIAW. No special receiving tricks needed here; if you don't already use the Hq station for propagation information, better form the habit. The frequencies and operating schedule are in every issue of *QST*. If you were trying to hear WWV right under the WIAW antennas, as this observer is much of the time, you'd know that they're on the air a lot. Their signal levels and quality should give good propagation indications on all bands, from 50 through 1.8 MHz, at ionospheric skip distances. With power levels and antenna efficiencies typical of the better ham stations, but on all those bands simultaneously, they provide a service you may never have used. They're a bit close, for me – but they could be *your* crystal ball, multiband style.

Cycle 20 Bottomed Out?

That this three-part series was longer getting into print than had been expected may have been a blessing in disguise. At least the delay has permitted insertion of late information, as September *QST* goes to press.

In 1968, Arthur E. Covington, ex-VE5CC, a pioneer in the development of solar flux monitoring, made a projection for the ending time of Cycle 20. His detailed records going back to 1947 show the low of Cycle 18, early in 1954, to have been 65.0. Cycle 19 reached bottom in October, 1964, 10-1/2 years later, at 67.2. Long-term records of solar flux may show this method to be more accurate as to cycle duration than visual observation of the sun has been since 1700. Projecting 10-1/2 years as the cycle length, Covington gave March-April, 1975, as the Cycle 20 minimum.

Table I, below, compiled from WWV bulletins, indicates that he may have been very close. While everyone acknowledges that the best information is obtained after the fact, the table makes a strong case for April through early June as the bottom we've been awaiting. April showed the "lowest high," 74, June had the "lowest low," 65.5, Ottawa figures, reported as 66 by WWV.

A slightly different approach, picking the lowest 10-day period each month, points to early

[*] Covington, "Solar Radio Emission at 10.7 Cm, 1947-1968," Journal of the Royal Astronomical Society of Canada, Vol. 63, No. 3.

Table I – Solar flux statistics for 1975, through July 15

	Month High	*Month Low*	*Average*	*10-Day Low**
January	85	72	77.45	22-31 73.3
February	83	70	74.18	18-27 70.3
March	77	68	72.52	21-30 68.9
April	74	67	70.63	15-24 68.0
May	80	67	70.1	12-21 67.3
June	79	66	69.73	6-15 66.1
July	88	71	76.27	2-11 73.2

* Not necessarily in 27-day recurrence order

June, with a 10-day average of 66.1. Despite a later surge that sent the flux up to 75 or over for the last five days, the June average was 69.73, a shade under May's 70.1, the lowest in ten years up to time. Narrow-beam scans of the solar surface, Covington reports, showed almost no variation from the quiet-sun condition, from June 6 through 14, a quiet spell without counterpart in the Cycle 20 record.

More solar fireworks began around July 10, and on the 13th the flux reached 88, a 1975 record, to date. As we write, New England has been under a cloud blanket for more than a week, so we have not seen evidence that might show if this is old-cycle activity, or the first major stirrings of Cycle 21 – but things *are* happening up there. Fall, 1975, should be an interesting time. We're going through by far the best-documented solar minimum ever.

References

Because it has been telling the unfolding story of man's use of the radio spectrum through almost the entire history of ionospheric radio propagation, *QST* is without equal as a source of information, historical and technical, on this fascinating field. How signals get from one place to another has intrigued most amateurs since the first QSO came to an untimely end as the result of a fadeout. Propagation vagaries practically dictated the formation of The American Radio Relay League. Remember the famous tale of The Old Man needing a relay station to get a message from Hartford to Springfield?

We've come a way since then, and the road ahead will be a bit clearer if we retrace at least the more important turns we've taken to get this far. In addition to the specific references footnoted, there are propagation articles throughout *QST*, back to the earliest years. Checking back through them would keep you reading for a very long time, so we cited only a few in Part II. The yearly index, in each December issue, will be useful in locating more.

Propagation basics are covered in any modern edition of *The Radio Amateur's Handbook*, Chapter 19, in recent years. Because several of the DX modes were discovered or developed on the frequencies above 50MHz, *The Radio Amateur's VHF Manual* offers interesting and useful information. Chapters 1 and 2 have extensive bibliographies.

The definitive technical work on all long-distance modes is Davies' "Ionospheric Radio Propagation," (NBS Monograph 80), 470 pages densely packed with propagation information and references, available from the Government Printing Office, Washington, DC 20402, price $2.75.

If, as has been reported recently, the supply of this work has been exhausted, it can now be obtained, reprinted by Dover Publications, from Communications Technology, Inc. (*Ham Radio*) Greenville, NH 03048, price $4.00. QST

Strays

QST Congratulates . . .

Ken Langenback, W4NW, recently promoted to Deputy Director of Voice of America for Engineering and Technical Operations. His office manages radio broadcasting facilities, frequency utilization, R&D, and technical planning.

W4WYP, recipient of the Alabama Naval Reservist of the Year award, who was cited by Gov. George Wallace for his ham radio public service work.

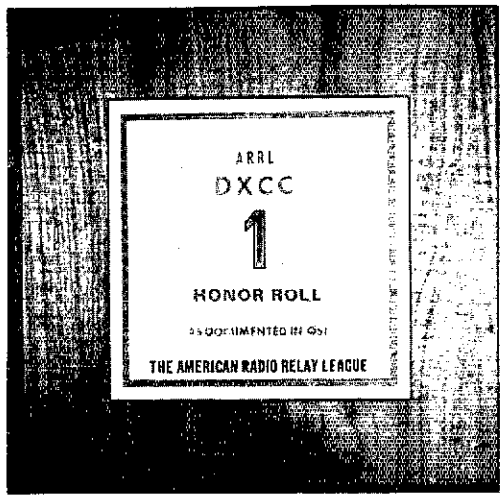
Joe Bathner, W2HPB, recently elected national president of the Pearl Harbor Survivors Association.

Perry Hopkins, W4FHJ, elected Virginia state chairman of the Pearl Harbor Survivors Association.

Walt Dettinger, W8NXN, president of the Toledo chapter of the Pearl Harbor Survivors Association.

Theodore J. Cohen, W4UMF, on his promotion to manager of the New Products Group of Teledyne Geotech which is responsible for expansion in digital system capabilities, with particular emphasis on automated hydrographic survey systems.

Jim Bartram, W1PDL, for his election as Fellow of the Society by the Acoustical Society of America. Past president of the Newport County Radio Club, W1PDL currently serves as its corresponding secretary.



Minute 41 of the January 1975 ARRL Board Meeting authorized an appropriate plaque to any amateur who has attained the Number 1 spot in the DXCC Honor Roll. The 6" white tile is set in a 10" square heavy walnut backing. Colors are red, yellow, blue, gold and black on white. The personalization will include call, mode, month and year of documentation. If you qualify and wish to order, please note the month/year of the *QST* showing your call in the top numerical position and send with a check for $25 to ARRL.

Coherent CW

Amateur Radio's New State of the Art?

BY RAYMOND C. PETIT,* W7GHM

IT HAS BEEN KNOWN for many years that the bandwidth used for cw reception in most all amateur applications is much, much wider than is needed for efficient reception of the signal. Today it is very common for an operator to use a receiving filter that is 100 times broader than needed, and this huge amount of extra bandwidth permits a great deal of QRM to pass which otherwise could be rejected.

There are several reasons why extremely narrow-bandwidth receiving systems have not been more widely used. The first is frequency stability. If a filter only 10 Hz wide were to be used in the receiver, the desired signal would soon drift out of the passband unless both the transmitter and the receiver were manufactured to standards greatly exceeding present designs. Even getting the signal tuned correctly in the first place would be difficult because of inadequate dial resolution and backlash. So far, no commercial manufacturer of amateur equipment has considered it worthwhile to provide frequency accuracy or stability exceeding about 100 Hz.

Another problem with narrow filters is ringing. In a typical audio-filter design, *Q*s must be kept low (and hence, bandwidths broad) to prevent random noise and even the signal itself from producing so much ringing that it masks the desired dots and dashes.

A Bold Leap in Frequency Stability

Recent advances in integrated-circuit technology now make it possible to *synthesize* all the local-oscillator signals needed for both transmission and reception – at a cost that is attractive to the amateur. With synthesis techniques, only one independent and highly stable crystal oscillator is used as a reference to generate all the other signals needed. The signals so generated are just as accurate and stable as this one master standard, and the standard can be set easily to within about 1 Hz of WWV at 10 MHz. With a synthesized transmitter and receiver, you can tune to the frequency you want and know that you will be within a few hertz of that frequency. If both stations in a QSO are operating with synthesized rigs, the problem of drift is eliminated.

Nine Hertz Bandwidth and No Ringing

If enough is known about the incoming cw signal, it is possible to build what is known as a "matched filter" for this signal at the receiving end. Such a filter has the narrowest bandwidth possible (and therefore the best possible signal-to-noise ratio) for that particular signal, and it will not ring when correctly adjusted. For a Morse code speed of 12 wpm such a filter is 9 Hz wide, and its skirt selectivity can be best characterized as *spectacular*.

What needs to be known about the incoming signal? Naturally, you must know its frequency – which simply means that you must have the signal centered in the passband of the filter to within a few hertz. Here is where frequency-synthesized rigs are necessary. Operation of the matched filter also requires that the transmitted signal be synchronized in time. To do this, it is only necessary to generate a suitable timing signal by frequency division from the master-frequency standard. By using this precise clock signal as the speed-control signal in an electronic keyer, all transitions from mark (dots and dashes) to space and vice versa occur at extremely well-defined instants. For a 12-wpm Morse code signal the basic time interval is 100 milliseconds, and all dots and dashes begin and end at instants which are exact multiples of this

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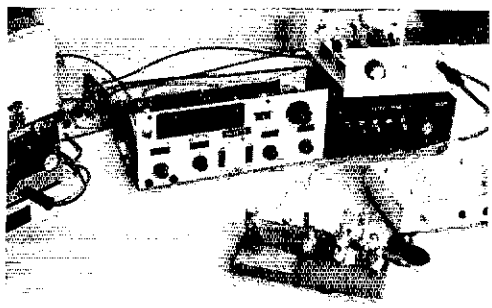


Fig. 1 – This is the first complete amateur station to be built for coherent-cw operation. Assembled by Andy McCaskey, WA7ZVC, it consists of a modified Ten-Tec PM-2 transceiver and homemade modules which provide for the control and processing of signals as required for coherent-cw operation.

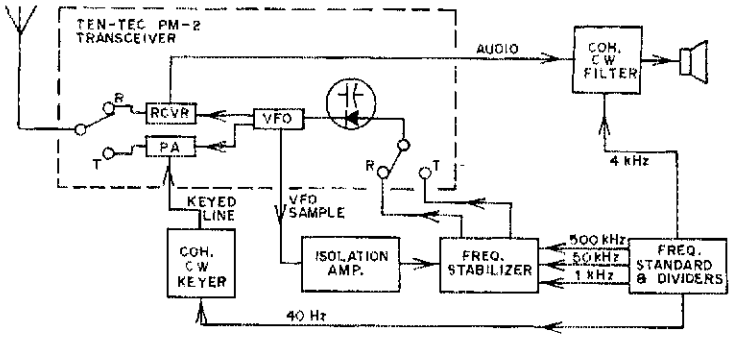


Fig. 2 — Block diagram of coherent-cw station complement at WA7ZVC. The functions of the various blocks are discussed in the text.

interval. All dots, dashes, and spaces can be thought of as being "blocked" into time segments of precise duration.

The matched filter recovers the signal by analyzing the receiver output, block by block, and presenting the receiving operator with a cw tone corresponding to each block. The intensity of each tone is proportional to the total signal energy that the filter received within its bandwidth during that time block. Adjustment of the phase of the filter timing signal at the receiver compensates for the propagation delay between the transmitter and the receiver.

Experiments Show 20-dB Signal Boost Over QRM

If a receiver using a 2-kHz bandwidth is provided with a matched filter having a 9-Hz bandwidth, theory indicates that a 23.5-dB improvement in signal-to-noise ratio will result. If your receiver uses a 500-Hz filter, the improvement is 17.4 dB. What does this mean in practice, in crowded conditions on the air? The author built an experimental matched filter for 12 wpm and a suitable Morse code test generator. A very weak signal from the generator was combined with severe 80-meter QRM including RTTY signals, other cw signals, and static. The test signal was buried in the QRM. When the matched filter was switched in, the signal stood out distinctly, almost like a code practice oscillator alone. Clearly, here is a technique which could be a great help on our congested bands! Similar experiments by WA7ZVC have given equally worthwhile results.

Coherent CW on the Air

Several amateurs, mostly in the U.S. Northwest, are building coherent-cw stations using simple designs worked out by the author. Nets are being formed on 80 and 20 meters for on-the-air experimentation and contacts via coherent cw. The first complete ccw station to go on the air has been built by Andy McCaskey, WA7ZVC. As shown in Figs. 1 and 2, he assembled his station from a Ten-Tec PM-2 transceiver and a number of home built models made especially for ccw operation.

Andy's frequency standard generates the 4-MHz, 500-, 4-, and 1-kHz, and 40-Hz clock signals that are required for the various other station components. For transmitting, the Ten-Tec VFO is phase locked to the standard and operates at 3550.000 kHz. For receiving, the VFO is phase locked to 3551.000 kHz to provide a 1-kHz beat note for the incoming ccw signal. The isolation amplifier (a carefully shielded cascode stage) and the frequency-stabilizer unit are used in accomplishing these functions. The isolation amplifier is required to prevent a coherent spurious signal at 3550.000 kHz from getting back into the receiver and blocking the system.

The ccw keyer uses CMOS ICs. Instead of an internal clock, the clock is a 40-Hz signal derived directly from the 4-MHz standard, and this preserves the timing required for ccw operation. The experimental ccw filter which Andy constructed is shown in Fig. 3. It provides a bandwidth of less than 10 Hz at a 1-kHz center frequency, and has no ringing in the output. A 10-position phase-setting switch is visible in the lower right corner of Fig. 3. Ready-made circuit boards for a similar filter are now available, as are kits of parts. This filter uses two quad op amps and eight CMOS ICs, plus a few resistors and capacitors. For information write to Charles Woodson, W6NEY, 2301 Oak St., Berkeley, CA 94708. "Woody" also edits the *Coherent CW Newsletter* (CCWN), which contains full technical information and diagrams, and complete ccw information. A current subscription will be provided to any amateur who is willing to build his own coherent-cw station. QST

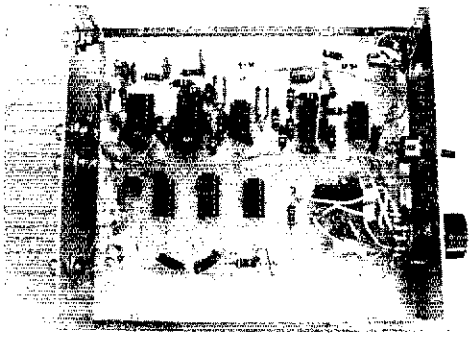


Fig. 3 — Home-built experimental coherent-cw filter constructed by WA7ZVC. It has a bandwidth of less than 10 Hz at a bandpass frequency of 1 kHz. Ready-made circuit boards and a kit of parts are now available for the construction of a similar filter, as described in the text.

The Micro-TO MK II Keyer

BY CHET B. OPAL,* K3CUW

MORE THAN eight years have passed since the Micro-TO Keyer first appeared in *QST*.[1] The design is still basically a good one; however, there have been significant advances in semiconductor technology in the intervening years which make possible a better version of the keyer. The following improvements have been made:

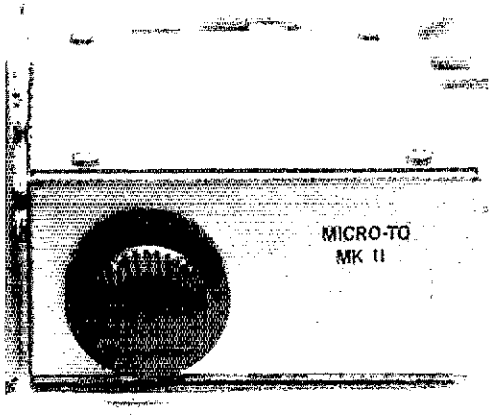
1) Complementary MOS integrated circuits are used, rather than the obsolete RTL ICs and germanium diodes used in the older version. The CMOS circuits operate over a wider voltage range (3 to 15 volts, versus 3.6 volts for the RTL circuits) and draw much less power. Because of the lower power consumption, the new keyer can be battery powered; in fact, the key-up battery drain is so low (less than 1 microampere) that an on-off switch is not even needed.

2) A transistor rather than a reed relay is used to key the transmitter. Since virtually all transmitters now use grid-block keying, it is possible to design the circuit so that a semiconductor replaces the expensive and rather hard-to-find relay.

3) The monitor circuit has been redesigned and is much improved, at the cost of some complication. The new circuit produces a loud, smooth-sounding, clickless and chirpless tone. A monitor volume control has been added.

[1] Opal, "The Micro-TO Keyer," *QST*, August, 1967, p. 17; also *The Radio Amateur's Handbook*, 1969 through 1972 editions.

* 1304 Massachusetts Ave., S.E., Washington, DC 20003.



The new keyer handles just like the old one. The logic design is about the simplest which is capable of sending perfect letters. The keyer has no memories, automatic letter spacing, or other frills many of which, in my opinion, one is better off without. One feature it does have is that the clock, which generates the basic timing pulses, is not free running but starts the instant the key is depressed (provided that the mandatory space following the preceding character has been completed). This is particularly an advantage at low sending speeds.

How It Works

The essence of a good keyer is the perfect dot: when the dot side of the paddle is closed, the transmitter should immediately be turned on and it should stay on for a prescribed time (determined by the setting of the speed control), after which it should necessarily remain off for a period exactly as long. A dash should be a sequence of two dots, with the space between filled in.

In the Micro-TO MkII (Fig. 1), dots are formed as follows: normally all inputs to the dot gate (U1A) are at logic "one" (+9 V in this case). Closing either the dot or the dash contact makes one of the inputs a logic "zero" (i.e. ground) and, since this is a NAND gate (which means that if any of the inputs is logic *1*, the output is logic *0*), the output of this gate goes to logic *1*. This triggers the clock, which consists of U2A, U2B, U1B, and U1C. The functioning of the clock is discussed in greater detail below; for the present it is sufficient to know that, once started, it generates one cycle of a square wave. Thus it makes dots, but unfortunately they are not perfect dots (the "mark" is longer or shorter than the "space," depending on the particular unit chosen for U1B, as discussed below). By using additional components it would be possible to trim the clock to form perfect dots, but it is easier to make them by using the dot flip-flop (U4A) to divide the clock frequency by two. Since integrated circuit flip-flops come only in pairs, and since we will need a dash flip-flop later, we may as well use the other half as the dot flip-flop. The flip-flops are type *D* which means that the input at the *D* terminal is transferred to the output *Q* during the positive-going portion of the clock pulse applied to the *C* terminal. Before the dot started, the *Q* output of U4A was sitting at zero. Thus its complement, $\overline{Q}$, which was applied to the *D* terminal, was a one. When the clock pulse started, its output (connected to the *C* terminal) transferred this *1* to the output terminal. This *1* in turn

is fed to the output gate, setting its output to ground, which turns on the keying transistor *Q*1.

The keying transistor is a high-voltage pnp type; its purpose is to ground the key terminal (which in a grid-block keyed transmitter lies at −100 volts or so). On key-down the key terminal is clamped to about +0.7 volts by diode CR1. The value of R9 was picked so that a keying current of up to −4 mA can be drawn. If your transmitter draws more than this, R9 can be reduced in value. On the other hand, if your transmitter draws considerably less than this, the value of R9 should be increased because, aside from the monitor transistor, Q2, this is the major source of battery drain in the keyer.

Dots are self-completing because, besides keying the transmitter, the output of U2D connects back to the dot gate. Therefore, as the output gate goes to *0* at the beginning of a dot or dash, it grounds pin 8 of U1A so that, so far as the output of U1A is concerned, it appears that the paddle contact is still closed even if it is released. Since pin 8 stays at ground through the end of the character, it forces the clock to generate another square wave. This changes the state of U4A to a zero (because *Q*

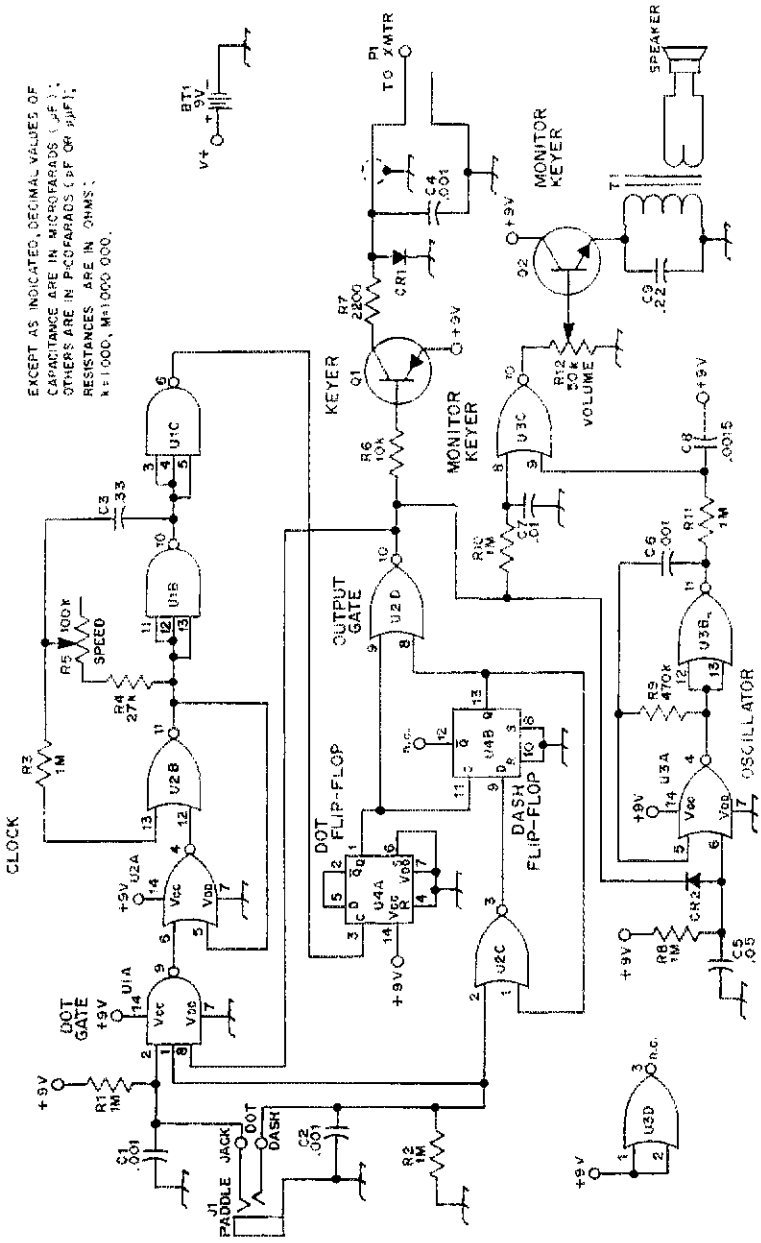
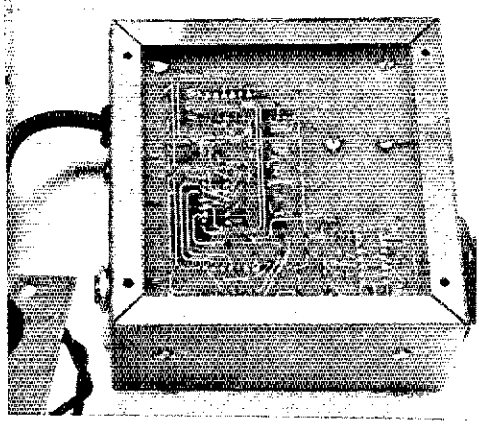


Fig. 1 — Schematic diagram of the Micro-TO Mk II keyer. Since current drain is very low, no on/off switch is included in the unit. The monitor and the keyer are housed in two different chassis boxes. One box could be used if the builder wishes.

BT1 — 9-volt transistor radio battery.
C3 — 0.33-μF mylar capacitor.
CR1 — 200 PIV silicon rectifier (1N4002 or similar).
Q1 — High-voltage pnp silicon transistor (MM4002 2N5415 or similar).
Q2 — General-purpose npn silicon transistor.
R5 — Linear taper, 2-watt carbon.
R12 — Audio taper, 2-watt carbon.
T1 — Audio transformer, 500-ohm primary.
U1 — Triple 3-input NAND gate (CD4023AE, McM4023 or equivalent).
U2, U3 — Quad 2-input NOR gate (CD4001 AE, McM4001 or equivalent).
U4 — Dual type *D* flip-flop (CD4013AE, McM4013 or equivalent).



and hence the *D* input are now *0*), producing a one at the input of U2D. This ends the dot and sets pin 8 of U1A to one. Since all the inputs to the dot gate U1A are now 1, its output goes to *0* and it tries to turn off the clock. But the clock, for reasons described below, is oblivious to this and goes on to complete the second cycle of the square wave, making the perfect space after the perfect dot. It is impossible to start a new character until this space has been completed.

The dash contact of the paddle also goes to an input of U1A, so that closing the dash side of the paddle also starts a dot as described above. But the dash contact is also connected to U2C, a NOR gate. This gate normally has pin 1 sitting at ground, so as the other input goes to ground its output goes to *1*. This *1* is applied to the *D* input of U4B, so as the flip-flop changes state its output (which is connected to the *C* input of the dash flip-flop) causes this *1* to be transferred to the output of U4B. Now both inputs of the output gate U2D are

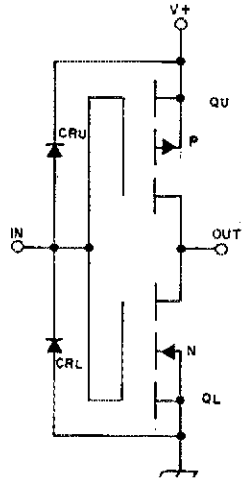


Fig. 2 -- Simplified schematic of an MOS device. See text for a brief description of the operation of the circuit.

one, so its output stays *0*, and hence the transmitter remains keyed, until both U4A and U4B return to *0*. Meanwhile when the *Q* output of U4B, which is connected to an input of the gate U2C, went to one, the output of U2C was forced to go to *0*. But since the output of the output gate is still *0*, the clock pulse will remain present at the input of U1A. Thus a second dot is formed. This time, at the onset of the clock pulse formed when U4A changes back to a *1* at the beginning of the second dot, the *D* input to U4B is at *0*. Thus the output of U4B goes to *0*, and finally when U4A goes to *0* at the end of the second dot, all the inputs to the output gate are at *0* and its output at last goes back up to *1*, ending the dash. Meanwhile, the clock has been forced to start a fourth and final square wave, ensuring that the appropriate space follows the dash.

So far, nothing has been said which would not apply to any type of logic circuit. In order to understand the functioning of the clock and monitor circuits, however, it is necessary to discuss how CMOS circuits work. The discussion here will be very cursory; the reader is referred to the RCA COS/MOS Integrated Circuits Manual for details. The basic CMOS circuit (an inverter) is illustrated, in a simplified manner in Fig. 2. It consists of a p-channel MOS transistor in series with an n-channel MOS transistor and a pair of protective diodes, CRU and CRL (the latter are important in the operation of the clock circuit). When the input is grounded, the gate of the p-channel transistor (QU) sees a voltage which encourages it to conduct, and the n-channel transistor (QL) is cut off. Thus the output circuit is clamped to V+. When the input goes to full positive voltage (V+), the opposite happens and the output is clamped to ground. Since the gate circuits draw negligible current and the diodes never conduct, the circuit draws essentially no power in the quiescent state. And because the voltages at which the gates cause the transistors to conduct are chosen so that they never both conduct at the same time, the only power drawn by the circuit is that used to charge and discharge stray capacitance. A NOR gate is made by hooking up a number of such pairs with all their QLs in parallel and their QUs in series; a NAND gate is made conversely. A type *D* flip-flop is much more complicated and will not be discussed here.

The basic clock consists of gates U2A, U2B, and U1B. Gate U1C is an inverter, which generates clock pulses of the proper polarity to feed the dot flip-flop.[2] Normally, the output of dot gate U1A is at ground, that of U2A at V+, that of U2B at ground, and that of U1B at V+. At the beginning

[2] It might seem that this gate is redundant, since pulses of the proper polarity are present at the output of U2B. However, the waveform at that output is very soft, and during the positive portions of the clock pulse it is possible for the dot flip-flop to be triggered before U1B changes state. A change of state then rushes through the output gate, dot gate, and clock gates, turning off U2B before it has a chance to turn off U1B. The result, for certain combinations of integrated circuits, is that the characters are not completed. Naturally, this was discovered the hard way.

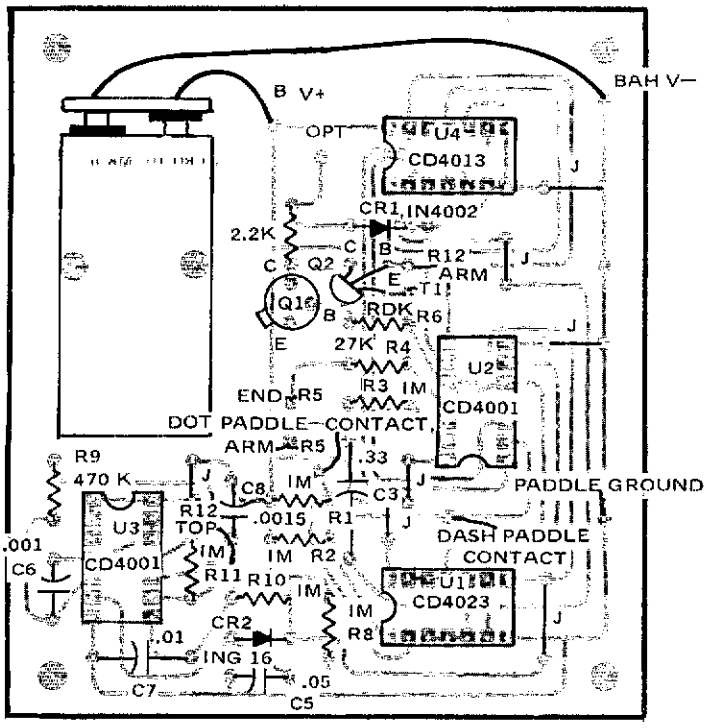


Fig. 3 — Scale drawing of etching pattern from component side of board showing component placement. J = wire jumper.

of a character, U1A goes to V+, forcing the output of gate U2A to ground. This feeds a *0* to one input of NOR gate U2B, and since the other input is also at *0*, the output of U2B goes to *1*, forcing the output of U1B to ground. Now capacitor C3 has been sitting with V+ at the terminal connected to the output of U1B and the other side at ground. Consequently, as the side connected to U1B went to ground, a more negative voltage appeared on the other side. A large-value resistor, R5, is installed in series with pin 13 of U2B so that this voltage is not shorted to ground by the protective diodes on that pin. The main discharge path for C3 is then through R4 and the speed control, R5, to the output of U2B, which is sitting at V+. As that terminal of C3 heads for V+, it eventually puts a *1* at pin 13 of U2B. At that time the output of U2B goes to *0*, the output of U1B goes to *1*, and that side of C3 goes to V+. The other side of C3 now goes to nearly twice V+. Again, C3 discharges through R4 and R5 to the voltage at the output of U2B, which is now ground. As C3 heads to ground, it eventually puts a *0* at pin 13 of U2B, the output of U2B goes to *1*, and the whole cycle repeats. Thus, so long as pin 12 of U2B is at ground, the clock will oscillate. Pin 12 is kept at ground via the dot gate U2A whenever the mark portion of a character is being generated. In addition, the other input to U2A comes from U2B itself, so that if a clock cycle is started it must continue until the output of U2B goes to *0*. This happens during the second half of the clock cycle, which continues no matter what the input at pin 12 of U2B is. Thus a clock cycle, once started, is self-completing. Since all inputs to the dot gate cannot go to *0* at the end of a character until a clock cycle has been started, the completion of that clock cycle inserts an automatic space at the end of the character, as desired.

The frequency of oscillation of the clock, and hence the keying speed, is independent of supply voltage, since the voltage swing across C3 is proportional to supply voltage and the voltages at which U2B changes state are also proportional to supply voltage. The clock output is not a symmetrical square wave, however, because voltages corresponding to a *1* and a *0* at the input of U2B are not symmetrical; that is, for a supply voltage of 9 V, U2B may be turned off at +2 V and on at +5 V, so that as the clock oscillates C3 discharges through +11 V in one direction and −13 V in the other. The keying speed range is determined by the combination of R4, R5, and C3. The values selected give a range of 12 to 60 wpm.

Construction

The complete keyer is housed in a 3 × 4 × 5-inch utility cabinet, and the unit less monitor fits easily into a 2 × 4 × 4-inch cabinet (see illustrations). The prototype was built on Vector type 59P44/032 board, which is drilled on 0.1-inch centers. Hard wiring between sockets and flea clips was used, but these are unnecessary (the sockets were used for testing different type ICs, and the flea clips represented terminals for designing a printed circuit board). Later a printed circuit board was made; this is shown in Fig. 3. The pc-board layout can be used as a guide for a hard-wired circuit if desired. Nearly all components are on the

(Continued on page 39)

Construction Hints for
VHF Converters

QUITE A FEW vhf enthusiasts still like to build their own converters. Doing it yourself comes close to necessity currently, with the unfortunate tendency of the larger manufacturers to abandon the converter field - at a time when mixed-band satellite activity is bringing the need for converters back into focus.

The difficulty of obtaining suitable components, and doubts about one's ability to make satisfactory circuit boards tends to scare off would-be builders of simple equipment. Requiring only elementary tools, the 2-meter converter shown here, worked out as a joint project by K3HEC and WA3HMK, is simple to build, yet its performance is adequate for weak-signal work. You may find some of its ideas useful, even if you don't duplicate it entirely.

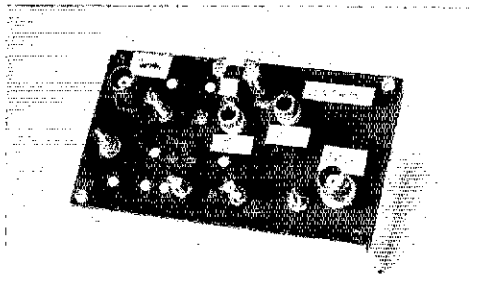
Interior of the 2-meter converter, with components in the same position as in the layout drawing, Fig. 1.

Mechanical and Circuit Details

Circuit board is used for the base plate and principal partition, but it is one-sided stock, used as sheet metal, with no etching required. It is 2-1/2 × 4-1/2 inches, mounted on a 1-inch high box of the same dimensions. Push-in Teflon standoffs are used as tie-points, as are several feedthrough bypass capacitors. Inexpensive Centralab 829-series tubular capacitors for tuning the rf circuits are mounted in an unusual but simple way, to avoid the common problem of loosening lock nuts. Small holes are drilled adjacent to opposite sides of the mounting nut. A Z-shaped stiff wire or thin piece of copper or brass is then soldered to the outer surface of the nut and to the metal film on the underside of the base plate. This locks the trimmer firmly in place and provides a good ground connection.

The layout drawing can be used to duplicate the original, if the builder keeps in mind any differences resulting from component substitutions. The long partition is also circuit board. The small one in which the first rf amplifier transistor is centered is sheet brass or copper, but could also be board material, if desired. It is 7/8-inch square, with a hole in the center just large enough to pass the body of the E-300 transistor. The gate lead is soldered to the shield. The source and drain leads run directly to C1 and C2, respectively. All the other transistors are supported by their leads, which are about 1/2-inch long.

The first rf stage is a grounded-gate amplifier using a low-noise JFET. The second rf amplifier and the mixer are MOSFETs. The oscillator contains a low-cost bipolar transistor. Almost any vhf oscillator type should work. The injection portion of the converter is of interest in that a 116-MHz



The WA3HMK converter is built on circuit board, mounted on a small aluminum chassis. Rf circuits are at the bottom, in this view.

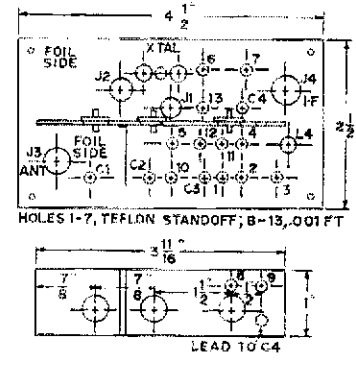


Fig. 1 — Layout details for the main plate and partition for the 2-meter converter. Both are single-sided circuit board. Hole dimensions and positions, where given, are approximate and may vary with components used, but general layout should be followed.

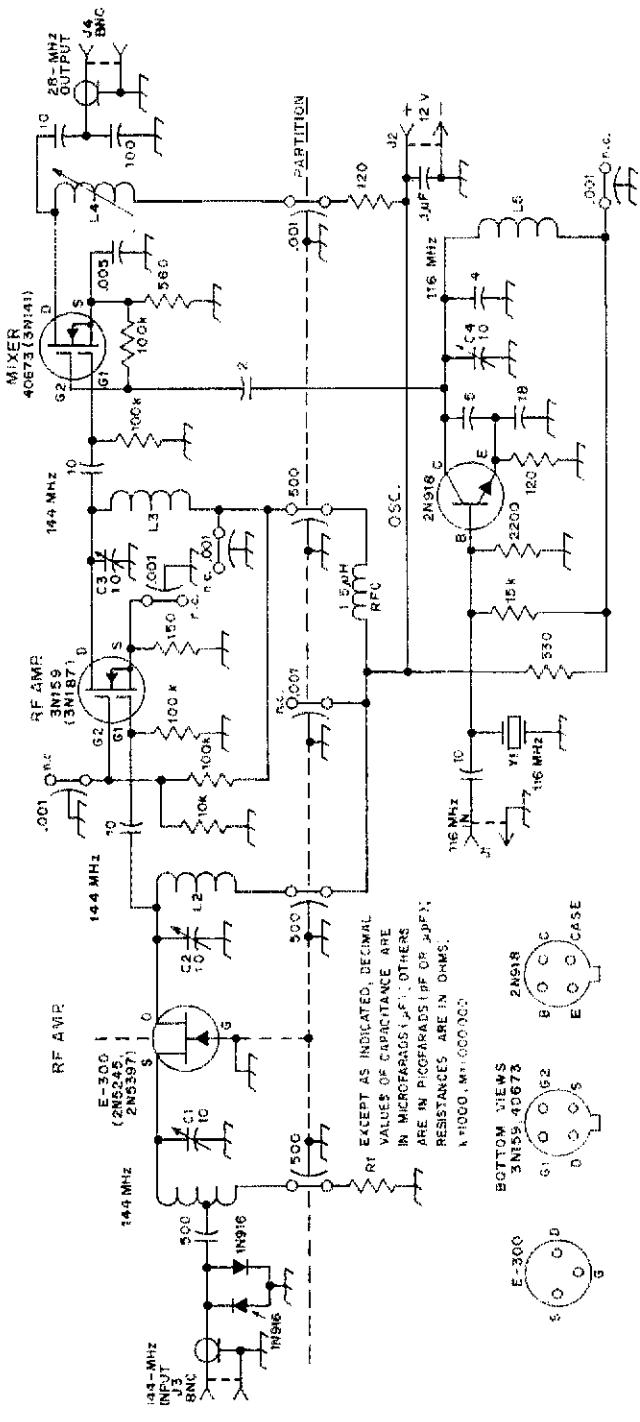


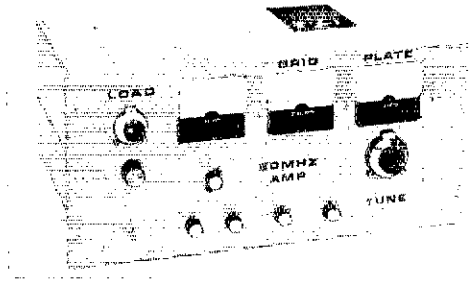
Fig. 1 — Schematic diagram and parts information for the WA3HMK converter. Decimal values of capacitance are in μF, others in pF. Resistors are 1/2-watt or less. 500-pF capacitors are button-mica feedthrough types (surplus). The .001-μF capacitors are small ceramic types (Centralab MFT-1000).
C1-C4, incl. — 10-pF tubular ceramic trimmer (Centralab 829-10).
L1 — 6 turns No. 16, 3/8-inch dia, spaced wire dia. Tap at 2-1/2 turns from bypassed end, or for best noise figure.
L2 — 4-3/4 turns, like L1.
L3 — 4 turns No. 22, 1/4-inch dia, 5/16 inch long.
L4 — 2.7 to 4.2-μH slug-tuned coil (Miller 4307).
R1 — Adjust for 5 mA drain current, or lowest noise figure. Final value in original unit, 220 ohms.
Y1 — 116-MHz overtone crystal (International Crystal Mfg. Co.).

crystal is used, eliminating the need for multiplier stages and their attendant problems of unwanted frequencies that can generate spurious responses. This is especially desirable in a simple layout such as this. Injection can also be supplied from an external source, merely by removing the crystal, Y1, and feeding 116-MHz energy into the phono jack at the lower left. This provision makes the converter suitable for use in transverter service, an

(Continued on page 39)

A High-Performance 50 MHz Amplifier

Part I



BY EDWARD L. MEADE, Jr.,* K1AGB

THE AMATEUR 6-meter assignment is in the oft' noted "grey area" between approximately 25-70 MHz where traditional hf plate-circuit techniques for high-power amplifiers are not always optimum and most vhf linear inductors are too bulky for practical application. The crux of network design problems in this range is usually a high circuit loaded Q (Q_L) caused by the large, fixed-value minimum capacitance of the amplifier tube(s). A successful approach to lowering Q_L in a parallel circuit is to eliminate the tuning capacitor and make the inductor variable.[1] Reasonable values of Q_L can be obtained using this "vari-L" method in combination with an adjustable plate-voltage supply. A power supply which provides several high voltage outputs and still maintains good dynamic regulation can be costly. An economical solution is to use one plate voltage and design a plate circuit which will operate efficiently at several values of Q_L. The unloaded Q (Q_u) of typical air-wound coils is not generally optimum for efficient, low-loss operation at high Q_L, and better circuit elements are needed.

It has been demonstrated previously[2,3] that linear circuits (lengths of transmission line used as inductors) can act as low-loss elements for use under unavoidably high Q_L conditions at vhf/uhf. Selection of an appropriate type from the linear family, for use in high-power 50-MHz amplifier plate circuits, is not difficult when one checks the capabilities and specifications of each.

Both round air-dielectric coaxial lines and flat-plate air-dielectric strip lines meet the power-handling criteria. Round coaxial elements have been used with success at 50 MHz,[4] but a rather unusual form factor is necessary for best efficiency. Round lines should not be bent or folded, and about 40 inches of amplifier height is required when optimum impedance, shorted, $\lambda/4$ lines are used with moderate capacitive loading. They yield best performance for characteristic impedances (Z_o) in the 70-ohm region, thereby limiting somewhat the best possible choice of Z_o for optimum circuit-element design.

A Practical Plate Line

With reasonable attention to construction detail, air-dielectric, flat-plate, strip-line vhf inductors can be bent without measurable efficiency degradation. This is a very useful characteristic from a packaging standpoint, and it shall be capitalized upon in this amplifier. A realistic high Q_u, far greater than that of an air-wound inductor, is easily obtained using polished, but not necessarily plated, strip-line elements. The theoretical Q_u of such a line, shown as Curve A in Fig. 1, is very high indeed. An additional advantage of linear inductors is control of odd-mode ($3\lambda/4$, $5\lambda/4$) resonance responses in a shorted $\lambda/4$ line. Proper design can inhibit harmonic output through several orders (*2f*, *3f*, *4f*). Calculations indicated that a shorted $\lambda/4$ line length of 26 inches, and capacitive loading of 30 pF at 50-MHz resonance, would yield harmonic suppression through *5f*, before $3\lambda/4$ mode operation could begin. A careful grid-dip-meter check of the amplifier proved this to be correct. By contrast, longer $\lambda/4$ lines with less capacitive loading will develop $3\lambda/4$ mode operation potential much lower in frequency, typically around *3f*.

For this amplifier, a line Z_o of approximately 120 ohms offered optimum performance in an enclosure of reasonable dimensions. Choice of strip width and thickness was made from Fig. 2. Sidewall spacings on the order of one inch from the edge of thin lines will reduce fringing effects and ensure reasonable graph accuracy. With fixed capacitive loading at the open end, electrical length in degrees ϕ for a shorted $\lambda/4$ line is calculable to sufficient accuracy by using textbook formulas for lossless lines as resonant circuit elements.[5] Conversion of electrical to physical length in inches is done using the approximation: $L = 32.8\ \phi/f$MHz. Skin-effect losses are not as great at 50 MHz as at uhf, and a simple polished aluminum line element was deemed adequate. A piece of 1/8-inch thick 6061-T6 sheet was cut to shape as shown in the photographs.

[1] This and all other references are listed at the end of this article.

* 92 Grove St., Plainville, MA 02762.

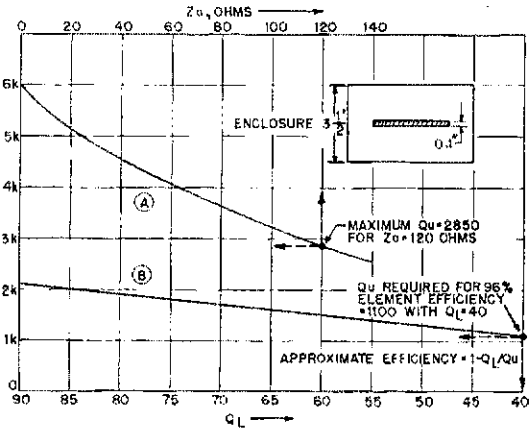


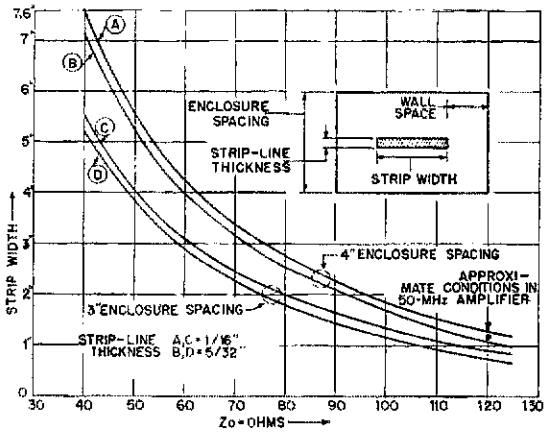
Fig. 1 — The theoretical Q_u versus Z_o of a copper shielded strip line is presented in Curve A. This represents a nominal value of Q_u for a line 0.1-inch thick in a 3-1/2 inch enclosure. The curve is marked at the approximate impedance (120 ohms) of the line used in this amplifier, indicating that a theoretical Q_u of 2850 is available. Curve B shows Q_u versus Q_L for an approximate strip-line, circuit-element efficiency of 96%. Q_L between 40-90 are listed since they are commonly found in vhf/uhf amplifier designs. A Q_L = 40 is encountered in the 50-MHz amplifier at 1-kW input for conditions given in Table I, thus an element Q_u = 1100 is required for 96% efficiency. With a maximum available Q_u = 2850 at our chosen line Z_o, no major conflict is encountered if reasonable construction procedures are followed. Lines with $Z_o >$ 140 ohms become lossy and should be avoided in high-power plate circuits, although they are adequate for use as input-circuit elements where losses can be overcome by increased drive power. In general, for low line Z_o, the best enclosure choice is one yielding closest ground-plane spacing, where a narrower line will be required to attain the desired Z_o. The opposite is true of high-Z_o lines. The basis for Curve A can be found in the *Microwave Engineers Handbook and Buyers Guide*, 1967, page 81.

This particular form was chosen to concentrate line current in the chassis ground plane and top cover, instead of the sidewalls and partitions. Current "bunching" effects are minimized with a smooth-line bend which, to some extent, retains H-plane integrity. Concentrating current flow in the chassis is preferred, as the tube grid is returned directly to this plane. Efficiency measurements listed in Table I are based on the aluminum line element. Line operation under other than desired quasi-TEM conditions is unlikely, since the strip width of one inch is a small fraction of a wavelength at 50 MHz. Special care must be taken in uhf design to avoid very low impedance lines (with large fractional-wavelength strip widths) and enclosure sizes which could result in complex electromagnetic line operation; otherwise, one must be prepared to experiment with mode-killing procedures. Internal partitioning of the plate compartment provides the necessary continuity between upper and lower reflecting line ground planes. A trough is formed to contain high circuit currents within the immediate vicinity of the line, preventing unwanted ground loops and undesirable coupling to dc components.

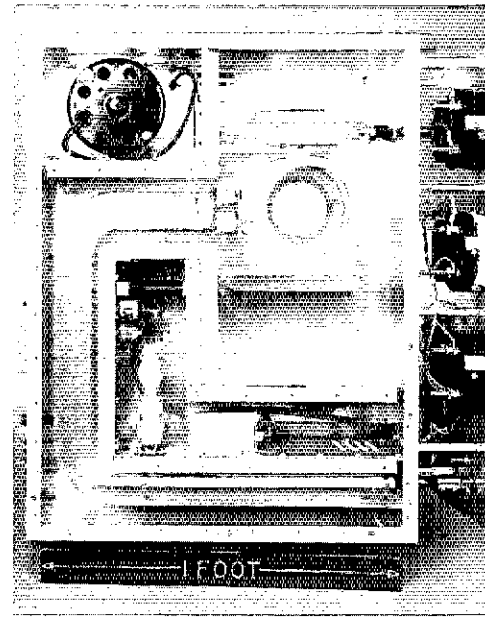
A wide range of tube resonant load impedances (R_L) can be matched to the load (antenna) by using a series-tuned link with variable attitude, coupled to the H-plane of the strip line at the high-current end, near its grounding point. Consideration was given initially to "vari-*L*" tuning by inserting a sliding short in this region. Variable-link coupling was also desired, and the tank confines would not permit both.

The dc block between tube and line in this amplifier must be able to carry up to 14.6 A of rf current without degradation. Perhaps the best method of dc blocking at vhf is a low-inductance sandwich capacitor with Teflon dielectric. This approach is not practical here due to the narrow line involved. Appropriate capacitors rated for rf service are specified in the parts list, and TV-type substitutes in this application are not recommended because they cannot handle the current. The two parallel capacitors represent about 1.6-ohms reactance at 50 MHz and, although they run a bit warmer than I personally desire, no problems

Fig. 2 — This graph presents line width in inches versus Z_o for an air-dielectric strip line. Curves are for two different thickness elements spaced equidistantly in 3-inch and 4-inch commercial aluminum chassis serving as enclosures. Capacitive fringing effects of wall spacing to line edges are not included, as they depend upon line thickness. Wall to line-edge spacings on the order of one inch or greater for the thicknesses listed will produce minimum fringing effects, and ensure reasonable graph accuracy. The graph is most useful in approximating line widths and overall enclosure dimensions during the first hardware iteration. Line-length requirements can be calculated by using formulas given in the text. It is worth noting that asymmetric line spacing in the enclosure, wall proximity, and supporting insulators all tend to lower effective line Z_o. Therefore, some cut-and-try will always be necessary before strip width can be finalized.



The secret to squeezing a high-performance amplifier into a small package lies in the novel doubly-hent plate line. Careful attention to spacing, shielding, and operating Q allows excellent efficiency and stability. A Teflon rod along the cold end of the plate line supports the output-coupling link. Greater detail of this and other features of construction will be presented in part II.



have been encountered. Some of their heating is a result of thermal transfer from the tube anode through the connecting strap. There is ample room in the tank area to parallel four of these capacitors if needed.

Tube Types

For designs where a high Q_L is unavoidable (or intentional), special consideration must be given to the tube type used in the amplifier. Those with ceramic insulation are proven stable performers as they can handle heavy rf current on their seals, if it is properly distributed around the tube. Use of the chassis as one of the major strip-line, ground-plane surfaces helps ensure this distribution. The 3CX1500A7/8877, in a cathode-driven configuration, was chosen for operation in this 2-kW PEP amplifier based on the author's past experience with the tube. Cathode drive allows the use of moderate excitation power and helps assure stage stability, as the tube grid in this triode is grounded directly to the chassis. Like most external-anode tubes in general amateur use, it offers a low profile for compact packaging and lends itself well to mechanical connections necessary for transition to air-dielectric, strip-line inductive elements.

TABLE I

Operating Data: 50 MHz Strip-Line Amplifier

P_{in}	1000 W	2000 W
E_b	2700 V dc	2700 V dc
I_b (idling)	0.075 A*	0.075 A*
I_b(single-tone)	0.370 A	0.740 A
Egrid**	−12 V dc	−12 V dc
I_{grid}	8-10 % I_b *(single-tone)*	8-10 % I_b *(single-tone)*
P_{drive}	20 W*	40 W*
P_{out}	590 W	1230 W
Efficiency (apparent)	59 %	61.5 %
Stage gain (apparent)	14.7 dB	14.9 dB
Resonant Load Impedance	4000 ohms*	2000 ohms*
Operating Q	40*	20*

* - approximate values

** - bias derived from 1N3311 Zener diode in cathode lead.

Tuning Arrangement

Parasitic-free operation is enhanced by vane-type tuning capacitors of negligible inductance. There are no leads between the tube anode and the strip-line inductor, including the plate-blocking capacitors, that are not an active part of the operating circuit. In hf amplifiers the interconnecting leads between tube and tuning capacitor, as well as parasitic inductance associated with tuning capacitors themselves, can and do form potential oscillatory circuits whose effects must be suppressed. These conditions are not evident in this amplifier.

An input circuit using recognizable *L/C* techniques, in the form of a low-Q network, matches the amplifier to the exciter. The objective in tuning the cathode circuit is to provide a reasonable match to the exciter, thereby reducing IMD, and not necessarily to achieve maximum power transfer to the tube. Most exciters in the 200-watt PEP class are capable of overdriving this amplifier unless operating conditions are closely monitored. An alc circuit could be incorporated, if desired.

Cooling

An important consideration, not to be overlooked in designing around air-cooled external-

Fig. 3 — Schematic diagram of the 50-MHz amplifier. More construction details will be provided in Part II.

B1 — Blower; Dayton 2C781 with 3-13/16 inch dia wheel. Shroud is removed before installation in amplifier chassis. Dayton products are available from W.W. Grainger nationwide outlets (wholesale) and from Barry Electronics, 512 Broadway, NY 10012.

C1 — Hammarlund APC-140-B.†

C2 — Hammarlund APC-140-B modified to 12 rotor and 12 stator plates.

C3, C4 — Vane capacitors. See Fig. 4, part II and title photograph.

C5 — Johnson 149-5, modified to 4 rotor and 3 stator plates for 50 pF maximum.

R1 — Two 7500-ohm, 2-watt, carbon resistors in series.

R2 — Meter multiplier resistor, approximately 5 megohm. Nine 510k, and one 430 k Ω 2-watt carbon resistors in series. Trim 430 k Ω value to calibrate meter at about 2500 V dc.

R3 — 25kΩ low-wattage linear potentiometer.

L1 — 8T No. 18 tinned, 1/2-inch diameter, 7/8-inch long.

L2 — 8T No. 18 tinned, 1/2-inch diameter, 5/8-inch long.

L3 — Strip-line element. See text and Fig. 3.

L3,L4 — Stripline element and output link. See construction text and photographs.

RFC1 — 19T No. 20 Formvar coated, closewound on a 1-Ω 2-watt carbon resistor.

RFC2 — 56T No. 20 Formvar coated, closewound on 1/2-inch dia. Teflon rod, cut to fit in dc compartment.

RFC3 — Bifilar wound, 22T in each line, No. 12 Formvar coated, 3-1/4 inches long on a 1/2-inch dia, 4-inch long porcelain insulator.

All .001/5KV capacitors are Centralab 858S-1000. Substitutes *not* recommended.

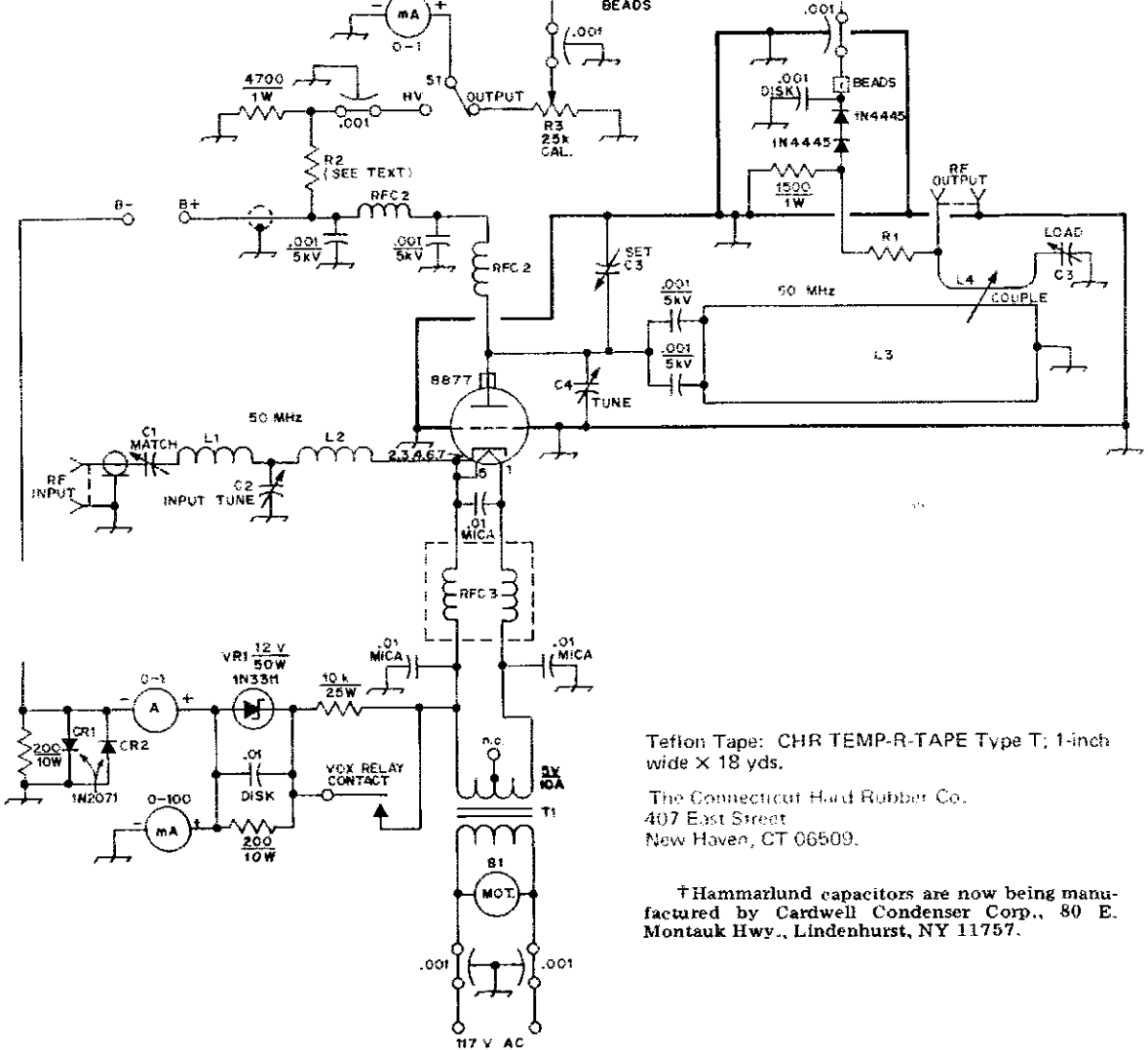
All .001 feedthrough capacitors are Erie 327-005 X5U(102M or equivalent, 500 WVDC.

Plate circuit enclosure: Bud AC-428, 13 × 17 × 4-inc chassis.

Input circuit enclosure: Bud AC-420, 13 × 17 × 3-inch chassis.

Bottom Cover: Bud BPA-1598.

Relative-output-meter enclosure: LMB Type MOO.



Teflon Tape: CHR TEMP-R-TAPE Type T; 1-inch wide × 18 yds.

The Connecticut Hard Rubber Co.
407 East Street
New Haven, CT 06509.

†Hammarlund capacitors are now being manufactured by Cardwell Condenser Corp., 80 E. Montauk Hwy., Lindenhurst, NY 11757.

anode tubes, is the amount of cooling air required for the operating frequency and desired power level. The blower specified provides up to 50 cfm air delivery at 0.7" static water pressure. This is in excess of tube requirements for full 1500-watt, anode-dissipation rating under normal ambient (25°C) air-input conditions. The tube heater transformer and cooling blower are on the same primary line so that, when the bottom cover is in place, the tube heater cannot be activated without air flow through the chassis cut-out area and tube anode fins. A small amount of air is bled from the pressurized bottom chassis into the line trough near the shorted end of the line. The purpose of this flow is not so much to cool the line, as to provide a positive flow in the trough, avoiding a buildup of hot air. A homemade Teflon chimney, between the tube anode and perforated portion of the top cover, concentrates exhaust-air flow from the anode directly upward through the cover. This minimizes the amount of exhaust air distributed in the plate compartment as a result of turbulence. Air-flow holes in the chassis and strip-line trough wall are clearly visible in the photographs, as is the Teflon upper chimney.

Metering and Bias

There is nothing unique about tube-metering and biasing methods. A 12-volt, 50-watt Zener diode in the cathode dc-return lead provides operating bias, while a 10 k-Ω resistor in series with the diode essentially cuts off the tube during receive periods. No tube shot noise is generated. This resistor is shorted out on transmit by means of a spare set of contacts on the VOX relay. CR1 and CR2 shown in the schematic diagram protect the meters from voltage transients. If either of these diodes shorts, grid-meter operation will be incorrect, and readings will be considerably low.

Capacitive decoupling is performed on all leads entering and leaving the pressurized area, except for the high-voltage lead. Plate voltage is carried by the center conductor of a length of RG-59/U cable. The cable shield is grounded at both ends via coaxial hoods, and effectively prevents unwanted coupling between the input circuit and plate-voltage line. RG-59/U is useful up to at least 5 kV in dc applications.

The unpressurized compartment contains tube-biasing and metering components which are shown on the schematic diagram, as well as a small relay and power supply which are not. They are parts of external control circuitry which may or may not be desired by the builder.

In the second part of this article we will present construction techniques used to convert these ideas to high-performance hardware. Sufficient detail will be provided to enable the experienced builder to assemble and operate the amplifier with, hopefully, a minimum of difficulty. QST

Part II will appear in a subsequent issue of *QST*.

References

[1] "Grounded Grid 50-MHz Amplifier," 1973 ARRL *Handbook*, page 219; also in subsequent editions. First described in *QST* for November 1970.

[2] Knadle, "A Strip-line Kilowatt Amplifier for 432 MHz," *QST*, April, May 1972.

[3] Meade, "A 2-kW PEP Amplifier for 144 MHz," *QST*, December 1973, January 1974.

[4] Gridley, "A Coaxial Line Amplifier for 50 Mc," *CQ* May 1964.

[5] Terman, "*Radio Engineers' Handbook*," First Edition, 1943, page 192.

Strays

Break-Break-Break! Letter asks if the "break" procedure so commonly used in voice circuits has ever been adopted by ARRL, and if so, in what context? That is, what does "break" and its multiples mean?

Well, no, the League has never "adopted" it, although its existence has been mentioned on at least one occasion. Trouble is, its use isn't really standardized. Perhaps it should be. Our correspondent observes that the following appears to be the usual meanings attributed:

"Break." Lemme in, please.

"Break-break." I need in on a priority basis.

"Break-break-break!" Emergency!

But then you occasionally hear someone using a multiple break just to get into a conversation or attract attention on a repeater for no urgent reason, or some clown says "breakety-break" and the whole issue is beclouded. Shouldn't we have a standardized emergency calling system? Our correspondent suggests just "Emergency."

We can see some of you throwing up your hands and saying "Here we go again!" Emergency calling has been discussed in this or the Public Service column many times. At one time we used QRR as the standard ARRL "land SOS," then changed it to QRRR when the predecessor of ITU adopted QRR for something else. Still later, "CQ Emergency" was adopted for voice. We eventually had a poll on the subject, and the result showed that most favored the standard ITU "SOS" for cw and "Mayday" for voice. So we dropped the matter. But still the use of the "break" system prevailed on many amateur circuits.

When someone says "break" on a net or repeater frequency, he invariably means just what the word signifies – that he wants to "break in" to the conversation. What he means when he used a double or triple break, if anything other than the above, varies from net to net, from repeater to repeater. The ARRL procedure for an emergency call is "SOS" (didididahdahdahdididit) on cw, "MAYDAY" on phone. – *WINJM*

Want your *QST*/ARRL membership to continue without interruption at renewal time? Then don't wait until a few days before expiration to renew. If you renew within two or three weeks after receiving your first notice of expiration, *QST* service will be continuous. Overseas members can insure similar continuity by renewing promptly via airmail.

Semiconductors

(Continued from page 22)

Hookup and Adjustment

Disconnect the cable which runs from the output of the 2-watt module to the antenna connector. Connect the output of the 10-watt amplifier to the antenna connector, and the output of the 2-watt module to the input of the 10-watt stage using RG-174 or RG-58 cable. Connect a wire from the dc-input terminal on the amplifier board to the +V binding post on the rear apron. Attach a 50-ohm dummy load to the antenna connector and a regulated supply to the appropriate power terminals. The completed transmitter draws approximately 1.1 amperes from the power source. During initial tuneup the output of the transmitter should be monitored with the FET voltmeter and rf probe. Key the transmitter and adjust C24 for maximum output. R 8 on the buffer/amplifier board should be adjusted for a 17.5-volt reading on the voltmeter. This voltage corresponds to 6-watts output power. Spectral analysis revealed that the second harmonic was down 40 dB, and no significant spurious outputs were present anywhere in the spectrum – a clean transmitter indeed! QST

Micro - TO MK II

(Continued from page 31)

board. The rf bypass capacitors C1, C2, and C4 are mounted at the points where their leads enter the cabinet. C9 is mounted across the terminals of T1.

The circuit board is mounted with small angle brackets near the top of the enclosure. The speaker is mounted over a pattern of 7/32-inch holes. There are rubber grommets on the bottom plate to keep the keyer from sliding around and to raise it above the table so the sound can be heard; the whole box then acts as an effective baffle, and the down-facing holes do not collect dust. The speed and volume controls are mounted on the narrow end which does not have the seam. The output transformer, jack for the paddle leads, and output lead are on the rear.

Obtaining components in this time of shortages may be difficult. The CMOS integrated circuits are manufactured by RCA, Motorola, Solitron, Solid State Devices, etc. They are specified by C*x*400*yz*, where the *x* indicates the manufacturer, and the *y* and *z* the package type and environmental specs. Any *x*, *y*, and *z* will do. The high-voltage pnp keying transistor may present a problem; examples of RCA and Motorola types are specified. If your transmitter key-up voltage is only −100 V or so, you may be able to select a common 60 V BV$_{ceo}$ transistor to do the job. Any diode will do for CR2; CR1 is a power supply rectifier, since it needs to withstand the key-up voltage. Absolutely any npn silicon transistor will work at Q2. The keyer will run on anything from 3 volts to 15 volts, although it may be necessary to reduce the value of R9 if very low voltages are used. Below about 6 volts, the primary of T1 should have a lower impedance (e.g., about 100 ohms for a 4-V supply) in order to get adequate volume. A complete set of components was priced from the catalog of a single midwestern mailorder house; the keyer with monitor costs $28, complete with an allowance for hardware, wire, and Vectorbord. The version without monitor costs about $9 less.

Two versions of the keyer have been built, one which uses point-to-point wiring and includes the monitor, and another which uses a printed circuit board but has no monitor. The original breadboard unit has been in use at K3GJD for almost two years. The two final versions were used in two recent contests at that station.

I will be happy to correspond with anyone having difficulties with the keyer, or to answer any questions. I will be even happier if, when you write, you will enclose a self-addressed (and perhaps stamped) envelope. Of course, this is largely irrelevant, since everyone's Micro-TO MkII will work perfectly. QST

VHF Converters

(Continued from page 33)

application now in the process of being tried by WA3HMK.

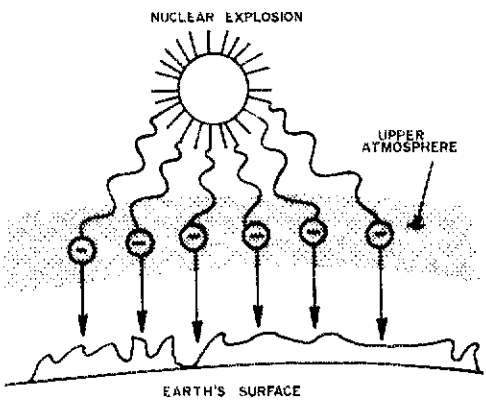
The circuit diagram is drawn in a manner that will illustrate use of feedthrough capacitors as tiepoints and bypasses. All the .001-μF capacitors are small ceramics of the FT type. The 500-pF capacitors are button-micas. Both types are often found as surplus. Each capacitor is shown in the compartment or partition in which it is mounted. All parts shown below the broken line are on the oscillator side of the partition. All above are in the rf portion.

The converter was checked in the ARRL lab and used in communication at W1HDQ. Sensitivity and gain were adequate for weak-signal work. Spurious responses, often a problem in simple converters of the oscillator-multiplier type, were conspicuous by their absence. The value of R1 should be adjusted for a current drain of about 5 mA, or for optimum noise figure. The original is 220 ohms, but higher values may be needed. C1 and the position of the tap on L1 should also be optimized for noise figure. Converter gain can be controlled by varying resistor values in the second stage. – *W1HDQ*

Strays

The Calgary Centennial Award 1975 is the special certificate for 1975 of the Calgary Amateur Radio Association. The special prefix CY will be used by Calgary amateurs for one credit each and by the 2 club stations, CY6AO and CY6NQ, for double credit. An Oscar contact is worth 4 credits. Any band or mode – only one contact per station. Send log data or questions to CC Award, Box 592, Calgary, Alberta T2P 2J2.

EMP and the Radio Amateur



BY DR. C. R. FISHER,* KØTYB/K4KGN, DR. D. B. NELSON** and P. R. BARNES**

WHEN A NUCLEAR weapon is detonated in or above the atmosphere, an intense electromagnetic field is created. This field, called the electromagnetic pulse or EMP, has been observed and measured in nuclear testing, but its significance has been veiled by military classification until recent years. The fact that EMP can damage radio equipment hundreds or thousands of miles away from a high-altitude detonation is of great importance to the radio amateur. His understanding of EMP and how to protect himself and his equipment from its effects could make him a vital asset to this country in the event of nuclear war. In this article we will provide information on the nature of EMP and its effects on radio equipment. We will also describe protective measures which recent research has shown to be effective against these effects.

What Is EMP?

When one thinks of a nuclear explosion, he usually thinks of the devastating effects of the explosion itself: the shock wave, the heat, the ground shock, and the nuclear radiation. Another phenomenon that may be of more importance under some circumstances is the generation of EMP. The sources of the electric and magnetic fields comprising EMP are electrical charges and currents produced in the detonation. These in turn are caused by gamma rays, high-energy photons which radiate from the explosion. (X-rays can also produce EMP, but they have a very short range in air and, hence, are important only for equipment in outer space.) When a gamma ray strikes an atom in the air, it knocks an electron free from the atom and drives it outward from the detonation in a process known as the Compton effect. Since the electrons are quite small they move outward more rapidly than the remaining large, positively charged portion of the atom. Hence a charge separation and an electric current are created.

What happens next depends on the location of the detonation. If it is near the earth's surface, the gamma rays and electrons causing EMP are absorbed within a few hundred or thousand meters depending upon the weapon yield. Inside this region the EMP is very intense, with the electric field exceeding 10^5 volts/meter and the magnetic field 100 gauss. The rise time for these fields is short, less than 10^{-8} second. But people and equipment within this region would be more affected by the blast itself than by EMP, unless they were in a very good blast shelter. A smaller EMP is radiated outside of this region, but its intensity is usually not large enough to cause any damage.

The real threat to amateur radio equipment comes from the high-altitude burst, greater than 50 kilometers (30 miles) above the earth's surface. At this height there is not enough air around the weapon to create local currents, and the gamma rays travel earthward unimpeded until they strike the atmosphere at a height of 20-40 kilometers. Compton electrons are then created in a huge pancake-shaped zone, its size limited only by the curvature of the earth. But instead of moving radially, as in the surface-burst case, the Compton electrons have enough range in the thin upper atmosphere to be turned by the earth's magnetic field. The resulting transverse currents act like an enormous sheet antenna and radiate large signals down to earth. The electric field reaches 10^4-10^5 volts/meter in 10^{-8} second or less and lasts nearly 10^{-6} second. Because the signal is generated over such a large area and propagates only a short distance, the EMP intensity is substantially uniform and can extend thousands of kilometers from ground zero, depending upon the height of burst. Why would anyone detonate a nuclear weapon at these altitudes? Our Spartan antiballistic missile is

* 108 Adelphi Road, Oak Ridge, TN 37830.
** Oak Ridge National Laboratories, Oak Ridge, TN 37830.

intended for use above the atmosphere, and there are reasons why an attacker might wish to detonate missiles this high, among them being the generation of EMP.

EMP should not be confused with the more widely known blackout. Blackout is the disruption of radio communication by regions of ionized air and debris from the explosion. Propagation through the ionized region is blocked by reflection and absorption for a few minutes to hours depending on the frequency of concern. Blackout cannot damage equipment and would be important only in cases where continuous radio contact was vital.

Effects of EMP on Radio Equipment

Although the generation of EMP may be mysterious to the radio amateur, its effects should be easily understandable. The changing electric and magnetic fields induce currents and voltages in any conductor exposed to them, just as radio waves do in a receiving antenna. But, the magnitude of these currents and voltage is much larger than those caused by radio waves, although shorter in duration, because the field strength of EMP is roughly a million times larger than a strong radio signal. The closest natural analogue to EMP is a direct lightning stroke, and EMP protective devices are similar to those used for lightning. The rise time of EMP-induced surges may be one hundred times shorter than lightning surges however, so very fast-acting devices are required.

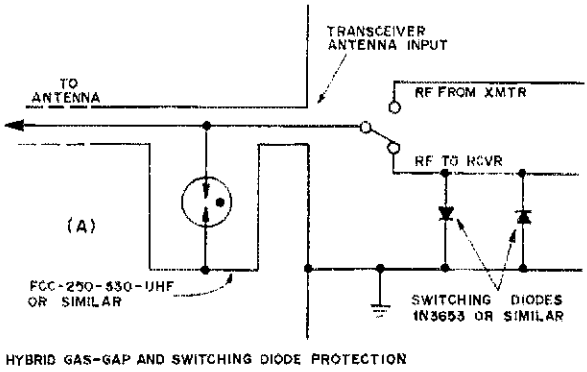
Table I shows the characteristics of surges in different conductors of interest to amateurs. As expected, the largest magnitudes are attained in long unshielded wires. Surge duration is not given because this depends very much on the wire length and termination impedance, resonances, and so forth.

The energy in a surge may be many joules, usually not enough to melt the wire, but enough to damage sensitive components attached to the wire. For example, experiments have demonstrated that vhf whip antennas on walkie-talkies can collect enough energy to destroy the front-end transistor unless special protection is provided. Since transistors can be destroyed by microjoules of energy, this result is not surprising.

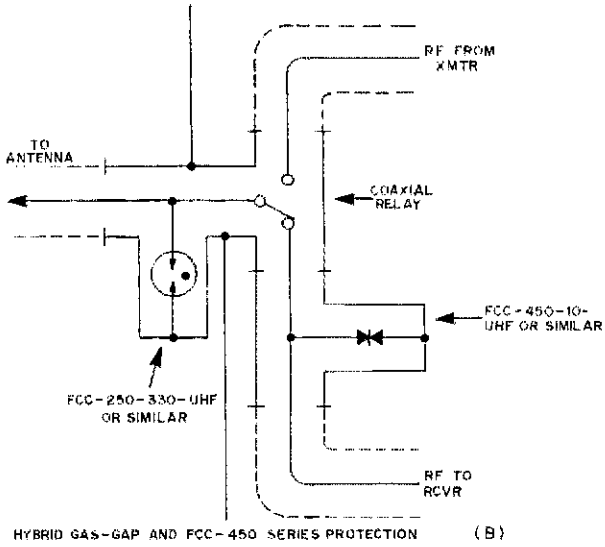
For amateur radio equipment the chief causes of damage would be energy collected by antennas, electric power lines, microphone and remote-control cables, or telephone lines. Enough shielding is usually provided by equipment cases so that the energy collected by the short wires inside will not cause damage. The components most likely damaged include transistors (especially FETs), ICs, diodes, and possibly low-voltage capacitors, inductors, vacuum tubes, and relays.

The direct danger to human life is small. The fields comprising EMP are, themselves, harmless, but it is possible that contact with an insulated wire such as an antenna lead or an electric fence could cause electrocution.

The main concern to radio amateurs is that a single high-altitude detonation could damage much of the radio equipment all over the country. Amateurs have a vital role in war-time emergency communications, just as they do during peacetime disasters. Damaged equipment is useless for communications, and replacement transistors cannot be manufactured in one's basement.



HYBRID GAS-GAP AND SWITCHING DIODE PROTECTION



HYBRID GAS-GAP AND FCC-450 SERIES PROTECTION (B)

Fig. 1 — Protection from EMP surges on the antenna.

Protective Measures

Radio amateurs should prepare against the EMP threat since their present lightning protection is probably not adequate for EMP. Antennas with direct-ground lightning protection and many others with standard antenna lightning arresters offer no protection

Table 1. EMP-Induced Surges on Conductors

Type of Conductor	*Rise Time (sec.)*	*Peak Voltage (volts)*	*Peak Current (amps.)*
Long unshielded wires (power lines, large antennas)	$10^{-8} - 10^{-7}$	$10^{5} - 5 \times 10^{6}$	$10^{3} - 10^{4}$
Unshielded telephone and	$10^{-6} - 10^{-5}$	$10^{2} - 10^{4}$	$1 - 100$
AC power line at wall plug	$10^{-7} - 10^{-5}$	$10^{3} - 5 \times 10^{4}$	$10 - 100$
HF antennas	$10^{-8} - 10^{-7}$	$10^{4} - 10^{6}$	$500 - 10^{4}$
VHF antennas	$10^{-9} - 10^{-8}$	$10^{3} - 10^{5}$	$100 - 10^{3}$
UHF antennas	$10^{-9} - 10^{-8}$	$100 - 10^{4}$	$10 - 100$
Shielded cable	$10^{-6} - 10^{-4}$	$1 - 100$	$0.1 - 50$

against EMP surges. Special EMP surge suppressors are required to handle the fast rising EMP-induced transients. EMP surge suppressors also provide additional lightning protection.

We recommend that the radio amateur install EMP surge suppressors in the antenna and 120-V ac power circuits. A gas-gap diode in a coaxial tee such as the Spike Guard FCC-250-320-UHF, manufactured by Fischer Custom Communications, should be installed in the antenna feed line for all radio equipment with transmitter powers up to 300 watts. Fischer Custom Communications should be consulted concerning the Spike Guard suppressor compatible with equipment that has greater than 300 watts of output power. For solid-state equipment, a hybrid gas-gap and switching diode protection circuit as shown in Fig. 1A should be used. For equipment with a coaxial transmit-receive relay, the semiconductor portion of the hybrid protection can be provided by a Fischer-made coaxial tee device FCC-450-10-UHF as shown in Fig. 1B.

Experimental tests have shown the effectiveness of these transient suppressors. Fig. 2A shows a typical EMP voltage transient received by a vhf

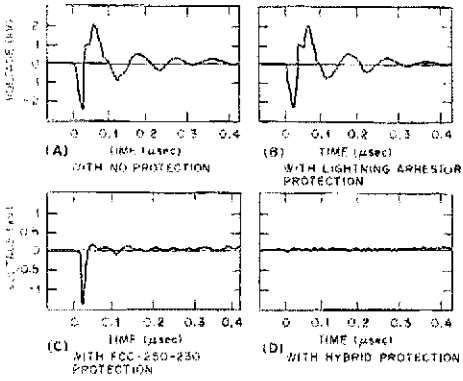


Fig. 2 — Typical EMP response of a vhf gain antenna connected to a receiver with various levels of protection.

10-dB-gain antenna. The standard "air gap" lightning arrester provides no protection, as shown in Fig. 2B. With the FCC-250-230 in the circuit, the initial voltage spike is clamped to about 1200 V and then suppressed as shown in Fig. 2C. The hybrid circuit is the most effective EMP surge suppressor, as can be seen from Fig. 2D. The semiconductor diodes in the hybrid circuit suppress the overshoot spike associated with the gas gap in the FCC-250-230 suppressor.

The hybrid approach can again be used to achieve good protection against EMP-induced power-line surges. A gas-gap diode such as the Joslyn P/N 2301-07 can be connected in parallel with a metal oxide varistor (MOV) such as the G.E. V13QLA1OA to form the hybrid protection. This hybrid circuit should be connected between the 120-V line and chassis ground. A similar arrangement, packaged as a convenient plug-in device, is the FCC-120-P made by Fischer. It should be plugged into the same wall receptacle being used by the radio equipment.

In addition to providing EMP surge protection for their present equipment, radio amateurs can also retain their old outdated equipment for use as emergency back-up communications. The back-up equipment should be stored in an out-of-the-way place and disconnected from the antenna and power line. When in use, this back-up equipment should also be protected by EMP surge suppressors.

The cost of EMP protection is estimated below:

Many of these devices can be purchased in the local parts store. If you have trouble finding them,

Number	*Item*	*Cost*
1	FCC-250-230-UHF	$24.00
2	Switching Diodes	7.00
1	FCC-120-P	6.00
	Total	$37.00

you can write to the manufacturer.

The Spike Guard coaxial tees can be obtained from Fischer Custom Communications, Box 581, Manhattan Beach, CA 90266. The 1N3653 switching diodes can be obtained from several manufacturers; among them are: ITT Semiconductors, 3301 Electronics Way, West Palm Beach, FL 33407, and Transistron Electronics, 168 Albion Street, Wakefield, MA 01880.

The P/N 2301-07 is a Joslyn gas gap for 120 VAC power-line applications. You can obtain it by writing: Joslyn Electronics Systems, P. O. Box 817, Goleta, CA 93017, and the G. E. MOV can be obtained by writing: General Electric, Semiconductor Products Department, Electronics Park, Syracuse, NY 13201.

It is our hope that the information presented will convince amateurs to spend a few dollars to add EMP and vastly superior lightning protection to their rather costly equipment. If clubs can pool their resources and make quantity orders, or if amateur radio vendors would make quantity purchases, the individual item costs could be greatly reduced, since the items are now priced on an individually produced basis primarily for research needs. The manufacturers listed can provide this information. QST

NEW BOOKS

Transistor Circuit Design, by Laurence Cowles, published by Prentice-Hall, hard-cover student edition, 6-1/4 × 9-1/4 inches, 344 pages including index, price $12.

"The practice of circuit design should begin with audio-frequency circuits that do not require either very high or low frequencies. With increasing experience the designer will apply his understanding of temperature problems, feedback, drift, runaway, and other problems. The designer will find these topics in this book in sufficient detail for everyday circuit design." The foregoing quotation from Chapter 1 of Cowles' book practically constitutes a book review, and indicates the general nature of the text – easy to understand. "Everyday circuit design" is what amateurs are concerned with the most. This reviewer has seen many technical books which were written on the subject of solid-state theory and design. Not too many of them are suitable in a general sense for study by amateurs who lack a formal education in electronics. As a matter of fact, some of the books are almost beyond the comprehension of *professional* engineers, mainly because the writers don't know how to tell their stories without obscuring the facts in paragraphs structured with fancy terms and yard-long equations. This unfortunate trend in technical writing is seen in the *IEEE Proceedings* also, so it is noteworthy when an author who knows his subject can discuss it in plain language. *Transistor Circuit Design* qualifies as one of the better books for technically minded amateurs (and professional people as well).

There is treatment of amplifier design, with detailed data given on the various classes of operation. Valuable information is supplied for those wanting to learn about operating transistors in the three typical modes – common emitter, common base, and common collector. Additional data are given respective to interstage network design, af and rf. Gain-impedance relationships are discussed in depth. Problems are given at the end of each chapter, and practical assignments are listed for those who wish to apply the knowledge gained from studying the text.

Math is practically obtrusive by its absence. The equations which are introduced through absolute necessity are few in number, and should be "duck soup" for any reader who has a knowledge of high-school algebra. The reviewer recommends this book to those who want to learn sugar-coated theory about transistors. Its scope reaches beyond that of the *Handbook*, thereby making it a useful adjunct to most of the books an amateur might have in his library.

Handbook of Electronic Components and Circuits, by John Lenk, published by Prentice-Hall, hard cover, 6-1/4 × 9-1/4 inches, 216 pages including text, price $12.95.

This is another of the Lenk books which was written for the ordinary man . . . not for a Phd. or ME type reader. The book includes basic design data on unijunction transistors and FETs. Most of the book is devoted to FET applications, and it provides valuable information on insulated-gate FETs as well as junction types. Treatment is given to af and rf amplifier design, oscillator circuits, and dc-amplifiers, all of which use field-effect transistors.

It is refreshing to find simplified equations for arriving at workable parameters. Unlike many of the present-day technical books, this publication does not contain two or three pages of complex equations for use with each basic circuit configuration. It is pleasing to note also that ordinary language is used to render the almost-rule-of-thumb approach used by the author to explain biasing and such matters in design work. The writer does not appear to be in competition with other authors with respect to which one can grind out the loftiest of explanations or employ the all too common mumbo-jumbo found in some writings. A radio amateur should have no difficulty learning design techniques from Lenk's presentation. Some of our modern-day technical writers could learn a valuable lesson by studying the writing style of the author of this book!

Amateurs who want to learn semiconductor theory, and who plan to do their own circuit design, should find this book well worth the price. It is considered a valuable addition to this writer's technical library. – *WICER*

Strays

Remember the "Let's Talk Transistors" series by Robert E. Stoffels, WB9ESH? We've put together a reprint booklet of this 9-part transistor primer, and it is available from ARRL for $1 including postage.

Hints and Kinks For the Experimenter

A HIGH-CURRENT, LOW-VOLTAGE REGULATOR FOR TTL CIRCUITS

While many amateurs are now using integrated-circuit voltage regulators, an external current-boosting (a series-dropping element) pass transistor is usually required to increase the regulator current capacity. Normal current-controlled regulator schemes, however, require additional active devices to duplicate some of the worthwhile safety features of the regulators – i.e., short-circuit protection, safe-operating-area protection and thermal shutdown.

Here is a regulator circuit which retains these safety features through a current-sharing design. This regulator, intended for TTL circuits, has an output of 5 volts at 5 amperes, and typical load regulation of 1.4%.

R1 and R2 provide the necessary current division (assuming the transistor base-emitter voltage equals the diode drop). The voltage drops across R1 and R2 are equal, and the currents through R1 and R2 are inversely proportional to their resistances. In this circuit, R1 has four times the current flow of R2.

For reasonable values of beta, the transistor emitter current will approximately equal its collector current, while the current through R2 will equal the current through the regulator. Under overload or short-circuit conditions, the protection circuitry of the regulator not only limits its own output current, but that of the external pass transistor, too.

Thermal overload protection is extended to the external pass transistor when its heat sink has at least four times the capacity of the regulator (this is because both devices have almost the same input and output voltage and share the load current in a 4:1 ratio).

For optimum current sharing between the regulator and the transistor as a function of temperature changes, the diode should be located physically near the pass transistor so its heat-sinking arrangement keeps it at the same temperature.

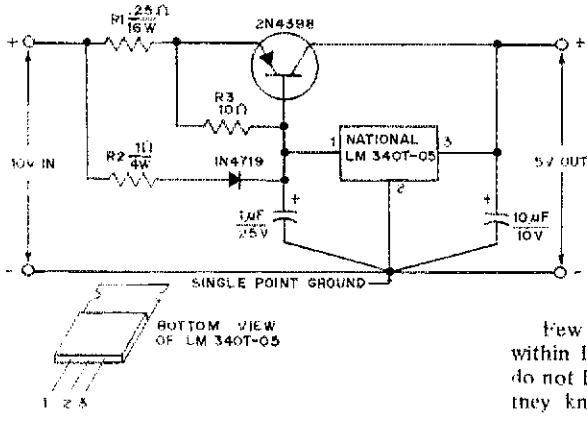
If the National LM340T regulator is used and mounted on the same heat sink as the transistor, the regulator should be electrically isolated from the heat sink, as its case (pin 3) is at ground potential while the case (collector) of the transistor is at the regulator output potential.

C1 prevents unwanted oscillations, while C2 improves the output impedance of the overall circuit. R3 is used to "unload" the excessive charge in the base region of the pass transistor when the regulator suddenly goes from full load to no load. The single-point ground system allows the regulator sense terminals (pins 2 and 3) to monitor load voltage directly, rather than at some point along a possibly resistive ground-return path which may be carrying up to 5 A of load current. – *William R. Calbo, K9ASL/8*

CALIBRATING A DC VTVM OR FET VOM

A VTVM or FET VOM can measure voltages quite accurately primarily because their input impedance is very high, which allows only a small amount of current to flow through them. In most cases they present such a light load to the circuit being measured that the voltage they indicate is almost the same as the actual voltage which would be present in the circuit without the added load of the meter. To take advantage of this accuracy the meter calibration should be checked periodically.

The usual methods for checking the calibration of these instruments are by comparison with another meter of known accuracy or by comparison with a source of emf whose potential is known. The standard of comparison should have an error which is appreciably less than that of the instrument to be calibrated. For example, the dc ranges of a VTVM with an inherent accuracy of ±2% should be calibrated with a cell whose potential is known to within ±1%, if not closer. Errors may accumulate, so the overall accuracy of the instrument would then be ± 3%. It would be within ± 2.25% if the cells voltage were known to within 0.25%.



Few batteries, however, can be trusted to be within 1% of their nominal voltage, and most hams do not have access to another meter much less one they know to be accurate to within one or two

percent! The calibration instructions for Heathkit's popular VTVMs call for setting the meter to a point on the scale corresponding to 1.55 volts while measuring a fresh, size-C flashlight battery. But the ubiquitous flashlight or transistor battery is one of the least stable sources of emf. These types of batteries may present an open-circuit voltage between 1.5 and 1.68 volts. This is a possible variation of −3.4% or +8.4% from the nominal 1.55 volts of a fresh battery. Of course high accuracy laboratory standards are available, but they are prohibitively expensive sources for some amateurs.

Probably the best readily available voltage source for calibrating the dc ranges on a VTVM or FET VOM is the popular PX-13. These batteries are commonly used in photographic exposure meters and cameras. Most photographic stores stock them and ought to have a reasonably fresh supply since they are so widely used. The open-circuit voltage of an unused PX-13 is nominally 1.35 volts, and in fact about 85% of the batteries tested in one manufacturer's laboratories had a potential of 1.35 volts. The rest of the units ranged from 1.34 volts to 1.36 volts. But even this variation (exhibited by only 15% of the batteries tested) is only ±0.74%. The tests included batteries just off the production line as well as ones which had been stored up to a year.

To calibrate the dc ranges of your VTVM or FET VOM, use only a new battery – one which has never been subjected to any appreciable load. Check the meter to make sure the mechanical zero is adjusted correctly, then turn the instrument on and allow it to warm up until stabilized. If there is a front-panel "zero adjust," set it so that the meter reads zero. Hold the probe tips to the PX-13 and adjust the dc-calibration potentiometer so the meter needle reads 1.35 volts on the range which gives the greatest needle deflection at that potential (usually the 1.5-volt scale). Remove the probes and zero the meter if necessary, and then repeat the calibration procedure. – *Daniel A. Gomez-Ibanez, WB9ICI*

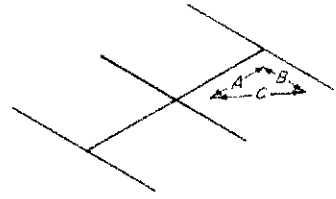
CALCULATING ANTENNA TURNING RADIUS

Crowded living in the world today sometimes makes it necessary for the amateur to know if the turning radius of an antenna will permit rotating it in a limited space. As can be seen in the accompanying sketch, A is the longest (or at least half) part of the boom extending out from the mast or tower, B is one-half of the reflector length, and C is the turning radius. In other terms, C is the hypotenuse of the right triangle formed by A and B. You may remember from high school math that C equals the square root of $A^2 + B^2$. Or $C^2 = A^2 + B^2$ is its usual form.

If you can't make the physical measurements for any reason, like not having the antenna yet, you will want to make sure it will fit your space before you acquire it. All you need to do is study the literature or advertisements, determine the boom length that is applicable to the formula and the length of the reflector, and you are in business.

For beams of various length booms, the following formula can be used:

$$\text{Radius in feet} = \frac{\left(\frac{\text{Boom length}}{2}\right)^2 + \left(\frac{\text{Reflector length}}{2}\right)^2}{}$$



3-ELEMENT YAGI ANTENNA

If your available space prevents installing a "standard" commercial antenna, there are a few tricks you can use. Mounting the Yagi vertically is just one; the turning radius resulting will be 1/2 the boom length. – *Robert Weinstein, K4KXR*

HW-202 OWNERS, BEWARE!

Do not use an antenna connector with a long center pin to plug into the antenna socket on the rear apron of the HW-202. I found out the hard way. The pin was just long enough to touch the printed-circuit-board foil that carries the 13.8 V dc to the receiver, causing the foil to open at that point. I jumpered the open circuit and changed the antenna connector to one with a short center pin. – *Bruce Rattray, VE3FCH/W1*

WINTERIZING VHF MOBILE ANTENNAS

Winter is once again around the corner, and for those who travel by car, that means driving through snow, sleet, and sanded and chemically treated streets and highways. Many hams now have vhf fm transceivers in their cars, and of course the antennas to go with them. This hint should help save you from possible aggravation later on.

Start by removing the mount from the car; completely disassemble the mount. Remove the coax and rinse the mount with hot water for about 10 minutes. After drying the mount thoroughly (use forced hot air such as that from a "hot comb"), check the antenna with an ohmmeter; infinity should be indicated without the coax connected. Reconnect the coax to the base of the antenna.

The most common cause of antenna problems in the winter is salt deposits forming inside the base of the antenna; therefore, some form of sealer should be used to prevent moisture and other foreign material from getting into the base of the antenna. I chose silicon sealer for use in my antenna.

For cleaning the antenna connectors or removing corrosion from the outside of the mount, a common household cleaner of the powder variety can be used. A toothbrush makes a good applicator and that, coupled with some elbow grease, will clean up the connector in quick time. – *Bill Horger, WB8SFZ*

• New Apparatus

MFJ ENTERPRISES CWF-2 FILTER

RC-active audio peak filters have taken the fore in recent months, aided by the availability and low cost of op-amp ICs. MFJ Enterprises sells such a filter, the CWF-2, for use in the audio channel of any conventional tube or solid-state receiver.

Two dual operational amplifiers, μA741s, are used in an RC-active peak-filter circuit. The center frequency is 750 Hz. Three bandwidths are available, switch-selected by the operator. The accompanying curves show the filter response in each switch position. In the maximum-selectivity mode there are four low-Q stages in cascade. This provides a very narrow bandwidth, high skirt rejection, and minimal "ringing."

The CWF-2 exhibits a high input and low output impedance. No matching is required to assure optimum performance. No distortion occurs when loads greater than 500 ohms are used. Low-impedance loads, such as that presented by an 8-ohm speaker, cause some distortion, though not enough to impair the copy of cw signals.

Any dc operating voltage from +6 to +30 can be used to power the filter. The current taken will range between 2 and 8 mA, depending on the applied voltage.

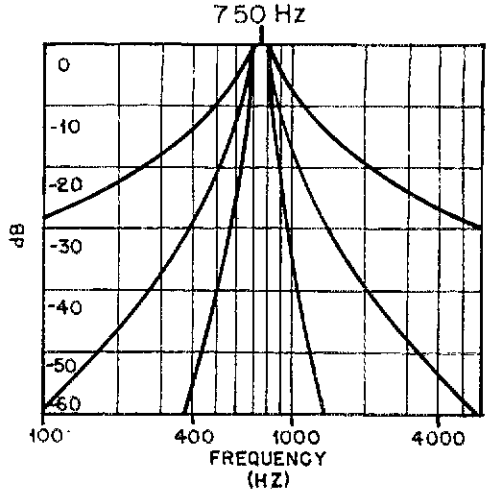
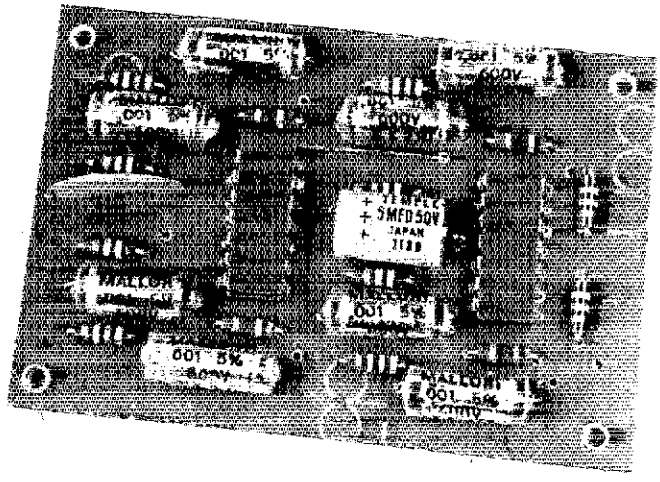


Fig. 1 — Response characteristics of the CWF-2 audio filter.



High-performance filters of this kind are useful to cw operators who have receivers which are equipped with a-m or ssb filters only. The CWF-2 can be installed in the audio section of the receiver between the detector and first af amplifier, and this is the recommendation made by the manufacturer. The unit can, however, be inserted between the output of the receiver and headphones or a speaker. There is no insertion loss with this filter. As the bandwidth is made narrower by switching in additional sections of the filter, the gain increases. The gain typically will be 1.2, 1.5, or 2.4 dB, depending on the degree of selectivity used. Input impedance is 680,000 ohms. The output impedance is less than 2 ohms. The Q of each filter section is 4.

Our tests were conducted after installing the CWF-2 in a Heath HW-7 QRP transceiver. The receiver section of the equipment uses the direct-conversion concept. The m-derived audio low-pass filter used in the HW-7 provides less than adequate cw selectivity for the "serious" cw enthusiast. That is, digging the weak signals out of the QRM is difficult if not impossible with selectivity of the kind provided in the simple receiver. The CWF-2 was installed between the output port of the existing filter and the input terminal of the audio-amplifier IC. A single-pole, four-position slide switch was provided with the filter kit, and it was installed on the rear apron of the transceiver cabinet. (The switch enables the operator to bypass the filter, or to select any of the three levels of selectivity available.)

It was astonishing to observe the improvement in receiver performance after the modifications were made. Signals that could not be read because of QRM were suddenly "QS." Weak signals that were well down into the noise could be "pulled up" and copied perfectly. No evidence of audio instability or distortion was noted.

Filters of the RC-active variety, exhibiting characteristics such as have been discussed here, should be equally effective when used with any commercially built or homemade direct-conversion receiver. A similar improvement in performance should be possible with superheterodyne receivers that are not set up for narrow-band reception of cw.

The CWF-2 is available wired ($12.95) or in a kit form ($9.95). Dimensions for the assembled unit are 2 × 3 inches. An etched circuit board serves as a foundation for the filter. Literature on

this and other MFJ filters can be obtained by writing to MFJ Enterprises, Box 494, State College, MS 39762. - *WICER*

QST —— QST —— QST

GENAVE TEL-ENCODER II

It's a bit difficult to tell from the photograph how small this gadget is. When the "pad" at the left is plugged into the shielded electronic package, center, the assembly measures only 2.1 inches high, 1.6 inches wide, and 0.65 inch deep. It weighs a skimpy 2 ounces.

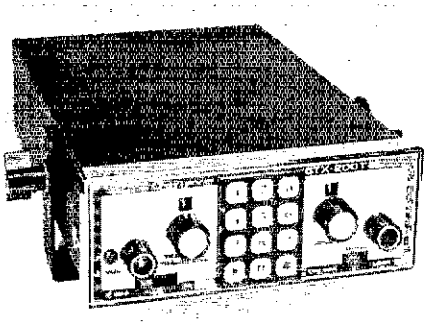
The Tel-Encoder II is a complete, two-tone, telephone-encoded audio generator which uses two dual operational amps and two other ICs. It produces the "telephone standard" two-tone signaling necessary for most fm repeater autopatch circuits.

This device will operate from any 7- to 30-volt dc power source and has a current drain of about 20 mA at 10 V dc. Output is 0.25 V rms minimum, with less than 0.1 volt peak noise and ripple. The frequency stability is rated at plus or minus 1 percent maximum 0° *C* to 50° *C*, 7 to 40 V dc.

When attaching the pad to a panel with a thickness of less than 0.06 inch, the mounting plate shown at the right in the photograph is not used. It can be used as a template for drilling the required holes, however. The shielded electronic package (center in the photograph) is mounted behind the panel with its two, furnished mounting screws. Because it is shielded, it may be located near the transmitter circuitry. The miniature Mylar keyboard is simply plugged into the socket from the front of the panel.

If the unit is to be mounted on a panel with a thickness greater than 0.06 inch, the mounting plate (right) is affixed to either the front or the rear of the existing panel and is used as a subpanel to mount the pad as described above.

A complete owners manual is furnished with the pad and it contains instructions, diagrams, and technical data on the gadget. The Tel-Encoder II is available from Genave, 4141 Kingman Dr., Indianapolis, IN 46226 and is in the $45 price class. - *Staff*

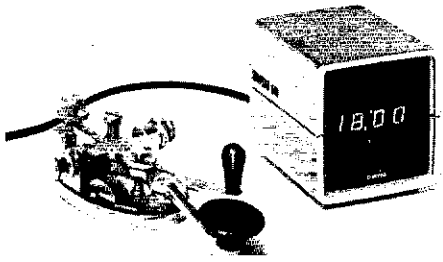


The TE-II Tel-Encoder is available as an integral part of the GTX-200[1] and the combination is called the GTX-200-T. By rearranging the location of the MODE switch and the HI/LO/OFF switch, the pad is mounted front and center on the panel. The 200-T also has a rear-panel jack for an external speaker, something the 200 didn't have.

[1] "Recent Equipment," March, 1974, *QST*.

QST —— QST —— QST

CORVUS CORPORATION ZULU 10 DIGITAL CLOCK



The Corvus Zulu 10 is small enough to place anywhere in the equipment lineup and includes a ten-minute reminder feature.

One of the more exciting results of the solid-state era is the compactness of some of the most sophisticated devices. This compact-size design is making its way into nearly every amateur station. Electronic clocks and keyers have become very popular. The Corvus Corporation has developed a clock that is small in size but contains features not found in many of today's electronic digital clocks.

The Zulu 10 can be placed almost anywhere in the equipment lineup. Its size is that of a 2-1/2 inch cube. The display has four numeric LED readouts and a pulsing "second hand" LED lamp. All of the characters are red. The control circuitry is located at the base of the clock. Two push buttons are used for the three time elements. One button controls the hour advance; the other controls the ten-minute display of the clock. Advancing the minutes is accomplished by pushing both buttons at the same time. The seconds count is reset to zero when the minute display is advanced. Thus, when calibrating the unit to a time standard such as WWV or CHU, the clock is set for the proper time minus one minute. At the start of the next minute, both buttons are pushed momentarily and the minute digit is then advanced to correlate with the correct time, to the second.

A three position slide switch at the base of the clock controls the built-in ten-minute timer. A

(Continued on page 134)

Restructuring

ARRL Files Counterproposal — Retention of privileges, strengthening of present structure are basic to League's recommendation.

BY DAVE SUMNER,* K1ZND

ON JULY 16, the General Counsel of the ARRL, Robert M. Booth, Jr., W3PS, delivered to the Federal Communications Commission the League's comments on and counterproposals to the FCC's restructuring scheme, Docket 20282. This was the culmination of hundreds of hours of work by the League's officers and staff in which the strongest possible case for the League plan was constructed by re-examining every conceivable argument, both for and against it. The resulting document contains 125 pages, including 42 pages of appendices.

It would have been impossible to print this much material in *QST* without eliminating nearly everything else for the month, so instead the complete document was immediately sent to the League's officers, directors, assistant directors, section communications managers, and affiliated clubs for further dissemination. For those members whose interest is not satisfied by the following summary report, a limited number of additional copies are available from headquarters for a 9-by-12-inch self-addressed envelope bearing $1.10 in postage.

The ARRL consensus position on restructuring was arrived at by the Board of Directors at its May 15 meeting after thoughtful consideration of the results of the membership survey in which 56,000 members participated. Members' comments outside the survey framework and the recognized future needs of the Amateur Radio Service were also given due weight. The survey and the Board proceedings were discussed at length in July *QST*.

Everyone involved in drafting the League's comments in Docket 20282 was keenly aware of the importance of the filing to the future of amateur radio, so no one was satisfied with the first or second, or sometimes even the third, draft of a paragraph. It was also apparent that, as the document became longer, fewer and fewer people at the Commission could have time to read it. This meant that a conscious effort had to be made to say the most in the fewest possible words, including eliminating some weak or complex arguments so as not to detract from the impact of the stronger, simpler ones. The filing was organized so that the table of contents itself effectively summarizes the League's arguments, the first few pages outline the basic philosophy and give a broad outline of the League's position, and a single page in the appendix presents the relevant details.

Here is a summary of the League's comments and counterproposals on restructuring:

I. *Introduction.* For more than 60 years, the American Radio Relay League has been the principal spokesman for the radio amateurs of the United States. It has accumulated a wealth of experience at the national and the international levels; its membership is the greatest pool of amateur radio expertise available, and its activities embrace every phase of the service. The League is the appropriate organization to comment on the proposed restructuring.

The following are considered the most significant of the Commission's proposals:

(a) Revision of the concept and scope of examinations to relate requirements to privileges more closely than ever before;

(b) Withdrawal of certain privileges now available to the General, Conditional, and Technician Classes;

(c) Introduction of a "dual ladder" licensing structure with separate licensing for frequencies above and below 29 MHz;

(d) Creation of a new entry class with minimal requirements, permitting only fm telephony emission on all amateur frequencies above 144 MHz.

The League favors some revision and improvement of the present license structure; however, it most strongly submits that the restructuring proposal of the Commission, while idealistic in its goals, is so unrealistic and potentially divisive as to be unworkable. The League supports, albeit conditionally and with a measure of trepidation, the creation of a new entry level amateur license for *limited* vhf operation *only*.

II. *The general rationale of the League's recommendations.* For reasons not fully apparent from the Notice of Proposed Rule Making, the Commission has stated that a "new licensing system" should be created based on the "relationship between the qualification requirements and the operator privileges authorized at each license class level." The League supports the established principle of relating operating privileges to license examination levels, *but only if implemented on a very broad and general basis.*

Even though the Commission states, "We desire to preclude or at least minimize, any adverse

* Assistant Secretary, ARRL.

impact upon presently licensed amateurs," even a cursory analysis of the proposal discloses a most substantial adverse impact upon General, Conditional, and Technician licensees. Amateurs are united in their opposition to a loss of privileges by existing licensees.

After careful and considered examination of the dual ladder license structure proposed by the Commission, the League concludes that a more moderate revision of the present structure will meet every reasonable objective of the Commission's proposal while avoiding its objectionable features. The League shares the often-expressed views of FCC Chairman Richard E. Wiley and other Commission spokesmen that over-regulation must be avoided and de-regulation should be encouraged. Instead of simplifying the amateur license structure, the Commission's proposals would have just the opposite effect and would lead to more, not less, regulation.

The League shares the Commission's objective of encouraging growth of the Amateur Radio Service. However, the Commission's proposals unnecessarily subordinate *quality* to *quantity*. Unless adequate safeguards are provided, the establishment for the first time in the United States of a codeless class of operator license will cause the overall quality of amateur radio to suffer. Amateurs are concerned that the lawlessness which has made a shambles and disgrace of the Citizens Radio Service not be transplanted into the Amateur Radio Service, whose record of self-discipline and self-regulation is based on *every* operator having to *work for* and *earn* a license. It is absolutely essential that this requirement be continued.

"The restructuring proposal of the Commission, while idealistic in its goals, is so unrealistic and potentially divisive as to be unworkable."

III. *More closely relating qualification requirements and operator privileges is undesirable and unnecessary.* The principle of relating qualification requirements and operator privileges discussed in paragraph 7 of the Commission's Notice of Proposed Rule Making (page 76, *QST* for February 1975) is central to its proposed dual ladder structure. Experience has shown that *closely* relating requirements and privileges is unnecessary for the healthy development of amateur radio; as new techniques have come along, amateurs have successfully utilized them without submitting to new examinations. In fact, one of the vital dimensions of amateur radio is that most of its licensees are able to experiment and operate in widely separated parts of the spectrum and with new modes without first seeking additional authorization. The history of amateur radio is replete with examples of persons who found their first interest in one frequency range and one mode and were later attracted to another part of the spectrum and another mode. The Oscar satellite program is currently the best illustration of this phenomenon. If amateurs interested primarily in high-frequency communication had had to apply for additional licenses to use the Oscar satellites, the growth of the amateur satellite program would have been severely retarded. Amateur radio has reached its present high level of technical excellence under a licensing philosophy based upon *learning by doing*. The Commission's proposals would shift the emphasis to a new, unproven principle of learning only by study. Examinations cannot keep pace with technological developments, nor should they be expected to. The primary purpose of licensing is to ensure that the operator is sufficiently skilled that he will not cause interference to other users of the radio spectrum. Of almost equal importance is the promotion of self-regulation and self-policing. The sweeping changes proposed by the Commission, which apparently assumes that the conquering of new frontiers must be preceded by an examination requiring study and demonstration of knowledge of those frontiers, are unnecessary and undesirable.

IV. *Loss of privileges by 91% of all licensed amateurs would be a breach of faith and would produce no commensurate benefits.* Although the privileges proposed to be withdrawn from present licensees to establish the dual ladder structure could be reacquired by purchasing an additional license, other privileges – especially those of Conditional, General, and Technician licensees – would be available only upon re-examination for a higher grade of license. Nearly all of the present Technician and Conditional licensees would lose the right to renew, which would work a great hardship on them and would be a breach of faith, especially with long-time licensees and with Technicians. For the most part, Technicians have never been offered the opportunity to appear voluntarily for a Commission-supervised examination. Similarly, the other Commission proposals to withdraw mode, power, and special station license privileges would be a breach of faith with the tens of thousands of amateurs now enjoying privileges which would be lost. The League perceives no benefits to be derived from adoption of the Commission's proposals and most strongly opposes the adoption of new rules and policies which would cause the loss of a single privilege by any present licensee.

"Amateurs are concerned that the lawlessness of the Citizens Radio Service not be transplanted into the Amateur Radio Service."

V. *The present license structure developed over a period of more than sixty years has been generally satisfactory.* A review of changes in the amateur license structure since World War II reveals that amateur radio has reached its present state by a process of gradual change. The resultant framework has proven to be quite workable. While the number of United States amateurs has remained virtually static in recent years, there are a number

of reasons for this lack of growth: (a) the major revisions in the license structure made in 1967, (b) the growth of the examination-free Class D Citizens Radio Service, (c) the wide variety of new avocations and interests competing for the attention and participation of the younger generations, (d) the imposition of fees for all applications, including renewals, beginning in 1964, (e) extensive changes in mail examination procedures, and (f) a general reduction in the opportunities for Commission supervised examinations. No doubt each of these has had some effect, but none requires the sweeping changes which the Commission proposes. The League's counterproposals

"Amateur radio has reached its present high level of technical excellence under a licensing philosophy based upon learning by doing."

are designed to improve an already excellent license structure.

VI. *The dual ladder license structure proposed by the Commission has many inherent weaknesses.*

A. *In proposing a dual ladder structure, the Commission has made many unwarranted assumptions.* In paragraph 9 of its Notice, the Commission states several unwarranted assumptions: (a) that few Technician Class licensees have upgraded, (b) that the level of amateur activity at vhf and uhf is now comparable to, if not already exceeding, that at hf, (c) that Morse code telegraphy is not a major communication mode above 29 MHz, and (d) that those operating now and in the future on frequencies above 29 MHz will have but limited interest in the lower frequencies. A careful examination of each of these contentions reveals that they are without foundation. The membership survey shows that nearly 70% of the Technician licensees entering amateur radio during the 1950 s were not satisfied with the limitations of the license, and that interest in hf operation still outstrips interest in vhf and uhf by a margin of 3 to 2. Many of the major accomplishments in amateur communication at vhf and uhf such as moonbounce and meteor scatter experiments, Oscar work, etc., have been possible only through the use of telegraphy, and it remains a relevant part of amateur radio for work at these frequencies.

B. *The additional workload imposed upon the Commission by the dual ladder structure would be so substantial as to be administratively undesirable.* The proposed structure would force at least 88,000 presently-licensed amateurs to obtain two licenses to continue operating as they now may with one. Furthermore, 70,000 present Conditional and Technician licensees would have to be re-examined by government personnel in order to remain at their present license level. The Commission's assumption that an unduly large increase in its workload would not be caused by its proposals is not well founded.

C. *The ability to serve in times of emergencies would be impaired by the dual ladder structure.* An amateur with a license in only one series would be severely restricted in the service he could perform. This loss of versatility in preparing for and handling emergency communications would most seriously impair the ability of the Amateur Radio Service to respond to emergency communications needs.

D. *The proposed dual ladder structure would be divisive of amateur radio.* The Commission's proposals would divide amateurs into two camps through the devices of assigned frequencies and distinctive call signs. The resulting caste system would be detrimental to the amateur fraternity. The League recommends that distinctive call signs be limited to the entry levels of license.

E. *The Commission's proposal would provide virtually no incentive for Series B licensees to upgrade.* The additional privileges to be gained by upgrading from Communicator to Technician or from Technician to Experimenter would be insufficient to encourage such upgrading, and the lack of access to hf would seriously limit the opportunity to gain the experience required to qualify for a Series A license.

F. *No significant benefits to the public would flow from adoption of the proposed dual ladder license structure.* The Commission, as the representative of the public in this proceeding, must ask itself how the public interest would be served by the introduction of unnecessary complications and divisions into the amateur license structure.

VII. *The League recommends modification and strengthening of the present license structure.*

A. *The objectives of the Commission and the League are identical.* Both want to attract more people into amateur radio and to provide valid incentives for amateurs to upgrade. The difference is in the choice of methods to achieve those objectives.

B. *The League supports the concept, but not the specific proposal, of a new vhf entry class license.* The League is firmly committed to encouraging a measured and manageable growth in the Amateur Radio Service, but there must be a balance between the attractiveness of an entry-level license and the motivation of those entering to advance to higher grades of license and thus to gain additional privileges. The Commission's proposal would give Communicators such broad privileges that this balance would not be achieved: (a) exposure to vhf techniques alone would not acquaint a new amateur with the tremendous diversity of activities within amateur radio; (b) the granting of 144-MHz repeater privileges would provide one of the most desirable vhf privileges at the entry level; (c) requiring no familiarity at all with the Morse code would make the step to the next grade of license appear that much more difficult and would isolate the new licensee from the rest of the amateur body; and (d) a fully renewable license at the entry level would not encourage advancement. The League believes that a new entry-level amateur license can be accommo-

dated within the present licensing structure without injury to the basis and purposes of the amateur service, and that such a license would enhance the service by attracting new blood into amateur radio. However, to be successful, such a change must have the support of those amateurs presently licensed. An examination completely devoid of Morse code, coupled with overly-generous privileges for the new amateurs, is unacceptable to a majority of present amateurs. The creation of a new class of license without regard to what already exists can only lead to a repetition of the problems the Commission has experienced in the Citizens Radio Service and might well lead to the destruction of the Amateur Radio Service as it has flourished throughout this century.

Name: The new entry class should be named Basic Amateur so as to underscore that it is an *amateur* license, and that it is the first rung of a ladder leading to even greater opportunities.

Frequency privileges: After carefully weighing a number of considerations, the League proposes 145.0-145.5 MHz and 222-225 MHz for the Basic Amateur Class. There must be intercommunication between Basic Amateurs and the holders of other classes of license, yet present licensees must not be alienated from acceptance of the Basic Amateur concept and the heavily-used 146–148 MHz repeater subband must not be further overloaded. Also, weak-signal experimental work, Oscar satellite communication, and radio remote control and auxiliary links in portions of the 220- and 420-MHz bands, must all be protected from interference by amateurs conducting short-range communication.

Modes of emission: There is no reason to limit Basic Amateurs to fm telephony emission. Other emissions, namely A1, A2, and A3, should be permitted so as to permit on-the-air code practice, the use of inexpensive equipment, and exposure to modes that are more efficient than fm.

Power: The Commission's proposal of 250-watts input is far from reasonable. Experience has shown that 50 watts is more appropriate for a vhf entry-level license.

"The League most strongly opposes the loss of a single privilege by any present licensee."

Examinations: The same written examination should be used for the Novice and Basic Amateur Classes so as to encourage upgrading and reduce the Commission's administrative workload. The League offers to work closely with the Commission in the development of a suitable examination.

Morse code: A familiarity with Morse code characters should be required. For example, the applicant should know that · – signifies the letter A, that – – – signifies the letter O, and so on. The ability to send or receive at any speed would not be required. Some effort must be expended by each applicant for an amateur license in order to ensure continued self-discipline and self-regulation. Furthermore, the ability to send and receive Morse code will be required for upgrading to any higher class, so an introduction at the entry level is appropriate. Finally, repeaters in the 222-225 MHz subband usually identify by code rather than voice.

Renewability: Because of the elementary nature of the entry-level license examination, there should be a periodic check of the licensee's continued knowledge and awareness of the responsibilities which come with being an amateur radio operator. For this reason, re-examination should be required as a condition of renewal of the Basic Amateur license.

"The League is firmly committed to encouraging a measured and manageable growth in the Amateur Radio Service. . ."

Examiners: Two examiners of General or higher class should be required.

Call Sign: A distinctive prefix is appropriate for the Basic Amateur, as it is for the Novice, but a licensee should be able to retain the suffix letters of the call sign upon upgrading.

C. *Expanded use of some privileges as incentives would strengthen the license structure; expanded use of others is unnecessary and undesirable.* Experience has shown that frequency privileges and call sign prerogatives are desirable incentive devices. The League supports expanded use of these where it can be accomplished without detriment to other licensees. However, the desirability of using specialized modes of emission, power, special station licenses, license tenure and renewability, and volunteer examiner privileges as incentives is outweighed by the disadvantages in each case, especially since these privileges would have to be withdrawn from present licensees in order to make them available as incentives.

D. *The League recommends an expanded single ladder license structure.* The League recommends the following structure:

Extra Class
Advanced Class
General Class
Technician Class
Novice Class
Basic Amateur Class

Each class would have all frequency and mode of emission privileges of every lower class. Present Conditional Class licensees would become General Class with an appropriate designator. To facilitate upgrading, the League recommends the following moderate and uniform progression of code speeds:

5 wpm	Novice and Technician
10 wpm	General
15 wpm	Advanced
20 wpm	Extra

The present Advanced, General, and Conditional Class licensees would be given credit for 15 wpm as

the difference between this speed and 13 wpm is not sufficient to warrant re-examination.

The privileges of the Extra Class would be unchanged, except for the lifetime operator license proposed by the Commission and the exchanging of the present exclusive voice subband at 21,250–21,270 MHz for a new one at 14,175–14,200 MHz. The limited use of this segment only by the Extra Class would have no significant impact upon amateurs outside the United States who generally operate telephony throughout the 14,100-14,350 MHz subband, yet its availability would serve as a powerful motivator for upgrading to the Extra Class.

The privileges of the Advanced Class would be unchanged, except that these licensees would gain access to the 21,250-21,270 MHz subband and would gain the right to apply for "preferred" call signs with a single letter prefix and three-letter suffix.

The privileges of the General Class would be unchanged, except that these licensees would gain access to the 50.0-50.1 MHz subband. Conditional Class licenses would continue to be renewable as General Class with an appropriate designator.

"There must be a balance between the attractiveness of an entry-level license and the motivation of those entering to advance to higher grades of license. . ."

Technician Class licensees would gain access to the 29.0–29.7, 50.0–50.1, and 144-145 MHz subbands and all operating privileges of the Novice Class.

Novice Class licensees would gain all operating privileges of the Basic Amateur Class. The license term would become five years, with re-examination by volunteers a condition of renewal.

Basic Amateur privileges were discussed in section VII. B., above.

Examinations: The Commission proposes to remove General Class licensees from the pool of potential volunteer examiners, thereby reducing its size by more than 50% at the time that the greatest demands are to be placed upon the volunteer examination system. The League recommends that General Class amateurs continue to be eligible to administer mail examinations, but agrees that two examiners, rather than one, should be required.

The League recommends that present Conditional licenses continue to be renewable without re-examination, and that the proposal to require Conditional licensees to be re-examined by Commission personnel when they move to within 175 miles of a periodic examination point not be adopted. Many have questioned the need for a physician's certificate of continuing disability as a condition of renewal of Conditional (P) [to be called General (D)] licenses. For a disabled person, the expense and difficulty of arranging for a physical examination would be most substantial.

The League most strongly recommends that all Technician licenses continue to be renewable, because, for the most part, Technicians have never been offered the opportunity to appear voluntarily for a Commission-supervised examination. The League endorses the proposal to require new Technician licensees to appear for examination before government personnel on the assumption that a program of expanded examination points (now underway on a trial basis using Civil Service Commission personnel) will be adopted and that, as a result, the inconvenience of appearing for examination would be greatly reduced.

The Commission proposes to eliminate the written examination for the Extra Class. Since former holders of the Amateur Extra First license (issued before 1934) now have credit for the code portion of the Extra Class examination, this would have the effect of making them eligible for Extra Class without further examination. While the League opposes the elimination of the written examination, it recommends that the relatively few persons who once held Amateur Extra First Class licenses be granted Extra Class without further examination.

Under the single ladder license structure proposed by the League, the progression from class to class would be so orderly and logical that there is no need for another class of license, whether Experimenter or something else. The League recommends that the Experimenter Class not be created.

VIII. *The League accepts the Commission's invitation to comment on subjects not directly related to restructuring.* The Commission has requested specific comments on methods of determining the power of amateur transmitters and on the need for rules limiting the use of speech compression on A3 single sideband emission. Reports prepared by the League's Technical Department and submitted as appendices address these topics. Briefly, the reports conclude (a) that there is no readily available method of measuring the output peak envelope power of amateur transmitters over a wide range of frequencies where the load of the antenna upon the output of the transmitter is ever changing, and (b) that there is no need for additional rules to limit speech compression techniques. The League recommends no change in the present system of measuring transmitter power or in permitted power levels, except to return the Novice Class system of measurement to the same basis used for transmitters operated by other licensees.

IX. *Conclusions.* The League shares the Commission's desire to strengthen and further the amateur license structure. As the only organization with members actively participating in every phase of amateur radio, the League respectfully submits that it is unusually well qualified to subject the Commission's proposals in this proceeding to the most searching analysis, to offer constructive criti-

(Continued on page 96)

CINCO BY NINEO

BY JOHN G. TROSTER,* W6ISQ

"YOU LISTENING on 2 meters, Charlie?"

"Yeah, where ya been. I got ya on a list for that LP7X. I'm the MC . . . . called ya four times already . . . . he's on 3770 listening 3804 . . . W6MAR just gave him a 5 and 7 . . . gonna slip your call in again next. . . you ready?"

"Yeah, sure Charlie . . . love this low-band DXin'."

"LP7X . . . say OM, finally got my friend here . . . go ahead ISQ, give him a call.

"Thanks Charlie . . . ahhh . . . LP7X . . . this is W6ISQ . . . you're 5 by 9 . . .

"Nooooo noooo . . . sorry, he's still talking to MAR . . . OK, try now."

"LP7X this is W6ISQ . . . 5 and 9 . . . 5 and 9 . . . "

"Again . . . "

"LP7X you're 5 by 9 . . . cinco and nineo . . . "

"You sure you're hearin' him 5 by 9? I haven't heard him since he was with MAR."

"Waaalll, I dunno. If MAR gave him 5 and 7, I gotta . . . ahhh . . . QSL and stuff . . . "

"QRX . . . there he is now . . . about a 4 by 4 . . . hear him?"

"Ahhhh . . . hmmm . . . oh well, just so long as you can hear him."

"There he is . . . call him . . . call . . . now, now . . . go . . . "

"LP7X . . . W6ISQ . . . Six Italian String Quartets . . . cinco by 9 . . . fiveo and nueve . . . "

"Ya got him . . . got him . . . give him his report again . . . again."

"LP7X . . . cinco by 9 . . . fiveo by nineo . . . "

"OK . . . ok . . . he QSLs . . . now he's giving you your report . . . OK . . . ya got it? He turned it over to you . . . go ahead answer him . . . "

"LP7X . . . thanks for the 5 and 9 OM . . . "

"Nooooo . . . nooo . . . that's not it."

"Ahhhh . . . thanks for the 5 by 8 OM . . . "

"Noooo . . . not it . . . tell him to count . . . count numbers . . . "

"Sorry OM . . . bad local QRM . . . please count numbers . . . "

"OK, he's counting . . . hear the numbers? Go ahead."

"Thanks for the 5 by 5 OM . . . "

"Noooo . . . tell him to count numbers again."

"Ahhh . . . thanks for the 4 by 5 OM . . . errr . . . count numbers again . . . "

"Not quite."

"LP7X . . . thanks for the 4 by 4 OM."

"Higher . . . couple more."

"Thanks for the 7 by 10 OM . . . "

"What are ya saying? . . . half that."

"3½ by 10?"

"The other one . . . the other one."

"Thanks for the 7 by cinco OM."

"Noooooo . . . but you're closer."

"Thanks for the 6 by 5?"

"I get the feeling you're not hearing the LP7 . . . down 2 on the first and up one on the second . . . "

"Ohhhhh . . . LP7X this is W6ISQ . . . thanks for the 4 by 6 OM."

"Yeah yeah . . . ya got it . . . hoooray . . . grrreeeaat . . . son-of-a-gun . . . heeeey . . . how about that . . . congratulations . . . way ta go . . . how many that make for ya now?"

"Yeah Charlie, some a these DX stations is easier to work than others . . . that makes 92 on this band."

"Great . . . almost DXCC on 80 huh?"

"Right . . . but ya know Charlie, it's gonna be a big let-down after I work a DXCC hunnert stations on 80 . . . no real challenges left." QST

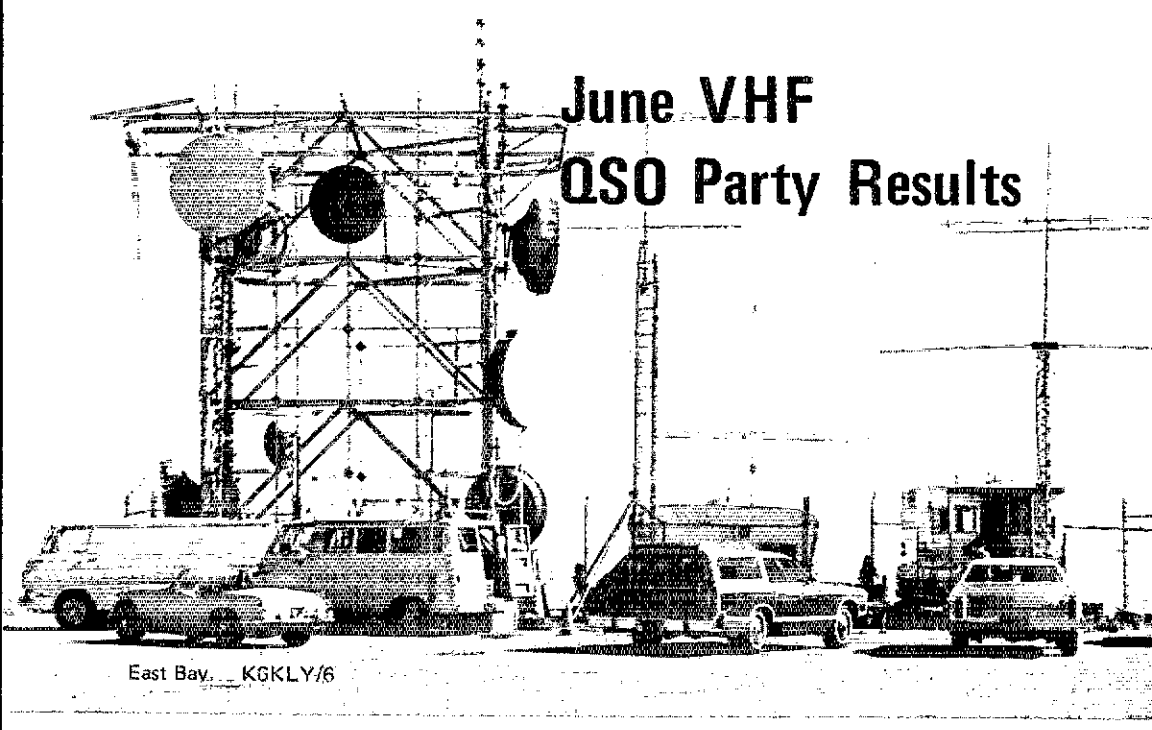
THERE ARE NO REAL CHALLENGES LEFT!

* 82 Belbrook Way, Atherton CA 94025.

ARE YOU LICENSED?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur operator license. Please state your call and/or the class of operator license held, that we may verify your classification.

June VHF QSO Party Results



East Bay, KGKLY/6

REPORTED BY JIM CAIN,* WA1STN

THE WEEKEND of June 14 and 15, 1975, was not the greatest in the history of VHF operating activities, condition-wise. Unfortunately, the June 1974 QSO Party weekend may very well have been the best ever. It is always tough to slide backwards despite the best efforts of everyone concerned. That's what happened this year, but perhaps we shouldn't dwell on the negative aspects of the event and rather concentrate on the positive.

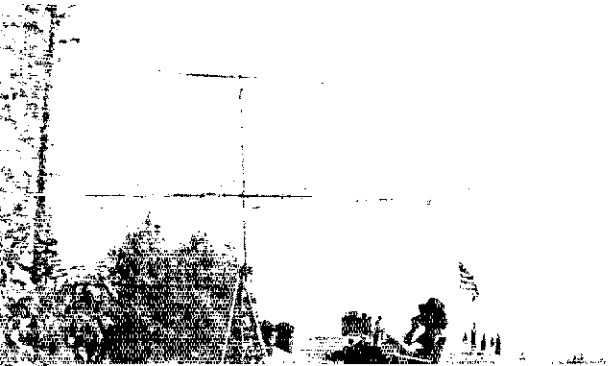
Let's start with some new Division records, changes which you can pencil in on the all-time records list which appeared in *QST* for November, 1974, page 78. No new single-operator records, though. In alphabetical order (Division), W3CCX/3 beat their old record by just about 10,000 points in the Atlantic Division; K9HMB and crew crushed the old Central Division record by 16,000 points, from 24 to 40K; WA8BCA pushed the Great Lakes top score from 58 to 61K; and K7IPQ/7 and W4BFB/4 both nudged their Division records (Northwest and Roanoke, respectively) up by a few points. All commendable achievements under adverse conditions compared to the years that the previous highs were established (all '74 except for the '73 NW record of W7VF/7).

Although the highest scores in the contest seem to originate on the Coasts (primarily East), we note that seven call areas are represented in the top ten single-operator scores and six in the multi category. The dominance of the 50-MHz band this year somewhat explains this, except for K6YNB and WB6KBZ, who had absolutely rotten 6-meter conditions. Otherwise, some fine multiplier totals on 6 are largely responsible for big scores.

At the risk of sounding negative again, let's compare '74 and '75. The average score in the top-ten single op. was over 29,000 in 1974 and dropped to just below 16K in 1975. The average top-ten multi score suffered only slightly this year, slipping from 84 to 81K. This is most likely due to the multi-operator stations being better able to take advantage of every tiny quirk in conditions during a not-so-perfect year; the single operators are more at the mercy of the propagation since they can't be in more than one place at a time.

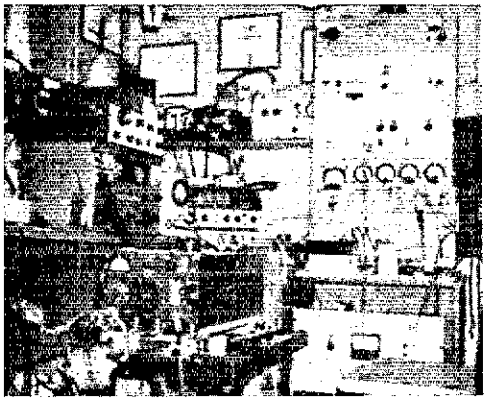
A few items we think worthy of note are: K5WVX turned in the high six-meter multiplier of 58. W1DC/1 topped all 144-MHz efforts with 22 sections while WA1MUG led the multiplier race on 220, 432, and 1296, with 18, 19, and 12 respectively.

* Asst. Communications Manager, ARRL.



Six and two from Hogback Mountain, VT, W1MY/1.

WA2EUS active from NLI on four bands.



By the way, *84* different stations had over 30 multipliers on 6, which leads us to a question: what do *you* think of the various minimums used to establish the "multiplier box?" Should any of the minimums be raised? Let us know your opinions.

For the record, no one came close to the WA1MUG score or multiplier records set last year. Probably no one will for some time to come. MUG's score dropped this year due to the poorer conditions plus rig problems. At the same time, the Pack Rats at W3CCX/3 and the Honeywell Club of W1DC/1 sneaked ever closer, both up in score from last year.

One good sign: log returns this year were virtually the same as in '73 and '74; 348 this time. Section winners will be receiving their certificates shortly after September 15, the USPS 'awillin.

As an aside to this write-up, it might be worthwhile to point out that logs without comments are not productive of an interesting contest write-up. This is your activity, and what you think about it is of interest to us and to the readers, at least as much as your score. Pictures are fine, the more the better. Any records broken? Tell us about it. Something funny happen? Good stuff for the write-up! Let's entertain the readers, even those who don't participate, not bore them to death. How about gobs and gobs of comments, complaints, accolades, anecdotes, whether for the write-up or just to get it off your chest and give us the benefit of it. If all the Headquarters receives from contest participants is bare numbers, then all we can give back to you are dry statistics and boring analyses.

Soapbox

A new record for us, even though we missed both RI and NLI out of 39 6-meter sections worked. – (WA1MAG). Our converter's noise factor of about 12 dB accounted for our not working many who apparently called; we apologize. – (W3GNR). DX in the form of XE2NL and TG9KJ plus the short skip added up to much fun. – (WA4MVT). Our 2300-foot elevation did little to help the poor conditions in Georgia this time. – (W4VO/4). W9HLY repaired a power supply just to work me on 220; now if only I could get him on 432! – (K9UVJ). At 4000 feet we spent Sunday *in* the rain clouds. – (K7IPQ/7). High winds wiped out my tower, beam, and ac power; hooked up the 6-meter transceiver to the car battery for some contacts. – (WBØPNW). 9300 feet on Capilla Peak sure beats Albuquerque proper! – (WA8FCB/5). Most selective sporadic E I've ever heard. – (WA2BPE). Seemed to be more cw activity this

TOP TEN

Single Op.		*Multiop.*	
K6YNB/6	27,840	WA1MUG	154,628
K8LEE	27,405	W1DC/1	138,528
WA1OUB	17,112	W3CCX/3	135,000
WA2FZW	15,189	VE3ONT	76,539
W3CJK/3	12,584	K2OWR	71,208
WA8CLN	12,105	WA8BCA	61,656
W5QDB	12,100	W3BBS/3	52,752
WB8BGY	12,060	K2DEL/2	43,290
WB6KBZ	11,508	K9HMB	40,468
WA4MMP	10,272	WA1NGR	38,313

DIVISION LEADERS

Single Op.	*Division*	*Multiop.*
W3CJK/3	Atlantic	W3CCX/3
K9UVJ	Central	K9HMB
WBØIWG	Dakota	KØALL/Ø
WB4JGG	Delta	W4SGI
K8LEE	Great Lakes	WA8BCA
WA2FZW	Hudson	K2OWR
KØJBL	Midwest	WØYZS
WA1OUB	New England	WA1MUG
K7CAZ	Northwestern	K7IPQ/7
WB6KBZ	Pacific	K6KLY/6
WA4MMP	Roanoke	W4BFB
WØOHF	Rocky Mt.	WB5AXC/5
WA2JVO/4	Southeastern	WA4FBH
K6YNB/6	Southwestern	W6AMT
W5QDB	West Gulf	K5WVX
VE4AS	Canadian	VE3ONT

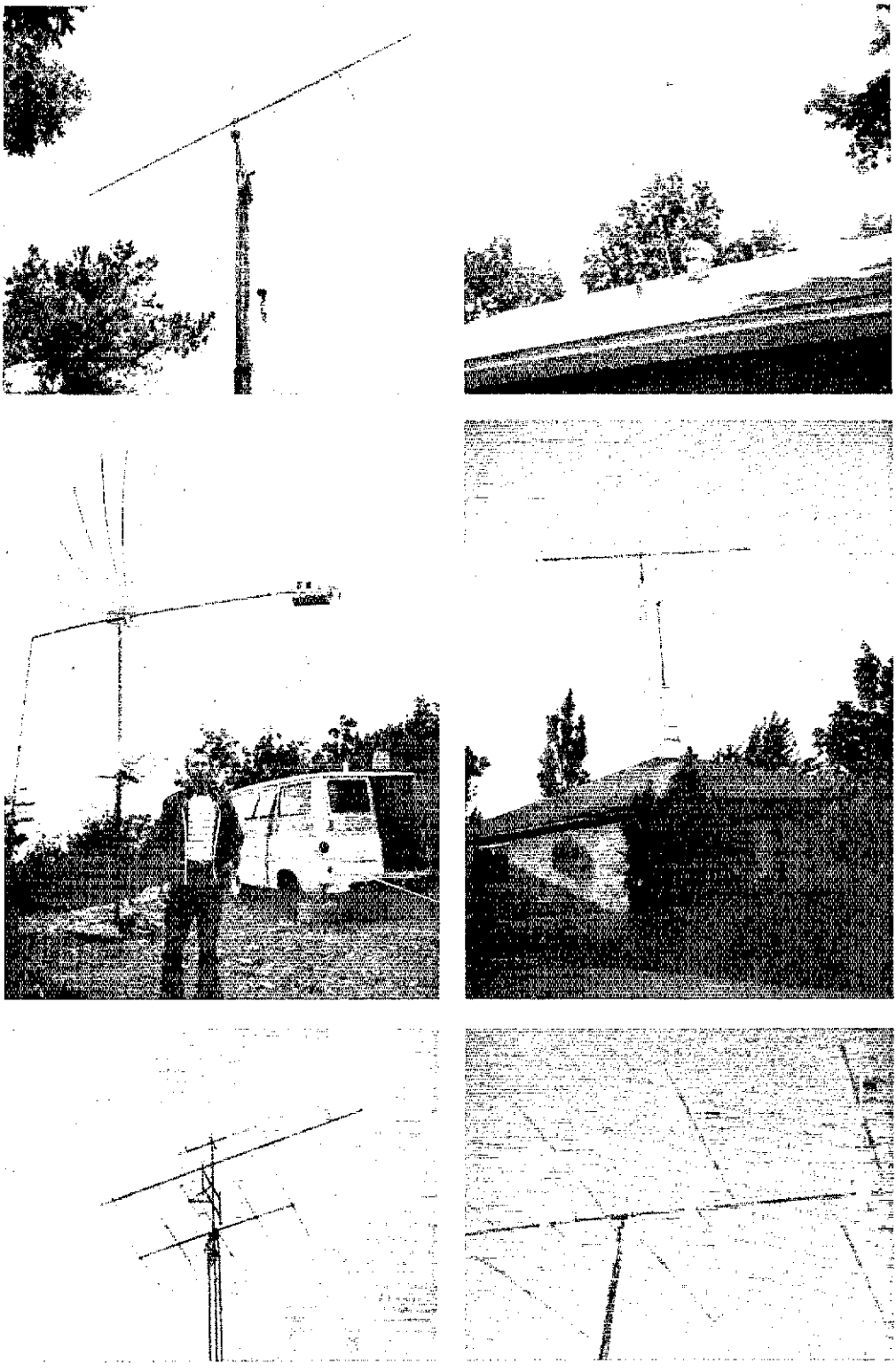
These five elements on six did a good mountaintop job for K7ZCB, Montana.

VE3ONT (op. VE3DSS) on 2 m. cw.

year. (WØOHF). Worked W8KPY on lightning scatter. – (KØDAS). Gave up the Orlando Hamfest to work the contest. – (WB4BND). Conditions were best on Friday the 13th. I'll be in North Dakota for the September QSO Party. – (WA8GUB/Ø). Used total solid-state on 50 and 144 MHz. – (W5USM). We need more cw operation, especially on 2. – (K6ERF). Birds broke my gamma match, then my SB-500 died at the beginning of the contest, followed by my first TVI complaint in five years. – (WA1MKE). Wish more operators would tune a little for my crystal-control. – (K2EVJ). 2-meter activity seemed much improved this time. (W1FJH). Some fm types seemed lost without their machines. – (WA7TDU). My broken mast got repaired just in time, with neighborhood help. – (WA3NNZ). A date other than Father's Day next time, please. – (WA3PNQ). At last, an opening during a contest. – (VE1RC). Snow still on the ground at our portable site. – (W5IXR). Activity in NC and surrounding regions seems on the upswing. – (K4ROM). All OK until we got 60-mph winds Sunday afternoon. (W4BFB/4). I use an indoor halo because the landlord won't allow outdoor antennas . . . except, the landlord has up a tribander and three dipoles! – (K3ARR). Had trouble reading the dials through the smoke from the 220 rig. – (WA2KHL/2). Worked more in the 145-MHz ssb segment than some of the locals worked down on 144; a healthy sign. (WA4MMP). Six good, but we still need more activity on the higher bands. – (K2DEL/2).

Min. Sections	30	15	4	3	1
MHz.	*50*	*144*	*220*	*432*	*1215*
VE3FHK*	35				
VE3ONT*	46	20	13	9	5
K1ABR				7	
K1AGB	34				
K1HTV		17			
K1MNS	37			4	
K1WHS*	36	18	10	10	
K9AQP/1*		15	8	12	1
W1AIM	32				
W1DC*	43	22	14	17	5
W1FJH		17			
W1FMF			4		
W1JAA				12	
W1JOT				4	2
W1MX*			11	5	
W1YTW			9		
WA1FSZ*	38			4	
WA1GYL	33				
WA1IMS	33				
WA1IOX				5	
WA1MUG*	43	21	18	19	12
WA1NGR*	41	17	11	11	1
WA1OLK	30				
WA1OUB	43	15		4	
WA1RWU/1	32				
WA2UXW/1*	40		7		
WA5IOD/1			4	3	
K2ARO/2			5	13	
K2BWR	41	16	12	9	
K2CBA*	39		13	16	1
K2DEL/2*	36	18	10	14	1
K2OVS		16		8	
K2OWR*	39	21	15	15	2
K2RIW				15	
W2BLV		15		9	
W2CRS		16			
W2CVW			4	5	
W2CXC		15			
W2EIF		16	14	10	1
W2HF				4	
W2OMS				17	4
W2PAU		16			
WA2BLM			10	6	
WA2EUS				5	
WA2FZW	33		9	8	
WA2GBG/2*	36				
WA2KHL/2*		19	4	12	
WA2NPP*		17			
WA2THS	30				
WB2CUT		15			
WB2FKJ/2	37				
W82VWW		17			
K3IPM*	38				
K3LNZ/3*	38	17	8	6	
W3BBS/3	34	20	13	16	1
W3BHG		17			
W3CCX/3*	43	21	15	18	6
W3CJK/3		17		10	
W3IOH	30				
W3JMY/3	42				
W3PGA/3*			5	6	
W3TMZ		21		16	
WA3LND		18			
WA3NNZ		16			
WA3WIV	35				
K4CO/4*	32				
K4EJO*	34				
K4FTO	38	25			
K4LWZ	39				
W4BFB/4*	49			5	
W4DFK		21			
W4ISS				4	
W4LHG	32				
W4PAR/4*	37			3	
W4SGI*	43				
W4UCH			6		
WA4BSZ	38				
WA4F8H*	47				
WA4GPM/4	40				
WA2JVO/4	37				
WA4LJQ	30				
WA4MMP	36				
WA4TTG		15	4		
WA4WSA/4*	35				
WB4BND	31				
WB4JGG	43				
WB4NCN/4*	49				
WB4OSN	36				
WB4PXW	31				
WB4VLH*	38				
WB4YAB	36				
K5FVA*	49				
K5WVX*	58				
W5QDB	42				
W5TRB	35				
W5USM*	35				
WA5UUD	44				
WA5VHN	38				
WB5AXC/5*	50				
WB5CUK*	36				
WB5CZV	35				
WB5NCN	32				
K6BPC/6*				7	9
K6IBY				6	
K6KLY/6*				5	6
K6KSY*					5
K6QAX				5	
K6YNB/6*				9	9
K6ZMW					3
W6AMT				6	7
W6BXO					4
W6ELT					3
W6KQG					3
WA6GYD				4	3
WA6NRV					7
WA6OSX/6*					3
WA6UAM/6				4	7
WB6KBZ				4	3
WB6NKO					6
K7CAZ	30				
K7IPQ/7					3
W7TYR					1
W7VDZ	31				
WA7RTA/7	37				
WB6OKK/7*				5	9
K8LEE	64				3
W8BAP*	34				
W8HAX	31				
WA8BCA*	46	17	8	13	
WA8CLN	39				
WA8FSE/8*		17			
WA8PLZ*	42				
WB8BGY				4	
WB8BKC	32			3	
K9HMB*	51			6	
K9REE	34				
K9UVJ				5	4
WØOHU/9	46				6
WA9HHH*	39				
WA9KVS	40				
WB8HHC/9	49				
KØALL/Ø*	41			3	
KØJBL	35				
K1WVE/Ø	30				
WØLCN				3	
WØOHF	32				
WØYZS*	34				
WAØCSL	33				
WBØIWG	48				

* Multioperator Station



Some antenna shots for your inspection; clockwise, beginning upper left. W4PAR/4; WB8BKC; WA9KVS; WA7BJU; WA5YOU; W3BBS/3.

VE

Maritime

VE1RC 1900- 95-20-AB
VE1ASJ 1628- 74-22-A

Ontario

VE3BQN (VE3ABG, opr.)
1100- 54-20-ABD
VE3DSQ 119- 17- 7-B
VE3WL 114- 19- 6-A
VE3EYR 90- 30- 3-B
VE3ONT (VE2s DFO YU VE3s ABG ASO CDX DXJ EMS FIB FVN HKE)
76,539-763-93-ABCDE
VE3FHK (+VE3FHU)
5265-135-39-AB

Manitoba

VE4AS 3534-111-31-ABD

British Columbia

VE7CGY/VE7
264- 88- 3-B

Yukon-N.W.T.

VE7AFB/VE8 20- 10- 2-A

U.S.A.

1

Connecticut

WA1HOX (K1ZND, opr.)*
7339-153-41-ABCD
WA1GTP 2170- 67-31-ABD
WA1LOU 2160- 90-24-AB
W1HDQ* 1450- 58-25-AB
K1HTV 1105- 65-17-B
W1EEZ 704- 64-11-B
WA1SHM 401- 43- 7-A
WA1EHF 243- 27- 9-B
W1WEE 102- 17- 6-B
K1ZZF 98- 14- 7-B
W1ENZ 65- 13- 5-B
WA1RZC (WA3JSU, opr.)*
7- 7- 1-B
W1HAX 3- 3- 1-B
WA1NGR (+WA1FBO WA3QHK)
38,313-430-81-ABCDE
W1AW (WB2SEZ WA3JSU)*
3690-123-30-AB

Eastern Massachusetts

K1AGB 5548-146-38-AB
WA1IMS 4092-124-33-A
WA5IOD/1 3999-118-31-ABCD
WA1MKE 3752-134-28-A
W1JAA 2944- 67-32-ABD
WA1NQV 731- 44-17-AB
W1GUD 590- 59-10-A
WA1LXP 429- 33-13-AB
W1JOT 207- 13- 9-BDE
W1MHL/1 78- 8- 6-BCDE
W1AYG 36- 5- 3-BDE
W1LMU 18- 9- 2-A
WA1JGG 8- 4- 2-A
K9AQP/1 (+WB2GLQ)
14,238-185-63-ABCDE
WA1OAM (+WA1s ONB OZI QWF) 8295-237-35-AB
W1MX (WA1JZC W2QHQ WA8WNU) 7518-151-42-ABCD

Maine

W1YTW 8085-149-49-ABCD
WA1TRE 589- 31-19-AB
K1WHS (+K1UTI)
25,382-303-94-ABCD

New Hampshire

WA1OUB 17,112-269-62-ABD
W1FMF 3429-118-27-ABCD
W1JSM 663- 51-13-B
WA1MYK/1 3- 3- 1-B
WIDC/1 (K1s KEC MUC NZQ OJQ SVF TWF W1s BXI EUJ GUU GXT PVF QXX WA1s DRO FIQ GVH HON KPS LXU MSK NPN NVC PQE QAA QAB QQJ QYM RSP RUJ TZV WN1s STL VEO K3WKV)
138,528-1166-104-ABCDE
WA1FSZ/1 (+WA1QMO)
14,310-259-54-ABD
K1MNS (+K1s HZN PLX)
11,792-253-44-ABCD

Rhode Island

K1ABR 2608- 99-22-BD
WA2UXW/1 (+WA1s AYS KFJ WA2JHR WB2CUO)
14,160-229-60-ABC

Vermont

WA1MAG 6591-169-39-A
W1AIM 3840- 94-40-ABD
W1MY/1 (WA1s MPY MTZ SV7)
2318-122-19-AB

Western Massachusetts

WA1GYL/1 7956-204-39-AB
WA1RWU/1 7700-175-44-AB
WA1OLK 2400- 80-30-A
W1FJH 1207- 71-17-B
WA1MJD/1 495- 55- 9-B
WA1JWE 280- 35- 8-A
WA1MUG (+K1s DQV RQF ZND WA1s ABV IQI HCO WA2s FBI PVV SCA SPL YGA WB2s BXP DRW OEU WO1 YBA)
154,628-1156-116-ABCDE

2

Eastern New York

W2CXC 9680-220-44-AB
W2CRS 3504-135-24-BD
WA2TQD 290- 29-10-A
W2HF 161- 17- 7-BCD
W2IP 70- 10- 7-B
WA2ZPD 28- 7- 4-AB
K2CBA (+WA2s BAH PVU VQB UYE WB2s BMZ BYP DNE QFS) 36,582-414-78-ABCDE
WA2BLM (+WA2LOA WB2s FOH FUG FZE GSW OZA SGN)
24,732-458-54-ABCD
WB2FKJ/2 (K2UKE W2s AWX KBH WA2HAQ WB2s GXF HDS NKN SUH YQU)
18,258-358-51-AB
K2ARO/2 (+K2BGU WA2s CVU HRE YOV WB2NPR)
9917-169-47-ABCD

N.Y.C.-L.I.

K2OVS 4602-110-39-ABD
K2RIW 1456- 91-16-DE
WA2PMW 900- 75-12-B
WA2EUS 798- 47-14-BCD
K2PAY 152- 19- 8-A
WA2SRH 98- 14- 7-B
WB2VTN 78- 12- 6-BD
WA2TLM 72- 18- 4-B
WB2CJN 45- 15- 3-B

Northern New Jersey

WA2FZW 15,189-214-61-ABCD
WB2VWW 5166-126-41-AB
WB2CUT 3510-130-27-AB
W2CVW 2755- 75-29-ABCD
WA2GEZ 2553-111-23-AB
W2OMS 1995- 45-21-DE
WB2RTF/2 1204- 86-14-B
WB2TMD 434- 31-14-A
WA2NTI 126- 21- 6-B
WA2BHB 119- 17- 7-AB
W2SMJ 70- 11- 6-ABCD
W2ODV (WA2FUI, opr.)
68- 17- 4-B
WA2CAK 56- 14- 4-B
WB2ZIH 18- 6- 3-B
K2OWR (+W2CLL WA2DBD WB2s UIJ WIK)
71,208-703-92-ABCD
K2DEL/2 (K2s IXE TKR WA2s BSU CRF CXS DJM ERZ JIM INO NKL RYC WB2s LDN NGT PCS QQU TSG UAN VLC VPR YJV) 43,290-493-78-ABCDE
WA2KHL/2 (+WA2UDT WB2s LDE LYP WN2s WJY YGF)
27,590-405-62-ABCD
WA2NPP/2 (WA2NLP WB2s AEH CDI ZJQ)
12,060-268-45-AB

Southern New Jersey

W2EIF 7840-113-49-ABCDE
W2PAU 2968-106-28-AB
WB4NXY/2 2054- 79-26-AB
W2BLV 1800- 63-24-BD
W2FGY 248- 31- 8-B
K2BWR (+K2ZRJ)
22,230-248-78-ABCD

Western New York

WA2IKO 4046-119-34-AB
WA2THS 4000-125-32-AB
K2LZF 1876- 67-28-AB
W2CXM (WA1CQW, opr.)
1764- 63-28-A
WB2KLD 1464- 61-24-AB
K2IIQ 468- 36-13-B
WA2HYK 330- 30-11-B
K2EVI 286- 26-11-A
W2WGL 247- 19-13-B
WA2GBG/2 (+WA2ZGA)
5760-160-36-A
WB2FBP/2 (+K2RKW WA2s RQC TOI WB2ERK)
3380-130-26-AB
WA2BPF (+WA2OON WB2s PMI RKD) 3364-116-29-AB

3

Delaware

W3BHG 867- 51-17-B
K2PAY/3 144 18- 8-A
WA3THL 105- 15- 7-AB
W3CGV 15- 3- 3-AD

Eastern Pennsylvania

WA3WLV 7093-173-41-AB
W3IMV/3 5208-124-42-A
WA3RIM 3270-109-30-AB
WA3YUE 3266-142-23-AB
K3IWK 3080-110-28-AB
WA3KPS 1656-148-12-B
WA3CSP 663- 39-17-A
WA3ETB 602- 42-14-ABC
K3ARR 351- 27-13-A
WA3KFT 198- 33- 6-AB
K3JRO 119- 17- 7-A
W3CCX/3 (W2EIF K2EVW WA2MWB W3s AJF CL CLQ HMU ELX HQF KKN YXF ZD K4s ACR BPP DLS EOD GAS IGX IPM JJZ KTY MXM ZSG WA3s AXV IUF NFV NGK OVH SPR UDS YZC)
135,000-1073-108-ABCDE
W3BBS/3 (+K3s CP RYL YWY W3s AXX FMF GPY ZMN WA3s BRW UFU UGP VVG)
52,752-560-84-ABCDE
K3IPM (+WN3VIU)
8702-229-38-A
WA3ZAU/3 (+WA3MNV WN3YYC)
3733-139-27-AB
W3LP (W3s GFN JUZ WA3CUQ)
344- 43- 8-AB

Maryland-D.C.

W3CJK/3 12,584-225-52-ABCD
W3TMZ 6068-134-37-BD
WA3DME 4560-149-30-ABCD
WA3LND 2934-163-18-B
WA3PNQ 1836- 68-27-A
K3MWQ 1280- 64-20-A
WA3NNZ 1024- 64-16-B
W3JPT 896- 56-16-AB
W3HQX 432-113- 4-B
K3AKR 351- 39- 9-AB
W3CRE 38- 19- 2-B
K3LNZ/3 (K3s AAF DUA W3s KMV UIG WA3s NZL OVW)
18,561-249-69-ABCD
W3PGA/3 (K3s EME PHH KOJ W3VRD WA3s QKB SCR)
12,508-222-53-ABCD
K3IVO (W3DPN WA3ZNM WB4ACJ) 6156-161-38-ABCD
W3EAX (WA1NQG WN3Y(FP)
208- 22- 8-BC

Western Pennsylvania

W3IOH 3700-100-37-AB
W3DIM 189- 21- 9-A
W3GNR/3 (K3s TFL ZDR W3DQF WA3BUX)
403- 31-13-B

4

Alabama

WB4NCN/4 (+WB4EOW)
8526-174-49-A

Georgia

WA2JVO/4 6380-144-44-ABC
WA4JMO 480- 30-16-A
W4ISS 275- 23-11-AD
W4SHL 16- 8- 2-B
WA4EBH (+WB4UMD Buzz)
11,000-219-50-ABD
W4VO/4 (multiop)
4305-205-21-AB

Kentucky

WB4YAB 2412- 67-36-A
K4CO/4 (K4JBV WB4HDW K4SJF WA8OGS)
7070-202- 35-AB
WB4VLH (+WB9IFT)
3344- 88- 38-A

North Carolina

K4LWZ 8640-180-48-AB
WA4MVI 3983-151-33-AB
WB4LDO 4865-139-35-AB
WA4GBE 2160- 80-27-AB
WB4MXC 1104- 69-16-A
K4ROM 868- 62-14-AB
K4NHO 21- 7- 3-AB
W4PAR/4 (+W4WAU K4HGK)
7830-170-45-ABD
WA4WSA (+WA4s CGM ZIA WB4SSA)
6903-177-39-AB
K4MOH/4 (+K4s CAW JAR SNI W4DGE WA4IHA WB4s DBB FXW IJE JUI)
6875-275-25-AB

Northern Florida

WB4HSZ 4758-122-39-AB
W4CSS 544- 34-16-A

South Carolina

K4GMJ 1350- 54-25-AB
WB4NBK 703- 37-19-AB
W4BEB/4 (K4s BWS GHR IZE JFY LVV MQG SLC W4NUS WA4s APD ICM IPQ TPZ UPA VCC WB4s BZN CCW IBW IZP PCS YFC WN4MKC WB9OPQ)
28,224-435-64-ABD

Southern Florida

WB4OSN 4572-127-36-A
WB4PXW 2883- 93-31-A
WB4RND 2139- 69-31-A
W4LHG 2112- 66-32-A

Tennessee

WB4JGG 8419-177-47-AB
W4SGJ (+W4s LQE PPR RO Z WA4IRG)
16,500-330-50-AB
K4EJQ (+K4FJW WA4JCF)
7998-154-43-ABD

Virginia

WA4MMP 10,272-214-48-AB
WA4GPM/4 9360-208-45-AB
WA4ITG 6072-131-44-AB
WA4LIQ 5236-154-34-AB
WA4SIQ 4032-126-32-AB
W4UCH 3850-100-35-AB
W4DFK 2163-103-21-B
K4FTO 1197- 63-19-AB
WB4NTV 528- 35-15-AB
WB4WIW 416 104- 4-B
W4KMS 182- 26- 7-A
K5DZE/4 144- 24- 6-A
W4WSF 108- 36- 3-B

5

Louisiana

WA5IUD 8096-184-44-A
WB5CZV 5439-147-37-AB
K4CHE/5 2670- 89-30-AB
WA5QBX 1680- 56-30-AB
WSJFB/5 1240- 62-20-A
WA5YOU (+WA5WUX WB5NII
2040- 68-30-AB

Mississippi

K5EVA (+W5NOF)
16,371-321-51-AB

New Mexico

W5TRB 1325- 95-35-A
W5IXR/5 34- 12- 2-AB
WB5AXC/5 (+K5EFW WA5M WA5FCB)
11,679-229-51-AB

Northern Texas

WB5NCN 4290-130-33-AB
K5GMX/5 2366- 91-26-A
WB5ACO 2002- 91-22-AB
WA5IKU 646- 38-17-AB
WB5ECR 168- 21- 8-A
W5USM (+WB5LUA)
6801-161-41-AB

Oklahoma

WA5VHN 6474-166-39-AB
K5WVX (+K5s HXG W5WAX)
23,436-372-63-AB

Southern Texas

W5QDB 12,100-275-44-AB
K5LZJ 2828-101-28-A
K5HAY/5 2700-100-27-A
WA5QCP 777- 37-21-A
WB5CUK (+K5YHX WB5s E FMA) 9020-217-41-AB

6

East Bay

W6BXO 1395- 80-15-AB
WA6VEE 416-104- 4-B
WA6BMV 228- 57- 4-B
K6ERF 200- 40- 5-B
K6KLY/6 (+W6UKM WA6J K7INS) 30,912-577-46-AB

Los Angeles

WA6RAY 286- 26-11-AB
W6AMT (WB6s ASR GQR R RIV V7Y)
32,594-705-43-AB
K6KSY (+WA6HXW)
4118-126-29-AB

Orange

W6ELT 154- 16- 7-BD
K6IBY 144- 12- 6-C
WA6DBX 27- 9- 3-B
WB6JCD/6 (+W6s NYB PJM Jensen) 8070-267-30-AB

Santa Barbara

K6YNB/6 27,840-425-60-AB
K6BPV/6 (+WA6s BFW LCF M W6ss IMV ORA RAJ YVP)
9630-182-45-AB

Santa Clara Valley

WB6KBZ 11,508-257-42-AB
K6QAX 2938- 97-26-AB
WA6GYD 2205- 74-21-AB
WA6UOM 129- 43- 3-B
W6PRI/6 42- 21- 2-B
WA6UAM/6 (+W6OAL W HWT TVN YFY WB6 WN6IEI) 7585-173-37-AB

San Diego

WB6NMT 2782- 87-26-A

WA6PKS 60- 10- 6-A
WA6LDN (+WB2VUO) 3404-148-23-AB
WA6AWM (+WA6MHZ) 2553-111-23-AB

San Francisco

W6KQG 6981-173-39-ABE

San Joaquin Valley

WA6NRV 6394-119-46-ABDE
WA6OSX/6 4550-169-26-ABD
W6YKS 4116-147-28-AB
W6DPD 338- 24-13-ABC
K6ZMW 27- 3- 3-E

Sacramento Valley

WB6NKO 4235-110-35-ABD

7

Arizona

K9DKW/7 3960-120-33-AB
WA0MRH/7 230- 23-10-A
W7KMV/7 (+K7CC) 888- 74-12-AB

Idaho

WA7ECY/7 2040- 68-30-AB
W0NRI/7 (+W0LJF WA0IQN) 1848- 66-28-AB

Montana

K7ZCB/7 1288- 56-23-A
W7JEF 533- 41-13-AB

Nevada

W7ABX 234- 18-13-A
WB6OKK/7 (+WA6PMJ) 7176-164-39-ABCD

Oregon

WA7BJU 2875-125-23-AB
W7TYR 1264- 70-16-ABCDE
W7JXU 1054- 62-17-AB
K7HSJ 528- 44-11-ABCE
WA7TDU 369- 41- 9-AB
WA7RTA/7 (+K7s DYH RWT TKX WA7VKC) 15,280-382-40-AB
K7AVO (W7UDM VK3BGR) 561- 46-11-ABCD

Washington

K7CAZ 4158-126-33-AB
K7QFW 1890- 90-21-AB
WA7UEW 880- 80-11-AB
W7UGK 561- 51-11-A
W7HVB 500- 50-10-AB
K7IPQ/7 (+W7s DNU FHZ GLS WA7s MHM NAN TOM WMC) 20,876-588-34-ABCDE
K7LED (K7s CAL WTG YRQ W7GPW WA7s ERH ELI HWX NIW RJW TBP UIF WN7ACM) 4662-257-18-ABCD
W7DAZ (+WA7s PRG UQV) 4028-212-19-AB

Wyoming

W7VDZ 3689-119-31-A

8

Michigan

WB8BGY 12,060-261-45-ABD
WB8BKC 8514-191-43-ABCD
K8HWW 1425- 74-19-ABC
WA8EUU 1122- 66-17-AB
WB8TGY 812- 58-14-AB
WA8ZCO 168- 28- 6-B
WB8CKW 36- 12- 3-B

Ohio

K8LEE 27,405-435-63-ABD
WA8CLN (2,105-269-45-AB
WB8TDW 1998- 74-27-AB
WA8TLZ 1575- 56-25-ABCD
WA8STX 1512-108-14-AB
K5BWZ/8 901- 53-17-AB
WA8RQQ/8 576- 96- 6-AB
K8CKY 300- 30-10-A
WB8IAY 111- 37- 3-B
K8OGH 8- 4- 2-A
WA8BCA (K8UQA WA8s DXB OGN PKB RCN WB8PBR George) 61,656-655-84-ABCD
WA8PLZ (+K4GGY WB4YIH W8KPY WA8s DZU FLE LHL LTA MSE PAR WB8s MRU MVR PIF QQC G3PAC) 19,881-423-47-AB
WB8AP (K8SUB WB8s BBP GFY OZL) 7224-172-42-AB
WA8WCU/8 (+WB8s JRZ VEP) 2548- 98-26-AB
WB8RVT (+WB8HIW) 1890- 90-21-AB

West Virginia

W8HAX 3635-123-34-AB
WB8LAI 30- 15- 2-B
WA8FSF/8 (WB8s EKG IJW NQB OIF QPU) 7298-178-41-AB

9

Illinois

W9ARA 4128-129-32-AB
W9KDR 1219- 53-23-A
K9KQR 396- 44- 9-B
W9IVI 378- 54- 7-B
W9LLW (WB9BNF, opr.) 54- 18- 3-AB
K9DNW 39- 13- 3-AB
K9HMB (+WA7CJO K9s DVC MTE WA9s EJD PBK WB9CAS) 40,468-590-67-ABCD
WA9HHH (+WB9CLN WA0IYY) 14,640-300-48-ABC
K9TZZ/9 (WA9s NFO PQY WB9s GEN IWN KLW KNY KXI) 6534-191-33-ABC

Indiana

K9UVJ 9045-183-45-ABCD
WA9MEM 4455-165-27-AB
WB9CEP 2874- 99-26-AB
K9UNM 216- 24- 9-AB
WB9KVY 10- 5- 2-A
WB8HHC/9 (WB8s GEU GEW GEX GEY) 12,925-235-55-AB
K9JRK (+K9ZUH WA9s DFZ USE WB9s HVJ LXV OKB) 1600-100-16-AB

Wisconsin

WA9KVS 5550-150-37-AB
K9REE 5355-153-35-AB
K9OXY 2496-178-32-AB
WA9KGQ 1885- 65-29-AB
W9OJI 612- 43-12-BD
WB9OQD 2- 2- 1-B
WA0HUJ/9 (+K9s AKS CHZ UYK WA9s CWY GTU) 20,301-291-67-ABCD

0

Colorado

W0OHF 4288-134-32-A
W0IA/0 4050-135-30-AB
WA0TVZ 2600-104-25-A
W9MHE/0 1080- 54-20-A
WA8GUB/0 1008- 42-24-A
W0DYB 882- 49-18-A
K0YDO 352- 32-11-A
K0CLJ 108- 12- 9-A

Iowa

K0DAS 588- 49-12-B
WB0OAZ 119- 17- 7-A

Kansas

WA0TRO 1012- 46-22-AB

Minnesota

WB0JWG 9168-191-48-A
W0LCN 2844- 74-36-ABD
K1WVE/0 2820- 94-30-A

Missouri

WA0TXV 2030- 67-29-ABD
W0KC 600- 60-10-AB
WB0LNS 312- 26-12-A
WB0PNW 228- 19-12-A
W0YZS (+K0TLM WB0ITA) 7964-175-44-ABCD

Nebraska

K0JBL 4773-129-37-AB

North Dakota

WA0CSL 5476-147-37-ABD
K0ALL/0 (WA0s KSB ZNJ ZOK WB0GPW) 8865-197-45-AB

Asterisks denote Headquarters staff members, ineligible for awards.

RTTY DX Sweepstakes

1) The contest commences at 0200 UTC Sat. Oct. 4 and ends at 0200 UTC Mon. Oct. 6, 1975. The total contest period is 48 hours but no more than thirty (30) hours of operation is permitted. Time spent listening counts as operating time. The non-operating period can be taken at any time during the test and summary of times on and off must be included in the score sheet.

2) The contest will be conducted on the 3.5, 7, 14, 21 and 28 MHz amateur bands.

3) Use the ARRL Country list, except that KL7, KH6 and VO are to be considered as separate countries.

4) The message is to consist of a message number, time in UTC and zone.

5) All two-way RTTY contacts with stations in one's own zone will receive two points. All two-way RTTY contacts with stations outside one's own zone will receive points listed in the Zone Chart (See page 52, *QST* for September, 1974). Stations may not be contacted more than once on any one band. Additional contacts may be made with the same station if a different band is used for each contact.

6) 100 bonus points will be added for every VE and VO station contacted. Bonus points to be added to total score at end.

7) Entries will be classified as either single operator stations or multioperator stations with one transmitter. Individual operators of multi-operated stations may submit their logs singly and compete as single operators instead of submitting a group log, if desired.

8) A multiplier of one is given for each country worked including one's own on each band; e.g. if one country is worked on 3 bands, 3 multipliers are given. *Each U.S.A. and Canadian District will be considered a separate country.*

9) CARTG log sheets are available for s.a.e. or IRCs. Separate pages will be used for each band. Information contained will be band, exchange numbers, times in UTC, station calls, zones, countries, exchange points and power. Logs must be received not later than December 1, 1975. Send them to: Canadian Amateur Radio Teletype Group, 85 Fifeshire Road, Willowdale, Ontario, Canada M2L 2G9

10) To score, the total exchange points multiplied by number of countries worked, multiplied by number of continents (maximum 6). Finally bonus points added.

Awards

Ten plaques will be sponsored by the CARTG, the *RTTY Journal*, and a Group Member. Other awards include the following. High U.S.A. Score, Gold Medallion and Ribbon – *RTTY Journal*. High Canadian Score – Canadian Director's Award. High Score for Green RTTYer (no participation in previous RTTY test), Sidney Burnett Memorial Plaque. Most two-way 80-meter contacts, plaque – C.A.R.T.G. SWL printer high score, plaque – C.A.R.T.G. High score using low power (under 100 watts), plaque – *RTTY Journal*. High score for multi-operated stations, plaque – C.A.R.T.G. Certificates for top scores in each U.S.A. and Canadian District and each country. QST

Part V-B

TRANSFORMERS, TUBES TRANSISTORS

BY MARGARET KOERNER,* WBØBEM

Transistors

THE TRANSISTOR, brainchild of three men — John Bardeen, Walter Brattain and William Shockley — came into the world in 1947 and within ten years' time had earned world-wide fame for itself and a Nobel prize for its developers. Its electronic genealogy shows it is a distant relative of the vacuum tube, and the two components (vacuum tubes and transistors) have many functional characteristics in common. They also differ in many important ways, and if we tried to use the same vocabulary in describing transistors that we just used to describe vacuum tubes, we would find our words going down the drain in a flow of holes.

Transistors, unlike inductors, capacitors, and resistors, are constantly in the news and even the general public knows them by name. They are widely used in the field of radio, and all active amateurs, regardless of license class, are aware of their increasing importance in amateur radio equipment. Novices and would-be Novices, however, as well as a large number of higher class licensees, look upon transistors as the hardest to understand of all the circuit-team members.

Extensive technical information concerning transistors exists in a wide variety of books and periodicals, including such ARRL publications as "How to Become a Radio Amateur" and *QST*'s recent series entitled "Learning to Work with Semiconductors." It is hoped that the following discussion, by virtue of its different approach, general nature, and primer type of explanation, will be an additional help to beginners studying for their Novice and General exams.

Transistors have been defined as "solid-state electronic devices made of semiconductor materials" — a definition which, for the beginner, may only add additional words which need explaining. We'll start, then, with those.

Solid State

The trend in amateur radio today (a trend so fast-moving that it is almost an avalanche) is toward what is commercially referred to as "solid-state equipment." Thousands of amateurs have already switched their allegiance from strictly vacuum-tube equipment to this new type of rig, and judging by what one hears on the amateur bands and elsewhere, thousands of others are considering doing so in the near future. The trend marks the biggest change in amateur radio since a-m lost out to single sideband, although the present conflict of loyalties is not as emotionally charged as that battle seems to have been.

The term "solid state" goes back to the fact that substances exist in either gas, liquid, or solid form. Since transistors and crystal diodes consist of solid materials, they are called solid-state devices or solid-state components, and the fact that their electric currents flow through solid materials distinguishes them from vacuum tubes, in which current flows through a gas.

An early-day solid-state device was the cat whisker diode made of a galena crystal and a piece of wire. A more stable solid-state diode was developed later and used in radar sets in World War II. Finally, in 1948, Bell Telephone Laboratories produced a three-section device, the transistor. All of these solid-state devices produce desired electrical phenomena by using a type of material called a semiconductor.

Semiconductor Materials

The prefix "semi" (pronounced either seme or semi) means *half*, and semiconductor materials received their name because their ability to conduct electricity lies in between that of good conductors such as copper, and good insulators such as glass or ceramics.

The semiconductor materials most frequently used today in the manufacture of transistors and solid-state diodes are **germanium**, a rare chemical element; **silicon**, a more common element; and **selenium**, a fairly rare element. The atoms of these materials are arranged in orderly geometric *lattices* or patterns to form crystals. (Note: The crystals used in transmitters to control frequency are quartz crystals, which are not semiconductors and have very different physical properties.) Early-day

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† Sixth in a series

diodes were made of semiconductor crystals which contained *natural* chemical impurities. Today's semiconductor devices depend on crystals which have had their lattice structures purposely modified by the *laboratory* addition of certain chemicals.

Chemicals can change both the *resistance* and the *mechanism* of current flow within semiconductor crystals, and the chemicals used in modern solid-state devices are introduced into the crystal lattice by an ingenious laboratory process called **doping.** Depending on the choice of doping chemical, *electrons can be added* to a crystal lattice or *"holes" can be developed in it.* (These holes are not holes in the usual sense, but rather are positions in the lattice from which electrons are missing – electrons which would be there if the crystal was not doped.) Chemicals which donate electrons are called **donors** and donors develop current as a result of **electron flow.** Chemicals which develop holes are called acceptors, and acceptors create current by what is called (very confusingly) a flow of holes. All I can advise you to do if you wish to visualize this flow of holes (and as far as your license exam is concerned you certainly don't have to) is to get a game of Chinese Checkers, play it, and watch the holes flow.

From Semiconductor Materials To Semiconductor Devices

Now let's look at a seven-step primer-simplified explanation of semiconductor materials and how they become diodes and transistors.

1. Semiconductors are a class of crystalline materials which exhibit certain characteristics. At very low temperatures, their crystals act as insulators, but at higher temperatures (even as low as room temperature) some of the electrons within the lattice pull loose from their atoms and start drifting around the crystal. A further increase in temperature, or a voltage placed across the crystal, increases the conductivity so that an actual measurable current can be created.

2. Pure crystals of semiconductor materials are produced *only in laboratories* where they are "grown" from tiny "seed" crystals which gradually accumulate layers of material. These pure crystals (emphasis on the word pure) can *conduct in more than one direction.*

3. In their natural form (that is, as they are found *in nature*) semiconductor crystals contain chemical impurities, and these impurities determine the *mechanism* and *direction* of current flow. Galena, one of the semiconductors from which early cat whisker diodes (**point contact** diodes) were made, contains many such natural impurities and early experiments showed that if a spot or point where the proper impurity was located was touched by a thin wire (called a **cat whisker**), current could flow through the crystal and the wire but *in only one direction.* The crystal was then acting as a *conductor in one direction and an insulator in another.*

4. Basing their experiments on this phenomenon, scientists began to dope pure laboratory-grown crystals of germanium and silicon with chemicals chosen to *consistently* achieve desired results. It was found that by adding certain chemicals such as arsenic to the crystal, a **negatively-charged** (–) or *n* region could be produced – a region which had an excess of stored electrons. By adding other chemicals, such as indium or boron, instead, a **positively-charged** (+) or *p* region resulted, which can be thought of as having a deficiency of static or stored electrons. The chemicals used in the doping process are usually added to the solution from which the crystals are grown, but they can be "injected" into the crystals, after they are formed, by a method such as thermal diffusion or by using an ion injection gun.

5. By placing a p (+) region and an n (–) region together, the **junction diode** was developed – a stable diode which conducts in one direction, with current flowing from the n region to the p region when the proper electric pressure or voltage is placed across it.

6. By using three of these doped n and p crystal sections (two of one kind and a very thin one of an opposite charge) the **junction transistor** was brought into being – an npn sandwich, or a *pnp* one.

7. Summary: The peculiar characteristics of semiconductor materials – their ability to produce free electrons, their mid-way position between good conductors and good insulators as far as conductivity is concerned, their tendency to let impurities determine the direction of flow of their currents, are what we might call congenital characteristics. Semiconductor crystals are semiconductors to begin with and doping only makes them more so. The addition of chemical impurities by laboratory doping gives them definite p or n properties, depending on the kind of impurity introduced into them, and makes possible the *control of direction and of strength* of their electrical current, thus bringing them much closer to materials with excellent conductive ability. Their conductive ability, however, is in *one direction*, and makes possible the production of present-day crystal diodes and those modern miracle workers, the transistors.

Electrodes in Crystal Diodes and Transistors

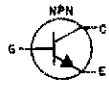
The n and p regions or sections of the crystal diode act as its two electrodes – a **cathode** and an **anode.**

These correspond to the cathode and anode of a vacuum tube.

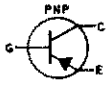
The electrodes of the npn and pnp transistors are its three "sandwich" parts, designated **emitter, base,** and **collector,** with the base as the "filling" of the sandwich. They correspond in general to the electrodes of a triode vacuum tube – the emitter corresponding to the cathode; the base to the grid; the collector to the plate. You'll have no trouble remembering that the emitter corresponds to the cathode, since both electrodes emit, but if you have trouble remembering how the others com-

pare, just remember that "passing the plate" in any group means taking up the *collection*.

The symbol for an npn transistor is



for a pnp transistor



The arrow on the emitter shows the direction of current flow. (Note: Beginners sometimes have difficulty remembering which way the arrow points for the two types. Although it embarrasses me to do so, and may offend serious readers, I'll tell you the memory device I finally figured out to help me when I was a beginner. Think of the base as North. The npn arrow then says "not point north"; the pnp arrow says "point north," You can add "Please" if you wish to make the pnp complete.

Uses of Solid-state Devices in Radio Equipment

Solid-state devices do the same type of work that vacuum tubes are designed to do. They rectify, amplify, oscillate, modulate and detect.

Special types of transistors which are appearing with increasing frequency are the Field Effect Transistor or FET (usually pronounced by saying each letter) and the *Metallic Oxide Semiconductor Field Effect Transistor* or MOSFET (pronounced moss-fet). These field effect transistors combine the best features of conventional transistors and also have some of the most desirable features of vacuum tubes. They have extremely high input resistance on an electrode called a **gate** and current flow is controlled by a voltage on this gate. Their other two electrodes are a **drain** and a **source**.

Comparison of Transistors and Vacuum Tubes

Transistors have many advantages. They are small in size, light in weight, and are therefore valuable for miniature and portable equipment. They are mechanically rugged, have a long life expectancy, and are highly efficient. They require no warm-up time and no heater current is needed. Many of them are very inexpensive.

The main disadvantages of transistors are their inability to stand transient over-voltages, their inability to stand a lot of heat, and their power-handling limitations. They are often prone to cross-modulation in receivers, and have a number of insertion problems (as hams who have built solid-state rigs can testify).

Vacuum-Tubes, on the other hand, can stand high transient voltages (which accounts for their being described as "more forgiving"), have fewer cross-modulation problems have very few insertion problems, and provide greater power at less cost per dollar. However, they are bulky, mechanically fragile, require time and power to warm up, have a shorter life expectancy and in general are more expensive and less efficient than their modern counterparts.

Vacuum tubes are still the stars on many circuit teams, but as we stated earlier, transistors can be considered superstars, heavily loaded with advantages, and the trend today is toward solid-state rigs, commercially referred to in ads as "Completely solid state!!" or "Completely solid state except for finals." The finals referred to are vacuum tubes which carry high power for desired amplification.

Transistors did not even come of age until recently, yet they have changed the age in which we live. Their development has made possible the **integrated circuit** (IC) in which hundreds of complete circuits can be placed on a chip of semiconductor material 0.1" by 0.1" in size. With

(Continued on page 78)

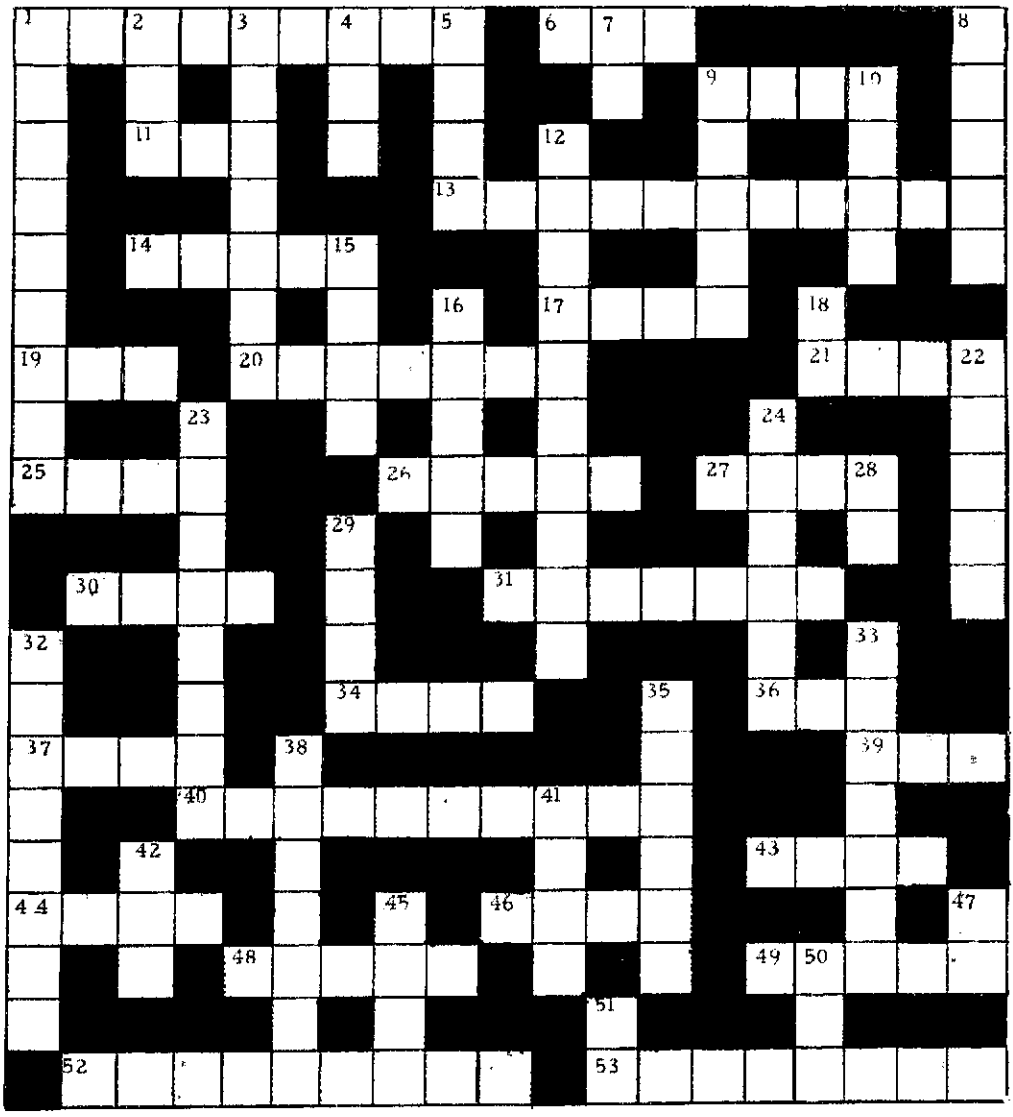
ACROSS

(It goes easier if you do these first)

1. General term for any electronic working part of a v.t.*
6. Nickname for wire "whisker" in early-day diode
9. Wires exit through these at base of tubes
11. Special type of transistor (abbrev.)
13. Tetrodes have an advantage over triodes because they don't have to be _____
14. Rectifier tube
17. Laboratory state of crystal before doping
19. Second syllable of tube names (and a form of verse)
20. Transistor element corresponding to v.t. cathode
21. Plate current flows through this after leaving tube
25. Prefix meaning "half"
26. What this puzzle is but we hope you aren't
27. Wire-mesh electrode in v.t.
30. Common name for negative voltage on control grid
31. Grid which determines number of electrons reaching plate
34. Which line on a battery symbol indicates the positive side?
36. If you say semiconductors do not exist in natural form, you____
37. Pentodes provide high amounts of this
39. Is it true that the trend today is toward solid-state equipment?
40. Three-part solid-state device
43. Important element in FET
44. Name of atoms which have lost or gained electrons
46. Transistor element corresponding to v.t. grid
48. The flow of these in semiconductors is like their flow in Chinese Checkers
49. Germanium is a _____-state material
52. Transistor element corresponding to v.t. plate
53. Type of charge placed on plate to attract electrons from cathode

DOWN

1. A cloud of these makes up a space charge
2. Another name for voltage (abbrev.)



3. A v.t. with four electrodes
4. In diodes, current flows in _____ direction
5. + and – charges try to _____ things out
7. Rectifiers change this to dc
8. Technical name of v.t. plate
9. Common name for v.t. anode
10. The small _____ of transistors makes them valuable for portable equipment
12. Grid that turns back electrons bounced off of plate
15. The cathode can do this to electrons
16. In this Primer, v. tubes are rated as the _____ on circuit teams
18. A woman amateur radio operator
22. Semiconductor crystals get _____ with chemicals in laboratories
23. Emits electrons in directly-heated v.t.
24. V.t. with 3 electrodes
28. Prefix meaning "two." Used in name of rectifier tube
29. Publishers of *QST*
32. Type of charge on grid to repel electrons coming from cathode
33. Semiconductors "grow" in this form
35. Grid which prevents interaction between plate and control grid
38. Part of v.t. that emits electrons (general term)
41. In this Primer, six components make up a circuit _____
42. A transistor sandwich with a negative filling
45. Tubes require _____ for the emission of electrons; transistors do not
47. Observe safety rules with plate voltage or you'll need this one fast (abbrev.)
50. From the top of a v.t., conducting wires lead _____ through a cap
51. The amount of current in a piece of semiconductor material goes this way when temperature is increased or a voltage placed across its crystal

* v.t. = vacuum tube

Are You Ready To Leave?

BY MEADE M. PADGETT,* KH6GHZ

ARE YOU *really* ready? I mean, are you prepared for the day a sudden heart attack may claim you or, perhaps, a highway accident or other disaster befalls you, leaving your widow with a ham shack full of equipment, tools, publications and other items that she won't have the slightest idea of how to dispose of? Have you thought ahead, irrelevant as it may seem at the moment, to the day when your XYL may be faced with disposal of your gear – assets she has helped to pay for over the years? Do you want her to *give* all those goodies away simply because she has no idea of their worth and, worse yet, because you didn't prepare her for that eventuality? Of course not!

It has been wisely written, "Planning is something no contingency should be without!" (*QST* extra, "Are You Ready?", Dec., 1967). Death and taxes are things we all face, and there is really nothing we can do about either of these. However, we can prepare for them, just as we gear to file the old income tax report each year. We pay premiums to provide life insurance to protect our loved ones, so why not prepare the XYL with information on the assets in the ham shack? She could use the money!

How about a new kind of insurance? Let's call this "Ham Insurance." Insurance companies don't provide this, but you can if you think ahead and realize the position your XYL will be in. Why not figure and document the equity that you have in your equipment, tools, publications, etc., so that the XYL will know what to do with them when you are no longer around?

All ham equipment has a reasonable resale price. *QST*, *CQ*, *Ham Radio*, *73*, and other ham magazines list all types of amateur equipment which is for sale. From these you can derive a reasonable resale price for your equipment. Also, equipment distributors list new and used equipment which can be the basis for your judgment of the equity you have in your equipment. However, the XYL may not read these and, therefore, it is up to you to develop this information for her.

How about a survivor's kit of information for the XYL? I suggest listing all of your equipment by nomenclature and condition. Indicate date of purchase or acquisition; state whether you bought it new or used, and include the original cost of the equipment. Indicate a suggested resale price for each item. Such information will help her make intelligent decisions regarding the disposal of equipment.

In my case, I favor a ledger-type format consisting of several columns which are headed as follows: (A) Manufacturer, (B) Nomenclature with model indicated, (C) Serial number, (D) Cost, (E) Year acquired, (F) New or used when acquired, and (G) Remarks or catch-all column. In the remarks column, I suggest a *reasonable* sales price for the item as a guide for *her*.

Next, make a listing of ways in which she can dispose of the equipment. This will require your rapt attention to details involved. Your list should include, first, the name or names of close friends or ham buddies who can help and advise her. She will appreciate their help in her time of need. Next, list ways in which she can sell the equipment, i.e., newspapers, ham magazines, or other advertising media. Provide a list of addresses for all those you recommend so that she is not faced with another problem in locating them. Place yourself in her position and anticipate the problems that she will be facing in such circumstances.

Many amateur radio operators own numerous technical books and other reference material as well as many respectable libraries which relate to amateur activities. Most radio shacks contain a goodly supply of back issues of ham periodicals. And, how about the old junk box of tubes, fuses, coils, capacitors, etc? Boy, what a dilemma all this will create for the XYL!

You must know of a local radio club, high school, or other electronics center which can use anything of this nature that comes their way. Make notes on these things as part of her "survivors" package. If you can't be specific as to the actual organization of your choice, at least provide suggestions. She'll have none!

As the sayings go, "We can't be here forever," and, "You can't take it with you." This sort of planning and related thinking makes sense. We all plan ahead with life insurance, disability and mortgage insurance. We draw up wills and make maximum effort to provide for the security – financial and otherwise – of our surviving spouse. I'm sure most of us have assembled a packet of all such data the XYL will need when that day comes. And, undoubtedly, you have gone over the details of those documents with her. Why not go one step further and fatten the package with the type of information I allude to here? She can use your guidance, and she can also use the money that your shack represents. Lay it out in usable format, whether it be along the lines I have described or in a format of your choice. But, lay it out, and discuss it with her. Be sure she knows what it is and how she can use it. Use her questions to make yours an even better package than it seems now. One day, she'll love you for it.

Food for thought? You bet it is. Why not act on it??

* 46-439 Kuneki Street, Kaneohe, Hawaii, 96744.

Reducing AIR POLLUTION

BY EDWARD BIRO,* K6NB

RADIATED RF ENERGY is never destroyed but appears in conversion by-products such as sound, light and heat. This article will discuss pollution caused by heated air. Assuming that the transmitter has been adjusted in accordance with FCC regulations (minimum power to maintain communication), hot air, can be further reduced by shortening the time to say what we want. A brief article cannot possibly cover both cw and phone modes, so this will pinpoint cw, though much of it will also apply to voice.

	MEANING
QSL 0	I really don't dig QSL cards, so please don't bother to send one.
QSL 1	Don't need your card but will send one of mine if you wish.
QSL 2	You probably could not care less about getting a card from me but I would like one of yours.
QSL 3	Am waiting for a new batch of cards from the printer, will send you one as soon as they arrive.
QSL 4	Will send via airmail.
QSL 5	Will send direct.
QSL 6	Will send via burro.
QSL 7	Need yours for WA . . . (add C,P,S or Z).
QSL 8	Need yours for 5 band WA . . ., (add C,P,S or Z), Desperately need your card, will send s.a.s.e.
QSL 9	IRCs plus 100 Blue Chip Stamps.

The avid phone operator will probably contend that cw produces more pollution because it takes longer to say the same thing, but let us observe what suitable cw abbreviations can do. Consider that popular phrase "you know" heard so much in the phone segments. It takes about one second with voice and about five seconds with cw. But, an abbreviation such as UNO could reduce the time to about one and a half seconds with cw.[1] What many phoners overlook is that they often squander their original four second advantage by creating other pollution with utterances of aaargh, ughhh, garumph, etc.

Cw operators don't use such verbosity, but are guilty of other things. For instance: "I used to work cw at 55, 60, 65, etc. words-per-minute all day long years ago, but I am sort of rusty now". Actually there are two forms of pollution involved here – but let us stay with the rf type. QTK is an unassigned abbreviation, though some use it unofficially for Quit The Kidding. If we adopted it, and add the former speed of years ago, the rf pollution would be reduced considerably. You have heard the cw operator (not the QTK type) that uses NV for "test," PD for "and," PLL for "well," NAG for "name," HOG for "home" and NNMA for CQ. These abbreviations save no time and should be avoided. He constantly complains that his key or keyer is acting up. QKAU would be an excellent abbreviation, though here again, it would only reduce the rf type of pollution. He often comes back with "R" (all received correctly) and then asks for a repeat of NAG, QTH and signal report. What is needed here is an abbreviation for a partial OK, such as POK. In this case it actually increases the rf pollution slightly but eliminates the other kind entirely. We can't win them *all*!

73 stands for best regards. We hear him say "must QRT so it's Best 73s (plural) for now". Evidently some kinds of 73 are better than others, so let us use 74 to indicate the *best* kind and several of them for this point in time. He generally begins operations for the day with a robust tuneup and believing in "togetherness" selects a frequency already in use. When finally tuned up he immediately sends a long series of fast QRZ?. As QRZ? means "who is calling me?", this must be some experiment in ESP – why else would he assume that someone had been calling him while he was tuning his transmitter? If no one answers he will send a marathon-long CQ then finally his call letters, which come out differently each time they are sent, and then concludes with KN. Rarely does anyone come back to him, KN notwithstanding.

He gives everyone a T9 report, even if the other station has a note that sounds like a gooney bird with laryngitis. Should the other station give a signal strength report of less than S9, our friend will go through the whole tuneup procedure again, find he has increased his plate current by five milliamperes, and then ask for a new report. If the new report is not revised upwards, he will brood over his high SWR of 1.5:1. His QSOs are of the receiving-code test type: "OK on your weather, OK on your rig, OK on your antenna, OK on losing $50 at Las Vegas, OK on building a MOOG synthesizer, and OK on going to the Chagos Islands, so how now?" An abbreviation is needed for Tough Luck Old Boy; being hobbled with only FB, he is forced to say "FB on your tower being blown down" and "FB on being in the hospital

(Continued on page 96)

* 4362 Detroit Ave., Oakland, CA 94619.

[1] UNO is also the name of a popular candy bar so our legal department should be consulted before adopting this one.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY BILL MANN,* WA1FCM

New ARL Texts. As a result of Communications Department polls and suggestions from traffic handlers, five new ARL numbered radiogram texts are being added to the list. Topics included are: DX cards at ARRL QSL Bureau, general holiday greetings, general congratulations and Mother's and Father's Day greetings. Reference material is being changed to reflect the additions. Listing of ARL Numbered Radiograms is in the back of each ARRL Logbook and the list is available free for an s.a.s.e. as CD Form 3.

New Texts are as follows:

THIRTY NINE – DX QSLs are on hand for you at the____QSL Bureau. Send ___ envelopes.

FORTY NINE – Greetings and best wishes for ____ Day.

EIGHTY THREE – Heartiest congratulations on _____.

EIGHTY FOUR – Wishing you the best of everything on Mother's Day.

EIGHTY FIVE – Wishing you the best of everything on Father's Day.

MARSions. This fall marks the 50th anniversary of cooperation between amateurs and the military. The cooperation was first detailed in *QST* in October, 1925, in an announcement of "Affiliation of the Signal Corps, U.S. Army, and the Transmitting Radio Amateurs of the United States." Although originally tied in only with the Army (Army Amateur Radio Stations, and later Army Amateur Radio System – AARS), the military-affiliate program (now called Military Affiliate Radio System – MARS) is presently separated into three branches: Army, Air Force and Navy–Marine Corps.

The handling of morale traffic, and to an extent overseas phone patches has dropped off somewhat with military de-esculation abroad. However, there is still traffic to handle on behalf of servicemen and women and the MARS mission to provide backup for military communications is also a primary factor.

For more information on the MARS program, write to the appropriate addresses given below. An amateur may be a member of only one MARS branch at any time.

Army MARS – Commander, U.S. Army Communications Command, ATTN: CC OPS OM, Fort Huachuca, AZ 85613.

Air Force MARS – Command MARS Director, Headquarters AFCS DOYFM, Richards-Gebaur AFB, MO 64030.

Navy-Marine Corps MARS – Chief, Navy-Marine Corps MARS, Eighth & South Courthouse Road, Building 17, Arlington, VA 22204.

Omaha, Nebraska – Hams Perform. The following is excerpted from an article prepared by WØYZV for the Ak-Sar-Ben Radio Club's *Ham Hum*. It's a good example of what amateurs can accomplish when confronted with a "typical" major emergency.

Whereas it is well known that in the event of an emergency, hams from the community affected as well as surrounding communities will flock to the rescue and give a good account of themselves by assisting in communications. It is also a well known fact that in so doing, it takes considerable time to become organized to the point of efficiency using these volunteers. About two years ago, the Ak-Sar-Ben Radio Club encouraged one of its members, WAØDHU, to apply for appointment as Emergency Coordinator for Douglas County, Iowa. He gathered a group of interested and dedicated hams and they developed an AREC Net for the purpose of training and preparedness.

Shortly after noon on May 6, 1975, we received a call from Offutt Air Force Base. In accordance with previous plans, we established a net control station at the base and dispatched several mobiles to designated points. Once they were at location

Recently, K7KVV (left) received an EC certificate from WA7KIU, Oregon SCM.

* Assistant Communications Manager, ARRL.

they provided Offutt with continual visual observance of developing weather conditions. At approximately 1600 a mobile reported funnel touchdown in the Ralston area.

Moments after the Offutt sirens sounded, the Omaha sirens began their continuous wail. Net control was immediately turned over to the regular AREC Net. NCS was WBØCMC. From 1630 to 1700, mobile units reported and plotted the path of destruction and the Red Cross was notified.

The first problem at hand in such a disaster is to survey the area. Block-by-block reports were sent to the NCS where the information was recorded on city maps. The total time for this initial survey was approximately five hours. During this time there was a continuous sending in of information and as a result, the Red Cross could coordinate services with city officials to take care of the people.

By 1900 it was concluded by Red Cross officials that a Disaster Relief Center would be established and a station was set up. Inasmuch as the NCS was now at the Red Cross Chapter House, this gave Red Cross immediate communications.

Communications were needed between the emergency line to police (911) and National Guard Headquarters. Rigs and operators were established at both locations. This operation was also linked to the Red Cross Chapter House on the AREC Net. In addition to the 146.34/146.94 MHz repeater, the .22/.82 machine was also used.

Following the tornado, it became necessary for the Red Cross to dispatch food vans into the areas and for efficiency, we supplied a communications setup for each of these vans, thus permitting communications for directions and supplies.

Thursday night the National Guard requested 10 mobiles to keep track of volunteer cleanup crews. On Saturday and Sunday, we turned our attention to individual guardsmen, providing them with backup communications as an onslaught of sightseers was expected.

At the request of the Federal Disaster Assistance Administration, we established point-to-point communications between their two offices at schoolhouses adjacent to the damaged area. Operation continued through Tuesday when these offices were moved.

The Red Cross station, WØCQX, was the hub of health and welfare activity. To simplify matters as much as possible and handle expeditiously the thousands of messages, we duplicated the initial survey map and attempted to get answers back immediately where the address of the party was completely out of the disaster area. For any address within the disaster area, we checked the Red Cross listing to find out what we could. Those we could not handle either by not being able to find them or positively identifying the address as being out of the area, we turned over to the Civil Air Patrol who worked with the REACT group. Answers were returned by teletype to the CAP Red Cross Hq. adjacent to WØCQX and the answer dispatched to the originator of the request.

Our special thanks go to those many hams who remained silent during our operations and to those who monitored and did not interfere with frequencies being used for emergency traffic but who did, when necessary, report in for accepting or delivering traffic.

After experiencing this 14-mile long strip of destruction, we have no one left who believes "It can't happen here." Since the tornado we have held several meetings to determine how a better job could have been done. We are pleased with the service we have rendered, but now know where it could be improved and will work toward this improvement.

On Emergency Communications

When tornadoes ripped through Atlanta, Ga., last spring, area hams were on hand to provide much-needed communications for the Ga. State Patrol, National Guard, c.d., Red Cross, Atlanta City Police and others. Reflecting on the activities, former Ga. SEC (now SCM) K4WC recorded some points on emergency communications that warrant repeating. Here are some of those points:

1) *Don't offer excuses.* You can't communicate with excuses. "I'll be available later." "My phone patch is on the shelf." "My low-band antenna blew down last week." All these mean the same thing – you can't help when we need you.

2) *Constantly check your equipment.* You can't talk on inoperative equipment. Only what is working right now counts.

3) *Register with and support AREC.* You may be the best qualified with the best equipment and ready to serve, but if your name, phone number or address is not instantly available and/or if you've not practiced and trained with the others before, how do you expect them on the spur-of-the-moment to overlook your shortcoming? In an emergency, only what's available is worth considering.

4) *Forget power.* Don't consider yourself unavailable because of low power. Flea power is more effective than no power. There is more to reliability than watts!

5) *Stick to your assignment.* Sometimes assignments are made with someone only to find later that the need arose earlier than expected and he had wandered off. It can't all be done just when you want it done.

6) *Heroes aren't needed.* Don't try to be a hero on the job.

7) *Listening is required.* Transmit only when asked to or when real need arises.

8) *Don't forget logistics.* Your effectiveness is affected by logistics. Most folks need a drink of water, a bit of food, a little rest, etc. Be sure to get another helper as soon as practical.

9) *The critique makes next time better.* The best help you can get is to learn from experience. If the latest emergency affair isn't criticized, the next one won't be your best effort. – *K4WC*

■ For June, 32 Section Emergency Coordinators reported a total AREC membership of 11,393. At this time in 1974, 40 SEC reports were received with a membership of 13,095. Sections reporting: Alaska, Ariz, Colo, Conn, Del, EMass, Hi, Ill, Ind, Kans, Mar, Mich, Mont, NC, NNJ, NTex, Okla, Ont, Org, Ore, RI, SDgo, SCV, Sask, SFla, SNJ, STex, Utah, Wash, WMass, WNY, WPa.

As a half-year summary, 246 SEC reports have been sent in from 51 different sections. At the same time last year, 227 reports were received

At left, WB4DQI and WB4UCO man checkpoint No. 1 on the 50-mile path of the Memphis, Tenn., Heart Association bike-a-thon. At the control point (right) W4AHB and WB4SCR maintain communications with the seven checkpoints as will as amateurs patrolling the route - assisting the riders. Over 20 Shelby Co. amateurs provided communications for the March 23 event.

from 54 different sections. So far, sections with 100% reporting this year are: Alaska, Ariz, Colo, Conn, Del, Hi, Ill, Ind, Kans, Mar, Mich, Mont, NC, NNJ, NTex, Okla, Org, SDgo, SCV, Sask.

Traffic Talk

Once in a while a station will check into a net with traffic that can only be handled on another net. So someone takes the message to the other net for him, no sweat, right? Wrong! Because this time the originating station is inexperienced in formal traffic handling. He sends the text, then the address and gets ready to go to dinner. Some ops think "putting a number on it" solves this problem. But putting a number on it does not a QTC make. The receiving station should get complete preamble information from him and read it back for approval. Thus, a radiogram is born. Now, the message and replies can be routed correctly. At the same time, the originator becomes acquainted with proper procedures. Of course, when he says "roger roger" instead of affirmative, it becomes clear that you can't win 'em *all*. – *WB2NOM*

■ *National Traffic System.* D1RN certificates were issued to K1GUP W1OOV WA1QJU WA1RLP W1UKR. 4RN certificates went to WB4GHU and WB4HKP. W6INH is the new RN6 manager. WB9KPK took over as 9RN manager. W7TGU and WA7ZEA earned DRN7 certificates. W4SHJ commends WA4FBI and K4SCL for outstanding support of 4RN. Band conditions could be better comments CTN mgr. K7IFG. K2KIR bemoans "Wrotten Wrepresentation."

June Reports

Net	*Sessions*	*Traffic*	*Ave.*	*Rate*	*%Rep.*
EAN	30	1337	44.5	1.179	95.0
DEAN	29	361	12.4	.519	77.2
CAN	30	967	32.2	.759	98.9
PAN	30	995	33.2	.805	96.6
1RN	58	376	6.5	.414	89.0
D1RN	27	78	2.8	.230	83.9
2RN	58	436	7.5	.741	94.6
3RN	60	400	6.6	.396	96.1
D3RN	28	184	6.5	.469	91.1
4RN	52	371	7.1	.279	81.7
RN5	60	852	14.2	.380	85.9
DRN5	29	198	6.8	.278	70.0
RN6	55	513	9.3	.394	93.3
DRN6	58	170	2.9	.115	52.0
RN7	60	347	5.7	.470	89.8
DRN7	40	45	1.1	.170	37.5
8RN	47	259	5.5	.330	69.4
D8RN	29	122	4.2	.476	70.0
9RN	57	368	6.4	.310	78.4
D9RN	30	95	3.1	.187	83.3
DTRN	44	67	1.5	.110	54.8
HCN	60	211	3.5	.300	83.3
TWN	58	267	4.6	.203	82.0
DTWN	21	45	2.1	.090	50.0
CTN	28	351	12.5	.283	87.7
TCC Eastern	113[1]	715			
TCC Pacific	112[1]	756			
Section	4005	10886	2.7		
Summary	*5083*	*25846*	*5.1*		
Record	*4995*	*27092*	*15.9*		

[1] TCC functions not counted as net sessions.

[2] Section and Local nets reporting (123): AENB AEND AENJ AENM AENR AENT AENW AENX (AL), ASN (AK), AIEN (AZ), AMB APN ARN ATN OZK (AR), NEN NCN SCN (CA), CN CPN (CT), DEPN DTN (DE), FAST FMTN FPTN GN NFPN QFN QFTN TPTN VEN (FL), GSBN GSN (GA), IMN (ID,MT), ILN (IL), INN (IN), IPSMN TLC (IA), KPN KSBN QKS QKS-SS (KS), KNTN KTN KWN KYN (KY), LAN LSN LTN (LA), MDCTN MDD (MDC), EMRI EMRIPN EM2N HHTN WMN WMPN (MA), MACS MNN MI6 QMN WSBN (MI), MSN MSPN PAW (MN), MSBN MSN MTN (MS), MON MOSSB PHD (MO), ENEAREC WNN (NE), NHVTN (NH,VT), NJN NJPN NJSN (NJ), NLI NLS NYS (NY), CN NCSSBN THEN (NC), NDRACES (ND), BN BNR OSSBN OSN O6MTN (OH), OAN OLZ OPEN OTWN STN (OK), BSN OSN (OR), EPA&TN PTTN WPA (PA), SDEN (SD), TN TNN (TN), TEX TEX-SS TTN (TX), BUN (UT), VSBN VSN (VA), NSN WSN (WA), WVN WVMDN WPN (WV), BWN WIN WNN (WI), APN (Mar.), GBN ODN OPN OQN (ON), WQV/D (PO), MTN (Man.).

Transcontinental Corps

Pacific TCC certificates went to W6RVB, WB6DJP, K7IWD, K6DRL.

Area	*Functions*	*%Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	113	95.0	1779	715
Pacific	112	93.3	1520	756
Summary	*225*	*94.1*	*3299*	*1471*

The TCC roster (June): Eastern Area (W2ER, Dir.) – W1s NJM QYY K1GMW WA1s MSK POJ STN, W2s ER GKZ KAT/3, WA2s DSA ICB PJL UWA, WB2s PYM RKK, W3EML, K3s CB DZB MVO, WA3RBS, W4UQ, K4KNP, WB4SGV, W8PMJ, K8KMQ, WA8HGH, VE3SB. Pacific Area

(K5MAT, Dir.) – W5RE, K5MAT, W6s BGF BVB EOT MLF QAL VZT, K6HW, WA6DEI, WB6s DJP OYN, VE7ZK, W7s BQ DZX GHT KZ, K7s IWD NHL NHV QEG, WØs LQ, LRN, KØDRL, WBØHCK.

Independent Nets (June)

Net	Sessions	Traffic	Check-ins
Central Gulf Coast Hurricane	30	51	1717
Clearing House Net	25	285	477
Hit & Bounce Net	30	916	313
Hit & Bounce Slow	15	54	124
IMRA	38	647	1394
Mike Farad Net	26	30	165
Mission Trail Net	30	184	1195
North American Net	25	238	341
20 Meter ISSB	21	1315	245
75 Meter ISSB	30	439	1058
7290 Traffic Net	42	689	1598
West Pacific Net	30	163	148

Public Service Diary

■ St. Clair Co., AL – Jan. 10. Amateurs on the staff of the Anniston, AL, Army Depot handled emergency communications when a tornado hit the area. – (Public Information Office, Anniston Army Depot)

■ Cleveland Heights, OH – June 4. The SKYWARN Net went into action when heavy winds knocked down trees and power lines in the area. – (W8GRG)

■ Cedros Island, Mexico. – June 5. Doctors in a small Mexican hospital were in desperate need of complicated anesthesia instructions in order to save the life of a critically-ill woman. A 75-meter station was setup at the hospital and contact was made with XE2LQ, a Tijuana anesthesiologist. His knowledge and advice made surgery possible. Early the next morning, the woman was pronounced out of danger. Many amateurs assisted in this "surgery by remote control," among them XE2QM and XE2MMX. – (W6GBF, SCM SDgo)

■ Scott Lake area, WA – June 8. Members of the Boeing Employees ARS furnished a communication link during the search for a missing young woman. – (W7RJW)

■ Harris Co., TX – June 9-10. During severe flooding, Harris Co. amateurs furnished emergency communications for the Civil Defense department as well as providing rescue and first-aid. – (WA5ABA, EC Harris Co.)

■ Calhoun, Ky – June 12. The Coast Guard requested assistance from amateurs after a serious boat accident occured. – (W4OYI)

■ Stillwater, OK – June 13-14. Fourteen amateurs assisted authorities as spotters during severe tornado conditions in the area. – (WA5FSN, SEC OK)

■ Central OH – June 17. AREC mobile units provided communications and damage information when tornadoes hit the Grove City and Columbus areas. – (K8MLO)

■ Danbury, NC – June 21. While hiking at Hanging Rock State Park, WB4IFO fell and became unconscious. His wife called for help on WR4AGS. WB4VNZ and WB4EXW heard the plea and contacted authorities. – (WB4VNZ)

■ Leucadia, CA – June 24. After observing a person go into cardiac arrest, W2GBX/6 called for assistance on WR6ACF. WB6OBM responded and notified the CA Highway Patrol. – (W6GBF, SCM SDgo)

■ La Costa, CA – June 24. While operating mobile on 75 meters, WA6NNC spotted a brush fire and requested assistance. WB6HMY responded and called the fire department. – (W6GBF, SCM SDgo)

■ Clark Co., IN – June 27. When a small plane hit a truck on its landing approach, WA9TVS handled communications from the Red Cross station with K9OTU and WA9NQU at the scene. – (WA9TVS, EC Clark Co.)

■ Tucson, AZ – June 28. In the midst of their Field Day operation, K7CC/7 heard a distress call from a mobile on 40 meters. WA6GMI/7 had broken down in the middle of the desert. The AZ Highway Patrol was notified. – (K7CC)

■ Owensboro, KY – June 28. Three amateurs assisted authorities when a boat struck a dam and was demolished. – (WB4ANL)

■ Dane Co., WI and vicinity – July 3. Members of the Dane Co. AREC supplied sighting reports to the National Weather Service following a severe hail storm. – (WB9DWG)

■ Owensboro, KY – July 5. Following the touch-down of a tornado, five amateurs assisted authorities with communications. – (WB4ANL)

■ Brooklyn, NY – July 6. K2EDU/2 broke in on WR2ACD to report very high winds had injured several people and overturned several cars and trucks. K2EDU was injured on the scene. K2CMJ notified police. – (WB2EDW, EC Manhattan)

■ Whitesville, KY – July 6. Six amateurs supplied communications during a search and rescue of a young woman. – (WB4ANL)

■ Topeka, KS – June 3. Upon request by the Weather Service, mobile stations were dispatched to spotting locations when severe storms threatened. Luckily, no severe storms hit the area. – (WBØCZR, EC Topeka)

Public Service Honor Roll June 1975

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (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.

WBØHGX	69	K9LGU	52	WB4DJU	44
W4OGG	65	WBØKWJ	52	WA4LPJ	44
WB9MDS	62	WB2SHL	50	K4GR	44
VE3IRG	62	WB4JHU	50	WB4SKI	44
WA1MSK	61	K5MAT	50	WA5YEA	44
WA2DSA	61	W5UGE	50	WB6AKR	44
WB2PYM	61	W2OE	49	KL7JDO	44
WA3DUM	61	WA2PJL	49	K7QEG	44
WB4FZO	61	WB4ZSO	49	WB8JGW	44
WA5IQU	61	WB5FHA	49	W9NXG	44
WA5ZZA	61	WB5IGF	49	WB9NMF	44
W7OCX	61	WB5MTG	49	KØCVD	44
W8IBX	61	W5MYZ	49	WBØIJV	44
WB8PAV	61	KØMRI	49	WBØJGT	44
WBØCZR	61	WØOTI	49	WAØKKR	44
VE3GFN	61	VE4PG	49	VE3FQZ	44
WB2RKK	59	K1PAD	47	VE3GOL	44
WB5MTN	58	WB2OYV	47	VE3GT	44
WBØHBM	58	WA3VBM	47	VE3SB	44
WA1ECM	56	WB5MFQ	47	KØJTW	43
WA1QKD	56	K5TTC	47	WA1MJF	42
WA4IBI	56	WB6PVH	47	WB2EDW	42
WB4YKM	56	WA9QVT	47	W2KAT/3	42
W5GHP	56	WAØFMD	47	WA3SJY	42
WB5LBR	56	WBØOCT	47	WB4FKJ	42
WA5PRI	56	WA6TVA	46	WA5VBM	42
WA8HGH	56	WØOYH	46	WA6DFT	42
K8LGA	56	K3KAJ	45	WØDE	42
VE3GJG	56	W1BVR	44	W2MTA	41
WA3WRN	55	W1EIH	44	K3YHR	41
WB5AMN	55	WA1POJ	44	WB4FDT	41
W5KLV	54	WA2BSU	44	W5UJJ	41
W6RFE	54	W2MLC	44	WB9KPX	41
W5FIJ	53	WA3SWF	44	W2FR	40
WB9ICH	52			WB2LZN	40

(Continued on page 132)

Correspondence From Members-

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

LICK RFI NOW!

● Congratulations to the American Radio Relay League RFI Task Group for a great job! Now as amateurs we must all write to support the RFI bill in the House of Representatives (HR-7052) since the problem treated by this bill affects every active amateur, regardless of his operating preferences, bands, modes, or other interests.

This bill would give the FCC the right to regulate the manufacture of electronic home entertainment devices (televisions or stereos) so that the susceptibility of these devices to signals from nearby radio transmitters is reduced.

I would like to see a supportive effort for this bill mounted by ARRL similar in intensity to the recent restructuring survey so we can lick this problem once and for all!

Write in support of HR-7052 to your Congressmen *AND* to:

Chairman T. H. Macdonald
Subcommittee on Communications
Room B-331, Rayburn Building
Washington, DC 20515

— *J. M. Cadwallader, K6ZMW, Fresno, CA*

BUCKLE UP FOR SAFETY!

● I am writing this letter in the hope that I may be able to save someone else a lot of pain and suffering. I learned my lesson the hard way! Whenever climbing a tower to do any work, BE SURE TO USE A PROPER SAFETY BELT, or don't go up!

On June 7, 1975, I was standing on top of the top section of a 3-section crankup tower which we thought was completely lowered. Because of some confusion, the safety belt I was planning to use didn't show up that day. I figured I would be able to stand on top and wrap my left arm around the six-foot mast extending above the top while with my right hand installing a two-meter antenna on top of the mast. Just as I was about to install the antenna, the tower section I was standing on dropped two feet; suddenly, I lost my grip and fell off, about twenty feet down to the ground. Luckily I landed rather erect with my knees bent slightly which helped to break the fall and I went down hard right on my rear, and rolled back in excruciating pain. An ambulance was called and arrived about three minutes later, although it seemed like an eternity due to the intense pain I was in.

I suffered a hairline fracture of the lumbar number one vertebra, or in other words, a broken back. I figure I was quite lucky in that there was no spinal cord damage, so I will suffer no paralysis. I am still fairly young and was in good physical shape when the accident happened; otherwise, I might have been permanently crippled.

In a few months I will be able to climb towers again, but NEVER WITHOUT A PROPER SAFETY BELT, as anything can happen. — *Matthew T. Lewis, VE7CHI, Vancouver, BC*

A BAD FEELING, PART II

● I want to echo Jim Spikes's letter (A Bad Feeling) in July *QST*. Although I have my Advanced license and have been a ham since 1973, I still have to wait another four years before I can administer an amateur exam.

I would like to propose that Section 97.29(b) of the FCC's rules be changed as follows:

> Unless otherwise prescribed by the Commission, an examination for the Conditional, Technician, or Novice Class license will be conducted and supervised by a volunteer examiner selected by the applicant. A volunteer examiner shall be at least 14 years of age and shall have held an Amateur Extra, Advanced, or General Class license for not less than 2 years, or the volunteer examiner shall hold a commercial radiotelegraph operator license. . . .

I feel that the above change (or one similar) would help to make the teenage hams feel more a part of the amateur fraternity. — *George L. Chandler, WB5KMW, Dickinson, TX*

● I am writing in reference to WN4NJZ's comments in July *QST* on teenage operators not being able to oversee mail exams. Age has no say in mail exams really – it's what the age means. I am a 16 year old Extra and a college sophomore. I'm sure I could oversee a mail exam with no problem. Sure I feel bad. But if I did abuse the right if I had it, what could the FCC do to prosecute me? I would still be a minor and I would get off easily. The question should be legal age; 18 should be a fine age for supervising mail exams. Anything younger, no way! — *Jay H. Garlitz, WB4ZVF, N. Miami Beach, FL*

WENDY

● I read with great interest the love story by Wendy Clay, WN7WEO, which somehow or other sneaked into the pages of the ARRL's sophisticated publication.

I have only one comment. Was it by accident or design that the continuation of this pleasant story was to be found on page "88"? — *Phil D. Boardman, W3LEZ, Scotland, PA*

● Well, now you people have really done it! You've actually printed such risque phrases as "live in sin," "illegitimate kids," "smoke pot," and (worse yet) "if Dick has four milliamps and Jane has sixteen volts, how many ohms does Baby Sally have?" (p. 63, July *QST*.) What did the old-timers say when they read that?

Either your editor has gone plumb crazy, or good old *QST* is changing with the times. The next thing you know this magazine will come out in 8-1/4 × 11 size. — *Mark Kulish, WB0LVR Denver, CO*

● Since that doesn't appear to be a key she's holding, page 63, July *QST*, I checked paragraph 97.7(d)(2) of FCC's rules. Sure enough, Novices are still restricted to A1 emission.

Is it then that the mike is connected to a carrier-suppressed ssb rig, and she radiates as would a 100% modulated siren? – *F.K. Williams, K4GTS, Clifton, VA*

RESTRUCTURING – ARRL STYLE TAKE TWO

● Hurrah for ARRL "single ladder" unified approach to amateur licensing! – *Wallace Thompson, WB5ILK, El Paso, TX*

● After a thorough survey of 56,000 replies to a questionnaire sent to 100,000 members, the ARRL has prepared an excellent counter-proposal to Docket 20282. I strongly support the ARRL counter-proposal as written. – *William A. Lambuth, WA6EYI, La Crescenta, CA*

● While in general agreement with the ARRL proposals as outlined, one area, in my opinion, *does not* enhance the growth and quality of amateur radio as we have known it. I am very strongly against the license terms, as proposed, for the Basic and Novice amateurs. A five year term for these beginning levels, especially if reobtainable after that period, *does not* enhance upgrading. You will certainly increase the number of licensed amateurs, as well as ARRL membership, and probably render the frequency allocations for these beginning levels useless for normal (?) amateur communications. The only real incentive may be to upgrade to a clear spot. Two years, not reobtainable or renewable, for Basic, and the existing rules for Novice, should be incentive enough to upgrade, and certainly enough time to learn about amateur radio benefits. . . . *L.E. McKieman, W0PRR, Wichita, KA*

● Received the July issue of *QST* and was astounded by your ladder concept of amateur radio licensing. If adding "Basic" to the restructuring would do anything for amateur radio, I would say OK, but it will not. Just take the meaning of the words *basic* and *novice:* they mean the same so you are playing with words. . . . It really appalls me when you, the ARRL, are deeply involved in a technical area and you do not apply the same thinking process to this matter. . . . – *Daniel G. Mackintosh, W6SPC, San Francisco, CA*

● I heartily endorse the ARRL position on amateur restructuring (Docket 20282) and want to see it go that way!

I see no need for increased power levels as proposed by the FCC nor for channeling future amateurs through separate achievement routes – this is a hindrance and not an enticement to broadening one's exposure to other appealing aspects of amateur radio. This is especially true of a newcomer who sooner or later discovers there is more to amateur radio but whose curiosity is hampered by lack of permission (license). It is curiosity and lack of restrictions that has spawned much of the amateur contributions to communication and electronics in general.

I believe the ARRL proposal will achieve all that the FCC proposal intended – retaining the good points and rejecting the diminutive aspects. – *Arnold A. Berkland, K0QWU, Stillwater, MN*

● I support the stand and the new counter-proposal the League has put forth in opposition to Docket 20282. Keep up the good work; maybe this is one time the voice of the silent majority was heard. Thank you. – *Allen J. Charst, K9UXC, Loda, IL*

TEMPTATION

● For the past several contests, since the increase in activity on 2-meter fm, I've noticed something that takes place here in this part of the country (and perhaps other areas as well) that disturbs me – that is "Contesting" on repeater frequencies; i.e., stations transmitting on the repeater's output frequency while listening on the repeater's input frequency for replies. I accuse no one, but let's face it: the ease and temptation to go ahead and listen for those enhanced replies through the repeater is there.

It seems to me that in an area where such practices were widespread it could bring normal repeater operation to a virtual standstill. While the vhf contest rules specifically prohibit the use of repeaters for contest work, I think this rule should be expanded to prohibit this type of contest operation before it gets out of hand. I personally feel that this type of contest operation is akin to "shooting fish in a barrel."

Whether or not this practice is widespread I don't know. I would like to hear (as I'm sure would the Contest Advisory Committee) how others, particularly the repeater owners/operators and the vhf contest operators, feel about this situation. – *J.G. Botts, K4EIQ, Blountville, TN*

LEGION OF LIDS

● Having been more or less inactive during my recent retirement, I had little opportunity to monitor the operating practices, courtesy, observance of both legal and moral restrictions, and adherence to the golden rule which have all been traditional to our fine hobby.

As in today's mixed up world, there always seem to be a fringe few who completely ignore and trample over the rights of their brother hams. I have heard lids calling DX stations in a pileup who, when called by the DX station, were obviously not able to hear it. I have heard other lids break in during short DX contacts to deliberately interfere with the two stations in QSO. I have heard one lid tell the DX station to listen for his good friend down the block or around the corner with the result that many good operators patiently awaiting their turn and taking their chance in the pileup often lose out.

I have several young men in the area visit the station frequently because they are interested in becoming hams. In tuning the bands to illustrate to them what good operating practices should consist of, I sometimes have a difficult time finding any! And, often as not, there is a more than generous smattering of mild to not-so-mild profanity.

What a dramatic change from the conditions which existed not so very many years ago! There are always going to be lids but why did there have to be so many so fast? The list of transgressions seems endless and I wonder if some significant part of the problem is a degree of ignorance regarding the proper way to conduct oneself on the air. In any event, I strongly recommend a concerted campaign by *QST* and other amateur radio publications to better educate all hams in the proper and courteous operation of their amateur radio stations. – *Donald R. Greenwood, W7JZV, Grants Pass, OR* QST

Hamfest Calendar

Arkansas – The Queen Wilhelmina Hamfest '75 is Saturday and Sunday, September 6-7 at Queen Wilhelmina State Park, Rich Mountain, Mena. Excellent accommodations and food at newly restored historic Queen Wilhelmina castle. New equipment displays, flea market, camping area with hookups, amusements for harmonics. Talk-in 146.52, 3995. For info write: WB5GZR.

Illinois – The Chicago Radio Expo '75 is September 6-7 at the Lake County Fairgrounds Rt. 45, 120 at Grayslake. Sponsored by the Pioneers of Amateur Radio OOT Club & the Chicagoland Quarter Century Wireless Club. Info from Ed Webb, W9IPO, 812 No. Dearborn Street, Chicago IL 60610.

Illinois – The Peoria Area Amateur Radio Club, Inc., 18th annual hamfest is Sunday, September 14 at the Exposition Gardens, northwest edge of Peoria. Lunch available. Activities for the family. Banquet Saturday night. Free coffee and donuts 8:30 to 9 AM. Free swap session, eyeball QSO, parking, contests, cartoons for the kiddies. Advance registration $1.50; $2 at the gate. Write: Earl R. Kimzey, WA9SCA, RFD 1, Hanna City IL 61536.

Illinois – The 23rd Annual W9IDXCC meeting and banquet is Saturday, September 20 at the Itasca Holiday Inn. Off I-90 at Irving Park Road. Featured speakers include: VS5MC, XU1DX, W3ACE and DXers from many foreign lands. Pre-registration (including evening banquet) is $13, $14.50 at the door. Mail to W9IDXCC Committee, 7008 West 71st St., Indianapolis IN 46278. Mail reservations to Joyce Ginsburg, Holiday Inn Itasca, 860 West Irving Park Rd. Itasca IL 60143, phone (312) 773-2340.

Iowa – The Cedar Valley Amateur Radio Club's hamfest is Sunday, October 5 in Cedar Rapids (home of Collins Radio). Manufacturers and dealers welcome. Hawkeye Downs Exhibition building, ample parking, overnight camping area, picnic facilities, privately run concession stand, tickets $1.50, $2 at door; 1st table $3, others $5. Talk-in frequencies: 16/76, 146.94, 3.970 MHz. For advance tickets write: CVARC Hamfest, Russ Boone WØERS, PO Box 994, Cedar Rapids IA 52401.

Kansas – The Wichita Amateur Radio Club's Hamfest is September 14 at Edgemoor Park 9th in East Wichita. Free flea market.

Kentucky – The fifth annual Greater Louisville hamfest is Sunday, September 28 at the Kentucky National Guard Armory on Crittenden Dr. at I-65 in Louisville. Large flea market on paved area, indoor exhibits, forums, group meetings, ladies bingo and refreshments. Admission $1.50 for adults, children under 12 free. For infor contact K4GOU, 2415 Concord Dr., Louisville KY 40217.

Louisiana – The Amateur Radio Club of Southwest Louisiana's 1975 hamfest picnic is scheduled for October 5 at Pecan Grove near the Cities Service complex in Lake Charles. Talk-in on 146.94 simplex.

Massachusetts – The Sharon Amateur Radio Assoc. is holding its annual auction Sunday, September 14 at 1 PM, free. Refreshments, club takes 10% selling commission. Auction is at Sharon Community Center, Massapoag Ave., Sharon MA. Further info from Ed Levine, 6 Carlton Rd., Sharon MA 02067, phone (617) 784-6033.

Massachusetts – The 19/79 Repeater Asso. second annual clambake hamfest is Sunday, September 21 at the Tewksbury Rod and Gun Club, 11 Chandler St., Tewksbury MA (off of Rt. 38). Talk-in 19/79 and 146.52 direct. Lobster dinner tickets $8 per person. Activities from 10 AM to sunset. The program includes: hidden transmitter hunt, horseshoe pitching contest, ARRL forum with W1UED, radio control model airplanes flying demonstration, fun and games for the kids. For tickets and program send check or money order to: 19/79 Repeater Asso., Box 221, Malden MA 02148.

Massachusetts – The Quannapowitt Radio Asso. annual auction is Saturday, October 4 in St. Joseph's Parish Hall, Wakefield MA 10 AM – 4 PM, doors open 9 AM, 10% commission, no minimum. Talk-in 146.52.

Massachusetts – The annual New England DXCC meeting and banquet is October 4 at the Waltham Holiday Inn. Afternoon program includes talks on DXing via OSCAR and the moon, QSL bureau activities, and liability aspects of tower ownership, as well as a slide show of area DXers' stations and antennas. After the cocktail hour and banquet there is a special guest speaker, DX quiz with prizes, and the latest DXCC and DXAC info from ARRL representatives. Send s.a.s.e. to W1VAH, Chairman, 11 Vanderbelt Rd., Acton MA 01720.

Michigan – The Grand Rapids Amateur Radio Asso.'s annual swap n shop is Saturday, September 20 at the Fairgrounds in Hudsonville MI. Admission $2 at the gate, no charge for tables or trunk sales. Talk-in on 16/76 or 94/94.

Michigan – The swap n shop L'Anse Creuse ARC is September 21, EDT 9 – 3 L'Anse Creuse Central Jr. High School, free parking, good food, 3800 Reimold Rd., Mt. Clemens MI. Talk-in on 146.94 and .52.

Michigan – The Adrian Amateur Radio Club fall hamfest is Sunday, September 28 from 8 AM to 3 PM at the Lenawee County Fair Grounds, Dean St. in Adrian. Talk-in frequencies are 146.46, .52, .94 MHz. All buyers, sellers, and visitors are welcome. Refreshments. $1 in advance; $1.50 at the gate. Table size 8 ft.; $1.50 per half. Write: Adrian Amateur Radio Club, PO Box 26, Adrian MI 49221.

Minnesota – The North Suburban Wireless Asso., Inc. Radio Club's annual ham sale is September 19, 20, 21 at Crystal, 6920 60th Ave. North. Buyers and sellers are welcome with a 10% charge on all items that are sold. For info send s.a.s.e. to WAØNON.

New Jersey – The Garden State ARA flea market and ham picnic is September 14 (rain date September 21) at the Bellingham Estate, Telegraph Hill and Holland Rds., Holmdel NJ. Bring the family, food and junk. Info: W2HXJ, W2DVR, (201) 542-7388.

New Jersey – The Knight Raiders VHF Club's auction and flea market is on Saturday, October 4th, at St. Joseph's Church of East Rutherford, Hackensack St., East Rutherford. Free admission, free parking, refreshments available. Talk-in is on 146.52 and 146.94. Flea market tables: $5 for a full table, $3 for a half table. Reserve by writing to Knight Raiders VHF Club, Inc., K2DEL PO Box 1054, Passaic NJ 07055.

New York – The Hamburg International Hamfest is September 20 with a giant flea market, technical forums, picnic facilities, excellent programs, non-amateur displays, code contest, women's programs, organization meeting, equipment displays, FM hospitality room. Recreational vehicle parking only $2.50 for the entire weekend. Bring the family: children under 12 admitted free. Accommodations at Regency Motor Hotel, 4408 Mile Strip Rd., Hamburg NY 14075. Talk-in stations 31/94 146.94 simplex, 7.255 (ECARS), and 3.925.

New York – The 1975 National Historical Radio Conference is at Canadaiqua NY on October 3-4. Two days of historical programming and demonstrations plus large flea market for the radio collector. Write: Lincoln Cundall, W2QY 69 Boulevard Pky., Rochester NY 14612.

North Carolina – The Shelby Radio Club's annual hamfest is August 30-31 at Cedar Park,

GREAT LAKES DIVISION

Columbus, Ohio **October 10-11, 1975**

The Columbus Amateur Radio Association, W8TO, invites you to attend the 1975 ARRL Great Lakes Division Convention being held at the Ohio State Fairgrounds, adjacent to I-71, in Columbus, Ohio, on October 10 and 11, 1975. Friday evening will feature the opening of the commercial exhibits at 5 PM in the fairgrounds Electric Building. Activity will shift to the headquarters motel hospitality suites at 9:30 PM. The traditional "Wouff Hong" ceremony will be held at the stroke of midnight Friday evening.

Saturday activity will begin with the opening of the flea market at 7 AM at the fairgrounds. Forum activity will begin at 9 AM and includes sessions on DX, contesting, history, training, Army MARS, state-of-the-art, FCC, ARPSC, fm, ATV, vhf, and ARRL. League headquarters will be represented by ARRL President Dannals, W2TUK, and Jerry Hall, K1PLP, Associate technical editor of *QST*. The DX Forum will feature Rusty Epps, W6OAT, and his exclusive films on the Kingman Reef DXpedition.

Family activities are also a noteworthy portion of the convention. Included on this portion of the agenda are tours to the fascinating Ohio Historical Museum and the Ohio Village (Ohio Village is a real-life depiction of the 1700s in Ohio, including craftsmen demonstrating the skills of that time. The village is modeled after Williamsburg, VA. Also included is a large Ceramics Trade Show with special beginner classes in ceramics especially for ARRL convention attendees.

The convention activity will close with a banquet on Saturday evening. Featured speaker at the banquet is Fred Laun, W9SZR/3, outstanding contester, DXer, and goodwill ambassador for amateur radio. Fred is the American diplomat who was kidnapped from his shack in Argentina by left-wing terrorists in 1974, shot, and left for dead. Fred's story of ham radio around the world plus his Argentina ordeal will provide an exciting and informative evening.

Convention prizes will exceed $2000 in value and include a TR4-C and 2R4-Cs. Advance registration is $2.50. Register now by writing to Mary Gibb, W8RVP, 293 Ceramic Drive, Columbus, Ohio 43214.

COMING ARRL CONVENTIONS

September 12-14 – NATIONAL, Reston, Virginia

October 4-5 – Delta Division, Memphis, Tennessee

October 10-11 – Great Lakes Division, Columbus, Ohio.

October 17-19 – Midwest Division, Lincoln, Nebraska.

October 24-26 – Southwestern Division, Ventura, California.

November 1-2 – New England Division, Hartford, Connecticut.

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.

DELTA DIVISION CONVENTION

Memphis,TN **October 4-5**

The Delta Division Convention and the Memphis Hamfest will be held on Saturday and Sunday, October 4 and 5 at State Technical Institute, Interstate 40 at Macon Road (Exit 11). There'll be something for everyone – seminars, demonstrations, displays, XYL entertainment, flea market, prizes, Army and Air Force MARS Meetings, major distributor events – the works! Welcome Inn across the street has hookups for campers and trailers. Holiday Inn and several fine restaurants at the same exit. Informal dinners for various groups on Saturday night. Breakfast Meeting 7-9 AM Sunday morning at Hungry Fisherman. ARRL Forum 10-11 AM with ARRL President Harry Dannals, W2TUK, Delta Division Director Max Arnold, W4WHN, Vice-Director John Sanders, WB4ANX. Talk-in on 34/94, 3980 and MARS. For further information contact Chairman, Harry Simpson, W4SCF, Box 27015, Memphis, TN 38127 or telephone (901)362-7510.

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north of Shelby on Hwy. 10. Southern fried chicken and pit cooked barbecue; all you can eat. Sunday school, playground, free bingo, trailer and camping facilities, plenty of trading and swapping. Annual meeting of Carolinas-Virginia FM Repeater Assoc. Talk-in on all popular repeater frequencies and 3.923.

Ohio – The Findlay Hamfest is September 7 at Riverside Park, Findlay. Write: Clark Foltz, W8UN 122 W. Hobart, Findlay OH 45840.

Ohio – The 38th Cincinnati Hamfest is Sunday, September 21 at the New Stricker's Grove on State Route 128, one mile west of Ross (Venice). Flea market, contests, model aircraft flying, food and beverages all day. Advanced tickets $7, covers everything; $8 at the gate. Write: Carl J. Dettmar, W8NCV 8630 Cavalier Dr., Cincinnati OH 45231.

Ohio – The Annual Cleveland hamfest and flea market is Saturday, September 27th, at the Cuyahoga County Fairgrounds in Berea. Easy access from Hopkins Airport, I71, I90 and the Ohio Turnpike. Talk-in from the East on 146.76; South on .82; West on .88 and locally on .52 and .94. Tickets $1.50 before September 24th; $2 at 8 AM when gates open. Flea market parking earlier, bring your own tables. Music and dancing and ethnic beergarten. For early tickets and info on motels and camp grounds, send a check and s.a.s.e. to: Cleveland Hamfest Asso., Box 43413, Cleveland OH.

Ontario – The Radio Society of Ontario's 1975 Convention is in Ottawa, October 3-4. Complete program of technical sessions, forums, commercial displays, hospitality and display rooms, ladies program. Friday evening buffet meal and dancing, and on Saturday night a traditional RSO banquet

with dancing in the Grand Ballroom of the Skyline.

Pennsylvania – Pie gabfest is Saturday afternoon, September 6 at the old Pittsburgh Rd., off Rt. 51 at the Uniontown by-pass. Refreshments available. Write: Joseph M. Sofranko, Secy., 438 Braddock Ave., Uniontown PA 15401.

Pennsylvania – The Central Pennsylvania Repeater Asso. hamfest is Sunday, September 14 in Harrisburg, 200 Block Walnut St., with a park n shop garage. The gates open at 9 AM with registration at $3 per ham; XYLs free.

Pennsylvania – The Mt. Airy VHF Radio Club Hamarama is Sunday, October 5 in Philadelphia. Flea market, auction, home-brew van, ATV demonstrations, free playground for children and parking for over 800 cars. Festivities begin at 8 AM, auction starts at 2 PM rain or shine. Food concessions on the premises with many nearby motels and restaurants. Talk-in 146.52, 52.525 and the club repeater WR3ACD 222.98 in and 324.58 out. For further info and flyer with map send s.a.s.e. to Lee A. Cohen, K3MXM, 8242 Brookside Rd., Elkins Park Pa 19117.

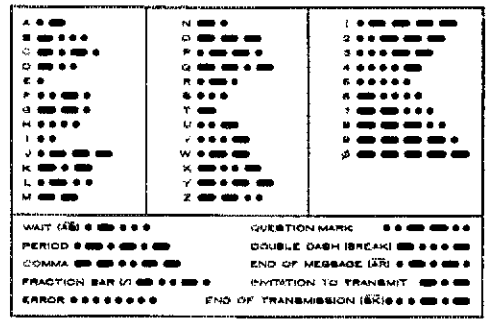
South Carolina – The Rock Hill Amateur Radio Club's annual hamfest is October 5 at Joslin Park on Lake Sylie near Rock Hill SC.

Texas – The El Paso hamfest is at the Vista Motor Hotel, September 20-21. Special guest speaker and banquet Saturday night. For info write: Charlie Wood, WA5KYV, 10012 Suez, El Paso TX 79925.

Texas – The Tidelands Amateur Radio Society's annual hamfest is Sunday, October 5 from 9 AM at the Galveston County Park, League City. Advance registration $1.50; $2 at the door. Free parking, swap booths and refreshments available. For info s.a.s.e. to: Luke Sterling, 105 Seabreeze Dr., League City TX 77573.

Wisconsin – The 3rd Annual Dane Co. swapfest is Sunday, September 28 in the Youth Bldg. at Dane County Coliseum. A pancake breakfast will be served. Talk-in station on 146.94 MHz. Write: Madison Area Repeater Asso., P.O. Box 3403, Madison WI 53704.

Strays



International Morse code is not as fearsome as it looks. Special letter groups such as AS and SK are transmitted without spacing between letters; when printed, they are identified by a bar over the two letters.

Prospective novice class scholars are handed this card which explains just what they are getting themselves into (!) by members of the Columbia Amateur Radio Association (Md.).

Silent Keys

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

W1BYP, Wallace W. Paquette, Fairfield, ME
K1HDY, Mitchell J. Finer, Milton, MA
WA1OYE, James A. Williams, Rocky Hill, CT
WN1SEQ, Edward J. Dunn, Granville, MA
W1ZBA, Andrew L. Lucas, Westfield, MA
WB2BBW, Vincent DiNapoli, Wyckoff, NJ
K2CIP, Leo W. Schubert, Brooklyn, NY
WA2DBB, Michael P. John, Collingswood, NJ
W2GGO, Henry J. Clark, Ft. Montgomery, NY
W2GW, Howard A. Cookson, Wyckoff, NJ
WA2GYN, Eugene P. Edwards, Eggertsville, NY
K2MZJ, Abe Green, Fair Lawn, NJ
WB2RKE, Gordon H. Cusack, Oswego, NY
K2UBF, Charles P. MacKay, Bluff Point, NY
W3GGL, Albert J. "Pic" Bittner, Salisbury, PA
W3GKP, William L. Smith, Spencerville, MD
W3HB, Willis C. Brown, Bethesda, MD
W3KPZ, Frank Roman, Pittsburgh, PA
W3TOR, Patrick G. O'Brien, Silver Spring, MD
W3UKY, Lewis W. Keller, Philadelphia, PA
K4BQ, William E. Dickson, Gulfport, FL
K4GHF, Lloyd C. Wingard, Eustis, FL
WN4KOL, Charles E. Zahos, Mooresville, NC
WN4LHH, Wendall C. McNeal, Milledgeville, GA
WB4OOT, Charles E. Brown, Sr., Cataula, GA
K4QHB, Paul Ferrell, Seymour, TN
W4OV, Charles P. Carroll, Mobile, AL
WB4TJU, Dr. Alfred R. Earl, Spanish Fort, AL
W4ZS, Rev. Basil B. McGinty, Riverview, AL
W5NO, Joseph H. Uhalt, New Orleans, LA
W5QJ, Karl G. Seibold, New Orleans, LA
W5UIW, Paul O. Lonneke, Pipe Creek, TX
WA6ADL, Robert A. Richardson, Saugus, CA
W6CLP, Lester E. Fry, Modesto, CA
W6EDR, Bernard Y. Smith, Walnut Creek, CA
W6EWU, Thomas Halcomb Wells, San Diego, CA
WA6IDF, Rolf W. Carlsen, Saratoga, CA
W6IEZ, Otto V. Schuehard, Orinda, CA
WN6IPM, Eddie C. Hulteen, Concord, CA
K6KPJ, John E. Hurley, Rocklin, CA
W6LZM, Paul C. Gripper, Orinda, CA
K6OPH, Sidney W. McEwen, Jr., Bakersfield, CA
K6PRR, Walter L. Sonnenstuhl, Sacramento, CA
W6QEP, Elmer F. Hill, Concord, CA
WN6YDS, Eugene C. McFarland, La Habra, CA
W7JRX, Robert J. Williams, Sierra Vista, AZ
WA7KAH, Frank P. Mathews, Eastsound, WA
W7NIA, Joseph H. Witten, Ogden, UT
W7RT, John P. Gruble, Seattle, WA
W8BDU, Dennis H. Hoyt, Dearborn, MI
WA8BHJ, Edward W. Wiley, Ann Arbor, MI
W8BWV, Donald E. Fetters, Plymouth, OH
W8CHL, Albert R. Tunstall, Cleveland, OH
W8FXT, Hebert T. Phillips, Lyndhurst, OH
WA8YNI, Edwin S. Wietnik, Hasting, MI
W8NCG, John Bacon, Columbus, OH
W9EH, Newell F. Stanfield, Hobart, IN
WB9EIP, Robert S. Monroe, Decatur, IL
K9MQD, Parke F. Riley, Canton, IL
W9NCL, Robert T. Howlett, Northbrook, IL
W9NDI, Ralph A. E. Juneau, Menasha, WI
WA9PJV, Marvin F. Kimball, Lafayette, IN
WA9SVL, James L. Forthoffer, Indianapolis, IN
W9YBH, Albert L. Campbell, Berkeley, IL
WØACA, Leo S. Hobelman, Denver, CO
WBØCAC, Paul E. Greenfield, Harcourt, IA
WØCND, Milton H. Schradsky, Denver, CO
WØIJU, Bernard J. Emanuel, Denver, CO
WØPMJ, Henry Brundage, Sr., Kansas City, MO
WØQHX, Ronald A. Brown, Rapid City, SD
VE3FYA, John B. Bowman, Scarborough, ON
VK2VN, M. H. Meyers, Killara, NSW, Australia
4X4CZ, Jack H. Davis, Ramat-Hen, Israel

Happenings of the Month

ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

Nominations are now in order for director and vice director in these eight divisions of ARRL. Only ten Full Members need to join together in naming a candidate by a petition which must reach the Secretary of ARRL by noon EDST September 20.

Democracy within our League starts with these nominations. If more than one candidate is nominated, and each meets the requirements explained below, then all Full Members of the League in the division will have a chance to choose from among the candidates by secret ballot between the week of October 7 and noon of November 20.

The election procedures, outlined briefly here, are specified in the Articles of Association and Bylaws; copies will be sent to members free upon request. An informational pamphlet generally outlining duties and responsibilities of elected League officials is also available for the asking.

Any eligible Full Member of the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific or Southeastern Divisions can be nominated for either director or vice director. If one person is nominated for both offices, his nomination for director will stand and that for vice director will be void; no person may simultaneously be candidate for both positions.

Since all the powers of the director are transferred to the vice director in the event of the director's death, resignation, removal outside the Division, or inability to serve, careful selection of candidates for vice director is just as important as for director. The following form for nomination is suggested:

Executive Committee
The American Radio Relay League
Newington, Conn. 06111

We, the undersigned Full Members of the ARRL residing in the . . . . . division, hereby nominate . . . . . of . . . . as a candidate for director; and we also nominate . . . . . of . . . . . as a candidate for vice-director from this division for the 1976-1977 term.

(Name Call , City , Zip Date)

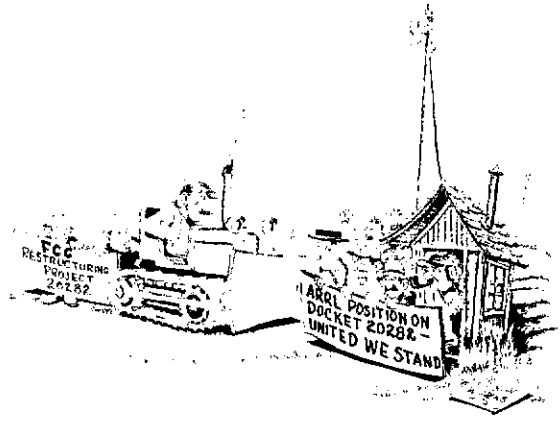
The signers must be Full Members in good standing. The nominee must be the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full Member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, is commercially or governmentally engaged in frequency allocation planning or implementation, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in Newington, CT, by noon EDST of the 20th day of September, 1975. There is no limit to the number of petitions that may be filed on behalf of a given candidate, but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates for both director and for vice director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 8 and November 20, except that if on September 20 only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are — *Atlantic:* Harry A. McConaghy, W3SW and Jesse Bieberman, W3KT; *Canada:* A. George Spencer, VE2MS and Ronald J. Hesler, VE1SH; *Dakota:* Thomas M. Kulas, WAØIAW and Garfield A. Anderson, WØKE; *Delta:* Max Arnold,



Here's one ham's view of FCC restructuring, and the League counterproposal, courtesy of W7ZXS!

W4WHN and John H. Sanders, WB4ANX; *Great Lakes*: Richard A. Egbert, W8ETU and William E. Clausen, W8IMI; *Midwest*: Paul Grauer, WØFIR and Richard W. Pitner, WØHZO; *Pacific*: J. A. Doc Gimelin, W6ZRJ and Albert F. Gaetano, W6VZT; *Southeastern*: Larry E. Price, W4DQD and Ted R. Wayne, WB4CBP.

Full Members are urged to take the initiative and to file nominating petitions immediately.

For the Board of Directors:

July 1, 1975
John Huntoon, WIRW
Secretary

RFI BILL – HR7052

As we reported in this space in July, a bill has been introduced into Congress by the Honorable Charles A. Vanik of Ohio to give FCC authority over the manufacture, shipment and sale of home entertainment devices, such as TV, stereo, intercom and other electronic equipment, so as to require adequate rejection of radio frequency signals from nearby transmitters.

The bill, HR7052, has been assigned to the Subcommittee on Communications and Power of the House Committee on Interstate and Foreign Commerce. The chairman of the full committee is the Honorable Harley O. Staggers of West Virginia, while the Honorable Torbert H. Macdonald of Massachusetts is the chairman of the subcommittee. The first step in getting this measure moving is to convince the subcommittee that it should promptly hold hearings. One's own congressmen should be made aware of one's interest in the measure, too. Hq has a list of all members of the House; an s.a.s.e. will speed a copy to you.

The text follows:

94th CONGRESS 1ST SESSION HR7052

IN THE HOUSE OF REPRESENTATIVES
May 15, 1975

MR. VANIK of Ohio introduced the following bill, which was referred to the Committee on Interstate and Foreign Commerce

A BILL

To amend section 302 of the Communications Act of 1934 to authorize the Federal Communications Commission to prescribe regulations with respect to certain electronic equipment that is susceptible to radio frequency energy interference.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) section 302 of the Communications Act of 1934 (32 Stat. 290; 47 U.S.C. 302a.) is amended to read as follows (changes underlined):

INTERFERENCE WITH RADIO COMMUNICATIONS AND ELECTRONIC EQUIPMENT

(a) The Commission may, consistent with the public interest, convenience, and necessity, make reasonable regulations governing

(1) the interference potential of devices which in their operation are capable of emitting radio frequency energy by radiation, conduction, or other means in sufficient degree to cause harmful interference to radio communications and

(2) *the use of protective components in audio and visual electronic equipment which are capable of reducing interference to such equipment from radio frequency energy.*

Such regulations shall be applicable to the manufacture, import, sale, offer for sale, *or shipment of such devices and electronic equipment or the use of such devices*.

(b) No person shall manufacture, import, sell, *or ship devices and electronic equipment or use devices which fail* to comply with regulations promulgated pursuant to this section.

(c) The provisions of this section shall not be applicable to carriers transporting such devices *or electronic equipment* without trading in them, to devices *or electronic equipment* manufactured solely for export, to the manufacture, assembly, or installation of devices *or electronic equipment* for its own use by a public utility engaged in providing electronic service, or to devices *or electronic equipment* for use by the Government of the United States or any agency thereof. Devices *and electronic equipment* for use by the Government of the United States or any agency thereof shall be developed, procured, or otherwise acquired, including offshore procurement, under United States Government criteria, standards, or specifications designed to achieve *the objectives of reducing interference to radio reception and to electronic equipment*, taking into account the unique needs of national defense and security.

AMATEUR RADIO WEEK, CALIFORNIA

A new device has been used to produce an Amateur Radio Week for California, June 23-29. Rather than the usual proclamation by the Governor, this one takes shape in a resolution of the

John Reynolds, WB5CIQ, president (right) presents a set of League publications to the city and parish of Baton Rouge, Louisiana, on behalf of the Baton Rouge Amateur Radio Club. The gift was accepted by Mayor-President Dumas and Mrs. Max Schenker, chief librarian. Affiliated clubs – only – may acquire a set of League books to give to a library for the very special price of $17.50. The library must agree in writing to make the publications available to the public. *(Photo via Bill Mixon)*

Assembly Rules Committee, introduced by the Honorable Terry Coggin. A big assist was provided by Ed Stokes, WB6KOK, Assembly Office of Research, from material supplied to him by headquarters.

We have no special channels for obtaining this information; it all comes from amateur sources. If your state observed or will observe amateur radio week this year, and you haven't read it here, please send along the details to W1UED at hq. Got pictures of the presentation? All the better!

OVERSEAS AND ABSENTEE BALLOTS

All ARRL members who are licensed by FCC or DOC but are temporarily residing outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 20 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily residing outside the ARRL division they consider home may now notify the Secretary prior to September 20, giving the current *QST* address and the reason why another division is considered home (e.g., holding an amateur call appropriate to the division). So if your home division is the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific or Southeastern, but your *QST* goes elsewhere because of a different residence, please let the Secretary know, as soon as possible but no later than September 20, so you'll receive a ballot for your home division.

TRAFFIC IN EMERGENCIES

There was a needless international incident recently which could have been avoided. There are, true enough, rigid international restrictions on third party traffic in the Radio Regulations, Geneva, Edition of 1968 published by the International Telecommunication Union, in the amateur section, Article 41. But elsewhere there are superseding words which place traffic to save human life above all other traffic and above all other restrictions.

In the described incident, LU2DZ/SU, communications officer for the United Nations Emergency Force, attempted to handle a message relating to human life in jeopardy with three U.S. amateur stations, only to have the attempt foiled by a fourth U.S. station who repeatedly said that the traffic was illegal.

The long-standing rule has been to handle messages which involve safety of life and then to report full details to the regulatory authority as soon as possible afterward. If there was deliberate impropriety involved, the authorities can deal with it later. But an emergency is now!

W3GAC AIDE TO CHAIRMAN WILEY

Robert A. Luff, W3GAC, has been appointed engineering assistant to FCC Chairman Richard E. Wiley. OM Luff is 28, a native of Delaware, and holds a B.E.E. from the University of Delaware. He joined the Office of Chief Engineer at FCC in July, 1970, and in 1973, moved to the Office of Plans and Policy. His home is in Gaithersburg, Maryland.

Congratulations, W3GAC!

ADVISORY COMMITTEE NOMINATIONS

One of the many ways in which members help steer the course of the League is through advisory committees in specialized fields – presently contests, VHF repeaters, DX, and Emergency Communications. There is a maximum of eleven members in each group, and initial appointments of terms up to three years are authorized. The full rules may be found as an addendum to the Articles of Association and By-Laws, edition of August 1, 1974. (Copy on request to members; a stamped, self-addressed envelope of standard business size would be appreciated with the letters "AABL" on it.)

Candidates for committee membership may be nominated at any time by three sponsors, each of whom is a Full Member of ARRL. Each candidate must have been a League member for a minimum of two years; licensed as a Technician or higher for three or more; and currently and consistently active and qualified in the specialty area of the field served by the advisory committee.

This is a call for nominations; convenient forms may be obtained by writing the secretary at ARRL Hq. The President, in consultation with the committee chairman and liaison members, on or about November 1 of each year, will select replacements for members whose terms are expiring, or shall reappoint them for a subsequent term as appropriate. A file of eligible nominees will be maintained for use as a source of replacements.

A member's initial term of office will be either for two or three years as designated by the President, with approximately one-half the initial members having two-year terms. Members may be reappointed for no more than one additional three-year term, but are again eligible for appointment to committee membership after a lapse of one year.

The incumbents, with date of expiration of current term, are:

Contest Advisory Committee

Albert K. Francisco, K7NHV, chairman, Buckskin Rd., Pocatello, ID 83201; January 1, 1977.

Peter Chamalian, W1BGD, 52 Chestnut Ct., Cromwell CT 06416; January 1, 1976.

Stephen P. Branca, WA2BLV, 202 Minnetonka, Hi Nella, NJ 08083; January 1, 1976.

Eugene Zimmerman, W3BQV, 33 Brighton Dr., Gaithersburg, MD 20760; January 1, 1977.

John T. Laney, III, K4BAI, Box 421, Columbus, GA 31902; January 1, 1977.

Malcolm P. Keown, W5RUB, 213 Moonmist, Vicksburg, MS 39180; January 1, 1976.

Kenneth E. Keeler, W6PAA, 1584 Union Ave., Redwood City, CA 94081; January 1, 1976.

Robert D. Epstein, K8HLR, 21820 Ridgedale Ave., Oak Park, MI 48237; January 1, 1975.
C. La Mar Ray, W9LT, RR I, Box 316, Grabill, IN 46741; January 1, 1976.
Albert W. Vitt, WAØCVS, 7820 W. 96th Ave., Broomfield, CO 80020; January 1, 1976.
Leslie G. Sawkins, VE7CC, 25810-102nd Ave., Whommock, BC, Canada; January 1, 1976.
Director Liaison – Stan Zak, K2SJO, 13 Jennifer La., Port Chester NY 10573.
Hq. Liaison – Ellen White, W1YL.

DX Advisory Committee

Dr. John R. Sheller, WA8ZDF, Chairman, 4925 Hamilton Rd., Groveport OH 43125; January 1, 1976.
Ted M. Marks, WA2FQG, 81 Oakey Drive, Kendall Park, NJ 08824; January 1, 1976.
John H. Thompson, W1BIH, P.O. Box 1, Torrington, CT 06791; January 1, 1976.
Layfield L. Lamb, W3BWZ, Rte. 1, Whippoorwill Lane, White Plains, MD 20695; January 1, 1977.
William F. Christian, K4IKR, 2800 Cave Ave. NW Huntsville, AL 35810; January 1, 1977.
Louis A. Muhleisen, Jr., K5FVA, Box 927, Metairie, LA 70004; December 31, 1976.
Gary Stilwell, W6NJU, 7632 Woodland Lane, Fair Oaks, CA 95628; December 31, 1976.
Allen T. Clark, W7YTN, 2216 S. 120th St., Seattle, WA 98168; December 31, 1976.
Robert E. Baird, W9NN, P.O. Box 498, Plover, WI 54467; January 1, 1976.
Robert W. Wood, KØHUD, 1012 E. Main St., Vermillion, SD 57069; December 31, 1976.
Jack Ravenscroft, VE2NV, 353 Thorncrest Ave., Dorval, P.Q. Canada; January 1, 1976.
Director Liaison – Larry E. Price, W4DQD, P.O. Box 2067, Georgia Southern Branch, Statesboro, GA 30458.
Hq. Liaison – Robert White, W1CW.

VHF Repeater Advisory Committee

Charles R. Flanagan, W6OLD, chairman, 6427 West 83rd St., Los Angeles, CA 90045; January 1, 1976.
Lew Collins, W1GXT, 11 Brattle St., Arlington, MA 02174; January 1, 1977.
Rick Booth, WA2GCX, 206 Hillary Dr., Rochester, NY 14624; January 1, 1977.
William C. Parris, K4GHR, 6210 Gothic Court, Charlotte, NC 28210; January 1, 1976.
J. A. Mason, W5NSQ, 7727 La Risa Dr., Dallas, TX 75240; January 1, 1977.
Bob Dreste, K7VOR, 5040 N. 13th Ave., Phoenix, AZ 85013; January 1, 1976.
J. Michael Cox, K3GEG, 4513 Orangewood Lane, Bowie, MD 20715; January 1, 1977.
Richmond "Pat" Shreve, W8GRG, 2842 Winthrop Rd., Shaker Heights, OH 44120; January 1, 1977.
Jack Forbing, K9LSB, 1416 Lakewood Dr., Fort Wayne, IN 46819; January 1, 1977.
D.J. Manson, KØTVO, 2302 N. Oakland, Columbia, MO 65201; January 1, 1976
Howard Cowling, VE3WT, 64 Dunkeld Ave., St. Catherines, Ont., Can., L2M 4A7; January 1, 1976.
Director Liaison – Carl L. Smith, WØBWJ, 1070 Locust St., Denver, CO 80220.
Hq. Liaison – Lewis McCoy, W1ICP.

Emergency Communications Advisory Committee

M.F. "Bud" Cone, WA4PBG, chairman, 317 Van Buren St., Falls Church, VA 22046; January 1, 1977.
James P. Collingsworth, WB2EDT, 1040 W. Walworth Rd., Macedon, NY 14502; January 1, 1977.
Ellwood W. Haldeman, W3PST, 1732 Loney St., Philadelphia, PA 19111; January 1, 1976.
Andrew C. Clark, W4IYT, 41 Lenape Dr., Miami Springs, FL 33166; January 1, 1977.
William E. Mixon, K5SVD, 1007 Green Oaks Dr., Baton Rouge, LA 70815; January 1, 1977.
Arthur R. Smith, W6INI, 4515 Melisa Way, San Diego, CA 92117; January 1, 1977.
Robert L. Klepper, W7IEU, 7027 51st N.E., Marysville, WA 98270; January 1, 1976.
Robert S. Dixon, W8ERD, 2073 Highlandview Dr., Powell, OH 43065; January 1, 1976.
Robert J. Hajek, W9QBH, 235 Lawton Rd., Drawer H, Riverside, IL 60546; January 1, 1976.
Harry E. Legler, WØPB, 304 Miami St., Hiawatha KS 66434; January 1, 1977.
Holland H. Shepherd, VE3DV, 3016 Cowan Crescent, Ottawa, ON, K1V 8L1; January 1, 1976.
Director Liaison – Max Arnold, W4WHN, 612 Hogan Rd., Nashville, TN 37220.
Hq. Liaison – William C. Mann, WA1FCM.

Transformers . . .

(Continued from page 63)

their pnp, npn, FET, MOSFET, and IC designations; their bases, collectors, gates, drains, doping and flow of holes, they have accomplished miracles in radio communication and have brought a new vocabulary into the field of electronics. They have also brought our two-chapter discussion of amatuer radio's six- member circuit team to a close. Closed, that is, except for a test on vacuum tubes and transistors, which follows. Next chapter: The radio wave. QST

Strays

The Southside Virginia Amateur Radio Society will be operating a Special Event Station during the week of September 10-16 at the Five County Fairgrounds, Farmville, VA. The station will have FCC assigned call KF4FCF and will be operating on the 80, 40, 20, 15, 10 and 2 meter bands. QSL (with s.a.s.e.) to W4WWD, Rt. 4, Box 112C, Farmville, VA 23901.

The World Above 50 Mc.

CONDUCTED BY BILL TYNAN,* W3KMV

AMATEURS HAVE various opportunities for public service. In addition to benefiting others, these often result in enhancing the image of our hobby. Furnishing emergency communications in connection with violent weather or other disasters is but one example of the kind of public service that hams can render.

Although vhf is an important aspect in the general scheme of things when it comes to amateur radio's role in public service, we do not often have an opportunity to offer direct benefit to the world above 50 MHz portion of amateur radio spectrum. Yet, an important aspect of this opportunity is that we don't have to wait for a disaster to strike in order to be of service. The public service opportunity of which I am speaking is the educational program being conducted in connection with the Oscar satellites.

This program is one important facet in the amateur satellite effort and indeed is probably the strongest argument we have for securing launches. Because of this, in conjunction with Amsat and the Talcott Mountain Science Center, several years ago ARRL inaugurated efforts to bring the educational capabilities of the Oscar satellites to the attention of educators. An important part of this work was the compilation of curriculum materials which illustrate how amateur satellites can be used in teaching various principles of science. For a time, this comprehensive curriculum guide was available only to teachers who expressed a definite need and interest. Now because of increased quantities recently made available by a second printing, anyone may purchase a copy through ARRL for just $3.00.

To date, all known educational demonstrations of the Oscar satellites have been accomplished using the 2-to-10 transponder. This is partly because of the limitations of Oscar 6 and partly because most hams helping in such demonstrations had receivers covering the 10, but not necessarily the 2-meter band. Now we have Oscar 7 with its fine performing 70 cm to 2 meter transponder and vhf men should be well qualified to provide reception of the 145.95 MHz downlink.

With the school year about to begin, vhfers can take the lead in helping to present satellite demonstrations in local schools. Send for the curriculum booklet. Contact your local school systems or an individual teacher and offer to put on an educational demonstration using the Mode B 70 cm to 2 meter transponder in Oscar 7. Don't forget that Mode B is activated on even numbered days of the year. If we can show that 2 meters is being used at least as much as 10 meters for the educational program, we may have a better case for equipment for the higher frequency bands being included in future Oscar satellites. Remember that to be of any help in influencing such decisions your efforts must be reported. Send a summary of your results, good or poor, to ARRL headquarters giving full details including the school involved, the date, equipment used, and other pertinent information.

* Send reports to Bill Tynan, W3KMV, Box 97, Burtonsville, MD 20730 or call (301) 384-6736.

Northwest Visit

On a recent visit to Seattle, I had the opportunity to spend a very pleasent evening with W7FN. What made the event even more enjoyable was the chance to use Don's neat and efficient station to talk on 50 MHz to a number of area gang. The exchange of views on vhf operation in that part of the country with WA7RTA, W7KFS, K7GSE, W7HUB and others proved both entertaining and informative.

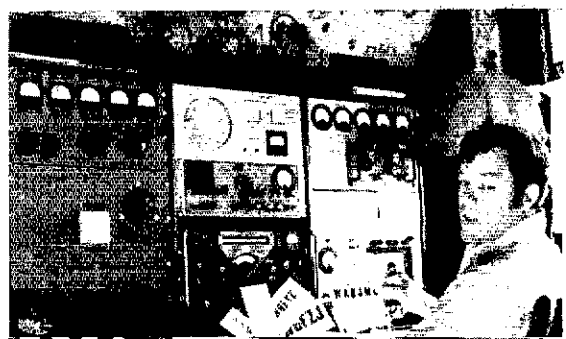
OVS Reports and Operating News

50 MHz Again demonstrating that the particular point in the sunspot cycle has little or no bearing on the frequency or intensity of *Es*, this year's season is reported by many to be exceptionally good with a high occurrence of multiple hop and very intense ionization.

From several reports received, June 30 was a particularly wild day. The always voluminous report of WA5IYX lists 6-meter stations logged the entire day as well as TV and fm reception, beginning as early as 0710 local standard time and lasting until at least 2200. At 1715 a Channel 7 station believed to be in Wheeling, WV, was received as well as another unidentified Channel 7 station. At 1720 there was a very short period of reception of a Channel 8 station. Indications are that the muf may have even reached Channel 12 at San Antonio.

Those observations made by WA5IYX are substantiated by Glenn Hauser of Enid, OK, who reports reception of signals from Channel 13, Tampa, FL, at 1719 CST the same day. Various other stations on Channel 7 and above peaked for

(Continued on page 136)



Here's W4NUS displaying some of his prized QSL cards.

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

The VHF YLs

YLS ARE WHERE you find them, enjoying just about all the many types of activity that are available to the licensed amateur. We find the gals on the hf bands on local and nationwide nets, in contests, RTTY, public service activities, or just ragchewing. The same procedures go on in the vhf frequencies.

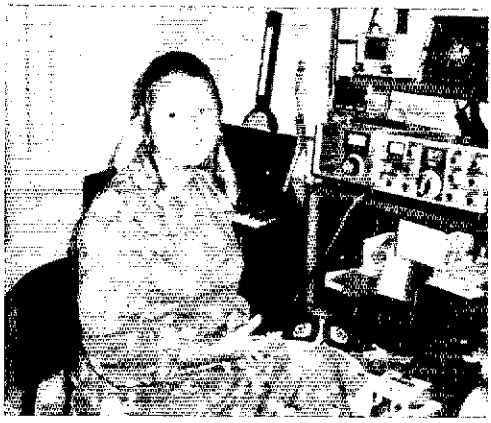
On the west coast the numerous YL members of the Salvation Army net, who operate with their base station WA6VFM, provide special greetings from the Los Angeles County Fair each year. These YLs also work during emergency drills to train to provide communications for that organization during emergencies in the Los Angeles area.

In Ohio the active Apricot Net gals, and their manager K8NKA, help to relay traffic on six meters into the designated delivery points. On the low bands the YLs who are members of the Buckeye Belles are an equally involved group with the name Chix-on-Six, one of the busiest of the midwest's YL clubs.

As control stations, as coordinators of their particular district, or as active participating members, many of the women who are members of MARS may be found using their MARS calls as they keep the Navy MARS RTTY nets going on two meters. Not just traffic or social nets keep the gals on the upper frequencies; they are also very busy in the Oscar program, giving the feminine touch to that side of the amateur program. The ATV gang know such YLs as Pat Mc Kee, WA6UAH, who seems to most of us to speak a foreign language as she discusses the equipment she uses or who surprises many when she tells of the DX she can accomplish with just eight watts of power.

The YLs in vhf can be easily identified by voice, that feminine touch that distinguishes many repeaters through the YL nets on 6 and 2 and the ladies participating in the public service nets or the military activities. We spot their picture on ATV or their calls on the lists of satellite tracking. They are adding their contributions to the vhf side of the growing YL story in amateur radio, a story begun just sixty-five years ago.

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



Nicole, C31YL, adds a new country to the YL map and one more gal with that distinctive YL suffix. Nicole and OM C31LO live permanently in Andorra. She speaks very little English, but hopes for more contacts with YLs in this country. *(Photo courtesy WA9INK/C31IL)*

1975 YLRL Calendar

The YLRL begins its 1975 fall activity with two club sponsored contests, YLRL Howdy Days and YLAP.

Beginning September 17 at 1800 UTC and ending September 19 at 1800 UTC, Howdy Days is the casual, get-acquainted contest that opens the fall-winter activity of the club. The YLAP schedules are Wednesday and Thursday, October 16 and 17, for the cw contest; and Thursday and Friday, November 6 and 7, for the phone section. Complete rules for both contests are listed in the Operating Events column of *QST*.

Both of these contests are for YL participants only. There is a special award to the Novice who submits the highest score. Please remember to mail logs to the YLRL Contest Custodian, Myrtle Cunningham, WA6ISY, 1105 East Acadia Avenue, El Segundo, CA 90245.

1975 Trillium Weekend

The Trillium Weekend, beginning 0030 UTC November 8 through 0030 UTC November 9, will open the calendar of the Ontario Trilliums as their major annual contest. The TOTs welcome all amateur radio operators who want to participate. This contest is an excellent opportunity for those who are interested in contacts for the new CLARA sponsored "Canadian Families" certificate in addition to the one sponsored by the Ontario Trilliums.

Members of the MINOW Net attend their annual meeting at Richland, Washington. Seated l-r: WA7TPU, Bernice; K7PVG, Freida; WA7BDD, Joan; WA7GMX, Pat; W7WLX, Ethel. Standing l-r: W7LOQ, Tiny; W7QGP, Mary; W7KCU, Marty; WA7UJI, Debbie; WA7RBR, Margaret; W7NJS, Beth; WA7UFS, Mona; K7TWQ, Jessie; K7UTT, Norma; K7RAM, Bobbie; K7MRX, Fran; WA7JFC, Lucille; W7FDE, Alma; and WA7RVA, Ruth.

The contest custodian will be TOT Vice President Joan Powell, VE3FVO, 39 Brightbay Crescent, Thornhill, Ontario, L3T 1C2, Canada. Full rules and suggested frequencies are listed in the *QST* Operating Events.

SOWP YL Members

It has been claimed that all we have to do is name the activity in amateur radio and it is an almost sure bet that we will find a YL in there some where. The Society of Wireless Pioneers, an organization of commercial radio operators, has listed six YLs in the membership. Those holding Professional Associate class membership are Carmella Cicerello, W8NAL; Esther Given, W6BDE; and Elsie Hermansen, W4COL. Three other YLs are classed as Technical Associate membership: Rose Ellen Bills, WA2FGS; Louise Moreau, W3WRE; and Linda Pettit, WB6ZSE. SOWP welcomes all YLs who have had commercial or military radio experience.

Meet the Club – L.I.A.R.S.

Call the club "Peaches," "Lassies," "Belles," or the many variations of LARC, and it adds up to a YL radio club. Now, the gals of the Winston Salem-Greensboro, North Carolina area have introduced a brand new name whose acronym stands for Ladies Interested in Amateur Radio Society.

The Ladies Interested in Amateur Radio Society holds two meetings a month. On the second Thursday of each month, they meet at the Western Sizzlin' Steak House in Greensboro. Here the meeting features a guest speaker. In the past these meetings have been devoted to such topics as emergency communications preparedness, message handling procedure characteristics of the amateur bands, and ARRL. The second monthly meeting is held on the fourth Thursday in the form of a social gathering at the home of WB4IJT in Greensboro.

The 1975 officers of the LIARS are President Carol Keller, WB4JCI; Vice President Mary Ross; Secretary Ann Lockhart, WB4IJT; Treasurer Sue Bino, WA4IHA; Publicity, Ruth Gamble; Contacts, Dee Lucas; Program, Nell Boles, WA4JMD; Social, Debbie Gabrial.

The aim of the club is to bring together women, licensed YLs and unlicensed wives of amateur radio operators, to learn more about radio and to help other women who want to become licensed amateurs. All interested women in the Greensboro-Winston Salem area are welcome to attend the meetings.

YLISSB History Available

A special edition of *VOICE*, the publication of YLISSB, commemorates the history of the YL International Single Sideband System. Edited by the system's founder V. Mayree Tallsman, K4ICA, and Jessie Billon, WA6OET, this work is a review of the organization through 1968, including current news, a full description of the large awards program and a partial membership list. Profusely illustrated, this history of the YLISSB System is a valuable addition to our library of material that tells the YL story.

Joan Strickland, WA3UNI/WZ1AEQ/1

Joan Strickland, WA3UNI, will be one of the three amateur radio operators who will provide communications for the bicentennial reenactment of the Arnold Expedition to Quebec this month. Joan, who is Secretary of the Bicentennial Amateur Radio Convention Committee of the Atlantic Division ARRL, received her Novice license in 1973. Three months later she qualified for her Advanced ticket. She is Vice President of the Penn Wireless Association, and assistant EC for the Lower Bucks County, PA, AREC. Active on EPaPTN, Joan enjoys Field Day and traffic handling.

Joan was recently honored by the League of Harry Bock Charities as Woman of the Year 1974-75 for her work with the birth defects program. This month she will be one of the few women, and the only YL amateur radio operator, who will be accompanying this reenactment of the Arnold Expedition. She and the OM, WA3HWR, will join the group on September 26 at Pittston, Maine, for the beginning of the march. She will assist with the radio communications using the special call sign WZ1AEQ/1 from each camp site. Times and frequencies for contacts with the expedition are found in *QST* Operating Events column. QST

If we work WA3UNI at WZ1AEQ/1 this month, we will be working an authentically dressed colonial lady. Joan is the only YL who will accompany the Arnold Expedition.

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., PO Box 3160, Haledon NJ 07508.

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

W4, K4 – National Capitol DX Assn., Box DX, Boyce VA 22620.

WA4, WB4, WN4 – J. R. Baker, W4LR, PO 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 – ARRL W6 QSL Bureau, 2814 Empire Avenue, Burbank CA 91504.

W7, K7, WA7, WN7 – Willamette Valley DX Club, Inc., PO 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, KØ, WAØ, WBØ, WNØ – Dr. Phillip D. Rowley, KØZFL, 5209 Loma Linda Road, Alamosa CO 81101.

KP4, WP4[1] – Radio Club de Puerto Rico, P.O. Box 1061, San Juan, PR, 00902.

KV4 – Graciano Belardo, PO Box 572, Christiansted, St. Croix VI 00820.

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

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

KL7, WL7 – Alaska QSL Bureau, Star Route, Box 2401, Wasilla AK 99687.

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

VE2 – A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal, Quebec H3R 2E3.

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

VE4 – D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg MB R3N ØE8.

VE5 – A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, SK S4S 5E3.

VE6 – D. C. Davidson, VE6TK, 1108 Trafford Dr., N.W., Calgary 47, AB.

VE7 – H. R. Hough, VE7HR, 1291 McKenzie Rd., Victoria, BC V8P 2L8.

VE8 – Frank Van Der Zande, VE8OO, PO Box 72, Fort Smith, NWT XØE ØPØ.

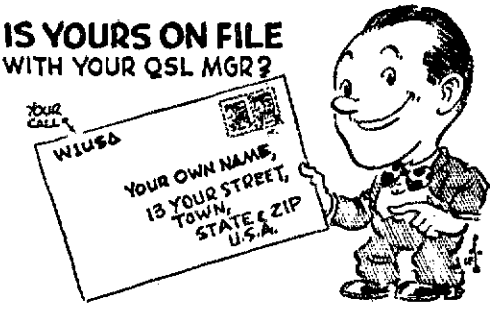
VO1 – William Coffen, VO1KM, PO Box 6, St. John's NF.

VO2[1] – Stan L. Parsons, VO2AS, PO Box 232, Goose Bay, LB.

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

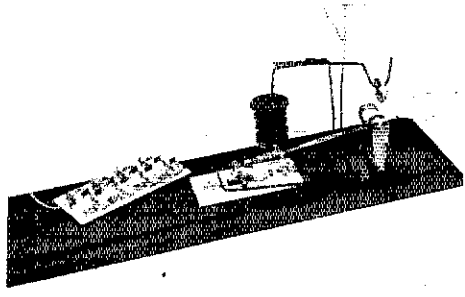
[1] These bureaus prefer 4-1/4 by 9-1/2 inch or No. 10 business envelopes.

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*.



Strays

WH6IMF communicates through dance as well as through key. Janet is one of the youngest members of the Lewward Amateur Radio Club of Waianae, Hawaii.



ARRL Hq. lab staff finally have the solver of many problems with this "Debugger," which was presented to ARRL President Harry Dannals, W2TUK, at the Lake County, Indiana, ARC dinner which was held earlier this year. Many thanks to the artist/creator of this "machine", Joseph Cress, W9GRA, for his contribution to the lab test gear.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

More people getting into the cw act, judging from the June issue of health magazine *Let's Live.* Wanna' be a big winner in your next DX contest? Ex-W9OVJ calls our attention to an article by one Harald J. Taub which dwells at length on tonic properties of Eleutherococc. That's not a new country unless you need Siberian ginseng. Got more and more interesting as we went along. . . .

> . . .In a pamphlet of clinical data prepared for physicians, prominent Russian pharmacologist Professor I. I. Brekhman makes the following enlightening comment: "Mental and physical work of man involves almost all physiological systems, and therefore the capacity for work is the most precise and integral characteristic of the organism's functional state. A good tonic is one which increases a man's capacity for work but produces neither an exciting effect, nor any undesirable functioning of internal organs or in metabolic processes. Eleutherococc (Siberian ginseng) is a tonic of this very kind; it combines advantageously all these properties with a pronounced tonic action. This action becomes evident after taking Eleutherococc daily for a long period of time and manifests itself in an increase in the patient's capacity for work not only immediately after taking a dose of the preparation but also for some time later. The tonic effect of Eleutherococc is accompanied by an improvement of the appetite, normalizing of weight, better sleep and an increase in the hemoglobin level."
>
> It seems to me to be a very good point that a person's ability to work provides a good measurement of the condition of over-all health. The kind of work that Professor Brekhman studied was the performance of radiotelegraph operators. He explains that this work makes high demands on the organism for diverse abilities such as complete concentration for long periods, precise coordination of the movements, fast reaction time, and very good hearing and vision. These may all be considered mental qualities although it is unlikely that anyone would possess them without being in good physical condition, but Professor Brekhman states that the work of a radiotelegraph operator requires great physical endurance as well. And he tells us that in his studies of the effect of Siberian ginseng on radiotelegraph operators it appeared "not only to increase the working capacity of the operators but also to reduce the number of mistakes." His examinations found that after long-time use of ginseng the vision of the radiotelegraph operators actually improved, and his tests were able to verify that their eyes had actually become more sensitive to variations in light. The acuity of their hearing also was increased, he says. . . .

We'll have to take all that ginseng with a grain of salt but the Professor's respect for manual radiotelegraphy is definitely our cup of tea. And it's good to know that our hula-hoop and three-mile jogs may well increase DX perception and push up the old code speed.

What:

About time we again sampled current DX activity on an interesting band or two. Eighty and 75 meters still are the ultimate hurdle for ARRL's Five-Band DX Century Club, except for some latecomers who have all squares filled but 28 MHz, so let's have a peek at single-sideband action around 3.8 MHz. Items worked, heard or heard worked by W9LNQ, WA3SWF, K2HYM, WBs 2EOO 2NOM 8FOS, OA6CV and the aftmentioned literature of clubs and groups include, on

75 PHONE: As 2CJP 4XAO 4XFW 9XH, AP2KS, C31s LO YL, C6s ABN AEN, CEs 2AA 8AA, CN8s BD BT BX DX HD, COs 2FA 2JA 3VR 8BO, CP1EU, CRs 4BC 4BS 7RJ, CTs 1EQ 1GD 1HL 1MK 1QP 2AE 2AK 2BN 2BP 2BQ 3AB 3AF 3AY 3BC, CX2AA, DA1EK, DJs 1XJ 2BI 2ZS 3DH/ET3 4ER 4VP 5PN 9ZB/JY ØRC, DKs 1FW 1YO 3BJ 5AD 5EZ 6TK 7ST ØWT, DLs 8FL 8MM ØVT, DMs 3ØBE 8JST, DUs 1GF 6BG, EAs 1FD 4AZ 4FH 6BH 8BW 8CR 8JJ 8JP 8LO 8OA 9EO 9FB, EI8BY, EL7F, EP2s CW TW, Fs 2MO 6AOI 6ARC 6BKW 6CKH 6CRZ 9MP, FCs 2CD 6CXT 6CYV 9VN, FG7AN, FL8s DN PE, FM7WE, FP8s DH CV, FYs 7AO 7WM ØBHI, Gs 2PU 3ALI

PAØGMW's rural acreage near Amsterdam, your QTH of the Month, is just the thing for a serious 80-meter DXer. Paul kicks an LPA1 600-watt amplifier with an FT200 into upright or flat delta loops, or a quarter-wave vertical. The ground factor is just great, too, because in this part of Holland the water table is almost at surface. *(Photo via PAØs JNH TO)*

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

OA6DM (right) entertains visiting W6HTY at his DX corner in Ilo. Larry's XYL, OA6DN, handled the photography.

3BAN 3FIN 3HTA 3LDI 3TJW 3UBR 3WMZ 3XFA 3XJZ 3ZPW 3ZYY 4CSW 4CVU 4DBR 61F, GB3MCG, GCs 3XBN 3YIZ 4BUE 4DAA 5BLE, GD5DZ, GI6VU, GW4s BIQ BVN CQT, HA5KKN, HB0s AAI AFI, HCs 1SC 2TV 2VN, HG5A, HH2s V WF, HIs 3JMN 8EJF 8FGP 8GP 8HA 8LMG 8MOG 8XAW 8XRG, HKs 4DF 5BWE 5BWX 0AA 0BKX, HPIs AH CU DV IW XDC, HRs IAT 2BLP 6SWA, HZ1s AB KE, I3s MAU MAY, IS0s CSX RNU, IT9s BUK PUE WGI, JAs 1ELY 1EOD 1KXY 1JRK 2KLT 7IJ 8CDT 8EAJ 8DNV 8JL 8ZO 9LEG, JH1IIB, JYs 3ZH 9CT, K4s BR/VP9 ERO/HC1, KG4s DB DS FO GG, KH6s AQ CF IGJ IJ, KL7s BJW HIY HNQ, KM6EA, KP4s AN AST EAJ EAK DHD DPN EBV ECH QS, KV4s BV FZ IJ, KX6MV, KZ5s BC JM, LG5LG, LUs 2AFH 4EGE 6DKX, LX2LX, LZ1KSL, M1C, OAs 4AGR 4AHA 4ANR 4HZ 4OS 4TI 6CV, OD5s CS HM IH IO, OEs 2WSL/5B4 5CA/YK 6TGF, OH0JN, OJ0MA, OKs 1ADM 3QIAE, ONs 4LJ 4UN 5NT, OXs 3DL 3OO 5EQ, OY5s NS SB, OZ5s BW KF, PAs 6VRL 0EG 0GMW, PJs 2RR 3DD 3HM 3RA 9BB 9EE 9JR, PYs 1RO 2ELZ 7BAC 7BVW 8JO, PZs 1AC 1AP 5FB, P29FV, SJ9WL, SK2AT, SMs ICNS 4APZ 5BLA 5GZ 5SB 6CLI 6CVT 0CER, SPs 30G 30L 7PZB, TA1HY, TF3s BB HP IRA SA SE, TGs 7BY 8KF 9DF 9YN, TIs 2CAP 2GI 2NA 2RT 6CBA 9CF 9DX, TJ1EZ, TR8DG, TU2FH, UAs 9VH/JT1 0CBO 0FGM 0MF, UB5BA, UC2ABF, UF6DR, UI8LAG, UK9AAQ, UO5BS, UP2OU, UR2EJ, UW0LT, VE3CUD/SU, VKs 2AVA 2RS 2XE 3AZY 4KA, VO1s AC FG HP JR KM, VPs 1FF 2A 2AA 2ABC 2AR 2DA 2DAJ 2DM 2DX 2E 2EEB 2EEE 2GMB 2LA 2LAN 2LGH 2LL 2MEO 2MJK 2SG 2SPI 2SQ 2VBH 2VZ 5B 5M 5RW 5WS 5WW 8NN 9AL 9AT 9DV 9GD 9HM 9HP 9HX 9LI, VQ9s D M, VR4s BS DX, VS6s DO FB, VU2s GDG KV, WA1PZQ/VP7, XEs 1AAC 1IX 1LFH 3EB, XW8s FA HV, YI8BL, YN1s AM AZ FWN HCB MAB MTY WB WD, YOs 2II 8AGL, YS2SJ, YUs 1AOP 1ADO 2EYZ 2HA 2RNE 3ROZ 4EBL, YVs 2AA 4AGP 4TI 5AHD 5ANS 5CVE, ZB2s CF CJ, ZC4AK, ZDs 3X 7FT, ZE6JL, ZF1s AK GC RD SV WE, ZK1DX, ZLs 1AMO 1AQ 1AZY 1BIL 1BOM 2BT 3GZ 3NR/c 4BX 4WF, ZM7AH, ZP5s AL EC, ZSs 1MH 3E 4MH 5LB 6DN 6DW, 3A2EE, 4S7PB, 4U1ITU, 4W1HJ, 4X4s GG NJ QG, 5T5DY, 5X5NK, 5Z4s LW PP, 6F8J, 6W8s DY FP, 6Y5DA, 7Xs 2HM 5AH, 8P6s AA AH AJ ES FU GK, 8R1s AG G J, 9G1s AK DY, 9H1BB, 9J2s EP WR, 9M2s DQ DW FK FX, 9V1SH, 9X5s PT SP, 9Y4s EH HJ NPSF TR VT VU and YF. If you're cute with the key just swing down to . . .

80 CW WHERE W1SWX, K2HYM, WA2JZX, WBs 2EOO 8FOS, VO1KE and W8KAJ recommend the radiotelegraphy of A9XU, C311U, CE8AA, CM6HT, CO7RCB, CR6s OZ, IZ, CTs 1BN 1QK 2BN 3WA, CXs 4LO 7BBB 7BQ 9BT, DJs 6SI/LX 9UN/OH0, DK4BP, DM2s CIF EDL, EAs 1FD 4BV 6BH 7KF, EI0REI, EP2XB, Fs 2PI 3NB 6ARC 6BLP 8OB 8OP 8RU, FC9VN, FPs 8AA 8AP 0BG, FYs 7AA 7AT 0BHI, GB3RN, GC2s FMV LU, GI3JEX, GM6RV, HAs 3KNA 5KDQ 5KLL, HC1CW, HM4GF, HR1AT, HS2AIG, I5YT, IS0BXL, IT9PUG, JAs 1CGM 1IDU 2GQO 2IYJ 2JW 3IAF 5FBZ 5PL 6BSM 7IJ 7WJ 8DNV, JD1AJG, JT1s AT KAA JX2s HD HK, JY9GR, KG6JAR, KH6s CF RS, KL7s DVE FA HDX, KP4s DJE WL, KV4s CI FZ, LUs 2AEI 2KZI 5DON 6DKX 7WH 8BAO, LZs 1KDP 2KDB 2KEF 30SOF, OAs 4AHA 5RU, OD5IQ, OE5KE, OHs 1LU 9TM 0BD, OKs 1ALW 30KFF, ON5s FG SY, OY6RRA, OZ5DX, PA9AEH, PJ7PJE, PYs 1RO 6HL, PZ1AP, SM2s CEW CLY EKM, SPs 1HJB 6PBF, ST2AY, TFs 3SE 5TP, TI2BEV, TJ1EZ, TU2BB, UAs 3LAV 3NAY 9CBM 9LAQ 0AG 0CBS 0FCE, UBs 30UV 5MFU 5UBJ 5XU, UC2OQ, UD6s DGG DGW DHC DHU DHX DII, UF6s DZ HK, UG6s AD SW, UH8s AC DL DU HAS, UI8s IR LAG, UJ8s AF AQ IJL JCA JCE, UKs 2BAS 2BBE 2FAA 2GAN 2GKW 2PAO 2WAF 5WAZ 9AAN 9AJA 9CCC 9CCJ, UL7s AAG ANV CAR GW JG LA TAM VAG, UM8s AP FM, UO5s OBE SA, UPs 2OU 30WI, UQ2s GCO HO, UR2s IO RC, UW3QZ, UY5s DM UW, VKs 2EO 2VN 3ABR 3AKL 3MJ 3MR 3XB 5MD 6HD 6WT, VO1KE, VPs 2EY 2GFA 2LAW 5CW 9CB 9HM, VQ9s M R, XE1s FFC LFH, XW8s ET HP, YC1HC, YO3JW, YUs 2OV 4EGR, YVs 1AD 4ID 4AGP, ZB2s BD CJ, ZDs 7PS 8TM, ZEs 1JV 2KV, ZF1s DM RD, ZLs 1AXX 3FZ 4AV 4NM, ZM7AH, ZSs 5DE 6KT, 3C1AGD, 4S7UD, 4U1ITU, 4W1ZB, 4X4s GD WF, 4Z4s HF IX, 5T5CJ, 5Z4JE, 6Y5s BF SR, 7X2ARA, 8Q6AH, 8R1J, 9A1BT, 9G1LZ, 9J2WR, 9K2DR, 9L1JT, 9M8HG, 9V1OP, 9X5s PF SP and 9Y4TR. Adequate quantity with quality but 3.5-MHz DX conditions suffer right along with higher bands when sunspots are scarce. The stuff is in there but ionospheric absorption and local atmospheric cracklings punch holes into the old saw that lower bands get better as higher bands get badder. Anyway, hang on for more sunspots. We're nearing bottom, all right, and when Old Sol finally does break out with measles, all this juicy material on 75 and 80 will once again become an impossible memory.

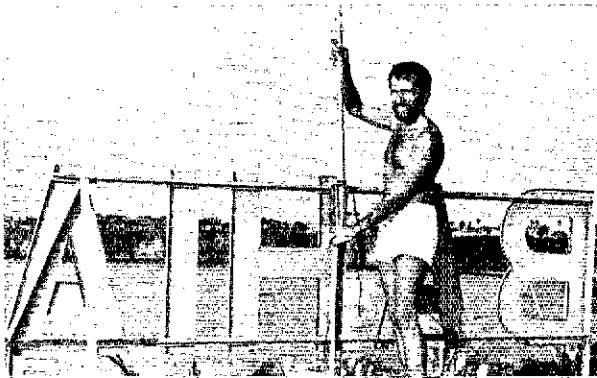
† † †

Where:

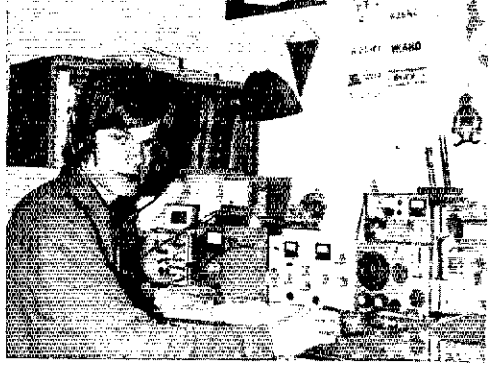
The large number of callsign identification errors in DX QSOs is very disappointing, especially when careful keying or use of phonetics should nearly eliminate this. In checking with my ARRL Bureau branch I found DX QSLs made out to W6s DGR DGS GDX DJG, K6DGH, WA6DGH, WB6s DGH and DGR which jibed with QSOs in my own contest logs. You'd think that operators intending to send out cards would strive for greater accuracy. (W6DGH, SCDXC) . . . Regarding DA1PK's item in July *QST*, DA1 stations have a fine bureau available if they would only use it, that of DARC. The official West Germany bureau has about ten thousand unclaimed DA1 QSLs on hand according to DJ9ON. DA1s caring to meet local DJ-DK-DLs may join the local amateur club in their closest city and thereby obtain DARC bureau privileges including outgoing facilities. Dues are quite reasonable when compared to postage costs accumulated by the average active DXer, and the performance of DARC's QSL bureau is one reason why DJ-DK-DL DX operators QSL so thoroughly. I have been active here since early 1973 and receive about 150 cards per month via DARC. A separate QSL bureau for DA licensees has been tried in the past with poor results. (DA1OR, ex-K9BWI) . . . WA6WMG is told by a Chilean source that QSLs for CE9-XQ9 stations should go only via FCRA, Box 72, Valparaiso, if not direct. (WCDXB) . . . It was reported by me in June's "How's" that 5Z4RT

was operated pirate style last December. The local GPO supported such opinion on an earlier inquiry but now I find that the call was legitimately used by DJ5RT at that time. Kenyan authorities must have misfiled record of this for they promptly issued 5Z4RT to DK8RT in February, the latter currently holding the call. My apologies to all concerned. (5Z4PI-VQ9WL-WA2RUD) . . . OJØAM QSOs in late June can be QSLd via OHØNA, and OHØAM contacts around the same period can be confirmed by guest operator OH2BH. (DXNS) . . . Finally broke a jinx with a QSL from Bulgaria and I suppose they'll come through by the handful from now on. Many of the more active LZs are club stations. This could be one reason why their QSLing is erratic. I know my own University of Michigan club, W8UM, has a few somewhat less than prompt QSLers. (WA8YTL) . . . The printer started on our 3C1AGD QSLs in mid-May and manager SM3CXS expected to start issuance by early June. (SMØAGD) . . . Due to return Stateside plus many personal items I'm somewhat behind in my EP2YL-EQ2YL-JY7YL-JY9YL QSL obligations. Sorry for the delay but be assured that I'll answer all requests as soon as possible. Contrary to some misinformation I do not have and never have had a QSL manager. Also be advised that I cannot assist with EP2FB confirmations. (K3ZZS/9) . . . CR7s deployed their new C9M prefix in July, C9MIZ being old CR7IZ, etc. (WCDXB) . . . QSLs for QSOs with operators Marv and Ed of C6ABC in early July can be respectively routed to W4ZMQ and WB4YHN. (DXNS) . . . Surprise! PRØITU's QSL indicates operation from St. Peter & St. Paul Rocks during International Telecommunications Union week. (VERON) . . . One East German ham tells me that International Reply Coupons are unavailable in his area, making direct QSL exchange quite difficult for him. He was joyful to receive my IRC and his return QSL came quickly, much faster than the leisurely bureau route. (W8ZCQ, CARA) . . . Advise the gang I'll answer all QSL petitions when I return to my San Jose QTH no later than the first of the year. (W6PEV/VP9) . . . As for Russian QSLs, from April 4, 1973, to January 6, 1974, I worked 67 U-stations in nine U.S.S.R. countries. Returns to date run about 70 percent, 46 stations confirmed in eight of those regions. The first came through almost a year after QSO. (W5UFF, ex-WØNDX) . . . All U-stations including oddities like UB3ØL, U4M and the like, plus 4J- and 4K-prefixed calls, can be QSLd via CRC, Box 88N, Moscow. (VERON) . . . If you seek SVØWZ's Rhodes QSL 'twill do no harm to take into account that Hans's QSL manager, OE3NH, is an avid philatelist. (WCDXB) . . . QSLs can sneak up on you. Got busy and forgot all about working UAØFY in 1973. Vlad QSLd first, via bureau, and my belated card is now en route. (WB6BEV) . . . San Salvador put its HU label to work again in June for commemorative purposes, suffixes unchanged. QSL HU1GMV to YS1GMV, etc. (WCDXB) . . . WA3HUP's QSL management in my behalf began in June. (CT1BY) . . . Printer delay slowed VP5B QSLing but WB4EYX says all cards should be in the mail sometime this month. (WCDXB) . . . I hope to become QSL manager for several European or African stations. Any candidates? (WBØMAO) . . . "QSLers of the Month" this trip include CR6s DN GA OR, CT2BP, DK6AP, FY7AK, GD4AM, HI8XKP, HKØBKX, HR1MM, HV3SJ, JA2SGU, KS6SFA, LX1BJ, ON6HV, UAØFY, VKs 3ZXX 4AK/9 4UR, VPs 1FF 2KF 2LAW 2MSUA 8OA, WA3KOS/C6A, YBØABV, ZB2USA, ZK1CV, 5T5s FP and ZR. as well as QSL tenders Ws 3KT 7OK ØGX, K3BSY, WB5IZN and KL7FA, all commended in "How's" mail from Ws 2QXA 7HPI, K2OVS, WAs 3DMH 8YTL, WBs 6BEV 9DVQ and VE2DKU for praiseworthy promptness in pasteboard production. Any swifties in your recent receipts? . . . 'Alp! Brethren in parentheses hunt hints and/or kinks toward acquiring overdue affidavits from specified targets: (W6JOT) HH2VA, VS5RCS, 9M2PO all '68; (W9OES) TH3AG; (K2OVS) C31BL, CR4BC '71, F2CD/FC, FL8MM '72, HP1CU, HR2WTA, IS1LIO '70, PZ5RK '70; (WA3DMH) VP5s DM MC; (WA8YTL) PZ1s AJ DD, ZD7CC. Any aid? . . . Now you're welcome to dig in our monthly DX directory, but remember that all suggestions are not necessarily either accurate, complete or official. . . .

A4XVG, C. Price, P. O. Box 981, Muscat, Sultanate of Oman
A9XBA, Box 144, Bahrein, Arabian Gulf
C31s IQ IR (via F6AUS)
ex-CM2CT-CO2CT (to KP4DPN)
DA2WN, C. Hall, "J" Trp., 21st Sig. Regt., Att. 18th RAF Sqdn., RAF Gutersloh, BFPO 47, England
DK7s PF/HBØ PV/HBØ (via DJ7OM)
EA5ES/EA9, A. de Salazar, c/Aridal de 5, El Aaiun, Spanish Sahara
EA9FC, P.O. Box 360, Melilla, Spanish North Africa
EA9FD, P.O. Box 326, Melilla, Spanish North Africa
FØBSD/FC (via ON6WT)
FH8CK, B.P. 186, Moroni, Comoro Islands
FL8GP, P.O. Box 462, Djibouti, T.F.A.I.
IF9JLG, P.O. Box 85, Trapani, Sicily, Italy
IZ1ARI, Box 7, Novara, Italy
JA1UMN, H. Satoh, 4131-837 Seya, Seya-ku, Yokohama 246, Japan
JA3PYD/4, c/o H. Matsuoka, 260-1 Takeda, Wadayama-cho, Asago-gun, Hyogo 669-52, Japan
JY7-9YL, R. Frisbie, K3ZZS/9, 2928 Simcoe Dr., Fort Wayne, Indiana, 46805
JY9DGC, c/o British Embassy, Amman, Jordan
JY9MC, c/o U.S. Embassy, Amman, Jordan
K4OKA/T12 (via W4KFC)
KB6CU, E. Dudek, P.O. Box 1158, APO, San Francisco, California 96401
KH6GKD/KB6 (to KH6GKD)
M1BS, P.O. Box 39, Rimini, Italy
M1D, G. Reffi, Central P.O., Republic of San Marino
OE5REB, Dr. R. Eisenwagner, Austrian MARS, Met. Stn., Aigen Airport, Linz, Austria
PA6KM-JAM (to P11ARS)
PZ5AA, Box 396, Paramaribo, Surinam
TF3AX, A. Solvason, Box 4069, Reykjavik, Iceland
VQ9DF, P.O. Box 468, Mahe, Seychelles Islands
VR4DQ, Box 89, Honiara, Solomon Islands
W6PEV/VP9 (to W6PEV)
WØTUT/T18 (to WØTUT)
WA6WTD/KL7 (via WA6RUS)
ZK1s CY MA (via W6KNH)
3D6BG, Box 21, Zulwini, Swaziland
9M6KT, K. Johnson, Box 1241, Kota Kinabalu, Sabah, Malaysia



3C1AGD (SMØAGD) shook up the DX world with a 14AVQ on this Malabo rooftop last March. Eric also generated recent pileups from Easter Island and Serrana Bank. *(Photo via W1WQC)*



OK1FCW needs only ten watts to work dozens of countries and all continents on 160-meter cw. Vlad, a student in Prague, gives credit to a high in-the-clear dipole and lots of persistent band-searching.

9Q5DM, P.O. Box 279, Somerset West 7130, Republic of South Africa

AP2KS (via JR1BFT)
C31JB (via SK7DP)
C31LY (to DJ9ZB)
C9MIZ (see text)
CN8BX (via F8SH)
CR8AG (via CT1SH)
CT1BY (via WA3HUP)
EP2YL (see JY7YL)
FØZR/FC (to WA9INK)
FMØAZZ (to F9MD)
FMØBQQ (to W6HJP)
FPØJD (to W2DEO)
FR7ZQ/g (to FR7ZQ)
G3JXE (via K9MKX)
HL9TO (to WB6GYS)
HU1JWD (see text)
IF9KZW (to IT9KZW)
JW9TM (to LA9TM)
JX2HK (to LA2HK)
JY8RS (via WA7ZLC)
KC6QM (via W7PHO)
M1C (via I4EAT)
ex-MP4THR (to DA2WN)
OE5CA/YK (to OE5REB)
OHØPA (to OH1PA)
PU7YS (to PY7YS)
PVØAKL (to PY4AKL)
T75AA (to TGØAA)
TF7V (to TF3AX)
TK2MO (to F2MO)
TK7GXT (to FG7XT)
UB5WE (via WA2DWE)
VE8ARS (via VE6AEI)
ex-VK8AW (to G3FAX)
VP1IL (via SM6PF)
VQ9WL (to WA2RUD)
VR1PE (to KH6GKD)
VR4JA (via JA1UMN)
XJ3GCO (to VE3GCO)
YBØABB (via W5KNA)
ex-ZB1HB (to G3RUS)
ZF1JE (to WA3SZI)
ZK1DA (via WA5OCN)
ZK1CW (via W4BAA)
3AØGY (to WB2EZG)
5V7WT (via F9GL)
5Z4RT (see text)
9H3U (to DK2BQ)
9H4G (6s to W6KNH)
9K2DX (via W6LU)
9H1DZ (via DL8OA)
9M2FK (via YU4HA)
ex-9M6AW (to G3EAX)

These came through the good offices of Ws 1CDC 1YL 2QXA 4WFL 6JOT 7HPI 7YF, Ks 2HYM 2OVS ØCMF, WAs 2EAF 8YTL, WBs 2EOO 9DVQ, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Belmore Rd., Norwich, NR7 OPU, England), International Short Wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15 5JE, England), Japan DX Radio Club *Bulletin* (JA3KWJ), Long Island DX Association *DX Bulletin* (K2KGB), Canadian DX Association *Long Skip* (VE1AL/3), Newark News Radio Club *Bulletin* (M. Witkowski, Rte. 5, Box 167, Stevens Point, Wisconsin 54481), Northern California DX Club *DXers* (Box 608, Menlo Park, California 94025), North Florida DX Association *News* (WA4UFW), Royal Signals Amateur Radio Society *Mercury* (G3DPS), Southern California DX Club *Bulletin* (WA6KZI), VERON's *DXpress* (PAØTO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). Feel free to consult parenthesized editors concerning the availability of subscriptions and/or memberships although some circulations are necessarily limited. Any QTHs for the gang?

† † †

W h e n c e :

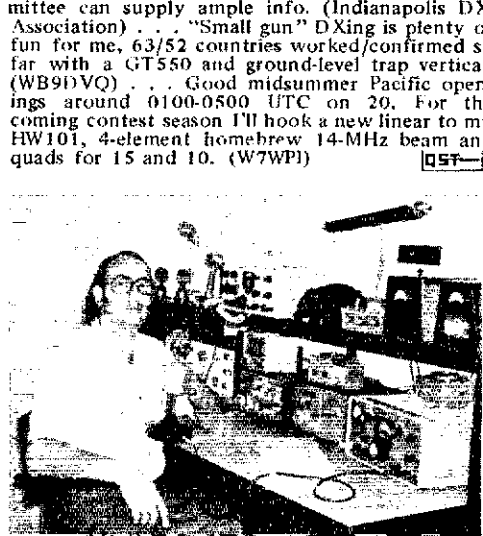
EUROPE – Results of Russia's 1974 CQM Contest reveal this single-operator any-bands order of U.S.A. entries: W6s MAR DGH, KK4ITU, Ws 9OHH 8QXQ, WA9JCO, K1OME, W2ESX, K7AL, WA3DMH, K3CL, W4JUK, WA2ZWH, Ws 3CBF 3CKR, KZ6ITU and W1OPJ. VEs 3BBH and 7IQ were Canada's one-two. Continental leaders include KG6JAR, LZ1GU, OA4AHA, W6MAR and 5B4AU. UA1DZ, UW3HV and UA4RZ led the home front in sequence. More toppers per country are DJ6AU, DM3YBF, EA5BS, F8TV, G8KP, GW3INW, HA4XT, HB9QA, HP1AC, I1FGT, JR1FVW, JT1AT, LA2Q, LX1ML, OD5LX, OE1ZGA, OH5YX, OK2QX, ON4FP, OX3MP, OZ6PI, PAØVB, SMØCCE, SP8FNA, UAs 4SM 4YAW 6IA 6PB 6WF 9CM 9XS ØYAE, UB5VY, UC2WP, UD6AY, UG6AD, UF6s FAV QAE, UH8BO, UI8AAS, UJ8JAS, UL7BG, UM8FM, UN1AU, UO5SA, UP2BAQ, UQ2HO, UR2MG, UW9WB, VK3XB, VU2UR, VX1KE, XW8PB, YO5AFD, YU1NGO, 4JØGM and UP2CG/CO2. (CRC) . . . I began another six-month Svalbard tour as JW5NM in June and intend to be quite active on 10 through 80 meters. If adequate equipment can be assembled I'll also try Oscar DX. (LA5NM) . . . After four enjoyable years with the ARRL Headquarters staff I've accepted a job in Europe. I'll be G5AYL, possibly GC5AYL, with an FT101B handy. QSOs as C31EF, etc., should follow. (W4WFL) . . . For rare geography how about that little neutral zone between Spain and Gibraltar? (VO1KE) . . . IMØCBM radiations in late June by I2XRG and myself occurred from Maddalena & Caprera Islands off northern Sardinia. (I2CBM) . . . SRAL of Finland, sponsor of this year's Scandinavian Activity Contest, welcomes W/K/VE/VO radiotelegraph participation on the 20th-21st of this month, voice competitors on the 27th-28th. (DJ7OM) . . . I plan to visit Monaco again as 3AØGY on September 8th through 20th. I'll most likely use 40 cw to compensate for ghastly 20-meter conditions. (WB2EZG) . . . W4MIA briefly operated UK75SW and stopped in at Moscow's Central Radio Club. His recent U.S.S.R. trip came about through invitation by Russia's scientific Popov Society. (W1YL) . . . I sadly note the passing of more than fifty pre-WWII U.K. hams over the last two years: G2s DN JC LB OI OQ SC XA YL YT, G3s AG GY GZ HT IR LN MU OV QC UD, G4s FN GA NS NT TZ, G5s BQ DV HS LC MA NP PA SS TN TZ UH UJ XW ZT, G6s BY LK PA PV TG UD XH XL, G8s FR OG RI SP, GC4LI, GIs 3AV 8PA, GMs 5HL 5JK 6IS 6NO, GWs 5AB 5VX and 8WQ. Too many familiar calls there. Happily, though, we still have with us three pre-WWI licensees: G2DY (1911), G2DX (1912) and G6DN. Calls in the G4-plus-three-letters series are currently being issued. Our "fancy" calls are in the GB2-3 series and we seem to be the only country not using new outlandish prefixes. My own operation is now 100-percent cw, all QSOs since 1951 being 94.8 percent telegraphy. Felicitations to G. Schultz and the DX Hoggery & Poetry Depreciation Society! (G3IDG) . . . We'll be signing DK7s PF/HBØ and PV/HBØ in Liechtenstein on 10 through 80 meters, cw and sideband, during the first two weeks of this month. (DJ7OM) . . . I especially enjoy W/K rag-chews on cw with Hallicrafters gear and a two-element spinner at Luino. (I2CWF) . . . Continental comments culled from the literary DX grapevine: PAØDIN takes office as VERON contest manager. . . . SVØWZ (WB4IRD) prefers to make Rhodes available to lower classes of W/K licensees on 14,300 kHz and above, usually from 2000 UTC. . . . Still need San Marino? W4BAA notes M1D regularly responsive on 14,240 or 14,300 kHz after 0930 UTC. Neighbor M1C likes 40 or 80 around 2100-2300. . . . Our Novice gang is heavily splattered by Radio Moscow's amateur radio program on 7105

kHz each Thursday at 0015 UTC. . . . Local QRM on Crete now features SVs 1FT 1GZ ØWAA ØWJJ and ØWKK, mostly near 14,200 kHz at 1200-2200 UTC. . . . Summer's 28-MHz short-skip season is no DX drag in Europe. You can catch twelve or fifteen countries in one sitting, sunspots or no. W6LRY continues to entertain inquiries about the 10-10 Club, a world-wide confederation of 28-MHz addicts.

ASIA – According to a poll of prominent Japanese DXers taken by JDXRC these ARRL DXCC countries are most needed in this order: South Sandwich, Bouvet, Bajo Nuevo, Clipperton, China, Kamaran, 8Z4, Malpelo, Albania, Iraq, St. Peter & Paul, Aves, Geyser, Burma, Glorieuses, South Georgia and Equatorial Guinea. (JA3KWJ) . . . Iwakura Amateur Radio Club issues a "Worked All Iwakura" certification to DXers world wide, an award based on QSOs with 45 cities and counties in our Aichi prefecture. Inquiries with self-addressed envelopes plus IRCs are welcomed by activity manager H. Mano, 275 Fujishima Danchi, Komaki, Aichi 485, Japan. (IARC) . . . Oriental addenda courtesy aforementioned periodicals of clubs and groups: BV2A-BV2B, first licensed as XU6A in 1940, later C3YW, scheduled a summer visit to Europe and the U.S. Tim's brother-in-law was old ac3WW. . . . XW8HK (JA1WTR) worked five JAs on 160 meters in May and expects to be hitting low bands hard in the next year or two. Neighbor XW8HP (JA3JYX) helps keep Laos available while over-all southeast Asia amateur emanations steadily decline. . . . TAs 1BW 1HY 1MB and 2QR keep Turkey workable on 20 sideband from 1000 to 1630 UTC. . . . YB9ABH-9V1OI expects to be spending time on Sri Lanka in the months ahead. . . . VU2ABC was close to WAS by QRT time in May. Sid visited pleasantly with 9N1MM and believes AC3-land will become active again in '76. . . . 9M2CJ headed back to Sweden via Los Angeles and Newington. . . . PAØIWH/S2 was glad to return to Holland after brief Dacca incarceration. Bangladesh authorities are suddenly highly distrustful of amateur radio, a temporary misconception we trust. . . . JY9FOC tries 160-meter DX, transmitting near 1826 kHz weekends around 0100-0200 UTC. . . . Ex-XV5s AC (ex-BV2AB-TJ1AZ) and AE (K6JGS) returned to the District of Columbia vicinity. The latter never did get a chance to fire up in Vietnam. . . . 9N1MM has Nepal back in the fray, usually near 14,240 kHz at 1500 or so UTC. W9CTY may be signing slant-9N1 again this month. . . . Sikkim's civil upheaval caused AC3PT to QRT in May, apparently for keeps. Troops occupying the royal palace confiscated the Chogyal's electronics gadgetry. JA1KSO is said to have been his final QSO.

AFRICA – Many strange experiences befell me on Fernando Poo where I managed 750 QSOs in twenty hours as 3C1AGD. It was particularly grim to have to dismantle my gear March 31st when my Equatorial Guinea stay extended through April 3rd. But I found it impossible to get permission for further operation. After all 3C frustrations I haven't yet renewed the will-power to plan my next DXpedition. Next year will find me again in South America with rare stops in mind. (SMØAGD courtesy W1WQC) . . . Via the club's press: FR7ZQ/g warmed his HW32 and dipole on the Glorieuses in June. At the same time FR7s AI BE ZL and ZU were respectively inhabiting Europa, Reunion, Tromelin and Juan de Nova, none DX-cessively active. . . . 3B8DA, who coincidentally works for the weather bureau, suffered heavy equipment damage in the winds of cyclone Gervais. Gusts up to 200 mph also blew away the skywire of 10-meter beacon 3B8MS. . . . Tunisia tickets for visiting DXers grow harder to come by. Even residential activity has receded. . . . ZD9BT of Tristan da Cunha has been scheduling QSL aide GB2SM near 21,370 kHz at 1500 UTC, Tuesdays, answering polite callers before signoff. . . . A2CCY's Botswana departure leaves A2CJP to pick up DX slack on 3796 kHz around 2100 UTC. The former is heard signing G4ECD/W5 in Arkansas. . . . ST2AY, Sudan DXclusive, has been favoring cw on 80's low edge, also 1827 kHz for low-band DX. . . . VQ9SS anticipates seven more months in the Chagos and will concentrate on 75 phone. . . . CN8DX, employing CN8BO's SB200, multibands like mad with a miniquad atop a Rabat hotel. Dave's usual hangout is near 14,215 kHz at 2100 UTC or so. . . . EA8CR & Co. want to do a large Spanish Sahara thing this month or next before the place changes DXCC status. . . . 5N2NAS has the first new Nigerian call in years. 5N2ESH, whose 3OLI and tribander have been representing that country almost singlehandedly, spent summer leave in England. . . . Be alert! VQ9BP and friends threaten early DXpeditionary developments, target(s) initially unspecified.

NORTH AMERICA – We'll be signing T75AA at Tikal, renowned archeological site and ancient capital of the Mayan kingdom, on 3780, 7080, 14,196, 21,300 and 28,600 kHz from zero UTC September 13th to 2400 on the 15th. (TGØAA) . . . Check with administrator W6UZX for details on Northern California DX Club's California Bicentennial Award to be offered during 1976. (W6ISQ) . . . Say, where's old Grommethead Schultz been hiding? (W5VE) . . . I managed twenty countries as a Novice and was more than glad to receive my General five days ago. Fifteen acting like it is, the best thing about being a WB type is that one can come home in the evening and actually find DX to work. (T.H.) . . . Glad to see the Elmer note on old W9AD. His family and friends appreciated it. (WØOMB) . . . Got my present Santurce call in '72 and have operated as CM2CT, CO2CT, HI3XAS, VP2s LCM VBZ and VCM. (KP4DPN) . . . K4BR/VP9 and CT1ID helped crack the no-sunspots blues on 15 to bring my DX contact total to 33. Friend WN1URA hooked FK8 FY7 and VK5. (WN1UAW) . . . TI2DL visited my WØTUT/TI8 installation near Puntas Arenas. (WØTUT) . . . Patience, clear keying or speaking, and good timing can get you plenty of DX with no more than a hundred watts on 80 through 10 meters. My HW101 seems quite enough. Who really needs all that QRO? (W3NAY) . . . Operated as PJ9CDC at the beautiful Santa Martha Bay location of PJ9JT (W1BIH). (W1CDC) . . . The 23rd annual W9-DXCC banquet comes off on the 20th of this month at the Holiday Inn, Itasca, Illinois. W9s VNE ZTD ZRX, K9OTB, WA9s BWY and FUD of our '75 program committee can supply ample info. (Indianapolis DX Association) . . . "Small gun" DXing is plenty of fun for me, 63/52 countries worked/confirmed so far with a GT550 and ground-level trap vertical. (WB9DVQ) . . . Good midsummer Pacific openings around 0100-0500 UTC on 20. For the coming contest season I'll hook a new linear to my HW101, 4-element homebrew 14-MHz beam and quads for 15 and 10. (W7WPI) QST



PY7APS climbed aboard ARRL's DXCC Honor Roll at the 313-country mark. Gerson also provides kicks for the global gang with occasional DX-cursions to rarer Brazilian islands.

September, 1925

. . . This issue is heavy on theory. "Reviewing the Receiver" by Wm. Adams goes from antenna through audio, and emphasizes: "No radio circuit that is of high resistance can tune sharply." Dr. Woodruff (later to be ARRL president) simplifies the use of Lecher wires for measurement of 5-meter wavelengths. The mysteries of transformer and reactor operation are explained by GE's Chadwick, and technical editor Kruse supplements this with a dissertation on why an 8:1 turns ratio won't necessarily give more amplification (in the same circuit) as a 2:1.

. . . Is nothing sacred? The reflecting-layer (Kennelly-Heaviside) theory is openly questioned by no less an authority than Dr. Greenleaf W. Pickard, who says that at the least a refraction hypothesis answers more questions. *QST* calls on all amateurs, especially those in the Experimenters Section, to be more inquisitive in propagation areas.

. . . The editor suggests our DX-minded hams will have more success if they listen outside U.S. bands, particularly at 40 meters. Foreigners apparently have no hard-and-fast frequency assignments (there are no international agreements as yet covering short waves) and know they won't be heard here through W QRM. The suggestion is to tune 32 to 37 meters for more action.

. . . Most "power leak" complaints come from other causes, says a Hartford Electric Light Co. expert whose job is to trace the source of such complaints. A major one is the trolley car.

. . . At last — a construction article: W.H. Hoffman of Burgess shares his design of a power-amplifier rig which will work "at least down to the 20-meter band." Grid-block keying is a feature.

. . . A. L. Budlong says you can add considerable punch to your neutrodyne by incorporating regeneration in the detector stage.

. . . Sangamo is turning out some new mica condensers, sealed in bakelite and accurate within 10% under all temperature and humidity conditions.

September, 1950

. . . W6YBT's "Mountaineer" portable 2-watt cw transceiver has 5 miniature tubes in a 3 by 8 by 9-inch package complete with batteries — a respected ancestor of today's solid-state equivalents.

. . . But monstrous rigs are still among us; WØPXZ bought from a department store a kitchen utility cabinet 25 inches wide (for standard panels), 12 inches deep and five feet high to house his 250-watt rig.

. . . VHF editor Tilton says multiple coverage of vhf bands is much too difficult on a coil switching basis, and crystal-controlled converters for each band are a far superior solution.

. . . A major advantage of the still-new sideband mode is rapid break-in, which the editor says "makes the old monologue-style phone QSOs something out of the dark ages." WISJT helps the am boys keep up, though, with a voice-operated keyer.

. . . W8ORI has a design for inductive coupling of rotary beams which is independent of the matching system.

. . . A meeting of European amateur societies in Paris commemorated the 25th anniversary of founding the International Amateur Radio Union. The Radio Society of Great Britain will set up a Region I (Europe-Africa) bureau to coordinate the special interests of that area.

. . . Two crystals are better than one, ex-G3CMJ deduces, and shows us a Q5er with quartz frequencies, 300 cycles apart, to superimpose the response peaks only slightly apart, providing a narrower passband with steep sides.

. . . With the Korean situation in wartime status, there is concern that amateur radio may be shut down, but League officials are in close touch with Washington authorities to represent our interests.

. . . Want to work more DX? All the principles and tricks of the trade are disclosed in a feature article — by W1DX, of course. — *WIRW*.

FEEDBACK

In July *QST*'s Simulated Emergency Test write-up, some scores were inadvertently left out. Under Western New York: Genesee, Orleans, Wyoming Cos., 241; Onondaga Co., 67; Niagara Frontier, 461; Oswego Co., 229; Tioga Co., 115. Under Western Pennsylvania: Armstrong Co., 47; Centre Co., 210; McKean Co., 73; Mercer Co., 155; Westmoreland, Allegheny Cos., 1693. The EC for Mercer Co. should have been listed as WA3SZX. ECs for Westmoreland and Allegheny Cos. were WA3SSU and K3SMB. Western Pennsylvania's total is 2178.

In *QST* for December, 1974, there is an error in "Some Ideas on Antenna Couplers," by Ulrich Rhode, DJ2LR/W2. The value for Ls in Fig. 8 should be 250 μH and not 25 μH.

In "The HF Discone Antenna," by John Belrose, VE2CV/VE3DRC (*QST* for July, 1975), part of the description of the antenna performance may have left you a bit bewildered. Reason: A line of type was dropped from the text. On page 56, the sentence beginning on the 12th line, column 2, should read, "At frequencies near the low end of the range, 7 MHz, the signal change is usually less than this, and at 14 MHz the signal change is usually greater, being 3 to 4 S units."

Strays

The Bronx County Historical Society sponsored a special events station recently on Bronx Bicentennial Day. The call was KT2BBC. The event included hand-outs to the general public interested in amateur radio, as well as shows and exhibits.

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; *Public Service*, W. C. MANN, WA1FCM; *Contests*, JIM CAIN, WA1STN. *Affiliated Clubs*, ROSALIE CAIN, WA1STO

Club Training Programs "A buncha baloney . . .that's what that Docket 20282 is. Why, if the danged clubs woulda held some classes once in a while we'd not be hearing about this 'we need quantity to keep our bands' business."

Member surveys sent out from Hq covering Docket 20282 came back with some comments similar to the above. The truth is that almost every local club bulletin received at Hq mentions a class or graduates thereof, a name of the educational officer, or students that are gearing up for an FCC test. Notes on these classes, gleaned from these bulletins, are kept in a file (there are special "class information cards" mailed to club secretaries to fill out and return, but these little white cards evidently get lost in File 13 all too often), and referred to when a person requests information on a class held near to where he/she lives. Year-round classes sponsored by clubs can be found in almost every state.

Here are some of the ways in which clubs promote their training program. Bulletin editors ask club members to visit their Novice Class scholars on weekends to help with any questions and encourage study. Members are asked to drive the students (many are too young to drive) to an occasional meeting. Scheduling classes an hour before the meeting and inviting novices-to-be to listen in are clever ways to whet the students' appetite for club activities. Code practice oscillators are favorites for club construction projects, built for use by future class-goers. The Whitman Amateur Radio Club (Mass.) printed a schematic of a code practice oscillator in their bulletin, to be given to prospective amateurs — a good public relations tool for the club, too. And take a look at this committee report taken from the Hall of Science Radio Club's (N.Y.) bulletin: "Hall of Science enrolls over five hundred persons each year in the amateur radio licensing courses. Many of these people never get on the air for many reasons. Some drop out; others need special tutoring; some are misguided to initial equipment which is too expensive for them; etc. Jim, WA2VOS led a discussion of what we could do to guide our new members and thus retain them as active hams and perhaps also to aid those in classes in getting on the air. It was felt that we should have a group willing to sponsor new novices."

The Wheaton Community Radio Amateurs (Ill.) have a "Dial-a-Radio-Club." A phone number is publicized in local papers and over the local radio station for anyone wishing to obtain information about the club, their classes, or amateur radio in general.

"Signees" for fall licensing are recruited at the county fair booth set up by the Rochester Amateur Radio Club (Minn.).

General interest meetings with no highly technical topics are scheduled to get joiners in the ranks of amateur radio and the local club. The Warminster Amateur Radio Club (Pa.) advertised one of its meetings in the local paper complete with pictures of equipment, over radio stations, and via flyers which included where to write for information about an upcoming hamfest. W3WRE presented the program entitled "One Hundred Years of Brass Pounding" (available on loan from Hq to affiliated clubs) which interested hams and "laypeople" alike.

Take a look at the number of requests received here for training aids to be used in classes under club jurisdiction. From April to June of this year, instructor licensing guides and operating aids of use to teachers (free of charge) were sent to sixty-four people. Two hundred and twenty-six training films/slide collections/tapes were loaned out with many of the request forms including "check-offs" for the set of quizzes available. An idea sheet and public relations handouts (also free) for exhibits and introductory one-day sessions at schools were sent to fifty-eight people. There were numerous requests for PR-type cassette tapes for use on broadcast stations, PR films for showing to service organizations (such as the Lions Club) or on educational television stations, code practice tapes for classes, and Oscar curriculum guides. Who knows how many of our requests for the Gateway Series (includes *How to Become a Radio Amateur, The Radio Amateur's License Manual, Learning the Radio Telegraph Code, and Operating an Amateur Radio Station*) and operating aids are really for classes. And any requests received for several different things may have been filed under the other requests and so were not included in this count.

Sure there are many clubs that don't sponsor (and probably never even thought about sponsoring) a class. These are specialized clubs — DX, contest — whose membership requirements are at least one step above "student" level. Many of the members belong to general interest clubs besides their specialty group, and hopefully the all-inclusive club holds a class. Vhf clubs were not listed with the so-called specialty groups. This was done on purpose. Many vhf groups now have regularly

W1AW SCHEDULE (effective February 23, 1975)

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M. - 1 A.M., Saturday 7 P.M. - 1 A.M. and Sunday 3 P.M. - 11 P.M., (all times local Eastern). 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 Mar. 28, May 26, July 4 and Sept. 1, 1975.

Times Days							
CST	*UTC*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*	*Sunday*
0740	1240	← Oscar[9] →					.....	.....
0800	1300	CODE PRACTICE[1] (5-25 wpm MWF, 35-15 wpm TTh) Details Below					.....	.....
1200-1300	1700-1800	21/28 cw[7*]	7.290*	21/28 cw[7*]	7.290*	21/28 cw[7*]	.....	.....
1300	1800	← Oscar[9] →					.....	.....
1320-1400[4]	1820-1900[4]	14.290*	14.080*	14.290*	14.080*	14.290*	.....	.....
1400-1500	1900-2000	7.080*	21/28 ssb[8*]	7.080*	21/28 ssb[8*]	7.080*	.....	.....
1500	2000	← CODE PRACTICE[1] (10-13-15 wpm) Details Below →					.....	Oscar[10]
1530	2030	← CW Bulletin[1] →					.....	.....
1600-1630[4]	2100-2130[4]	7.1 Nov.[5*]	21.1 Nov.[5*]	28.1 Nov.[5*]	21.1 Nov.[5*]	7.1 Nov.[5*]	.....	Oscar[11]
1630	2130	← RTTY Bulletin[3] →					.....	.....
1700-1800[4]	2200-2300[4]	CPN[6]	14.095 RTTY*	3.625 RTTY*	7.095 RTTY*	CPN[6]	.....	.....
1800-1830	2300-2330	.....	CN[6]	.....	CN[6]	.....	.....	.....
1830	2330	← CODE PRACTICE[1] (10-13-15 wpm) Details Below →					.....	.....
1900	0000†	← CW Bulletin[1] →					.....	.....
1930-2000[4]	0030-0100[4†]	3.7 Nov.[5*]	14.080*	14.080*	7.1 Nov.[5*]	14.080*	.....	.....
2000	0100†	← Phone Bulletin[2] →					.....	.....
2010-2030[4]	0110-0130[4†]	3.990†	50.190*	145.588*	1.820*	3.990*	.....	.....
2030	0130†	← CODE PRACTICE[1] (5-25 wpm TThSatSun, 35-15 wpm MWF) Details Below →					.....	.....
2130-2200[4]	0230-0300[4†]	3.580*	.....	1.805*	.....	3.580*	.....	.....
2200	0300†	← RTTY Bulletin[3] →					.....	.....
2230	0330†	← Phone Bulletin[2] →					.....	.....
2240-2300[4]	0340-0400[4†]	7.290*	3.990*	7.290*	3.990*	7.290*	.....	.....
2300	0400†	← CW Bulletin[1] →					.....	.....
2330-0000[4]	0430-0500[4†]	3.7 Nov.[5*]	7.080*	3.580†	7.1 Nov.[5*]	3.580*	.....	.....

[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 at 170 Hz shift, repeated at 850 Hz shift when time permits.

[4]Starting time approximate, following conclusion of bulletin or code practice.

[5]W1AW will tune the indicated band for Novice calls, answering on the caller's frequency.

[6]Participation in traffic nets.

[7]Operation will be on one of the following frequencies: 21.02, 21.08, 21.11, 28.02, 28.08, 28.11 MHz.

[8]Operation will be on one of the following frequencies: 21.26, 21.39, 28.59 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 cw frequencies.

[11]Oscar orbital data for the coming week, on RTTY frequencies.

† General contact period.

** No 10- or 15-meter activity from 2030-0000 UST.

‡ Indicates following day when UTC is being used.

All frequencies are approximate.

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 50.8 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*	*UTC/Days*
10-13-15	7:30 PM EDST dy 4:30 PM PDST	2330 dy
10-13-15	4:00 PM EDST MTWThF 1:00 PM PDST	2000 MTWThF
5-7½-10-13-20-25	9:30 PM EDST SnTThS 6:30 PM PDST	0130 MWFSn
5-7½-10-20-15	0 TThS 6:30 PM PDST	1300 TTh
35-30-25-20-15	9:00 AM EDST TTh 6:00 AM PDST	1300 TTh

The 0130 UTC 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 UTC dates and *QST* practice text to be sent in the 0130 UTC practice on the following dates, from the July issue.

Sept. 3:	It Seems to Us
Sept. 9:	Correspondence
Sept. 15:	League Lines
Sept. 25:	ARPS
Sept. 26:	World Above
Oct. 6:	YL News

5-BAND AWARDS

(Updating the August 1975 listing.)

5BDXCC: (Starting with number 435), K4CYU DJØUJ OZ7HT I2PHN W4EEE WA6JVD DK5EZ W6RKP.

5BWAS: (Starting with number 219), K7MOK HC1CW WB8HLI WAØZON K6DYZ K7CLO.

scheduled code practice and hold tech sessions on their club-owned repeater.

A letter on the subject – "Radio Communications and *Your* 1975-1976 Classroom," was forwarded to our Training Aids/Affiliated Clubs Branch from the Beachwood Amateur Radio Club of Beachwood, Ohio. This energetic bunch asked its president, WB8OJF, to send this letter to the local high school staff, outlining 5 curriculum areas (foreign language, social science, English – communications, mathematics, science) that amateur radio study would fit into perfectly. He asked to meet with the staff to answer further questions and make plans for the following school year (notice that he gave them plenty of time to make a decision). If your club would like a copy of this letter for ideas, write us for one.

Teaching "kits" have been put together by clubs so that a class can be started at any time the need arises. This way if one person cannot handle the load on a regular basis, any member can volunteer, even if for only one night, and everything will be ready to go. Burnaby Amateur Radio Club members (British Columbia) have recorded lessons on cassette tapes in case the instructor becomes ill or for some other reason cannot teach the class. Another member can take over at the drop of a hat.

We're proud of the clubs we've heard about. Clubs and their devoted licensing instructors are under-rated! Before you put them down for not educating the public, check out your area clubs. And how about you? Well, what *have* you done lately to contribute toward this end? – *WA1STO*

Staff Note. Those with sharp eyes may have noted an addition to the list of Assistant Communications Managers at the head of this column. Yep, WA1STO has earned the status of a full-fledged ACM in charge of the Affiliated Club Branch of the CD. If this keeps up, we'll have to start referring to the CD Distaff! – *W1NJM*

DXCC Notes

Effective July 1, 1975, AC3 (Sikkim) and Blenheim Reef became deletions on the ARRL Countries List.

The deletion of Sikkim is made in view of Sikkim becoming an integral part of India. Contacts made with Sikkim on or after May 1, 1975 will be credited towards the India listing.

The deletion of Blenheim Reef is made in view of recent information received indicating Blenheim comes under the administrative jurisdiction of the Commissioner of the British Indian Ocean Territory. Contacts made with Blenheim Reef July 1, 1975 or after will be credited towards the Chagos (VQ9) listing.

Please note that these two deletions are NOT reflected in DXCC Honor Roll listings appearing in this issue of *QST*.

DXAC Notes

The DXAC has placed the following item on its June, 1975 Agenda for consideration in October. Written comments are solicited from all DXers via Hq. for DXAC distribution.

(1) Is there sufficient interest in the country criteria used in considerations for the ARRL Countries List to warrant the printing of the criteria on the Countries List?

The criteria that were used were published in the Octoger, 1972 issue of *QST* on page 131. A copy of the criteria is available upon request to Headquarters.

SKN at W2DUS.

STRAIGHT-KEY NITE W1YL

How did our second summer SKN compare with the 1974 event? Great! Last year we had 91 reports in for the event representing participation by just under 500 different amateurs. This year entries were up to 135, reporting close to 650 taking part. Eighty-nine participants received one or more votes for "best fist," with the star of the evening being WB4AHH with 5 votes. Four votes apiece for K6OS and WA3TBW; 3 votes each for W1JSM WA2MFM K4LNC W8GMH, 2 votes for W1HV W1FCC/3 WB2FZG WB2ZRQ W3ADE WA3YXO W4NZR WB5HSZ K7QHH/7 W8NBK WN9PSO WA9VLK WBØLLU. Particular kudos to WN9PSO and the following novices earning a vote for best fist: WN2YGF WN2WBO WN3WNI WN4RZQ WN5NBC WN6HPB WN6HBL WN7ZWT WN8RDN WN9PNQ.

Reserve some time New Year's Eve for the next running of this fun event.

Soapbox

It would be unfair to nominate any one for best fist because they were all good. - W9ZCU. Helped me add 5 states towards WAS. - WN4MNG. Had a good time until an oil-filled filter capacitor exploded and shot hot oil all over the place. That kinda' spoiled the whole night. - VE3HNV. Brought back memories of my younger days in the 30's when I had a 210 Hartley. Sure was glad to go back to my bug again! - K4WP. Surprised to hear a 1-watt fb signal from W1AW. - K4BIY. The non-restrictive format for the night is good. - WA1RAB. Very enjoyable un-contest. - W3FPO. What is defined to be the best. Is it based on accuracy alone or sending speed vs. accuracy? This should be defined in the future. - WB2EZG. Interesting to note the high percentage of extra class license holders who participate in this event. - K5SVS. A welcome diversion in these days of automation. - W5UNI. How come no one wants to ragchew? - WB2EDW. Two QSOs then a big summer thunderstorm sat right above the vertical. It lasted 3 hours, which was longer than I did! - W9IQI. Thanks for a good time. - W9AEX. Perhaps we should spread out a bit more given such good participation. - W6IRA. Sure enjoyed meeting all the other "glass arms!" - VE7ZK. Most enjoyable. Sure missed all those extra dits. - W6VPV. Next time I'll have my 1921 Bunnell key polished and oiled up. - W5RUH. Should make mandatory 15-minute QSOs. - W8GMH. Thanks for putting on such an immensely enjoyable event. - WB8QPG. How about suggested freqs. on the 15/10 meter novice bands? - WNØOXS. For those who said cw is dead, July 4 must have been resurrection night. QRM was rough but I had a ball. - W5HY. Perhaps we should vote for the most interesting QSO. - WB8EHS.

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first numbe shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shows represents the total DXCC credits given including deleted countries. All totals shown represent submissions received through June 30, 197

CW/F

G3UKM	321/347	W6KZL	320/344	K4MQG	318/330	W5IO	317/345	YS1O	316/340	W3GAU	314/342
G3EXB	321/347	W6NJU	320/343	K4PDV	318/339	W5PWW	317/337	YV5BBU	316/325	W9TKD	315/334
GW3AHN	321/349	W6PI	320/346	K6OW	318/334	W5TJZ	317/338	YV5BJP	316/326	W4JDR	314/338
K2BK	321/344	W6ZO	320/350	K6RQ	318/337	W6EL	317/329	DL7AA	315/346	W4LYV	314/343
K2BZT	321/347	W7MB	320/353	K8IKB	318/338	W6FPZ	317/347	I2KMG	315/324	W4TM	314/345
LU6DJX	321/354	W8BT	320/345	K9FCF	318/336	W6FZJ	317/331	I8KDB	315/337	W5EJT	314/330
VE2NV	321/348	W8EWS	320/353	LA7Y	318/349	W6GPB	317/347	JA1BN	315/329	W5FF	314/340
W1BIH	321/353	W8LKH	320/348	OK4NC	318/347	W6ID	317/345	JA1DM	315/339	W5NMA	314/340
W1HX	321/350	W8OK	320/340	W1CBZ	318/342	W6KG	317/338	JA2JW	315/335	W5OB	314/334
W2AGW	321/354	W8ZCO	320/343	W1CKA	318/337	W6REH	317/332	K1ROE	315/323	W5OLG	314/344
W2BXA	321/354	W9DWQ	320/342	W1FZ	318/345	WA6GLD	317/327	K1YZW	315/323	W5PM	314/336
W2CTO	321/350	W9GFF	320/341	W1INV	318/343	WB6OOP	317/332	K4RPK	315/333	W6CAE	314/343
W2DXX	321/336	W9HB	320/343	W2BHM	318/341	W7CMO	317/336	K6AHV	315/328	W6DOD	314/322
W2NUE	321/346	W9LNM	320/352	W2EXA	318/340	W7OE	317/343	K6CH	315/343	W6DZZ	314/345
W2RGV	321/346	W0KE	320/346	W2FZY	318/340	W8ARH	317/329	K6GA	315/333	W6FF	314/336
W2SSC	321/346	W0MLY	320/345	W2PDB	318/338	W8CT	317/330	K8RTW	315/333	W6KNH	314/315
W2TP	321/339	W0SYK	320/347	WA2RLQ	318/328	W8KBT	317/339	KP4RK	315/334	W6SOP	314/338
W3KT	321/353	G2BOZ	319/346	W3LMA	318/349	W9KFC	317/346	OH2QV	315/329	WA6EPO	314/328
W3LMO	321/343	G3HCT	319/339	W4ML	318/347	W9WYB	317/339	UR2AR	315/333	WA6MWG	314/324
W3MP	321/352	G5VT	319/348	W5QK	318/338	W0BN	317/331	VE2WA	315/335	W7QK	314/337
W4FX	321/354	G8KS	319/344	W5QKZ	318/334	ZS6LW	317/339	W5ABY	316/342	W8CUT	314/330
W4GXB	321/351	I1ZL	319/339	W6ABA	318/329	CE3AG	316/348	W1HH	315/335	W8DA	314/333
W4OM	321/352	I0AMU	319/346	W6HX	318/350	DJ5DA	316/326	W2AYJ	315/343	W8EVZ	314/326
W4VPD	321/347	JA1BK	319/336	W6ISO	318/334	DJ0KQ	316/326	W2PN	315/325	W8JIN	314/348
W5KC	321/353	K2LWR	319/342	W6TZD	318/347	DL6EN	316/340	W3BWZ	315/319	W8UAS	314/343
W6AM	321/355	K3BW	319/342	W6RKP	318/341	G2BVN	316/343	W3RNO	315/342	W9ZTD	314/331
W7PHO	321/321	K4FZ	319/334	W6ZM	318/337	G3AAE	316/344	W4BFR	315/332	W0BL	314/319
W8BF	321/351	K4KQ	319/347	W7SGN	318/343	G4MJ	316/342	W4ZXI	315/321	XE1AE	314/332
W8DAW	321/354	K6DC	319/344	W8IBI	318/346	GI3IJM	316/337	WA4WIP	315/323	YV5AHR	314/326
W8GZ	321/353	K6FC	319/342	W8KIT	318/333	HB9KB	316/339	W5GJ	315/331	VE3MJ	314/327
W8MPW	321/348	K6LGF	319/340	W8OJR	318/344	IT1ZGY	316/338	W8NGO	316/342	CR6BX	313/338
W8PHZ	321/345	K7GCM	319/336	W8WZ	318/349	JA1BRK	316/328	W5LCI	315/335	DL1BO	313/339
W9BG	321/355	K8LSG	319/338	W9GIL	318/344	K2UYU	316/337	W6FOZ	315/342	GI3OQR	313/327
W0BW	321/351	OH2NB	319/349	W9JUV	318/345	K2YLM	316/325	W6KZS	315/326	HB9MX	313/332
W0DU	321/352	VK4QM	319/351	W9RCI	318/339	K4YYL	316/325	W6RGG	315/325	JA1MIN	313/326
W0FLA	321/353	W2BMK	319/340	W9RKP	318/344	K4VW	316/334	W7ENW	315/348	JA8ADQ	313/321
4X4DK	321/348	W2CP	319/334	W0CIZ	318/331	K6OJ	316/346	W8LY	315/337	K3UZY	313/328
DJ2BW	320/346	W2CR	319/345	W0LWG	318/337	K6QH	316/325	W9QLD	315/326	K4HJF	313/311
DL3RK	320/346	W2DOD	319/346	YV5AB	318/345	K6WR	316/331	YV5BPJ	316/326	K4MPF	313/325
DL9OH	320/340	W2GKZ	319/330	YV5ANF	318/325	K8DYZ	316/325	W0AUB	315/332	K5AAD	313/325
HB9MO	320/347	W2HTI	319/344	4X4JU	318/342	K8OHG	316/330	W0BK	315/333	K5LIL	313/320
K2FL	320/345	W2JVU	319/349	DJ7ZG	317/327	LU4DMG	316/341	W0NK	315/346	K6EV	313/324
K4LNM	320/343	W2PV	319/330	DL7HN	317/342	LU5AQ	316/340	YV5AIP	315/333	K6KA	313/318
K6ZO	320/353	W2OHH	319/349	DL7HU	317/335	OH2BH	316/327	DL1IN	314/339	K6KII	313/334
OE1FR	320/351	W2YY	319/336	HB9J	317/350	PY7YS	316/336	DL3BK	314/336	K6YRA	313/322
W1AX	320/352	WA2RAU	319/329	K1SHN	317/330	SM3BIZ	316/342	DL8NU	314/319	K8EHD	313/322
W1AZY	320/343	W3AEM	319/338	K2PXX	317/330	VE5RU	316/337	F9RM	314/332	OK1EP	313/340
W1DK	320/346	W3GRS	319/340	K2YXY	317/334	W1BPW	316/334	HB9FL	314/339	OZ3Y	313/331
W1MV	320/346	W4BJ	319/340	K4JC	317/330	W1GKK	316/350	JA1ADN	314/330	PY2BKO	313/322
W1NU	320/344	W4NJF	319/331	K6AN	317/347	W2GC	316/339	JA1AG	314/336	PY7APS	313/317
W1HZ	320/347	W4SSU	319/336	K6NA	317/347	W2MJ	316/336	JA3UI	314/332	SM7ANB	313/331
W1MV	320/346	W5POA	319/346	K8ONV	317/335	W2QK	316/329	K4ID	314/325	VE3WT	313/321
W2AO	320/346	W6CHV	319/346	K9BGM	317/326	WA2DIG	316/334	K4IKR	314/322	W1MU	313/330
W2BOK	320/346	W6KTE	319/329	OK1ADM	317/331	W4EFF	316/341	K4MZU	314/324	W2CKY	313/339
W2GLF	320/342	W6OSU	319/340	PA0FX	317/346	W4JC	316/330	K5QHS	314/319	W2IRV	313/338
W2LV	320/348	W6WWQ	319/345	PY2CK	317/349	W4OPM	316/340	K6ZM	314/331	WB2CKS	313/323
W2OM	320/344	W7AQB	319/340	PY2CO	317/327	W4PLL	316/340	K9KYF	314/331	W4MR	313/341
W3CGS	320/348	W7KH	319/351	PY2PA	317/327	W5ZBY	316/342	K9LUI	314/330	W5GO	313/335
W3FVW	320/350	W9IUW	319/334	PY2SO	317/327	W5FFW	316/342	ON4QJ	314/328	W5HDS	313/338
W3NKM	320/346	W9SFR	319/343	W1DGJ	317/330	W5HJA	316/334	PY1HX	314/339	W5HF	313/322
W3WGH	320/344	W0PGI	319/344	W1GL	317/329	W5NOP	316/336	PY2PF	314/324	W5MMD	313/341
W4AIT	320/352	W0QGI	319/344	W1GYF	317/341	W6EUF	316/324	PY4AP	314/321	W6HOC	313/335
W4BYU	320/347	ZL1HY	319/352	W2AX	317/342	W6PO	316/339	SM6AFK	314/322	W6LN	313/342
W4LRN	320/341	ZL3IS	319/341	W2CYS	317/348	W7ADS	316/343	SM6CKS	314/319	W6QNZ	313/335
W4MCM	320/340	DL1HH	318/336	W2GT	317/345	W8DMD	316/346	VE1VR	314/322	W6TA	313/335
W4QCW	320/345	DL1JW	318/339	W2HO	317/342	W8KPL	316/342	VE3BWY	314/337	W6UOQ	313/335
W5AO	320/347	DL1KB	318/347	W2ZLV	317/327	W8NDO	316/342	VE3MJ	314/324	W6YMV	313/328
W5MMK	320/350	G6TA	318/342	WB2HXD	317/327	W9HUZ	316/344	W2GQN	314/324	W7JQ	313/330
W5UX	320/344	GI3IVJ	318/342	W3DJZ	317/333	W9NDA	316/349	W2SAW	314/340	W7QPK	313/323
W6ANN	320/348	IT9TAI	318/343	W4BOY	317/340	W9TKV	316/341	W2WMG	314/334	W8JQ	313/325
W6RZE	320/348	K1IXG	318/334	W4IF	317/338	W0AIH	316/340	W2ZX	314/341	W8MB	313/333
W6CYV	320/347	K2TQC	318/334	W5GC	317/335	W0GKI	316/337	WB2FMK	314/324	W8ONA	313/338

WA8NYB	313/317	I3AF	312/333	K4IHA	312/316	W1YRC	312/317	W5UR	312/326	DJ7CX	312/322
W9JQD	313/318	G2FYT	312/333	K4TJL	312/330	W2WZ	312/344	W5WZQ	312/335	W9HJ	312/331
W9QQN	313/323	G3IFC	312/319	K5BGB	312/334	WA2IDM	312/317	WA5EFL	312/322	W9MQK	312/333
WØBEB	313/340	JA1MCU	312/318	K8WOT	312/326	WB2UKP	312/316	WA5JSI	312/316	WA9NUQ	312/319
ZL3OY	313/321	JA1ZZ	312/321	K9WEH	312/316	W3CS	312/324	W6FET	312/320	WØCKC	312/326
DJ7CX	313/322	JA4ZA	312/323	OH2LA	312/333	WA3ATP	312/318	W6JKJ	312/326	WØNVZ	312/323
DL3OH	312/318	K2KER	312/320	OK3MM	312/336	W5EGK	312/338	W7AC	312/345		
DL7AP	312/331	K4JCT	312/329	VE3DBT	312/315	W5LZZ	312/319	W8EV	312/339		

Radiotelephone

W2BXA	321/352	K2PL	318/334	WØCM	317/343	SM5BCO	315/334	W2LV	314/336	OK1ADM	314/323
W2RGV	321/344	VK5MS	318/346	ZS6LW	317/338	VE5RU	315/335	W2ZX	314/341	W6CHV	313/335
W2TP	321/336	W2OKM	318/343	DJ2BW	316/335	W4IC	315/323	W3AZD	314/326	W6YMV	313/327
W4FX	321/352	W2PV	318/329	DJ7ZG	316/326	W4SKO	315/338	W3DHM	314/338	W7QPK	313/326
W6AM	321/353	W6ZM	318/332	G8KS	316/339	WA4WIP	315/323	W3GRS	314/327	W9HB	313/334
W8BF	321/351	W8MPW	318/336	K2YLM	316/325	W6KTF	315/325	W3JK	314/322	W9SER	313/329
W8GZ	321/353	W8QJR	318/344	K4HEF	316/333	W9JT	315/323	W4UWC	314/325	WØAAA	313/323
4X4DK	321/348	W9DWQ	318/229	K4MQG	316/324	W9RNX	315/341	W5LZW	314/330	YV5AXQ	313/325
DL9OH	320/340	W9LNM	318/338	K5JEA	316/335	YV5AIP	315/333	WA8AJI	314/324	ZL1KG	313/337
3B8KM	320/342	WØGAA	318/330	LU4DMG	316/341	DL6EN	314/335	XE1AE	314/332	DL1IN	312/336
HI2HP	320/351	YV5AB	318/345	PAØHRO	316/341	F2MO	314/327	YV5AHR	314/326	EA4JL	312/317
W1JEG	320/344	YV5ANF	318/325	W9DWQ	318/329	F9RM	314/332	YV5AJK	314/331	FA7ID	312/332
W2GLF	320/342	ZL1HY	318/350	W1DGJ	316/329	I6FLD	314/330	YV5BNW	314/320	G3JEC	312/319
W4QCW	320/341	ZP5CF	318/343	W2EGD	316/326	I8AA	314/321	YV5BPJ	314/324	GI3JIM	312/331
W6GVM	320/350	4X4JU	318/338	W2QK	316/326	IØZV	314/330	ZL3NS	314/322	I2KMG	312/321
W7PHO	320/347	DY2YI	317/341	W3KT	316/343	IT9GAI	314/319	HB9J	313/342	K2BZT	312/331
W8BI	320/345	K6LGF	317/335	W4EEE	316/341	IT9JT	314/319	HB9TL	313/337	ON4DH	312/337
WØBW	320/344	K9UCF	317/334	W6EL	316/327	JA1BK	314/329	I2KMG	313/322	VE3WT	312/321
SZ4ERR	320/350	PY2CK	317/348	W6EUF	316/323	K7GCM	314/328	K4HJE	313/318	W2CKY	312/337
IØAMU	319/346	PY2PA	317/327	W7SGN	316/331	K8IKB	314/322	K4TJL	313/330	W5LZZ	312/319
W2HTI	319/343	VE3QA	317/340	DJ2YI	317/341	K9KYF	314/331	K5AWR	313/320	W5NMA	312/333
W2YY	319/331	W2ZTV	317/326	W9NZM	316/329	K9LUI	314/330	K5QHS	313/318	W6KNH	312/317
WA2RAU	319/329	W3DJZ	317/330	WØGKL	316/336	LU9DAH	314/335	ON4DM	313/341	W6PT	312/325
W3NKM	319/344	W4NJF	317/328	YV5BBU	316/325	OK1ADM	314/323	OZ3SK	313/327	W7CMO	312/324
W3WGH	319/337	W4OM	317/342	DL7FT	315/325	PY2PC	314/321	PY2CYK	313/320	W8CUO	312/326
W5JWM	319/339	W4SSU	317/331	DL7HU	315/331	SM3BIZ	314/339	PY2PE	313/323	W9HPS	312/325
W9ILW	319/334	W5GC	317/335	I8KDB	315/337	VE3MJ	314/322	WA2FOQ	313/322	W9JJF	312/337
G5VT	318/347	W5IO	317/344	K4JC	315/324	VE3MR	314/326	WB2HXD	313/323	W9WHM	312/338
G6FA	318/341	W6NJU	317/334	K4YYL	315/322	W1BAN	314/335	W4PDL	313/323	WA9NUQ	312/319
GI3IVJ	318/340	W6RHH	317/328	K6WR	315/330	W1ONK	314/339	W5PQA	313/336	YV4UA	312/316
K1IXG	318/334	W6RKP	317/335	K8RTW	315/333	W2GKZ	314/324	LU9DAH	314/335		

New Members June 1-30, 1975
CW/F

KV4FZ	306	DJ4IT	186	WØFHE	130	WØUYL	117	I1KBZ	108	WB4ZTI	103	VS6AW	100
JH1JGX	300	W7PR	182	K9MFY	127	F3HK	117	ZL2AUS	108	WØOXN	103	W1GBL	100
W2AJR	299	IT9WGI	179	W9TWM	127	WB6CUA	115	I3EGD	107	WA3QBF	102	WA6GSV	100
WA4EYR	233	VE5RA	176	DJ8HL	125	JAØDWY	114	JA1HQ	106	W4FLA	102	WBØAFA	100
W5BE	228	W3HHW	175	JR1VMC	124	WB4EDD	113	JA2WAA	105	WØOUE	102	YU4VAS	100
K9HMB	218	VE3ABP	174	JA2ETQ	123	K5KEZ	111	K4WLS/KL7	105	K9BSO	101	ZE1CQ	100
YU3ZV	220	W7TML/1	174	WB8DFK	122	VE3EJK	110	WB8NVD	105	WB5FCO	101	6Y5RS	100
W2MIG	194	DK3JU	143	JR1JFO	121	WB2CST	110	YU2NFY	105	DK4MC	100		
W2SRZ	188	KP4EAJ	143	OK1WT	120	JAØOE	109	ZL2F4T	105	EA8ED	100		
KP4DPN	187	WA6LHB	131	K9HQM	119	OE1KN	109	G3CPA	104	K1YZT	100		

Radiotelephone

K4FZ	297	W2MIG	193	W5ORX	126	WA2OQO	118	4W1BC	110	WA8AHU	104	K3CNH	100
JH1JGX	296	VE3ABP	170	WØFHE	124	WAØVDX	116	DK5AD	109	FGØAFA/FS7	102	K9MFY	100
W6BJI	276	W3HHV	169	I8ACB	120	DJ5CG	113	EA6BZ	109	K9HQM	102	KP4BDL	100
DK3HL	255	IS0SHU	161	JA2ETQ	120	JR1VMC	112	I6VDB	109	WB4ZTI	102	KP4EAJ	100
K9TZH	249	WAØPUJ	148	WB8DFK	120	I2GGJ	110	DK3GG	108	WB5IHC	102	WBØNHG	100
K6AAB	237	K4TBN	146	W9TWM	120	WA6LHB	110	I1JS	108	DK6XR	101		
CT1RM	224	KP4DPN	137	G3JKY	119	W9UWV	110	JAØOE	108	K2GI	100		
K9HMB	211	VQ9DC	137	W7ER	119	ZS2SG	110	F5VW	104	OE1BKW	100		

CW

W9KNI	126	W1DAL	111	K9UTN	103	K4YFQ	100
K6GA	121	W3KT	108	K1AGB	102	W6PT	100

Endorsements
June 1-30, 1975

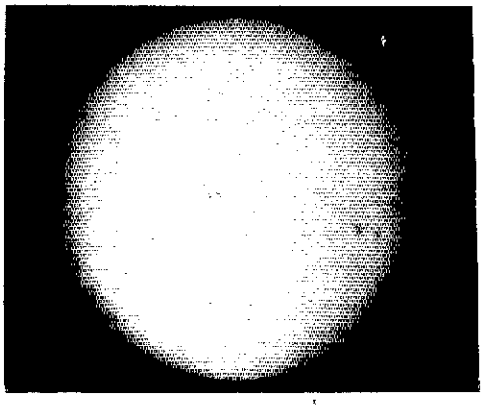
W5RDA	325	YU1BCD	320	W6BUO	310	JA1FDU	290	W6BJI	280	JA8KB	270
DL1CF	320	F2IU	315	WA2BRI	305	K6GWN	280	DK9FB	270	K5FVA	270
JA1IBX	320	SM6CWK	315	WA6DUG	305	WA2EAH	280	EA3NC	270	VK6CT	270

W4GIW	270	W4WWD	240	WB9LHI	200	DJ8CR	160	WB9MSV	160	W9MTT	1
WA2UWA	260	W9MLG	240	I3MQ	180	OK1ATZ	160	VE3HBD	140	KØSVW	1
WA9EOG	260	WA2MBP	220	JA2BP	180	W4JCH	160	VK2BC	140	W1YNE	1
YU1ODO	260	W5TWI	220	W1EWD	180	WB4OXD	160	W1SK	140	WA2WLM	1
CP1EU	250	W8TJQ	220	WA2RJZ	180	W5CPI	160	WB2GUB	140	WA3SXH	1
LA1H	250	K4BYN	200	W7AWH	180	W6YKS	160	W6HPB	140	WB4WFT	1
DL1LZ	240	OH6ZH	200	W8BPO	180	WA6EYK	160	W8TBZ	140	WB5HVY	1
EA3NA	240	W1PEG	200	WAØVDX	180	WB6BKN	160	W8WUT	140	WA8AWH	1
										WB9HHH	1

Radiotelephone

PY7YS	330	K6MOO	280	IIUW	290	W5TWI	220	W6BWG	180	W6MOS	1
W4CWV	330	VK6CT	270	EA3NC	240	W6DOD	220	WA2MBP	160	W8SDV	1
WØPGI	325	W4GIW	270	WA2EJS	240	W6KG	220	WB6BKN	160	WB9LHI	1
EA8JJ	305	JA1FDU	260	WA4YJJ	240	I3GZI	200	DK1YP	140	4W1AF	1
I4ZSQ	305	K5FVA	260	W9MLG	240	LA7DB	200	ET3RS	140	K9UTN	1
JA1IBX	305	K5UKN	260	DK5FZ	220	WØWO	200	VE3CKP	140	WB2GUB	1
K6GA	305	W6GTT	260	WA3EPR	220	CX7BF	180	W1MX	140	W2KFJ	1
JA1BN	300	SP5DZI	250	W5RDA	220	WB2VHC	180	W2HNV	140	W8GQP/4	1
										W7ISQ	1

Strays



This may not look impressive, if all the sunspot pictures you've seen were made near the peak of a solar cycle — but for August, 1975, there's a lot of spot area here. After more than 6 weeks in May and June in which there was almost no visible solar activity, the solar flux started climbing June 22, reaching 79 on the 27th. (Equivalent Zurich sunspot number: 19) A 1975 high of 88 (sunspot number: 32) was reached July 13, and the July average was 77.3, the highest since January.

The real fireworks began with the appearance of a group of at least 5 spots visible with the simplest projection methods, first clearly seen Aug. 1. The solar flux had started upward from 73 July 30, and it rose steadily to 105 (highest since October, 1974) on Aug. 5, when this picture was taken at the Talcott Mountain Science Center, Avon, CT. By Aug. 6-7 it had risen to 125. The very large group at the right may send flux readings still higher when it moves into the center of the solar disk.

If anything like this level of activity reappears 27 days later, the first week of September should bring higher *F*-layer mufs than we've seen in at least six months. *Photo (Criterion Dynamax 8-inch telescope) courtesy of the Talcott Mountain Science Center for Student Involvement.*

STOLEN EQUIPMENT

Theft on July 16 of Hallicrafters SR-46, Ser. No. 446000-512557, Sure M+2 mike also taken. Contact: Al DeRosier, K4KCU, (502) 426-6049 or Jefferson County Police, Louisville, KY.

Motorola Modar Triton, Ser. No. LM055X, from U.S. Army Engineers, P.O. Box 1229, Galvaston, TX. Notify Chief, Electronic Section.

Motorola PT-300, Ser. No. J-28196, Nicad pack and charger. Crystalled 146.34-94 and 146.31-91. Contact WA2AJQ or Syracuse New York Police Department.

Heathkit HW-202 series 7440. Crystals 94/94, 37/97, 01/61. Contact Michigan City Police Department, Michigan City, Indiana.

Drake ML-2, Ser. No. 11323. Contact William E. Willis, WA3SDU, 4517 Tarry Ln., Wilmington, Delaware. Phone (302) 998-4775.

Stolen June 28, SB-144, Ser. No. 620952. Crystals: 145.75/145.71; 146.94/146.94; 146.16/146.76; 146.19/146.79; 146.22/146.82; 146.31/146.94; 146.52/146.52. Contact Mr. D.L. Holdeman, W9HJL, 1510 Birch Ave., Hanover Park, IL 60103, phone (312) 289-1919.

Theft June 25 of Swan 350, Ser. No. C-596050, owned by W7UU. Contact Seattle Washington Police Department on case number 75-39991.

Theft June 27 of Clegg FM 27-B, Ser. No. 27033-1398, owned by WB4OEX. Contact Gainesville, GA Police Department.

Stolen Swan 350, No. 171805, with mobile mount. Contact W9MIB, Frederick C. Crowell, Jr., 5331 Old Georgetown Rd., New Albany, IN 47150.

Genave GTX-200, Ser. No. 27-12, GLB 400B Channelizer, Ser. No. 1783. Contact Bernie Swandic, K3DH.

Theft June 9 or 10 of FM Regency HR2A, Ser. No. 04-07415. Contact W4DO, W. H. Faulkner, Jr., 6475 Chapman Field Drive, Miami, FL 33156. (305) 666-9614.

I Would like to get in touch with . . .

. . . those interested in forming round table for discussion of psychic phenomenon. K8BRY.

. . . anyone owning a copy of an EI Catalogue, the ancient amateur's bible. W2MTD.

. . . anyone interested in organizing an amateur radio listening club. WNØOKA.

Operating Events

de WIYI

SEPTEMBER

4 ***West Coast Qualifying Run*** (W6OWP prime, W6ZRJ alternate), 10-35 wpm at 0400Z on 3590/7090 kHz. This is 2100 PDST the night of September 3. 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. Please include your full name, call (if any) and complete mailing address.

6-7 ***VHF QSO Party***, (p. 73 May and p. 67 August). ***Maryland-D.C. QSO Party, 4-Land QSO Party, Bavaria CCS Contest (HA)***; p. 98-99 August.

7 ***Frequency Measuring Test, Two-Meter RTTY Contest***, p. 99 August.

10 ***W1AW Qualifying Run***, 10-35 wpm at 0130 UTC transmitted simultaneously on 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. This is 2130 EDST (9:30 PM local Eastern time) the night of September 9. Underline one minute of top speed copied, certify copy made without aid, include your full name, call (if any) and complete mailing address.

13-14 ***European DX Contest*** phone, p. 106 July. ***CLARA Day Contest***, p. 94 July, ***Pennsylvania QSO Party, Washington State QSO Party***, p. 99 August.

13-15 ***T75AA DXpedition***, p. 99 August.

20-21 ***VE/W Contest***, p. 67 August; ***SAC cw***, p. 99 August.

23 ***W1AW Morning Qualifying Run***, 10-35 wpm at 1300 UTC. This is 9 AM EDST, same frequencies/details as under the September 10 listing.

27-28 ***SAC phone, Delta QSO Party***, p. 99 August.

See Note.

OCTOBER

1-Nov. 30 ***RTTY Art Contest***, full details from Don Royer, WA6PIR, 16387 Mandalay Dr., Encino, CA 91316.

1 ***West Coast Qualifying Run.***

4-5 ***California QSO Party***, sponsored by the Northern California Contest Club, from 1800Z Oct. 4 through 2400Z Oct. 5; of the 30-hour period the max. operating time no more than 24 hours. All bands, stations may be worked on phone and on cw on each band. A California station which changes counties (a mobile or portable) is considered to be a new station and may be contacted again on each band and mode. CA stations transmit consecutive QSO numbers and county. In lieu of county, others use state/VE province or country. (CA stations may work each other, but contacts between non-CA stations have no contest value.) Each complete QSO worth 2 points (no partial credit). The multiplier for CA stations will be the no. of states plus VE call districts VE/VO 1-8 (maximum of 8). CA stations may count CA as one multiplier. DX may be worked for QSO points but not for multipliers. Non-CA stations use the no. of different QSO counties worked. Final score equals total QSO points times the multiplier. Suggested freqs. around: cw, 1805 3560 7060 14060 21060 28060; ssb, 1815 3895 7230 14280 21355 28560; novice, 3725 7125 21125 28125. Try 10 on the hour and 15 on the half hour between 1800 and 2200 UTC. Log info. should include date/time, band and mode, calls, exchanges. Please number each new multiplier as worked. A summary sheet should be included showing your call, name, address, no. of QSOs on each band/mode, total QSOs, total mult. (max. of 58), claimed score. Note the category, either single or multioperator. Awards. All entries must be sent to the NCCC, c/o John Minke, W6KYA, 6230 Rio Bonito Dr., Carmichael, CA 95608, and must be postmarked no later than Oct. 31. A large business size s.a.s.e. is requested with each entry. All comments and suggestions appreciated. NCCC is promising to have all 58 CA counties represented by at least one fixed station, and at least 200 different W6 stations operating this year. Lots of activity promised. ***CARTG RTTY SS***, this issue. ***Rocky Mountain QSO Party***, sponsored by the Rocky Mountain Division of ARRL. The participating states are Colorado, New Mexico, Utah and Wyoming. Each state is having a separate QSO party. Periods: from 2100-2400Z Oct. 4, 0100-0500Z and 1800-2100Z Oct. 5. Freqs.: cw, 65 kHz up from the bottom; phone, near the edge between general and advanced; novice, near the middle of each band. Stations outside the division please refrain from calling CQ Contest near these frequencies. Exchange serial no., RS(T), state (county for stations in the division). Stations may be contacted only once per band regardless of mode, except that mobiles may be contacted again if they change counties. Intradivision and intrastate QSOs valid. Score 1 point per QSO. For Rocky Mt. Div. stations the mult. is the sum of states, VE provinces, countries and Rocky Mt. Div. counties; for stations outside, the mult. is the no. of counties worked in the state in whose party he is participating. There will be 4 different multipliers, one for each state, for those entering all 4 contests. Awards. Full log data, including exchanges, should be sent to Bill Wageman, K5MAT, 35 San Juan, Los Alamos, NM 87544, no later than Nov. 1. Include s.a.s.e. for awards and/or copies of the results. ***VK/ZL/Oceania DX Contest*** phone, sponsored by the Wireless Institute of Australia, open to all 160-10 meters; cw Oct. 11-12. Starts 1000Z Oct. 4, ends 1000Z Oct. 5; both single and multioperator categories. Exchange RS(T) plus consecutive serial starting with 001. Score 2 points for each QSO on a specific band with VK/ZL, 1 point for each additional Oceania station. Score: multiply total QSO points by the sum of VK/ZL call areas worked on all bands. Logs must show date/time(Z), calls, bands, serials. Underline each new VK/ZL call area contacted (separate logs per band). Usual summary and declaration. Awards. Logs must be mailed to arrive by Jan. 31. Send to VK/ZL Mgr. WIA, GPO Box 1002, Perth, 6001, Western Australia. Contest results and next year's rules by enclosing one IRC or mint stamps of your country to the value of one IRC. (If you're a certificate winner results/rules will be included with your award.) ***CQ-WE Contest***, Southern Region Hq. is host (K4KZP); session 1 on Oct. 4 1700-2100Z hf cw/RTTY/vhf cw; session 2 starts Oct. 4 2200Z runs through Oct. 5 0200Z for hf ssb and vhf ssb; session 3 Oct. 5 1700-2100Z for hf ssb/vhf ssb; session 4 on Oct. 5 starts 2200Z runs through 0200Z Oct. 6 for hf cw/RTTY/vhf cw.

11-12 ***CD Party***, phone. ***VK/ZL/Oceania DX Contest*** phone (see similar rules in the cw version listed under Oct. 4-5).

12 ***RSGB 21/28 MHz Telephony Contest***, open to all. A station, whether fixed portable or mobile may be worked only once on each band. Single op. only. Each complete QSO with a British Isles station will score 3 points. Final score is no. of points times total no. of British Isles prefixes worked on each band. (A prefix worked on both bands, therefore, scores 2 multipliers.) Pertinent prefixes: G/GC/GD/GI/GM/GW 2, 3, 4, 5, 6, 8. Contacts with GB stations do not score for points or multipliers. Entries should be sent to D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, Sussex, England. They should be posted to arrive not later than Dec. 8, 1975.

16 ***W1AW Qualifying Run.***

18-19 ***Manitoba QSO Party***, sponsored by the Amateur Radio Clubs of Manitoba, from 0001Z Oct. 19th through 0300Z Oct. 20. The same station may be worked once on each band and mode. VE4 to VE4 QSOs are permitted. Two-meter simplex contacts OK. Exchange QSO no., RST, name and QTH. Score 1 point per QSO. Use the no. of Manitoba cities and towns as mult. (VE4s use states/provinces/DX countries as mult.) Suggested freqs.: ssb, 3770 3905 7195 7230 14190 14285 21245 21355 28600; cw, 3705 7105 14065 21205 28205. Awards. Mailing deadline Nov. 10. Send log data and a signed declaration to Doug. Bowles, VE4QZ, 1104 First St., Brandon, Manitoba, Canada R7A 2Y4. ***RSGB 7 MHz DX Contest***, cw, from 1800Z Oct. 18 to 1800Z Oct. 19 (phone Nov. 1-2). Exchange report and serial (starting with 001). Non-British Isles station score 5 points for each contact with the British Isles; those outside EU 50 points. All may claim a bonus of 20 points for each British Isles numerical prefix worked (i.e. G/GC/GD/GI/GM/GW 2, 3, 4, 5, 6, 8). Contacts with stations using GB prefixes will not count for bonus points. Awards. (For non-EUs it takes at least 10 QSOs to qualify for an award.) Entries must be addressed to the HF Contests Committee, c/o J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, West Midlands, England, to arrive no later than Dec. 15 for the cw contest and Dec. 29 for the phone event. ***WADM Contest***, sponsored by the Radio Club of the GDR, from 1500Z Oct. 18 till 1500Z Oct. 19; open to all, cw only 80-10 meters. Send RST plus serial starting with 001. (DMs will send RST and the number of their Kreiskenner, i.e. 589 05). Work only DM.

Each complete QSO 3 points, partials 1 point. Each DM district per band is one multiplier; final multiplier is determined by the sum of districts worked on all bands. DM districts are the last letter of calls A through O. A maximum multiplier of 75. Categories: single op, all band, multiop, all band, SWLs. Awards. Separate logs per band, usual clear summary and declaration. Send no later than 30 days after the contest to the Radio Club of the GDR, DM Contest Mgr., DM2ATL, DDR 1055 Berlin, Box 30, German Democratic Republic.

25-26 *CQWW phone.*

27 *Special WIAW Evening Qualifying Run.*

NOVEMBER

1-2 *RSGB 7 MHz DX Contest* phone, see Oct. 18-19 listing. *North Carolina QSO Party, Worked-All-El-Paso Contest.*

6 *West Coast Qualifying Run.*

7-8 *Trillium Weekend Contest (TOT).*

8 *Frequency Measuring Test.*

8-9 *SS cw, European DX Contest RTTY.*

9 *OK DX Contest.*

14 *WIAW Qualifying Run.*

15-16 *All Austria Contest, 160-Meter cw.*

22-23 *SS phone.*

29-30 *CQWW cw.*

Dec. 6-7, 160-Meter Contest.
Dec. 7, TU2 Competition.
Dec. 13-14, 10-Meter Contest, EA Contest cw.
Dec. 28, HA5-WW Contest.
Dec. 31, Straight-Key Night.

Late September Note:

22 *WINJM High Speed Code Test.* Sponsored under auspices of the Connecticut Wireless Assn., this test will take place starting at 0130 UTC (9:30 P.M. EDT, Sept. 21) simultaneously on 3636 and 7085 kHz. Also, look for K6DYX on 3690 and 7025 kHz. Speeds will be 40, 45, 50, 55 and 60 wpm, with exactly five minutes at each speed. Call-up starts at 0115, instructions at 0130, first speed transmission at 0150, followed by speed transmissions at 0200, 0210, 0220 and 0230 in the above order. Copy instructions (25 wpm) at 0130, Sept. 22, for further details.

It Seems to Us

(Continued from page 9)

was able to gather a number of its West Coast members together in an all-day session during July) to exchange thoughts and to prepare for the next meeting of the Amateur Working Group which will be held in Reston, VA, at the time of the ARRL National Convention. While each committee is generating its own documentation to support its area of responsibility, a basic document for the use of all committees of the Amateur Working Group is the SPS/IRAC paper which we mentioned earlier.

There's a lot of expertise in the membership of the FCC's WARC-79 Amateur Working Group, but there are well over 100,000 other League members out there who have a vital interest in what happens in 1979 and whose input to the Working Group would be more than welcome. If you have any ideas on how additional amateur allocations could be justified, on how the amateur radio service could be strengthened on both a national and international basis through a change in the international regulations, on how we could achieve greater support for the amateur service on an international basis, please write. Send your comments to the appropriate committee chairman mentioned above of, if you're not sure, write ARRL Hq. and we'll see that your letter goes to the right committee.

The 1979 WARC may well be the most important conference ever faced by the amateur radio service, and while 1979 is four years away, the time to prepare is *now*. - *WIRU*

Restructuring

(Continued from page 52)

cism, and to recommend alternatives. One lesson which should have been learned in 1967 is that amateurs most strongly oppose any loss of privileges. The principal weakness of the Commission's proposals is that they are based largely upon withdrawal of still more privileges.

The League's support of the establishment of a new vhf entry class license is expressly conditioned upon (a) adoption of a requirement for a meaningful, not a *pro forma*, examination, and (b) access to only limited portions of the 144- and 220-MHz amateur bands.

The League's counterproposals fulfill the objectives of increasing the quality as well as the numerical size of the Amateur Radio Service. The League urges the Commission to improve an already excellent license structure rather than adopt an entirely new and untried concept of amateur licensing. QST

Air Pollution

(Continued from page 65)

with a fractured skull," - just because we don't have TLOB.

Calls for CQ DX should be augmented as he gets pushed out of shape if the answering station is not DX enough. By adding numbers 1 thru 14 to indicate a minimum distance in kilo-miles, stations at lesser distances would know they should not answer him.[2] QRP should be updated. We could use QRP for 100 watts or less, QRPP for 10 watts or less, and QRPPP for 1 watt or less (the metric system is inching closer). With the current energy crisis we should use QMX for "Best wishes for a very Merry Christmas" and QNY for a "Happy and Prosperous New Year." This would allow energy to be used for heating the inside of the shack instead of the outside air.

And now for the *piece de resistance*, we do not have adequate abbreviations relating to QSL cards. We presently say QSL sure, or just QSL (not-so-sure). If we added numbers after QSL, we could quickly indicate our desires as shown below.[3]

Air pollution during contests is beyond the scope of this article; perhaps someone not susceptible to nausea would undertake writing a series of articles on it.

Must QRT, so it's best 73s for now . . . sorry, I mean '74.

[2] The figure of 14 was arrived at by stretching a piece of string across an inexpensive globe and is therefore subject to correction. For moonbounce use MB instead of a number.

[3] More than one number may be used, for example QSL 1,3,4,5. QST

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, Roger E. Cole, W3DKX – SEC: K3KAJ. PAM: WA3DUM. RM: W3EEB. PSHR: WA3DUM 61, K3KAJ 45, K3YHR 41. The June MDD Bulletin shows W3EEB, K3KAJ and WA3DUM, one three and five respectively in QNI for the year. WA3KFR has been active on 40 with a Ten-Tec. W3TBG has added an SB220. The DELMAR Repeater (22-82) is now on tone activated squelch requiring 151.4 Hz to activate. New appointments: WA3WPY as ORS; WA3WWU as OVS. WA3WWU is working on a Homebrew 14-144 MHz Transverter and 829B Amp. K3AMC is becoming a regular on the DTN. W3KT, Vice-Director Atlantic Div. gave an excellent program at the Delaware ARC July meeting. A Drake ML-2 serial no. 11323 was stolen from WA3SDU at Louviers parking lot. DTN QNI 305, QTC 45; DEPN QNI 54, Tfc. 4. Traffic: K3KAJ 58, WA3DUM 52, W3FEB 51, W3DKX 29, WA3KDR 26, K3YHR 10.

EASTERN PENNSYLVANIA – Acting SCM, Paul D. Mercado, W3FBF – SEC: W3FBF. RMs: K3DZB, W3EML, K3MVO, WA3QLG. PAM: WA3PZO. PSHR: WA3PHQ 61, WB2FWW/3 58, WA3UKZ 54, WA3PZO 50, WA3VDQ 47, K3QIO 44, WA3ATQ 41, W3LC 15. W3EML handling traffic as usual. WB2FWW/3 is on call for Phila Electric Co. K3MVO says things are the same with him. WA3VDQ says FD was terrible. WB2RBA/3 worked FD with Binghamton, NY Radio Club. WA3QIO wants to see his call on PSHR. W3WRE added one more key to her collection. W3LC will be off the air temporarily. W3ADE attended the Harrisburg Hamfest. W3CL, Harry Stein still confused with his call. Have binoculars, will travel. W3HK still hanging on. WA3CKA wants to stop work so he can do more hamming. W3BNR still very busy out of town. W3EU is happy with new Field Strength meter. K3FBA had rain on Field Day but was happy with good chow. W3OY is improving with his health. WA3BJQ as always thankful for all the blessings. WA3VUE also hanging on until college. Sorry about W3HMR's father in the hospital. Hope for speedy recovery. Congratulations to K3ENX and W3UZU on passing Advanced Class exam. Looks like FD was a success in EPA by the letters and messages received. Nice work, fellows. PTTN – QNI 149, QTC 67. FP&TN – QNI 340, QTC 150. Traffic: W3CUL 2403, W3VR 954, W3AVI 631, WA3UKZ 539, WA3PHQ 480, WA3PZO 451, WA3QYY 417, WA3ATQ 295, W3EML 247, WB2FWW/3 144, W3ITX 107, K3MVO 86, WA3VDQ 42, WB2RBA/3 29, K3QIO 27, K3BHU 26, W3RWE 25, W3SK 16, W3LC 15, WA3DE 13, W3CL 5, WA3CKA 4, W3FBF 4, W3HK 4, K3HXS 4, W3BNR 2, W3VA 1.

MARYLAND-DISTRICT OF COLUMBIA – SCM, Karl R. Medrow, W3FA – SEC: K3LFD. RM: W3FZV. PAM: WA3EOP. NCM: WA3LPL. WA3UYF was an overlooked BPL winner for May. The MDD-MEPN-MDCTN picnic was a success with many net certificate winners. Field Day messages received from K3KSS/3, W3VPR/3, W3BHF/3, WA3RSG/4, K3AK/3, W3ZH/3, W3WK/3, WA3EWI/3, K3KAJ/3, WA3NSZ/3, W3PGA/3 and W3CWC/3. WA3WRN makes BPL and PSHR in June. Congrats and successfully completed Driver Training too! WA3FRW is trying to sked the New Mexico local of the Frederick Scout Troop. W3OKN is too busy moving, painting, and consulting for hamming. K3VQO hosted the W3VBM retirement dinner; W3VBM completed 40 years with the Govt. Best wishes. W3LDD is cramming 2-meter gear in his new Dart. WA3IHW has renewed for 5 more years. W3CDQ not enjoying poor health, but is home from the hospital and mending. W3BHE overcame a 6-week bout with a cold, but is back pushing for HR 7052. WA3VKH is an Advanced at 15 years. EP2VF is now W9ACC/3 and a motel owner. The Mountain ARC has a 28/88 Repeater Kit and eyes on a mountain top antenna site. K3DI cautioned to slow down is taking it easy. WA3ZAS got a second kw linear plus a work schedule change that wrecked all the tfc skeds. WA3EOP announces the Jr. Op arrived on June 25 at 10 lbs., 6 oz. Congrats. W8HZY/3 back and loud from the new QTH. WA3UPH is all settled in. W3FZV made the PVRC scene and many FD contacts. WA3SEE discovered he has been working hard and long hours. WA3UYB operates portable from Ocean City. W3ZNW is on enforced QRP. W3EOV is slowly getting the antennas back up. WA3UYF underwent successful surgery. W3MWD does his own typewriter repairs. WA3SJY is critical of contrived messages. WA3CUC missed the Washington County SET report and after all that effort. MDD Top Brass W3FA, W3FZV and W3MWD. Top Honor men MDCTN WA3DQ, WA3PRW, WA3WRN, W3FA and WA3UYB. MEPN toppers were WA3DQ, WA3PRW, three or less W3BHE, W3IQN and W3LDD. WA3JSZ is keeping the OO watch. The Section is saddened with the loss of W3HB, a Silent Key. WR PON had 13/76/14.5. MDCTN was 16/63/13.5. MEPN 21/93/20.1. MDD 57/211/6.4. Sessions/TFc/QNI avg. Traffic: (June) W3MWD 378, WA3WRN 247, W3FA 143, WA3ZAS 126, WA3UYF 88, W3FZV 83, WA3EOP 75, WA3SJY 67, WA3UPH 63, W8BZY/3 59, WA3UYB 28, W3EOV 21, WA3PRW 9, W3BHE 5. (May) WA3UYF 210.

SOUTHERN NEW JERSEY – SCM, Charles E. Travers, W2YPZ – It is gratifying to report the excellent Field Day activity for Southern NJ. Many clubs and organizations took part assisted by many interested individuals. In spite of the damp weather, activity went on and the results were excellent. Congratulations are due all those who participated and helped to make this a memorable FD. The Pine Barrens ARC reports installation of officers as of July 8. W2LPK, pres.; WA2UNJ, vice-pres.; K2AXQ, treas.; WN2YNT, secy.; WA2BAR, act. mgr. It is reported that WN2AML, a sightless operator passed his General AND Advanced Class exam on June 25. Congrats Dave for a tremendous report. WB2RMK mgr. of NJSN reports QNI 293, QTC 76, sessions 30. The Garden State ARA will hold a Flea Market and picnic Sun. Sept. 14, rain date Sept. 21 noon to dusk at the Bellingham Hill and Holland Roads, Holmdel, NJ. For details contact W2HXJ or W2DVR. Traffic: (June) WA2LZB 47, W2JI 32, WB2SFX 23, WA2TRK 13, K2BG 12, W2YPZ 10, W2ORS 6, (May) K2BG 8.

WESTERN NEW YORK – SCM, G.W. Hippisley, K2KIR – Asst. SCM: Richard M. Pitzeruse, K2KTK. SEC: W2CFP. Net mgrs. please update my listings for the new season. Correction to June column: UNYREPCO secy. is WB2JWD, not WA2JWD. New appointment: WA2PEA as EC for Onondaga County, replacing W2EOS, who resigns due to press of business. Author of the Month: W2HPQ (Tompkins County Emergency Call-Up Plan). W2ODC reappointed UNYREPCO Frequency Coordinating chmn. WNY OVS WA2TPR and WA2HUP decry the lack of non-FM activity on 6 and 2 meters except for an occasional opening or contest. Your SCM also knows the feeling well, but I wonder if the inclusion of key jacks on some of the more recent 2M FM gear might not presage some new DXing modes? Speaking of FM, WA2HFL adds a forty-four-element array to his tower, while a more modest ground-plane puts WA2EAJ back on the air. WA2AIV joins W2MTA as a potential home-town political candidate in fall campaigns. Regret to report the passing of WA2TDF. Not to be confused with WA2TQF, who's mighty active on 10. The SCM received FD messages from six WNY clubs; the SEC received one. Whether you sent one or not, hope your group had a good time. Speaking of contests, WB2WPA bemoans the timing of a super VHF opening halfway between the VHF QSO Paty and FD week ends! That's OK, Gary – K2KIR ain't too overjoyed that the local wx man chose to end the Central NY drought with a five-hour lightning storm that coincided with the start of the July CD Party. W2RQF has his new 60-ft. tower up. Finally, does anyone know if the Norwich (CVARA) repeater (07/67) is on the air yet? June reports: 736 check-ins and 276 messages for NYS; 7 EC reports for the past two months received by W2CFP, detailing 10 emergency drills and exercises. PSHR to W2s FR, MTA, OE. Traffic: W2FR 311, W2MIA 143, W2RUF 143, W2OE 116, WB2VND 79, WA2ICR 64, WB2AEK 46, W2RQF 38, WA2KUV 25, W2PZL 24, WA2DRC 23, WB2QIX 22, K2KIR 20, K2QFV 15, WA2TPC 13, W2UVE 13, K2DNN 12, WB2KUN 12, W2EAF 10, K2IMI 5, WA2AIV 3, WB2CTB 2.

WESTERN PENNSYLVANIA – SCM, Donald J. Myslewski, K3CHD – SEC: W3ZUH. Asst. SEC: K3SMB. PAM: K3ZNP. RMs: W2KAT/3, W3NEM, W3LOS, W3KUN. WPA CW Traffic Net meets daily on 3585 kHz at 7:00 PM local time. Pa. Traffic Training Net meets daily on 3610 kHz at 6:30 PM local time. Pa. Phone Net meets Mon. thru Fri. on 3960 kHz at 5:30 PM local time. Recent appointments made: WA3WOY as EC for Huntingdon County, WA3UDZ as OPS. It is with deep regret to announce the Silent Key of W3GK. WA3VUP recently passed the General Class exam. The Lawrence County Amateur Radio League announced the following officers for 1975-76: WA3VPO, pres.; W3QZH, vice-pres.; WA3VRO, secy.; WA3WNU, treas. W3HDH spent most of the summer with a Bicentennial wagon train. K3HJI has joined the Intruder Watch along with his duties as OO. The Steel City ARC is conducting license upgrading classes with WA3TPM in charge. The Latrobe area has a new repeater on 147.66/.06 MHz with the call WR3AGE. Also Clinton, Pa. repeater WR3AFF 147.81/.21 MHz is operational. Thinking of a repeater? Contact W3MIF, Frequency Coordinator, for details. WN3ZJH has been quite active on 40 and 15. Indiana County ARC reports W3FVU has retired and WA3MZU is very active on the County Hunters Net. K3AN is now a member of the OOTC and was awarded a 50 years in Amateur Radio certificate. WPA CW Traffic Net had 30 sessions for the month of June with 300 stations checking in and handled 145 messages. PSHR: WA3VBM 47, WA3SWF 44, W2KAT/3 42. W2KAT/3 made BPL. Traffic: W2KAT/3 524, WA3VBM 142, WA3RBS 111, W3UT 82, K3CB 65, W3EGJ 63, WA3SWF 41, K3HCT 36, K3CHD 33, W3SN 27, W3KUN 25, WA3OKK 10, K3HWL 8, W3IDO 8, K3VQV 8, W3HDH 7, K3SJN 4, W3FTN 2.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – Asst. SCM: Harry J. Studer, W9RYU. SEC: W9AES. RM: K9ZTV. Cook County EC: W9HPG. (Net, Freq., GMT/Days, Tfc.): ILN, 3690, 2330 Dy 110; ILN, 3690, Dy 120; ILL phone 3915, 2145 Dy, 343; NCPN, 3915, 1200 MS, 73; NCPN, 3915, 1700 MS, 96; IEN, 3940, 1400 Su, no report. Our beloved Nettie Barnes, WA9LDC, PAM for

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Kit SBA-104-2, Mobile mount, 6 lbs., mailable **36.95***
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Kit SB-634, 14 lbs., mailable **179.95**

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Designed exclusively for the SB-104. It provide split transmit and receive control and you aren frequency-limited in any way — transmit at on end of the band, receive at the other. The "644 even has two crystal positions for fixed-frequenc control. The "644" has a linear dial, but the exa frequency is displayed on the "104's" digital rea out. The display automatically changes whe switching from transmit to receive.

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Wind direction is indicated by eight arrows which light at the principal compass points; two adjacent lighted arrows show direction is a point between the two, giving sixteen point resolution. Easy to build, most parts mount on the two circuit boards. Easy to install, the remote transmitter boom clamps to any 1 to 1½" TV mast and connects to the receiver with 8-wire cable.

Kit ID-1590, 69.95.
50' cable, **7.50;** 100' cable, **13.50;** 150' cable, **18.50.**

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the Ill. Section has joined the ranks of Silent Keys. Nettie who became an active Ham during the later years of her life was one of the most active of traffic handlers. She will be missed very much by the gang and especially this writer. This column's sympathy is also extended to the families and friends of W9VPX and WB9EYV who also have joined Silent Keys. WA9OGD is now back in Clinton. WB9PDS (his father) is a new call in Clinton. W9LQN is transfering his QTH to the Island of Hawaii in Sept. K9OIY has a new Drake line and using it on cw chasing DX. WN9QDI is waiting for his General ticket and his brother is now WN9QXT. The amateurs of the Lawrenceville area set up operations on 2, 10 and 75 meters in cooperation with Excessarama III sponsored by the Civil Defense Agency and Office of Emergency Preparedness. W9KY's talk at the Northwest Amateur Radio Club's last meeting of "an inexpensive transmatch" drew a standing room only crowd. WB9DVV just completed WAS on 20 meters and also received his endorsement for 400 prefixes on the WPX, all ssb, certificate. New appointments this month include: WB9AGH, WA9LZA and WB9NIO as OBSs; WA9YDA as OO; WA9TOC as OVS and WB9IMV as ORS. The SEIH Club and the SARA Club held a joint meeting at their last regular meeting; the SEIH Club paper has a new format. WN9RJE, WN9RHV, WN9RHK and WN9RGB are new Novices in Springfield. WA9OBR has been appointed Net Mgr. of the North Central Phone Net. WN9RLW and WN9RML are new Novices from the Starved Rock Radio Club code and theory course. Their new two meter repeater frequency will be 147.12-147.72. W9VOK has a new licensed repeater WR9AHD on 147.24-147.84. New officers of CENOIS are W9AES, K9AWG and WA9NUL. WA9VGW is the only BPL recipient this month. Traffic: WA9VGW 678, W9NXG 288, WB9NVN 201, WB9NQZ 139, W9AES 123, K9KHI 109, W9NJP 105, W9HOT 100, K9ZTV 97, W9KR 46, W9LNQ 42, WB9OLI 37, WA9ULP 37, WA9JJE 24, WB9DED 13, WB9NIU 13, W9PRN 13, WB9GID 10, WA9LHU 10, WN9QDI 8, WA9MZS 6, W9RYU 6, K9UIY 2.

WISCONSIN – SCM, Roy A. Pedersen, K9FHI – SEC: K9PKQ. PAMs: W9AYK, WA9LRW, K9UTQ. RMs: WB9ICH, K9KSA, K9LGU, W9MFG.

Nets	Freq.	Time(Z)	QNI	QTC	Mgr.
BWN	3985	1145 M-S	469	360	W9AYK
BEN	3985	1700 Dy	680	159	WA9LRW
WNN	3725	2215 Dy	57	14	WB9ICH
WSBN	3985	2230 Dy	1061	179	K9UTQ
WSSN	3662	2330			K9KSA
WIN-E	3662	0000 Dy	225	120	W9MFG
WIN-L	3662	0300 Dy	212	125	K9LGU
WIPON	3925	1701 M-F	569	48	WA9NIX

WSBN certificate to WB9NME. WB9LKC operated portable 8 in Mich. with one watt cw. Sorry to hear XYL of W9EMC passed away. Silent Key: W9NDI. OBS to WA9POV. New General Class is WB9QXO; WB9ESK Extra Class. Central Division Convention July 9-10 1976, Red Carpet Inn Milwaukee, co-chmn. WA9KRF, WA9POV. Ground Hog Party Oct. 11. Dane Co. Swaptest at Madison Sept. 28. BEN-WSBN endorsed WA9GJU. WSBN-BWN-BEN endorsed K9CPM. WSBN to WB9NLS, WB9DFZ. K9DAF over 2000 counties confirmed. W9NFF now W9MY. BPL to K9CPM. WIN-L cert. to WB9LKC. W9SM had 1240 gross FD contacts, 625 on cw. WSSN summer vacation, starts again Sept. 1. WB9KPX on 2 meters with 2ODR. WB9PYG has Advanced ticket. Traffic: K9CPM 785, WA9QVT 211, WB9KPX 191, W9CXY 187, W9PVH 142, K9FHI 129, W9DND 124, K9LGU 117, WB9NME 97, WB9ICH 59, W9MFG 55, W9PD 54, K9KSA 51, W9AYK 50, WA9LRW 48, WA9PKM 46, K9UTQ 39, WB9ABF 37, WB9JSW 32, WB9KRR 32, K9IPS 29, W9IHW 25, W9BKD 23, WB9NKC 22, W9ESI 18, WB9LKC 18, WB9LSS 15, WN9PTX 15, WN9NRK 12, WB9KMQ 9, WN9OEC 8, W9ZBD 8, WB9PYG 5, K9EYA 1.

DAKOTA DIVISION

MINNESOTA – SCM, Tod Olson, WØIYP – SEC: WAØOFZ. PAMs: WAØYVT, KØFLT. RMs: KØZXE, WAØYAH. Chief OBS: WBØLOR. Chief OO: WAØPRS.

The Minn. Calling Frequency is 3925 kHz

At the point at which you read this many of you will know that I have resigned as SCM effective Sept. 1. Until an election can be held, KØZXE will be the Acting SCM. I want to thank all of the members of the section for their assistance and support. I only regret that the demands of starting a new business enterprise are such that I am unable to do justice to the job for which you elected me. Thank you all – WØIYP. The new Novice and Slow speed CW Traffic Net is meeting on 3710 kHz at 6:30 PM local time. The Call-up is MSSN (Minn. Slow Speed Net) why not tell your novice friends about the net and try your hand at cw traffic too. Various VHF stations have been providing assistance to the Duff's Golf tournament and to the Minneapolis Aquatennial. The MARC group was offering emergency phone service when the phone in the northern suburbs went out during a storm. WNØOAF tells of another Novice net meeting on 3725 kHz on Sat. at 1800. WBØJGB passed the Advanced, WNØLJJ & WNØPMZ passed the General. The annual MSN picnic was held at WØRQJ's with a nice turnout. The Handi-Hams held FD at Courage Center. The Mankato RC picnic was scheduled for July 27 at Spring Lake Park. Mucho FD activity this year, but condx not as good as last year. BPL: WRØHOX. Traffic: WBØHOX 794, KØZXE 254, KØCVD 209, WBØOCT 149, WAØYVT 107, WØQMY 84, KØZRD 71, WAØTFC 46, WBØCPC 43, WBØFMI 43, WAØYAH 38, KØFLT 29, KØZBI 27, WBØFTL 25, WBØEKC 14, WAØYWA 14, WAØGLI 13, WØHZU 13, KØCSF 12, WAØWOV 11, WAØIIB 9, KØJTW 8, WBØCYM 7, WBØENX 6, WBØGMK 6, WBØMLB 6, WAØWEZ 6, WAØJPR 5, WBØLJH 4, WBØGMJ 2, WØUMX 2.

NORTH DAKOTA – SCM, Harold L. Sheets, WØDM – OBS: KØPVG. OO: WØBF. WBØHHC has moved to Fla. WØGZD getting out well with new SB-104. WØDMJ has new tower and rig. WAØUNA has new base for his tower. KØFRP active on two meters. WAØSDQ moved to Park River and is very busy working on the new

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2C	$295.00
2AC Calibrator 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	549.00
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	120.00
DC-4 12vdc Supply for TR-4C	135.00
MMK-3 Mobile Mounting kit for TR-4C	6.95
T-4XC SSB Transmitter	580.00
L-4B Linear Amplifier	825.00
MN-4 Antenna Match Network	110.00
MN-2000 Antenna Match Network	200.00
W-4 RF Wattmeter (2-30 Mc)	62.00
WV-4 RF Wattmeter (20-200 Mc)	74.00
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
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Fixed-Frequency Crystals	7.50
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RY-4 Teletype adaptor	13.00
DIAL Crystal Selector - plain	2.75
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
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RP-500 Receiver Protector	90.00

TR-72

TR-22C

Order Today
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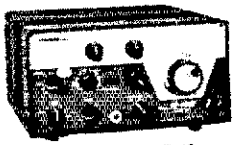

R-4C

L-4B

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welcome

- TOP TRADES for your good clean equipment
- STAY-ON-THE-AIR PLAN – Enables you to keep your trade- until your new gear arrives – Lose no operating time!
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- Top Notch Service Department
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SAVE up to $100.

If you purchase any of the new Merchandise listed below at the Regular Price and Without a Trade-in, you may take the "Bonus" Credit indicated below toward the purchase of other merchandise (such as power supplies, antennas, towers, microphones, crystals, linears, accessories, etc.)

TR-22C 2m FM	$20 Bonus	SPR-4 Receiver	$50 Bonus
TR-72 2m FM	$40 Bonus	TR-4C Xcvr	$60 Bonus
R-4C Receiver	$60 Bonus	C-4 Console	$40 Bonus
T-4XC Xmtr	$60 Bonus	L-4B Linear	$100 Bonus

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Mgr. Mail Order Sales

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I am interested in the following new equipment:

I have the following to trade: (what's your deal?)

Ship me:

I Enclose $; I will pay balance (if any):
☐ COD (20% Deposit) ☐ American Express
☐ Master Charge* ☐ BankAmericard

Account Number:

Expiration DATE *Master Charge Interbank number (4 digits)

Name:

Address:

City & State:

☐ Send used gear list

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AMECO
CN-50 6m conv (14-18) $ 29
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210 80-10m Xcvr $449

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20A Exciter $ 89
QT-1 Anti-trip 9
600L Linear 199
MM-2 Analyzer 59

CLEGG/SQUIRES-SANDERS
22'er 2m Xcvr $129
22'er Mk II Xcvr 199
66'er 6m Xcvr 109
Thor 6 Linear (RF) 75
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418 DC supply/mod 35
Interceptor Receiver 219
Interceptor B Rcvr 289
Apollo Linear 175
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75A-1 Receiver $139
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75S-3 Receiver 495
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32S-1 Transmitter 349
30L-1 Linear 395
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312B-4 Stn control 229
KWM-1 20-10m Xcvr 225
KWM-2 Xcvr 595
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PM-2 AC supply 95
302C-1 Wattmeter 59

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CTR-144 2m Xcvr $199

DRAKE
2A Receiver $149
2B Receiver 189
2CS Speaker 15
2AC Calibrator 9
2NB Noise blanker 15
R-4 Receiver 269
R-4A Receiver 289
R-4B Receiver 339
R-4C Receiver 399
FL-500 Filter 39
FL-4000 Filter 39
MS-3 Speaker 12
MS-4 Speaker 15
SC-6 6m converter 59
CPS-1 Conv supply 12
SDC-1 VHF calibrator 19
TC-6 6m xmit conv 175
TR-3 Xcvr 299
TR-4 Xcvr 399
TR-4/NB Xcvr 459
TR 4C Xcvr 449
TR-4C/NB Xcvr 509
FF-1 Xtal cont. adapt. 34
TR-6/NB 6m Xcvr 599
2NT Transmitter 99
T-4 Reciter 175
T-4XB Transmitter 375
AC-4 AC supply 85
DC-3 DC supply 75
DC-4 DC supply 89
L-4B Linear 595
W-4 Wattmeter 49
TR-22 2m FM Xcvr 149

DYCOMM
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753 Xcvr 129
751 AC supply 49
717 Keyer 49

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Galaxy III Xcvr $159
Galaxy V Xcvr 189
Galaxy V Mk II Xcvr 229
Galaxy V Mk III Xcvr 259
GT-550 Xcvr 279
GT-550A Xcvr 299
AC-35 AC supply 69
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G-300 DC supply 39
DC 35 DC supply 65
RV-1 Remote VFO 59
CAL-35 Calibrator 9
SC-35 Speaker 9
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DAC-35 Deluxe console 69
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AC-210 AC supply 19

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911A AC supply 79
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Thin-Pak DC supply 19
GSB-100 Transmitter 169
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SX-110 Receiver 99
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SX-140 Receiver 69
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HT-40 Transmitter 49
HT-44 Transmitter 159
HT-46 Transmitter 199
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PS-150-12 DC supply 49
SR-400 Xcvr 495
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FPM-300 Mk II Xcvr 349
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P-26 AC supply 45
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SR-42 2m Xcvr 79
SR-42A 2m Xcvr 89
SR-46 6m Xcvr 69
HA-26 6-2m VFO 39
HA-1 Keyer 59

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HQ-180A Receiver 369
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DX-20 Transmitter 29
DX-60B Transmitter 69
TX-1 Transmitter 99
SB-10 SSB adapter 75
HX-10 Transmitter 179
HX-11 Transmitter 34
HX-20 Transmitter 125
SB-400 Transmitter 225
SB-401 Transmitter 249
HA-10 Linear 175
SB-200 Linear 219
HA-14 Linear 99
HP-24 AC supply 49
HW-22 40m Xcvr 75
HW-22A 40m Xcvr 85
HW-100 Xcvr 249
HW 101 Xcvr 269
SB-102 Xcvr 369
SB-650 Freq display 159
HW-18 160m Xcvr 99
HW-30 (Two er) 2m Xcvr 34
HW-17 2m Xcvr 89
HP-13 DC supply 49
GP-11 DC supply 9
HP-23 AC supply 45
HP 23A AC supply 49
HP-23B AC supply 54
HO-10 Monitor scope 69
HM-15 SWR bridge 19

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KNIGHT
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NC-98 Receiver $ 89
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NC-155 Receiver 99
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NCX-3 Xcvr 169
NCX-5 Xcvr 279
NCX-5 Mk II Xcvr 299
NCXA AC supply 69
NCXD DC supply 75
NCX-500 Xcvr 199
AC-500 AC supply 69

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SB-33 Xcvr $179
SB1-LA Linear 149
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SB2-LA Linear 175
SB2-VOX VOX 15
SB2-XC Calibrator 12
SB2-MB Mobile mt 9
SB2 MIC Microphone 9
SB-36 Xcvr/AC supply 495
Scanvision SSTV 395
SB 144 2m FM Xcvr 169

STANDARD
SR C826M 2m FM Xcvr $199
SR-C12/120-1A AC PS 35
SR-C14U 2m FM Xcvr 299
SR-C146A 2m FM HT 189
SR-CMA Mob adapt. 9
SR CMP08 Mic 15
SR-UHHC-1 Charger 35

SWAN
SW-240 Xcvr $169
117AC AC supply 59
SW-12 DC supply 69
400 Xcvr/410/117B AC 299
406B VFO 49
MB-40 40m Xcvr 199
160m Remote VFO 89
270 Cygnet Xcvr 329
270B Cygnet xcvr 319
270B/SS-16B Xcvr 369
1200W Linear 199
350 Xcvr 269
500 Xcvr 309
500C Xcvr 329
700CX Xcvr 459
117C AC supply 65
512 DC supply 69
117XC AC supply 85
14X DC module 39
14C DC module 49
117X Basic AC supply 65
14-117 DC supply 99
510X Xtal oscillator 39
508 Remote VFO 189
600T Transmitter 399
ICAF Notch/peaker 19
NB-500 Noise blanker 49
250 6m Xcvr 239
250C 6m Xcvr 349
FM-1210A 2m FM w/AC 249

TEMPO
Tempo One Xcvr $299
AC/One AC supply 75
VFO/One Remote VFO 79
2000 Linear 275
ACH Charger 19

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PM-3 Xcvr $ 49
210 AC supply 19
TX-100 Transmitter 59
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FT-101 Xcvr $489
FT-101B Xcvr 549
FTDX-400 Xcvr 449
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FTDX-570 Xcvr 449
FT-401B Xcvr 499
SP-101 Speaker 15
SP-401 Speaker 15
FV-401 Remote VFO 79
FRDX-400 Receiver 249
FRDX-400SD Rcvr 319
FT-2 Auto 2m FM Xcvr 249

6-19-75

All items are subject to prior sale. Amateur Electronic Supply reserves the right to sell such items as power supplies with their matching equipment only, and not seperately - depending upon our stock situation. To insure quality, our used gear is serviced and made ready for shipment after we receive your order - so please allow for a possible delay (approximately 5 to 10 working days).

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4828 West Fond du Lac Ave. Milwaukee, Wis. 53216
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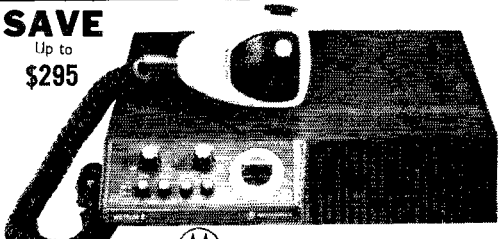


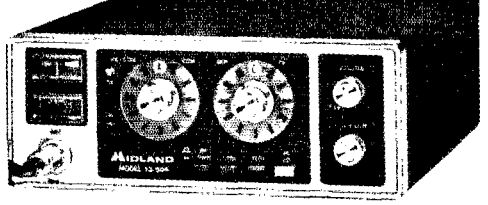
MOTOROLA

If you purchase a Metrum II on Sale as shown below – We will also sell you a PK-736 Tone Encoder kit for just $1 (reg. $45) and, or a T-1670A AC Power Supply for just $99

	reg.	Now
10 Watt Metrum II	$399	$249
25 watt Metrum II	499	299

Crystals (one per channel)	9.00	PK-735 Multiple Repeater	
Repeater Offset Crystal	13.50	Offset Modification Kit	39.00
T-1670A AC Power Supply	150.00	PK-736 Tone Encoder Kit	45.00

MIDLAND 2M FM



Model 13-505 Reg. $309.95

Write for our Deal today!

house and yard. W7IIM was back in his old haunts in Fargo ... vacation. Field Day in the Red River Valley was rather wet due ... heavy rains and flood conditions. The Minot and Dickenson Clu... reported good turnouts. The Dickenson Club had a Solar Pow... emergency rig! The Annual Mayville Ham Picnic was a decide... success with 115 registered hams and friends. WØUTT was auctio... eer for the sale, part of the proceeds went to the Repeater Fund. ... pot-luck dinner and coffee kept them well fed. Thanks to WØOE ... and helpers for a fine day. WØOEL, discovered that he and WØD ... had 97 years of hamming! WAØSUF continues his good work ... DTRN for ND. RACES meets on 3996.5 kHz, 1830 S-S, held 2 ... Sess., 384 QNI, 62 QTC, WBØATJ, WAØSUF. Traffic: WBØHHC 7... WAØSUF 67, WØDM 22, WBØBMG 7, WØMXF 3.

SOUTH DAKOTA – SCM, Ed Gray, WAØCPX – The Yankton ... Vermillion, Huron, Mitchell, Watertown area, and Rapid City group ... all reported FD activity to your SCM. The Mitchell group made tw... contacts via Oscar as part of their FD activity. WAØCPX has ... 136-ft. tower up with stacked beams on top. Ed recently secured t... 5BDXCC Award. WAØONL recently had a crane help install a 71-f... self-supporting tower with a 19-ft. mast. WAØVPY has hee... contacting eastern SD quite often on two meters. The SD Amateu... Picnic will be held at Sioux Falls next year under the sponsorship ... the Sioux Valley Repeater Assn. WØADJ a charter Black Hills AR... member is a Silent Key. The SD XYLs are working on an on-the-a... get-together on 3.955 MHz every Tue. afternoon. For more detai... contact WAØVRE. WAØKKR and WAØONL are recent Extra Cla... licensees. Morning Net 378 QNI and 28 formals; NJQ 737 QNI ar... 48 formals; Evening 988 QNI and 37 formals. SDN CW remau... active. Traffic: WAØKKR 110, WAØVRE 42, WØHOJ 26.

DELTA DIVISION

ARKANSAS – SCM, S.M. Pokorny, W5UAU – SEC: W5RX... PAM: W5POH. RM: W5MYZ. Net, kHz, Time/Day, QNI, QT... Mgr.: OZK, 3765, 0000/Dy, 128, 48; APN, 3937, 1100/M-S, 67... 28, W5POH; M-Bird, 3925, 2130/M-F, 462, 50, WA5ZWZ; ATI... 3995, 2230/Dy, 309, 62, WB5IGF; ANN, 3715, 2300/Dy, 82, 3... WB5IGF; ARN, 3995, 2330/Dy, 358, 61. Welcome to new han... WB5s OPU, OPW, OUJ; WN5s OLG, OMG, OMH, OMI, OMJ, OMK... OML, OMM, OMQ, OQA, OQZ, OTE. Need more operators in th... Ft. Smith area to help out in the Ft. Chaffee operation, contac... WB5FMJ or W5UAU. PSHR: W5EIJ 53, W5MYZ 49, WB5IGF 4... WB5FMJ 34. Traffic: WB5KEP/5 705, WB5FMJ 318, W5MYZ 32... W5TXA 152, WB5IGF 147, W5EIJ 94, W5UAU 56, W5KL 4.

LOUISIANA – SCM, Robert P. Schmidt, W5GHP – Asst. SCM... John Souvestre, WA5NYY. SEC: W5TRI. RM: WA5ZZA. PAM... WB5EKU. VHF PAM: WA5KND. Regret to announce Silent Ke... W5NO, W5HQE and W5QJ. They will be missed. NO VHF Club ne... officers are WB5HAX, pres.; W5VUH, vice-pres.; W5KO, secy.-trea... WB5DVS active on Army MARS and Southwest Traffic Net. W5Y... new OBS active on NO VHF Net. WA5WUJ new EC for S... Tammany Parish getting organized with the Red Cross. WA5YO... inactive. WB5KQJ, Lake Charles new OPS, active on LTN, a... attended Atlanta Hamfest. Southwest LA club picnic to be Oct. 5 ... Pecan Grove. WN5NSR passed General. Regret to announce th... resignation of WA5ZZA as LAN Mgr. Jay is organizing the Centr... Area Daylight Net, and will act as its Mgr. New LAN Mgr. will ... WA5PRI. WB5EKU and group had an excellent FD in Covingto... LRN, the RTTY pet inactive during the summer months, will sta... again in Sept.

Net	kHz	Time(PM)/Days	QTC	QNI	Mg
LAN	3615	7:00/10:00 Dy	158	236	WA5ZZ
LTN	3910	6:45 Dy	54	234	WB5EK
LSN	3703	8:30 M-F	25	73	

Traffic: WA5IQU 308, W5GHP 289, K5ITC 200, WA5ZZA 15... WB5LBR 85, WA5PRI 67, WB5NWO 19, W5YN 8, WB5IKT ... WB5JZQ 6, WB5KQJ 4, WB5DVS 2.

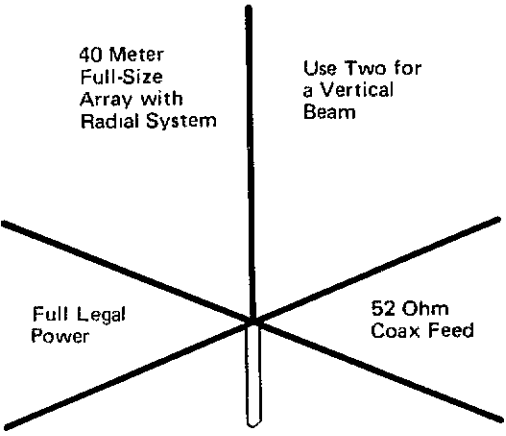
MISSISSIPPI – SCM, W.L. Appleby, WB5DCY – Field Day be... in several years, more clubs participating. WA5YZW, W5SB... WB5EIN, W5RUB, K5U8L & WB5LXW heard regularly on MT... W5RUB planned Oscar Opn for July CD Party. Grenanda La... Picnic big success per WA5MPO. WA4KWO/5 now WB5O... upgraded to Adv. WB5NSC now Adv. WB5NQS General. K7QDH ... on 6 meters. Welcome to WN5MDR's harmonic Isaac. WA5ZLX n... MSBN Mgr. WB5BUF did FR job as mgr. past year. Welcome n... amateurs WB5s OOV, OOG, OOU; WN5s OOA, OUC, OTX, OT... OTT; WB5OUK, WN5OUA, WB5s OTL, OPT, OPA; WN5s OUB a... OTZ. Hope to hear you on the Miss. Slo Net, Sideband Net a... Traffic Net. WA5WRE turning out novices singlehanded in Gulfp... area. WB5FMT is back. WN5OJT and other Novices heard on novi... bands from Vicksburg. WB5NVD. W5UQV & W5ZR heard ... VHF-FM. WB5IRR visited coast this month. Applications for O... are solicited. .52 becoming active in Hattiesburg. AREC alive a... ready in Harrison Co. K5IKB provides State Weather Watch N... with up to date offretal weather conditions. WA4EGP/5 n... 2-meter rig. WB8LDW/5 back with us. New towers up at WB5M... & W5UWJ. New CGCHN Mgr. WA5SXD, asst. WB5LTW. WA5Y... back as NCS Tue. MTN. WN5NGO now WB5NGO. Grieved ... report W5FGF a Silent Key. W5PDG & W5RW heard on Osc... W5SYA now K4KKG. WB5IRR pres. of Pearl River Valley AR... Miss Slo Net cert to WN5s NDE, LJD, OLL & NQS. MSBN 8... QNI, 80 QTC; MSN 56 QNI, 7 QTC; MTN 152 QNI, 53 QT... CGCHN 1717 QNI, 51 QTC. Traffic: (June) WB5FHA 72, WB5K... 47, WB5MTQ 43, W5EDT 40, WB5IDCY 30, W5NCB 22, W5WZ 1... WB5BKM 8, W5BW 7, W5QDC 5, W5LL 4, WN5MDR ... WA4EGP/5 2, WB5NSC 2. (May) WN5MDR 6.

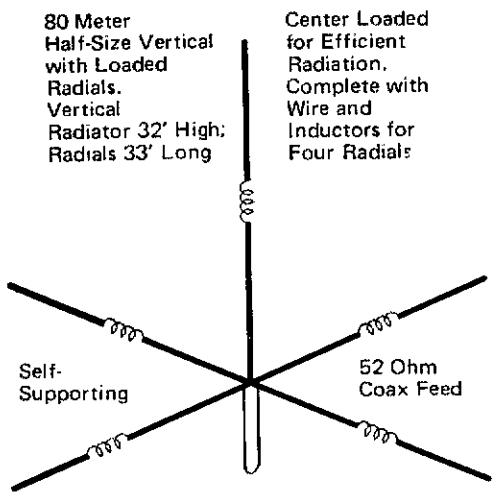
TENNESSEE – SCM, O.D. Keaton, WA4GLS – SEC: WB4DY... PAMs: WB4PRF, K4LSP. RM: WB4DJU.

Net	Freq.	Time(Z)/Days	Sess.	QNI	QTC	Mg
TPN	3980	1040 M-F	80	3455	198	WB4EW
		1145 M-F				W4PF

Monoband Verticals and Dipoles For 160 thru 10 Meters

RUGGED - SELF-SUPPORTING - EASY TO INSTALL





Features:

Complete with four Full Size Radials

36' High Vertical Radiator

SWR less than 1.3 to 1 at band edges

Model FV 40W . . . $69.95 F.O.B.

Heavy-duty double-wall tubing used extensively for maximum strength. Full legal power.

Model HV 80 WI . . . $89.95 F.O.B.

Conn. Residents Add Sales Tax

HALF-SIZE DIPOLES FOR 160 - 80 - 40 meters . . . .
MONOBAND GROUND PLANE ANTENNAS FOR 20 - 15 - 10

Write for Details

Improve your operating effectiveness with these station accessories . . . .

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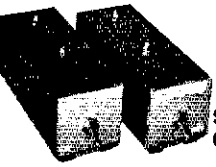

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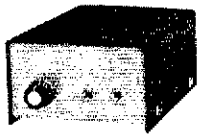

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		2330 M-S 1300 SSuH				WB4YP
TWN	3980	2100 S	4	72	5	WB4DY
TN	3635	0000 Dy	29	120	177	K4YF
TNN	3707.5	2300 Dy	24	109	18	WN4FZ
ETVHFN	50.4	0000 TThS	13	104	1	WA4YK
ETTMN	28.7	0000 WF	9	82	0	WB4NI
MITMN	28.8	0100 TF	9	61	0	W4EA
ACARECN	146.28 146.88	0000 T	4	65	0	WB4ZS
KCARECN	146.52	2130 F	4	27	0	WA4IP
WTVHFN	146.37 146.97	2000 S 0130 F	7	81	1	WA4VV
ETVHFN	145.2	0000 WF	4	37	0	WB4DZ

WB4DJU, RM, K4YFC and WN4FZU, net mgrs. of the TN and TN respectively are requesting that you join the nets because this a gre way to support your traffic system. WA4DPF reported 66 phon patches for the month of June. Traffic: K4CNY 280, W4OGG 20 WB4DJU 109, K4KCK 78, W4RUW 35, WA4UAZ 28, WB4ZSZ 2 WB4YPO 25, WB4MPJ 22, WA4GLS 21, WB4CMO 17, WN4FZ 17, WB4ANX 11, WB4DDV 11, WB4DYJ 9, K4AMC 8, WA4DPF WB4GTW 4.

GREAT LAKES DIVISION

KENTUCKY – SCM, Ted Huddle, W4CID – SEC: WA4GH Tune Nets: QNI/QTC: KRN 320/37; KTN 1009/137; KY 230/134; 8DAREC 76/9. Sorry to report K4QJJ as a Silent Ke License plates again: Our case went to the KY Court of Appea (State Supreme Court) on June 26. We can only wait now for it be docketed. Funds are still needed as we still have bills outstandin Congrats to WB4IKF on her new ticket. New BGARC officers a WA4CTC, pres.; WB4DSS, vice-pres.; WB4OEK, secy.-treas. Mar good HD activities around the state. Hope some good scores resu Traffic: WB4ZML 91, WB4EKQ 89, WB4EOR 58, W4BAZ WB4IGS 52, W4CID 45, W4RHZ 33, WB4BYV 19, WB4NHO WA4PAF 16, WB4IKF 16, K4HOE 15, WA4NNG 15, W4CDA WN4GAL 13, W4IQZ 7, WB4SIJ 2.

MICHIGAN – SCM, A.L. Baker, W8TZZ – SEC: W8MPD, RM W8JYA, W8RTN, W8YIQ, K8KMQ, WB8IMI, WB8NII, PAM K8LNE, WB8JIX, WB8BYB. VHF PAMs: WA8WVV, K8AFM.

Net	Freq.	Time/Days	QNI	Tfc.	Sess.	Mgr
GLFTN	3932	0130 Dy	167	66	24	WB8OB
QMN	3663	0200/2300 Dy	455	185	58	W8JY
MACS	3953	1500 Dy	784	386	34	K8LN
UPEN	3922	2230 Dy	454	32	30	WB8IE
BR/MEN	3930	2130 Dy	703	184	30	WB8BY
WSBN	3935	2300 Dy	596	75	30	WB8JI
Mi6M	50.7	0000 MS	182	30	20	WA8VX

W8CVQ reports SW Mich. 2M net QNI 58 in 5 sessions. 2M Catfis net had 85 QNI in 5 sessions as reported by WA8WVV. I receive Field Day messages from W8DF, W8HS, WSAOL, W8JWN, W8LXI K8DXF, K8HUT, WA8QCW, WB8MWG. The new 2 point for CW rule seems well received by Mich. ops. Many favorable comment were overheard on the bands. K8SWW reports best Field Da turnout by the Milford AREC with a Novice VE adding 8100 point to the club total. W8GLC is on the move to the Port Huron are says he is going to be scarce for awhile. The Andrews Univ. Clu Station WA8LKI is again active using gear provided by Heath an Electro-Voice. I am pleased to report no Silent Keys for the mont of June. At this writing the SCM election is about to take place. B the time you read this column the results may be known. It seem appropriate therefore to thank you all for the splendid cooperatio which I have received from the Amateurs of Mich. I am proud o you and I am pleased to have served as your SCM. Traffic: (June K8LNE 244, WB8DKQ 228, K8DYI 198, W8OW 115, WA8WZ 107, W8MO 98, W8NOH 91, W8TZZ 80, WB8JIX 63, WB8OBR 5 W8RTN 57, K8LJS 54, WA8FBL 54, WB8RXS 43, WB8NII 3 K8CWO 36, WB8BYB 34, W8UES 34, W8IHD 32, W8IUC 3 WB8EBG 28, K8AMU 23, WB8IFT 21, W8GLC 19, K8JED 1 WA8ENW 16, W8EU 16, W8LOU 14, W8VIZ 14, WB8DJS 1 W8PDP 13, K8ZJU 13, WA8CUP 12, W8WVL 11, WA8FXR 1 W8FZL 10, K8KCF 10, W8YIQ 10, W8DCN 7, W8RNQ WA8WVV 5, W8SDB 4, K8PYN 3, WA8FJF 2, WB8GKB 2, WSHK 2, K8SWW 2, K8WLE 2. (May) K8KMQ 341, WB8NII 53, W8GL 36, W8IHD 16.

OHIO – SCM, Hank Greeb, W8CHT –

Net	Freq.	Times	QNI	QTC	Sess.	Mgr.
OSSBN	3.9725	1430/2000/2245	2119	699	81	W8MOE
BN	3.577	2245	477	230	59	WA8WA
BNR	3.610	2200	123	28	30	K8NC
OSN	3.577	2210	130	42	26	WB8KK
O6MtrN	50.16	0100	241	66	29	WA8VW

Mark your calendars for Oct. 11 & 12, for Great Lakes Divisio Convention, Columbus, Ohio. Central Ohio AREC aided Columbu Red Cross in Tornado Relief Operations June 17. Among thos helping were W8BK, K8BYG, W8BTW, WB8CKI, W8DDE WB8DEA, W8ERD, WA8EVD, WA8EVP, W8IMI, WB8INY, K8IKD WB8IGO, K8IGY, WB8LRL, WA8LUR, K8MLO, WB8NNK WA8OHI, WB8OSC, WB8OMO, K8RES, WA8RUF, W8SIQ WB8SJV, W8VMS & WA8YHN. OSU station W8LT assisted as NCS with K8DDG at Red Cross. Richland Co. AREC assisted in Manhunt, utilizing WR8ACQ, on June 23. Apricot Net (Cleveland provided communications for Flag Day Parade June 14. Field Day seemed a roaring success, with good weather and excellent propa gation in most parts of the section. NW Ohio ARC (Lima) has WR8AHC operational on 146.07/67. K8TUT and WB8NUT repor that many 6-meter openings on sporadic E. WB8UKX has qualifie under 35 ppm in the May FMT. WN8TGA is about to be Advance Class WB8TGA. Traffic: WA8MCR 338, W8DIL 288, WA8HGH 282, W8FTT 208, K8YUW 125, W8QZK 116, WB8OZA 108 W8IBX 100, WB8KWD 98, WB8KKI 94, K8LGA 70, WB8OMQ 66

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GTX-200
2-meter FM, 100 channels. 30 watts **was $299.95** (Incl. 146.94 MHz) **NOW** **$219.95**

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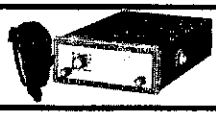
GTX-100
1¼-meter FM,100 channels,12 watts **was $309.95** (Incl. 223.5 MHz) **VERY SPECIAL** **$199.95**

☐ 

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2-meter FM, 10 channels. 30 watts **was $299.95** (Incl. 146.94 MHz) **NOW** **$199.95**

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6-meter FM, 100 channels, 35 watts **was $309.95** (Incl. 52.525 MHz) **SPECIAL NOW** **$199.95**

☐ **PSI-11 Battery Pack** (with charger) @ $109.95 $_____
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(allow 8 weeks delivery.)
For factory crystal installation add $8.50 per transceiver.

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NAME_____ AMATEUR CALL_____
ADDRESS_____ CITY_____ STATE & ZIP_____

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Note: Orders accompanied by personal checks will require about two weeks to process.
☐ 20% Down Payment Enclosed. Charge Balance To:
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K8VMI 58, W8JD 49, WA8VWH 48, WB8SGF 43, WB8MZZ 4
W8OE 36, K8ONA 34, W8QIL 34, WB8JGW 33, W8CHT 2
K8OYR 26, WA8MAZ 25, WA8RQQ 24, W8ALS 23, WB8GGR 2
W8WEG 22, W8TH 21, WB8DPW 16, WA8SSI 16, WA8MHO 1
WB8RTY 14, W8CXM 13, K8LXA 13, WA8MIH 13, WB8NUT 1
K8KWO 12, W8MOK 12, WA8DWL 11, K8CKY 10, K8JPE 1
W8MGA 8, WB8FMW 6, WB8KQJ 6, W8OUU 6, WN8IGA
WA8TSX 5, W8DCX 2, WB8IBZ 2, W8LZE 1, WB8MGW 1.

HUDSON DIVISION

EASTERN NEW YORK – Acting SCM, Gary J. Ferdinan WA2PIL. – SEC: W2KGC. Asst. SEC: K2AYQ. RMs: WA2FB WB2IXW, K2DN. PAM: WB2QEL. Nets: ESSN 3735, 1930Z; ES 3590, 2200Z; NYS 3675, 2300Z/0200Z; NYSPTEN 3925, 2200Z PON 3913, 2045Z. Hudson Division PR Net 2nd/4th Sun., 392 2100Z. K2OUA celebrated Advanced ticket with a new son, and th new son with a 60 ft. tower! K2SJN now in Ormond Beach, Fl Dutchess Co. EC, WB2NKN, reports AREC membership of 127. A you part of AREC? Field Day messages received from W2FSL/ K2AE/2, K2CT/2, K2DN/2 and WB2ZCM/2. WA2NLP an WB2EQD were summer camp operators of WA2YHC. Through th efforts of WA2CGA, WA2DHA, WA2HSF, WA2MMX an WB2NKN, a commercial AM/FM station had a broadcast designe to inform the public of amateur radio. More to come. In an Alban area news release W2OOJ reports WB2VJB handling amateur radi week messages between Governors Carey (N.Y.) and Evans (State Wash.). W2SZ boasts a new 100-ft. tower with WR2ABZ (22/82) o top along with a 40-mtr beam. The Albany ARA reports ne Novices: WN2AXH, WN2AXJ, WN2AXK, WN2AXM, WN2AX WN2BAA, WN2BBT. Schenectady ARA club officers: W2OD W2PKY, WA2ATQ, W2CPB, with directors W2IR, W2EW WB2PYO and WB2VPE. West Coast 6-meter openings were worke by W2CXC, WA2BLM, WA2PJL and WB2YQU. One night also sa TG9, KP4, XE1 and YV5 on 6. Congrats to WB2SKN for his BP Where's everyone else's activity reports? Traffic: (June) WA2PJ 304, W2ACQ 55, WB2TGL 36, K2SJN 26, K2TTG 25, WB2EM 16, K2OUA 16, WB2TDX 15, WA2HGB 2. (May) WB2SRN 29 WB2NKN 31, W2SZ 21, WA2FBI 10, WN2YBP 10, WN2WJO (Apr.) WB2NKN 24.

NEW YORK CITY-LONG ISLAND – SCM, John H. Smal WB2CHY – Asst. SCM/PAM: Art Malatzky, WB2WFJ. SE K2HTX, RM: WB2LZN. The following are major AREC/RACE Nets: join one!

Bronx	28.64 MHz	50.35 MHz	146.88 fr
Kings	28.64 MHz	50.35 MHz	146.88 fr
Richmond			146.88 fr
New York	29.5 MHz	50.48 MHz	146.88 fr
Queens	29.5 MHz	50.52 MHz	146.20 fr
Nassau	28.72 MHz		145.68 ar
Suffolk(west)	28.73 MHz(Hunt.)		145.59 ar
	28.66 MHz (Smith)		147.21 fr
	28.610 MHz(Babylon)		146.94 fr
Suffolk(east)			146.82 fr

Note: net times between 2000 and 2100 local, Mon. WB2JJD no attending the Merchant Marine Academy at Kings Point. WA2VE left the end of Aug. for Air Force Boot Camp, from there Don wi attend Electronics School. WB2EDW has issued NLS certificates t WN2ZGR, WN2YAY and WB2WRT, who by the way, finally got h Advanced after a long wait. WN2RSF has passed his General thank to the help of his Grandfather W2MOG. WA2YTR has moved t W.VA and WN2TUV/2 and friends wish him good luck in his ne QTH. W2PF attended ICC-75 in San Francisco in June, he als attended Northern Calif. QCWA Chapter meeting at S.F. Airpor W2KPQ reports that an ATV Net has been formed which will mee on Mon. evenings, from 10 to 11 PM on WR2ADM (25/85); the ne is being sponsored by LIMARC, licensee of the repeater. All ham interested in forming a UFO Net please contact WN2YEI. Welcom to new OVS WB2ZPL. WB2LZN finally has bugs cleared out of h new rig and is now active on the phone nets. WA2TQT is the ne editor of Great South Bay ARC. WA2IZX is rebuilding an ol 160-meter rig for cw use this winter. WA2BRF now has a FR2 and a B.A. in Spanish and computers. He will be attending Queen College for his M.S. WN2PXA now WB2PXA. WB2PII doing antenn experimenting with HB ant. tuner and 2-meter GP and 150-ft. c cable. WA2YMX has upgraded from Tech to General. Hall Science ARC will be organizing two construction projects; Homebrew (remember that strange word?) Transmatch and Homebrew CW Transceiver. Contact WB2FHN for further detail W2CLE/2 was set up at the Festival of The Arts in Stuyvesant Par by WB2JJD and others. Traffic: (June) WB2PYM 428, WB2SH 299, W2EC 241, WB2LZN 207, WB2EDW 78, W2MLC 56, WB2JJ 48, WB2WRT 42, W2HXT 29, WA2ROK 27, WB2WFJ 2 WB2QYV 18, WN2YAY 13, W2PF 9, K2JFE 5, WB2VTN WA2IZX 4. (May) WB2JJD 19. (Apr.) WB2SHL 82.

NORTHERN NEW JERSEY – SCM, William S. Keller, II WB2RKK –

Net	Freq.	Time(PM)/Days	Sess.	QNI	QTC	M
NJN	3695	7:00 Dy	30	450	194	WA2DS
NJN	3695	10:00 Dy	30	243	98	WA2DS
NJPN	3950	6:00 Dy	30	428	229	WA2DV
NJPN	3950	9 AM Su	4	58	19	WA2DV
NJSN	3730	8:15 Dy	30	293	76	WB2RM
NJPON /VHF	146.52	10:00 SuTh	7			WA2E
PVTEN	145.71	8:00 Dy	30	144	14	WA2OP

SEC: WB2PBO. PAMs: WA2DVE, WA2OPY (VHF). RM WA2DSA, WB2RMK. WB2VTT received OPS appointment and E for Kingston, NJ and vicinity. OO reports received from WA2DN and WB2TFH, and K2EK. I would like to hear from all radio club in the section that are planning license classes for the coming seaso so I can pass the information along to prospective amateur Congratulations to WN2ZIM on upgrading to General Class, and t WA2KFE and WN2YJP on becoming Advanced Class licensee

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AFM-24D	1000 watts	220-225	MHz	**$48.50**
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W2CVW now reports having 99 countries confirmed on 40 meters and 80 on 80 meters towards 5BDXCC. Hopefully he will soon have the award! WB2RKK now has 140 countries confirmed, while WA2SLF comes closer to DXCC with 81 confirmed. K2QBW reports working a VU2 and CN8 on 75-meter ssb during June. Congratulations to WB2NOM on receiving the CP40 award, and to WA2WDT on receiving the CP15 award. Notice: WA2CBB has been appointed AMSAT coordinator for NJ. He has a very good collection of information for anyone wishing to get started in Oscar work. K2QBW reports working KV4 and 6YS recently thru Oscar. June VHF QSO party participants included W2CVW, WA2NLP, and WA2FZW, who is planning an expedition to WVa with W2HVA, W2HIK, WA8ZLP, for the Sept. version of that contest. Welcome back to K2YFF who is again on the air after recent change of QTH. WA2GEZ reports working Wisc., Minn., Ill., and Ala. on six meters during June. New equipment dept: WA2OVE has a new TH6, WB2VTT a new 50-ft. tower, and K2OJD is again back on the air working DX on 20 meters. ED messages were received from K2BDX, W2GSA, W2EQK, W2ODV, W2GLQ, K2KF, W2DED, and The Jersey Shore Radio Club. Hope your 1975 ED was a success. WB2IWH recently visited W1OFO. WA2GEZ will soon be /SE2. WB2HJW is alive and well at 6 Crest Rd, Cedar Knolls. Craig is in the process of putting up a new tower. Hope to see you all at the 1975 National Convention in Virginia. Traffic: WB2RKK 841, WA2DSA 361, K2BHL 210, WA2BSU 142, WB2RMK 73, W2CU 72, WB2UJD 71, WB2AEH 48, WA2KFE 47, WB2KNS 45, WB2NOM 38, WB2RJJ 38, W2CVW 28, WB2HSG 27, WA2ELW 24, WN2UDI 22, WA2NLP 21, W2SWE 20, WB2FIT 17, K2ZFI 17, WA2OPY 15, WB2ELF 14, WA2CCF 11, WB2TDI 11, W2WOJ 11, WA2SLF 10, WA2WDT 10, K2KF 8, K2DOT 7, WA2UOO 7, WN2WIW 7, WA2OVE 6, WA2UOO/2 6, WA2QJU 5, WA2SRQ 4, WA2QNT 1.

MIDWEST DIVISION

IOWA – SCM, Max K. Otto, WØLFF – The weather was perfect, all bands open, even 10, which means Iowa had a successful Field Day. Benton, Dubuque, Guthrie, Humboldt, Jones, Johnson, Linn, Muscatine and Scott counties were able to get the word to me that all was going well. WØEMA says ED operation oiled up his CW arm. The KØSVW group scored an Oscar Field Day contact. Congrats to WNØOLJ for making a double jump to Advanced, and to WAØACX for being elected chmn. of the board of the Iowa 75 Meter Net. WRØABY 37/97 at Clarinda now has antenna at 400 feet. Yours truly had a nice eyeball with the Clinton ARC. Would you believe they welcomed me with 21 marching bands. WØBX and KØIIB keeping 2 meters hot with their new Clegg 27Bs. OO WAØEFN says OOing has been slow. WBØHOX reports KØBIX, WAØAUX, WAØSUF, WBØIJV keeping DTRN busy. WBØMCX gave his Swan 350 a workout while mobiling in W6-Land. Now that summer vacations are about to end, how about a station appointment? I could use some active OPS, OO, ORS and ECs. Just think you would be using your station for a service, and I could cover that hole in the wall with a certificate. Happy Labor Day. (Net, Freq., Time (Z) Days, QNI, QTC, Sess., mgr.): Iowa 75 Meter, 3970, 1730, M-S, 1295, 119, 25, WAØVZH; Iowa 75 Meter, 3970, 2300 M-S, 805, 32, 25, WAØACX; Tall Corn, 3560, 2330/0300 Dy, 263, 78, 89, KØAZJ. Traffic: (June) WAØAUX 270, KØAZJ 111, WAØLKM 106, WØYLS 84, WAØVZH 43, WØLCX 23, WØLFF 20, WØMOC 19, WBØDGF 18, WØOMV 15, WØHE 2. (May) WAØTAQ 25.

KANSAS – SCM, Robert M. Summers, KØBXF – SEC: KØJMF; RM: KØMRI. PAMs: WBØBUL, WAØSEV. VHF PAM: WAØEDA. WØWOB says the gang in NW Kans. have been busy on the 17th, 18th, 19th and 20th of June with weather watches, mostly utilizing the WRØAGS repeater. The Hiawatha ARC viewed the ARRL film at a recent meeting having as hosts the Western Union technicians. KØMRI reports WBØDFIY has earned his net cert. for OKS participation. WAØSEV has also awarded the section net cert. to most of the active phone station operators. WBØGVR has an L-4B, also passed his extra Class. WBØCZR has a new FT-101B. WAØMLE says he is very busy working in the garden for his XYL. Net reports for June: KWN – QNI 457, QTC 119. KSBN – QNI 840, QTC 164. OKS – QNI 419, QTC 194. KPN – QNI 101, QTC 7. Ham Butcher Net – QNI 457, QTC 119. KØJMF reports all EC except Zone 9 reporting activity for total QNI 1150 and QTC 101 in 111 sessions. Field Day messages rcvd from: KØNI/Ø, WØMBP/Ø, WAØAWB/Ø, WØLB/Ø, WØSOE/Ø, WØKQU/Ø and WØVZG/Ø, WØERH/Ø. Traffic: WBØKWJ 192, WØHI 183, WØFIR 160, WØOYH 146, KØMRI 94, WØNH 90, WØCHJ 79, WBØHBM 67, WAØLBB 64, KØBXF 53, WØOF 52, WAØMLE 43, WBØCZR 42, WBØGVR 40, WØPB 38, WAØSEV 35, KØJMF 32, WBØLJA 22, WØMGH 15, WØNYG 15, WAØVCE 14, WAØOWH 13, WØWOB 11, WAØGSG 9, WAØKVP 8, WØRBO 7, WØSCL 7, WAØWXY 5, WBØKWI 3, WØKL 2.

MISSOURI – SCM, B.H. Moschenross, WAØFMD – Asst. SCM/SEC: Cliff Chamney, KØBIX. New appointment: YAØYEF – ORS. MON net certificates were issued to WAØQOA and WAØYEF. MSN certificates to WRØMSY, WNØMWO and WBØKGP. WAØNVZ has changed OBS freq. to 7090 kHz at 2130 CDST, Fri., Sat., Sun. for the summer. (Net, QNI, QTC): MOSSB, 983, 57; MEN, 471, 32; MON, 162, 100; MON2, 142, 101; MSN, 90, 28; STLAREC, 71, 2; PHD, 67, 11; SCEN 56, 3. Field Day messages were received from KØDEW/Ø and KØBIX/Ø. The SEC received ED messages from WØCBL/Ø, WØBRN/Ø, WBØHSI/Ø and WAØUGU/Ø. Thanks to WØKZT, St. Johns Medical Center has the following new Novices: WNØPQP, WNØPQQ, WNØPRY and WNØPTH. Several others have passed their tests and are awaiting their tickets. Congrats to WBØJTX, WBØOAR and WBØPGI on passing General; WBØLRH and WBØENU on Advanced; WBØPRM and WNØHOU on Tech. WNØOIY plans to take his General exam in Aug. Lakes Area ARA is sponsoring a repeater, WRØAJL, on 147.66/147.06. It will cover southwest and central Mo. June PHD amateur of the month was WAØWPU who is moving to 5-Land. WAØFQL and WBØEJJ were honored in a feature story in the KC Star for their work in organizing the KC Assn. for the Blind ARC. Traffic: WØOTF 155, WBØHSP 91, WAØYEF 73, WAØFMD 43, WØOUD 31, WAØQOA

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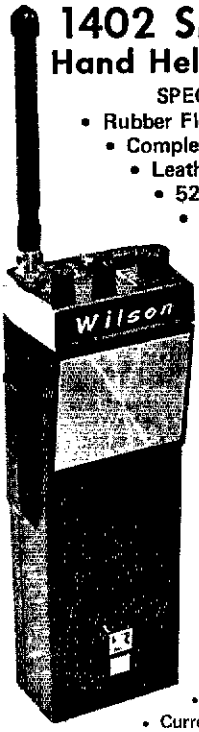

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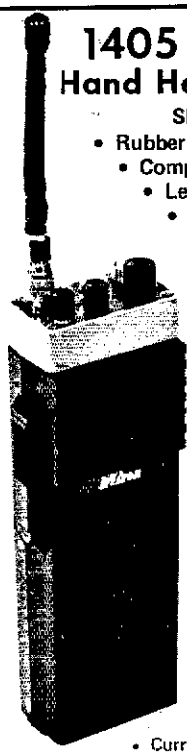

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24, WAØYNC 20, WAØKUH 12, WAØFKD 7, KØAHL 6, WØGBJ 6, WBØEOM 4, KØENH 3, WAØMOF 3, WBØLTD 1, WBØLTE 1.

NEBRASKA – SCM, Dick Dyas, WØJCP – New Novices in the Holdrege area are WNØPGJ, WNØPHS and WNØPIM. New Novice in Lincoln is WNØPOL. Preliminary reports indicate that many clubs participated in the Field Day activities and that individual participation was up. The weather was clear and hot and they did have an electrical storm in the Sidney area. There was some six meter activity on Sat. but it was silent on Sun. The Lincoln ARC is working hard on the Convention with the programming in the final stages, so plan to attend. Net reports: Nebr. Morning Net QNI 1032, QTC 46; Western Nebr. Net, QNI 460, QTC 1; AREC, QNI 208, QTC 3; Cornhusker Net, QNI 1260, QTC 63; Sandhills Weather Net, QNI 162, QTC 1; QCWA, QNI 46; Nebr. Storm Net, QNI 1588, QTC 37; Eastern Nebr. AREC Net, QNI 250, QTC 17. Traffic: WØJDJ 36, WAØCBJ 32, WØSGA 29, WØHOP 23, WØJCP 20, WØGKK 18, KØSEA 18, WØVEA 18, WAØPCC 16, WBØJWQ 15, WØHTA 12, KØJFN 12, WAØQEX 12, WØVYX 12, WBØGMQ 10, WØMW 6, WØFQB 5, WAØGHZ 5, WØDJU 4, WØGMY 4, WAØHAL 3, WØNIK 3, KØODF 3, WØRJA 3, WAØLEI 2, KØFIT 2, WBØGWR 2, WBØGAK 1.

NEW ENGLAND DIVISION

CONNECTICUT SCM, John McNassor, W1GVT – SEC: W1DGL. RM: K1EIR. PAM: K1YGS. VHF PAM: WA1OYE.

Net	Freq.	Time/Days	Sess.	QNI	QTC
CN	3640	1900 Dy 2200	60	356	363
CPN	3965	1800 M-S 1000 Su	30	440	218
VHF 2	28/88	2130 Dy	30	351	104
CSN	3725	1730 Dy			

High QNI: CPN – WA1DJC, W1NQO, WA1RUR and WA1RXA. CN W1CTI, K1EIR, WA1RUR and W1EEW. SEC W1DGL extends thanks to all who sent Field Day messages. AREC in good shape but can be improved with your help. EC reports from WA1JYP, WA1RXA, WA1LRO, WA1LMV & WA1NGL. Dir. W1HHR Newsletter requests contact with Asst. Dir. in your area. He would like to meet YOU at the Hartford Convention in Nov. – please stop for eyeball QSO! With sincere regret we add the call of WA1OYE (our VHF-PAM) to the list of Silent Keys. Jim reactivated the Nutmeg VHF Traffic Net as the first to use FM-2 for daily traffic. His friendship and helpful efforts will be missed by amateurs on all bands. Field Day operators made good use of cw and battery power – thanks for the many messages! New officers: Shoreline ARC: WA1PRI, pres.; WA1ONA, 1st vice-pres.; W1FXG, 2nd vice pres.; W1BDN, secy.; WA1CPH, treas.; W1EY, chaplin; WN1SYW, master-at-arms. Conn. Wireless Assn.: W1SG, pres.; W1DGL, vice pres.; W1NJM, secy.; W1BDI, treas.; W1BGD, comm. mgr. Congratulations to: WA1UAX Advanced Class & 25 wpm sticker; WN1TYP new Novice; WA1RUR High QNI CN and CPN June; WA1QME four-year Scholarship at U. of Colo.; and first annual "Amateur of the Year" from Shoreline ARC to W1BDN! Hope all enjoyed a fine summer vacation! Traffic: WA1FCM 183, WA1QME 109, W1AW 84, WA1RUR 81, WA1RYL 74, WA1RZC 74, WA1HLP 70, WA1STN 69, WA1UAX 67, W1CTI 64, W1GVT 57, K1YGS 54, WA1TNR 43, WA1RXA 34, WA1JCN 26, WA1JGA 25, WA1OPB 15, W1QV 15, WA1OQU 10, WA1JYP 8, WA1SWJ 6, W1BDI 5, W1CUH 5, W1DHT 4, W1WEE 2.

EASTERN MASSACHUSETTS – SCM, Frank Baker, W1ALP – SEC W1AOG received reports from ECs: WA1RTR, W1BAB, K1ZUP, WA1QKD, W1EQH, W1UFF, K1NFW, WA1KZT, K1VUZ is asst. EC for Medford. Medford & Malden CD group received nice letters from Medford CD Dir. for help in the parade. New EC: K1PAD for Billerica. Endorsements: K1UAQ, WA1TEH as ECs, K1AWP now pres. of Massasoit ARC. Silent Keys: W1AUX, K1HDY son of K1GGP. W7CAR visiting son in NH. W4CEH spending 3 months in St. Johnsbury, VT., both will be on 80 & 75. I received quite a few ED messages. W4KT/1, W6BJR/1 back on the Cape. Keep in mind fellows that in case of an EMERGENCY, we have many Nets in New England on 3945 and even the NY hams check in too. Our Dir. W1HHR held a meeting in Waltham to discuss the "League Exhibit" present were WA1QQV, W1ALP, W1UD, WA1AOG, W1PRI, WA1IDA, K1WNN, WA1TCS, W1MXC, W1DAL, W1VRK, K1VTE, K1CCW, K1HRV, K1SOP, W1PL. New officers of Chelmsford ARA: WA1SDZ, pres.; WA1QYM, vice-pres.; WA1GSF, secy.; WA1EMN, treas.; WA1OMU, officer-at-large; W1DBY, trustee. WINF was presented Golden Certificate by American Legion, member for 56 years, for his radio service in WW 1. K1CLM having rig trouble. K1GGS says he is leaving this area. WA1SBD passed Advanced. WA2KFL won fellowship at Woods Hole Oceanographic and working with WA1MKP. WA1QQK graduated from HS, went to Rochester Hamfest. W1IPZ has 2M FM. W1EQH and Bellingham AREC supplied communications for Bicentennial Celebration. W1DMS had rotator trouble. WA1TCP has HW-7 and an electronic keyer, set up a display of amateur radio at HS Country Fair. WA1PLK converted his HW-12 for CW. Massasoit ARA had a talk about "SKYWARN!" from the Dept. of Commerce at Logan Airport, if you see any extreme weather changes call W1DFZ at 323-3110. W2UUV/1 demonstrated/solar-powered station. WA1SXU has his General and a TR10 2200 on 2M. WA1USZ has ITC Mufti 2000 on 2M. W1AGN has GLB synthesizer completed. W1ERW has Triton transceiver. 1200 Radio Club, W1DC up on Pack Monadnock for VHF SS, organized by K1NZQ. WA1TCS, WA1TEH have their Extras. EMRI had QTC 213, QNI 304. NENN had QTC 36, QNI 66. EM2N had QNI 73, QTC 26. NEEPN had QTC 18, QNI 85. MT&RN had QTC 118, QNI 19 for May. Quannapowitt RA had their annual banquet at the Thomson Country Club in No. Reading, new officers were installed. New officers of Framingham RC: K1VVC, pres.; WA1KUL, vice-pres.; WA1RQF, treas.; WA1NUQ, secy.; WA1PYE, dir.; WA1MRJ, trustee. WA1EQU moving to Wrentham. WA1s IEB, EOT have their Advanced. WA1TFF and

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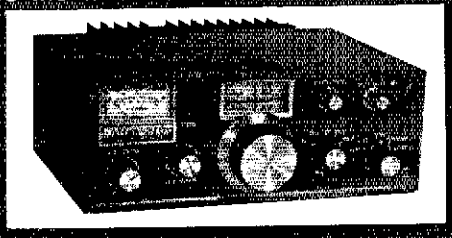

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XYL have a new son. WA1TOU has a 40-ft. tower & TA-33 p
W1HB now on 2-meter fm. K1ZUP in the hospital for tests. HHTF
had 163 QNI, 42 QTC. Traffic: (June) WA1MSK 272, WA1UIE
178, W1OJM 174, W1PEX 170, W1UX 146, WA1QKD 126, W1EL
98, K1PAD 88, W1DMS 68, W1MX 39, WN1UGJ 32, WA1OWQ 30
WA1POY 30, WA1HEE 15, W1TKZ/1 12, W1AOG 7, WA1RGA 5
WA1PAZ 3, WA1TCP 2. (May) WA1UIK 150, W1OJM 134, W1GJE
7, WA1TCP 3.

NEW HAMPSHIRE – SCM, Robert G. Mitchell, W1SWX – SEC
K1RSC. RM: WA1GCF. PAM: K1YSD. Welcome to new ham
WN1VBC, WN1VBN, WN1VBA, WN1VBO, WN1VCZ & WN1VEG
K1YSD back on the air. The L-4B is repaired and the Vee is again
inverted. W1JB operating his second station W1APK from Weir
Beach. K4YA/W1AAC back in Sunapee for the summer. Your SC
K1RSC moved to Brentwood. K1YSD reports NHLPN had 4
check-ins in 6 sessions. K1ACL moving to Rochester. WA1CET hac
on the air. WA1JSD says the Derry ARC had a successful FD
WA1GUD is the Keene High School ARC. WA1MXT, WA1PSI
WA1RFI, WA1LNH, K1STH & WN1RRW were active in FD. Also
active was W1WOM, the Port City ARC. Pres. WA1UZJ says result
were terrific. W1DXB has the new Drake line. Hope to meet you at
at the New England Division Convention in Nov. Traffic: (June
K1LMS 21, K1YSD 13, W1JB 8, W1SWX 4, W1DXB 2. (May
K1ACL 71.

RHODE ISLAND – SCM, John E. Johnson, K1AAV – SEC
W1YNE. RM: WA1POJ. PAM: WA1RFT. New appointments
K1LPA as EC and W1VPY as OPS. W1ZXA still looking for RI ham
who work RTTY on the low frequencies and would like to contac
them. The Newport County RC has received their repeater cal
WR1AFY and are starting to assemble their station. WA1NPF an
K1VPK have returned from Fla. WA1AUL, W1GGH and WA1POI
are working band openings on 10 and 15 meters. WA1RFT is editin
the EMEI Phone Net Bulletin. WA1POJ is Area Coordinator (RI) fo
AMSAT. RI was very active on FD with several clubs as well a
home stations participating. With summer here activity takes to the
beaches and 2-meter fm is very active. Don't forget to send those
activity reports in. New Novices in RI: WN1VRB and WN1VEF
New Tech, WA1VED. Traffic: WA1POJ 170, WA1RFT 22.

VERMONT – SCM, James H. Viele, W1BRG – SEC: W1VSA.

Net	Freq.	Time/ET/Day	QNI	QTC	Mgr.
VTSB	3909	2200 M-S 1130 Su	518	81	WA1PSE
Carrier	3938	1300 M-S	498	11	W2DSK
Green Mt.	3932	2130 M-S	506	35	W1JLA
Vt. Phone	3909	2130 M-S	92	7	W1KKN
VTRED	3909	2200 Su	87	22	K1BQE

Welcome new amateurs WA1VBZ, WN1VDR, WA1VGL and
WA1VGM.Governor Salmon has expressed interested in establishing
some form of state recognition for amateurs such as a radio amateur
week. WN1SYQ left for Marshall islands for a year or more.
WA1JGK moved to Dunseith, ND to work for station KEYA in
Belcourt, ND. Traffic: K1BQR 75, W1LMO 7.

WESTERN MASSACHUSETTS – SCM, Percy C. Noble, W1BVF
– W1TM's group logged 959 contacts during Field Day. New ORS
is WN1USF, WA1KHP at Camp Emerson is very active again thi
summer. Chief op. is W2FBF (acting SCM of E.Pa.) with 4 othe
licensed operators. SEC WA1DNB reports that Sun. WMEN held
sessions, QNI 87. RM W1DVW reports WMN held 30 sessions, QN
151, traffic 102. 75 Meter PAM WA1MJE reports WMPN held 2
sessions, QNI 239, traffic 32 (total of 52 different stations)
Three-county UHF/VHF PAM WA1PLS reports WM AREC Repeat
er held 21 sessions, QNI 136. CMARA reports WA1RLT is back u
6 meters. WA1TAI now has his Advanced. HCRA says annua
banquet held June 14. Guests included NE Div. Dir. W1HHR an
WM SCM W1BVR. At the CMARA auction, HCRA pres. WA1HH
and CMARA pres. K1COW had their first eyeball. MARC electe
WA1NAQ, pres.; W1VPH, 2nd vice-pres. Provin Mt. Repeater Assn
reports club has licensed 9 new hams since Jan., and code an
theory classes are continuing. NOBARC reports new member
WA1UBZ, WA1RZO, K1IGS, WA1UNR. WM ARA says twelv
members aided the 225 Bicycle Rally held at U. of Mass. Traffic
(June) WA1MJE 244, W1BVR 90, W1DVW 84, W1DWA 74, W1TA
61, W1KK 51, WA1RLP 38, WA1KHP 33, W1IHI 28, W1BBI 14
W1STR 8, W1ZPB 6, W1IQU 2, WA1PLS 2. (May) W1KZS 6

NORTHWESTERN DIVISION

ALASKA – SCM, Roy Davie, KL7CDK – The Fairbanks gang
reports that about 25 stations covered the 800 mile boat race from
Fairbanks to Galena and return on the Yukon river. KL7HMH has
new Ringo 2-meter antenna and puts a good signal out on all the
repeaters plus many simplex frequencies. KL7HLC is keeping in
touch with WB7BCN/R2 on the Beaufort Sea ice pack. Jim also
advises he is moving to Fairbanks the 1st of Sept. KL7HNQ says the
U.S. Army Bicentennial was rained out. KL7IEC reports handling
traffic from the Governor of Mich. to the Governor of Alaska. Good
work Eldon. From all reports the Anchorage Club had a good
turnout for FD and made a good showing. The Kodiak Club also
reports a good turnout and good score. Conditions were not too
good at times but opened up long enough to give participants good
scores. KL7GCH has had generator problems, some good amateur
buddies helped Ken with another generator. KL7HOV reports the
Alaska Snipers Net had 30 sessions with 518 check-ins. Traffic:
KL7CFX 30, KL7GCH 7, KL7JDO 5, KL7IEC 4.

MONTANA – SCM, Harry A. Roylance, W7RZY – SEC
WA7IZR. PAM: WA7PZO. The Mont. Proficiency Net, a cw net
meets Sun. at 1800 on 3735 kHz with WN7ACT as mgr. I am sad to
report the passing of W7VNP and W7EGB. Only correspondence for
this month is that the IMN had 21 sessions, 60 QTC and 176 QNI.
Several groups went out for Field Day but no report on how they
did. Traffic: W7NEG 12, WA7PZO 10.

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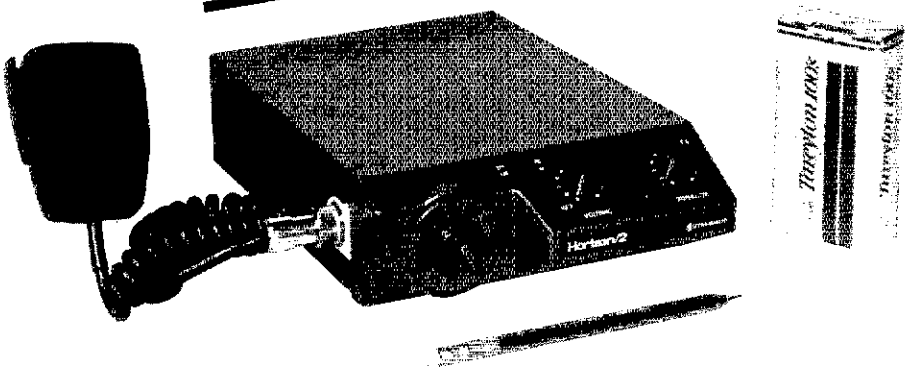

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OREGON – SCM, L.R. Perkins, WA7KIU – Asst. SCM: Danie J. O'Connell, WA7TDZ. SEC: W7HLF. RM: K7QUF. PAM K7RQZ.

Net	Freq.	Time	QNI	QTC	Sess.	Mgr
BSN	3908	5:30				
OSN	3585	6:45	176	151	30	WA7TX
AREC	3993	7:00	381	10	30	WA7RW
Nuclear	50.25	9:00 AM Su	33		5	W7FF
PDXAREC	04/64	7:00	246	2	17	K7WW

Congratulations to the Astoria group for putting on a most enjoyable hamfest. If we missed you this year, see you next year WA7YEU reports the Beaver State Net picnic on July 13 on th McKenzie River was a success. Report from the Bend area says thei repeater on 34/94 is worked in Tyge Valley, Chemult, Brothers an Santiam Pass. Now you can fish the high lakes and "ham" at th same time. For the elk hunters, Wallowa County is pretty good o the Moscow Idaho repeater, 22/88, according to WA7NXK. Salmo fishermen off the coast can work Coos Bay, Mary's Peak an Astoria. I also hear you can work some UA3/MM with a miliwatt Hi. Several Field Day reports were received. They were W7PXL/7 WA7FQD/7, K7CCH/7 and W7KYC/7. SOB STORY – Please star looking for one of our ranks who will be a candidate for SCM. Bein SCM for the past year and a half has been one of the most rewardin experiences of my life, but I cannot accept the job for another term Traffic: K7QUF 145, WA7TXV 139, K7IWD 109, K7QEG 106 WA7YEU 97, W7DAN 48, W7MLM 42, WA7UJO 37, WA7MHP 10

WASHINGTON – SCM, Mary F. Lewis, W7QGP –

Net	Freq.	Time	QNI	QTC	Sess.	Mgr.
WSN	3590	18:45	310	121	30	W7LC
NSN	3702	0200Z	380	114	31	WA7NI
NWSSB	3945	18:30	675	40	30	W7FI
NTN	3970	11:30	1465	67	30	W7PW
WARTS	3970	18:00	2369	215	30	W7QG
FSN	3920	17:00	301	205	26	WA7YE

With regrets I report the passing of the XYL of K7CTP, she was grand lady. W7RT and WA7CSF also joined the Silent Keys W7KHN doing a lot of flying in Europe. K3MNT/7 working o antenna. K7GGD has a second call W7HSC. Six Meter internationa Klub (SMIRK) has 747 members in 46 states & 13 foreign countries K7QEW reports excellent openings on 6 meters in June: 2 & 1 meters also showing long skip conditions. WA7BBJ is a radi operator on the Pacific Oceanographic SURVEYOR (OSS 32 NOAA in the Bering Sea, he will be on 20 & 40 meters. I appreciat all who voted for me for a second term and will try to continue t disperse information to your clubs and you. What project o information can I help you with? Appointments are being re valuated. Do you still use yours and have you been sending i reports? These are the items I will be looking into befor cancellations. Marysville Marytest found HAMS club sporting new orange vest, easy to ID members. WA7GVB will be instructing Novice amateur radio class at Jr. High level in Yakima this fall Traffic: WA7BDD 75, W7BQ 64, WA7ZNW 55, W7KFI 53, W7AP 52, K7OXL 37, WA7VHW 32, W7SYS 31, W7LG 30, W7PWP 27 W7IEU 17, WA7RCR 17, W7AIB 9, W7BUN 8, WA7GVB 3.

PACIFIC DIVISION

EAST BAY – SCM, Charles R. Breeding, K6UWR – Asst. SCM Ronald Martin, W6ZF. SEC: WB6RPK. Asst. SEC: WB6DSL. It i my sad duty to report WA6YST and WB6PKF have become Silen Keys. It appears that all clubs and a few independent operation were active during Field Day. I would like to thank WB6RPK you SEC and W6IH of Alameda County RACES for visiting a numbe of Field Day sites. OPS WA6IPI now an ORS; OPS WA6VEF no an OVS. The Calif. QSO party is just around the corner. Th Northern Calif. Contest Club has put great effort into this contes and all will have a good time. Check Sept. QST for full details WA6AHF did well in the score dept. of the All Asia Contest WB6BNR had nice vacation in Kans. W6DNY having a grand time i KH6-Land. K6OKO hard at work on getting RTTY gear on the air The Calif. Maritime Academy ARC, WB6LWB, is again becomin active. WB6AMB hard at work planning the Silverado AR Society booth at the Calistoga Fair. From CCRC the following were listed a new calls in the Section. WN6s KHL, KDA, KGI, KCY, KHN WB6KIS; WN6s KHG, KCB, KLT, KCZ, KKS, KKL, KEH, KMD KHE, KLY, KFO, KSW, KSR, KNU, KPO, KQU, KSM, KON, KNQ KTL, KST; WA6KRO; WN6s KSP, LBD, LAE, LAD, LAG. Traffic (June) K6HW 425, W6TYM 175, WA6IPI 141, W6JXK 114 K6PMG 24, WB6WBG 14, WB6VEW 12, WA6CAZ 7, WA6VFF 2 (May) WB6VEW 2.

NEVADA – SCM, John D. Weaver, W7AAF – New NARA officers are W7DIK, pres.; W7SRM, vice pres.; W7INU, secy.-treas. W7THH, sgt.-at-arms; WA7KNK, K7QOP, and Sylvia Statton, dir WA7KNK likes his new ham shack and 45-ft. tower. WN7YEF ha new Drake rig and a 50-ft. pole. WB5IQI is now WA7ACR an WB4TZB has become WB7BOX, both in Las Vegas. Gary Ross is new member in Winnemucca and could use help with his Novice July 3 floods in Las Vegas brought little response from amateurs We seem to be pulling into our shells as individuals. Hamming reall is more fun when you participate in public service activitie occasionally. By now you should be reading my section newsletter; hope you will respond to it and help build our operatin organization in Nev. Send your monthly reports, they really ar helpful. Traffic: W7ILX 137, K7OHX 35, K6MQX/7 7, W7AAF

PACIFIC – SCM, Pat Corrigan, KH6GQW – RM: KH6IAC ORS: KG6JAQ. Ex-KH6HCM now on from Reno as K4IRQ/7 Plenty KH6 activity in FD with reports received from Big Isl., Mau & Oahu. Congrats to KH6IAC & KH6IHP on Life Membership Woody handling QSL chores for DJ0FX & DL9PT. KB6CU flew u for SAROC-Hawaii Copy. KH6BVS had grand trip to "W" visitin family and friends. KH6BZF reports K1GAX & XYL spent 25t wedding anniversary in KH6. KH6GMP heard in the wee hour working DX. Thanks to all of you for your support. I look forwar

to serving you for a new term. Please send your comments a information for inclusion in this column. A big welcome back KH6HGP. WIZPB hopes to be at Kamuela teaching this fall. EAR Hilo Br. now Big Island ARC. KH6s JKB, GMP & GQW se mobiling for FD. KH6 was really on the map for ARRL Int. D Contest last spring. Traffic: (June) KH6IAC 404, KG6JED 1 KG6JAQ 114, KG6JEU 49, KH6BZF 19, KH6GQW 18. (Ma KH6BZF 12.

SACRAMENTO VALLEY – SCM, Norman Wilson, WA6IVD SEC: W6SMU. Twelve members of the Radio Amateur Mob Society went maritime mobile for a day in San Francisco Bay on t 31-Ft. schooner of WA6PIU and WA6RAN. K6RPN is trying son mobile cw while doing some vacationing. K6GG has a new Atl 210. W6KYA hosted a gathering of the Sacramento DX Grou WB6MDP is moving antennas back to Sacramento and is looking t some 2-meter gear. WA6AFE is trying to stimulate some Mode Siskiyou County interest in the Calif. QSO Party. An award will given by the Northern Calif. Contest Club to the top scorer in ea county during that contest. How about some inter-county inter-club competition? K6RTY and WA6JVD have over 100 their CW DXCC "worked" lists. W6AJY's latest radio class promis to restock the section with some new hams. Welcome! Traffi K6RPN 16, WB6MDP 16, WA6WIZ 2, K6MQX/6 1.

SAN FRANCISCO – SCM, Rusty Epps, W6OAT – RI WA6BTF, W6NUF has joined the ranks of the OTC. K6J WB6BDL and K6SRM have been issued NCN certificates. The Ge Ladd Pioneer ARC now has the equipment shelves built in the f area of its new clubhouse on Folsom St. CCRC reports the followi stations have been newly licensed in the SF Section – welcome WA6KHS, WB6MMP and WN6s KTP, KGU, KKE, KHO and KZE WA6BTF received his Advanced Class license. Congratulations W6RNL, WB6UPV and WB6BDL for making PSHR in June. Calif. QSO Party will be Oct. 4-5. So far, activity has been promise from all SF Section counties except Mendocino and Del Norte. A volunteers for county DXpeditions? W6GGR has been appointe OBS. Members of the Geo. Ladd Pioneer ARC provided rad communications and operated the sound system for the last annu "Chocolate Coated Banana Festival" sponsored by the SF Rec. a Park Dept. Humboldt ARC got good TV coverage for FD. We st need an SEC and ECs for most counties. Please contact W6OAT interested. Traffic: (June) W6RNL 222, WA6BYZ 151, WB6BD 32, WA6BTF 26, W6OAT 12, WB6UPV 10. (May) K6TP 67.

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6IPU The Fresno ARC held their FD in Auberry, with 12 operato K6QPE and WA6ERQ were in charge. The Turlock ARC held the FD near Don Pedro Lake with 10 operators. W6DTL busy handlin ffic. WA6RXI reported the Kern Valley ARC held their FD on M Able with 27 operators. WB6SID passed his Advanced exam, a WA6JVV passed his General exam. K6IDP building a 2-meter transmitter. WA6KZV holding cw practice on 145.35 MHz on We nites. WA6NRV has worked all states on 6 meters except Hta W6SMS needs Hawaii and Alaska for his WAS on 6 meters. W6YK reports 6-meter activity this summer is down. W6DPD has passed h Advanced Class exam and is on the lower freq. with Collu equipment. K6QPE has an Atlas transceiver. WA6JBD passed h Advanced Class exam. WB6LRQ is the call of the Firebaugh Jr. Hig School and boasts four novices. W6MGG reports the Tulare C ARC held their FD in Badger, Calif. WN6YAB passed his Gener Class exam. WA6RXI received a Certificate of Merit from Secy. Defense. WA6CPP is mobile in the Midwest trying for all counties the Stockton ARC held their FD at Pardee Dam. Traffic: (Jun WA6RXI 48, WB6MGG 12, WN6PPV 5, WA6JDB 2. (Ma WA6JDB 8.

SANTA CLARA VALLEY – SCM, Jim Maxwell, K6AQ/W6CU – SEC: WA6RXB. W6RSY made BPL. PSHR winner W6RK complains of the summer slump starting now on NCN. W6AU announces the annual QCWA picnic will be held Sept. 7 in Sonoma The Sept. SCCARA meeting will feature WA6UAM discussing stri line design techniques for hams. Pres. W6ZM has full time/locatio info. W6MMG reports that WA6DFM has a new TS520, whil W5DRG is now known by WB6LTF. NPEC meets on the 2nd Fr monthly in So. SF at QTH of W6QIE. Query pres. WA6RJI fo additional details. SCVer K6WR is up to 95 worked as PA9WR since last Nov. He has heard many of his W6 friends, but finds th circuit tough to crack for a two-way. New officers of NCDXC W6MUR, pres.; K6QX, vice-pres.; W6PHF, secy.; W6SC, treas. Th Foothills ARS, new officers are WB6GNM, pres.; W6OKF, vice pres.; WA6JCN, secy.; WB6OML, treas.; W8RPA, RO; WA6IJAM member-at-large. Have an open club date? Consider that Pac. Div Dir. W6ZRJ and Vice Dir. W6VZT are ORV for all SCV clubs t discuss the League's stand on Docket 20282, the results of th ARRL membership survey, and to hear your opinions. It's Cal Po for WB6IYA, who recently graduated from HS in Salinas. New OV is WA6UOM. The EMARC Flea Market was a roaring success – eve the weather cooperated! WA6ENE is the new operator at K6QTE into the CD nets, reports W6DEE. W6NW is again ORV i NCN/RN6 and PCN after a several month layoff. PAARA hold down two club 2M frequencies: 147.45 FM and 145.24 AM, wit the AM net a weekly affair at 8 PM. WN6FLD has been ORL with new SB-102 and a new 10M beam. WA6NZY finally solved long-standing TVI problem: rectification on a telephone line caused by a nail driven through the wire! Traffic: (June) W6RSY 838 W6RFF 232, W6YHV 221, W6BVB 106, WB6VBG 46, W6AUC 41 WB6IYA 32, W6NW 31, W6DEE 26, W6OIJ 22, K6AQ 18, K6WT 7, W6PIY 5, WA6WEI 5, WA6HAD 1, WA6NDN 1. (May) WB6TYA 15, K6WT 9.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Chuck Brydges, W4WXZ. SEC K4FBG. RMs: K4MC, WB4ETF. PAM: WB4JMG. VHF PAM K4GHR. EC of the Month is W4IRE who is caretaker of Forsyt County and keeps emergency communications revolving around th local 2-meter repeater WR4ACA. Contact John if you are in Forsyt

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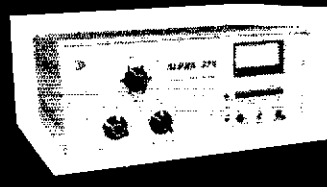

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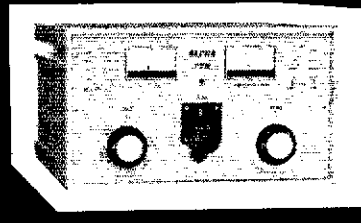

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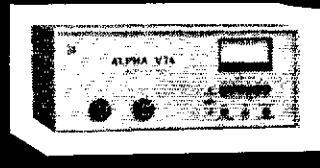

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County. The '75 SET results are out and NC ranked 6th nationa in participation. This was a better showing than our 1974 8th pl and could have been even better because some large city areas good exercises but did not report and record their activities. Wha shame. NC celebrated Amateur Radio Week June 22-29 wh preceded the Field Day exercise. Your SCM received FD tfc fr Alamance ARC; NC ARC Inc.; Cary ARC; Charlotte ARC; W Tech Inst ARC; Onslow ARC; Forsyth ARC; Mecklenburg ARS WENOCA RC. Remember cw2 Carolinas Net (CN) meets on 3 kHz nightly at 7 PM and 10 PM local covering NC and WB4OBZ/SC is now net mgr. CN for June had 40 sessions with QTC. W4OGH is new OO and enjoying FMT (Frequency Measur Test) along with K4BE. Hearty congrats to WB4IOU on rec arrival of new harmonic. K4OWK reports Scotland County A meets first Wed. at 7:30 PM and Sand Hills Emerg. Net meets da on 07-67/Laurinburg Repeater at 7:30. Congrats to WB4WYC w passed Extra. All amateurs are invited to participate in the 1975 QSO Party sponsored by the Alamance ARC, begin Nov. 1, 190 end Nov. 3, 0100Z. Watch QST for complete rules and NC statio will be needed on all HF bands for this event. Traffic: (Jun K4FTB 145, W4OEO 118, K4MC 73, WB4LFX 35, WB4KHZ W4WXZ 34, WB4MXG 30, W4FMN 17, WA4KSO 14, K4AH WB4IMG 7, W4EHF 3. (May) W4RWI 49, WB4IMG 21, WA4K 8.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A Martin, Jr., W4HV. SEC: WA4YIC. Asst. SEC: WA4PBG, R W4SHJ, K4IAF, WB2VYK/4, WA4AVN, WA4DHY. PA WA9NFW/4. SPARK Novice training recently graduated fath WN4RXU, and son, WN4RMW. W4RKC sweating while waiting (COM IC-22A. KØPIV/4 while mobiling to Iowa on cw, called and W2GHK/4 answered; when finished, his neighbor WB4O broke in. WA4AJF changed QTH. WA4OEB had fun with 2 wa on Field Day. K4MLC on with new SWAN 600. WB8KSS activa his K4CIO while recuperating from surgery at National Orthoped Father's Day and 15th wedding anniversary netted WA9NEW/4 SB620 and SB630. WB4GMC off to college July 7. VSBN mov late session to 0215Z and traffic picked up by an order magnitude. W4WWD planning operation at Five County Fair Farmville in Sept. has applied for special events call KE4F WB4YKM to UVa Engineering School this fall. ARRL First W4KFC active in everything as usual. K4EZL passed Advanced going for Extra. WB4DRB in hospital two days; his dad, WA4NEI working towards General. W4IUJ trying to improve his YF/X total (?). W4HU into FMT, DOS Net, Sig. Corps Net, ED, VHF t etc., etc. K4KA thinking of trying satellite ops. WB4KIT off to for July. HHRA's WR4ACN on with new solid state rig – repo say FB. WA4CGX has recovered from tower disaster and is ba servicing maritime mobiles. WA4ILH new on 6 with 500 watts s OVS WA4MMP has been invited by Hq. to do feature for Mar. QST's. "World Above 50 MHz." Vienna Wireless Society Bulletin newsy and Tidewater SSBN report full of goodies. Also heard fr LARC. VFN/VSBN picnic brought lots of people out. N QNI/QTC: VSBN 1330/3n7; VFN (May) 874/2T; VSN 281/114; PON 68/20; CV2MFMN 497/?. I notice individual traffic scores down. Traffic: (June) W4QDY 185, WB4YKM 160, WA4FPJ 14 W4UQ 148, K4KNP 136, K4GR 117, K4IM 99, WA4VFW 9 WA9NEW/4 76, K4MLC 72, WB4LFL 69, WB4KIY K4GR 1 K4IM 99, WA4VFW 82, WA9NFW/4 76, K4MLC 72, WB4LFL 6 WB4KIY W4SUS 30, WB4DRB 25, K4KA 23, WA4HEG 2 W4LGM 19, W4RKC 18, WB4YXN 17, WA4CLK 16, KADSQ/4 1 WB4ODZ 14, WB4LDF 13, W4THV 13, KØPIV/4 11, W4MK 1 WA4HUB 9, K4VWK 9, WA4AJF 8, WB4GMC 7, W4KFC 6, W4I 2, W4WWD 2, W4KX 1. (May) WB4QEB 48, WB4LFL 36.

WEST VIRGINIA – SCM, Ray C. Anderson, W8DUV – H turnout at Jacksons Mill for the 17th Annual State Conventio WB8DQX named Outstanding Amateur in State; Kanawha AR won Field Day trophy for '74. WB8PAV moving to Ohio, h mother – WB8NWT moving to Alaska, both good operators will missed by WV. Governor Moore proclaimed June 29- July "Amateur Radio Week in WV" just in time for Field Day a Convention. Thanks to those who signed petition nominating me this position; now let's have those monthly reports, please. Pho Net – 740 QNI, 123 QTC; Midday – 498 QNI, 101 QTC. Traffi WB8PAV 95, WB8DQX 40, W8EUE 19, W8FZP 17, W8DUV, K8ZDY 9, W8JM 8, K8NYG 7, WB8CPU 6, WA8NDY 6, KØQEW WA8RUZ 5, W8SQO 5, W8CKX 4, WA8YCD 4, K8BCT WB8CNN 3, W8GDP 3, K8IXO 3, WB8NFZ 3, W8QEC 3, W8CZT K8GWS 2, W8HIC 2, W8HZA 2, WA8KCJ 2, K8LSN 2, W8MN WB8QYN 2, WA8ZGP 2.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Clyde O. Penney, WAØHLQ – Sk KØELQ. RM: WBØHCK. PAMs: KØCNV, WAØYGO, WØHX reports a continuing increase in QNI to the CCN since it was move into the Novice bands. WBØPVT was acting NCS for Colo. RAC on June 17, while WBØIGT will be NCS for Hi Noon net during t summer. WAØYNQ reports he has issued 385 10-X numbers, and h qualified for 10 chapter certificates. He also is forming a ne Denver Area 10-X Chapter. KØOST has moved here from Dalla Tex., and is waiting the arrival of new crystals for his 450 MHz r to get back on the air. WA1QME/Ø has recnetly arrived in Colorad Springs, and is already quite active on local traffic nets. Net traf for June: Hi-Noon QNI 688, QTC 14, informals 76, 28 session time 700 minutes. Traffic: WØWYX 1785, KØZSO 864, WØHX 199, WØETT 126, KØSPR 82, W5HRS/Ø 63, WØSIN 38, WAØTM 19, WBØIZO 16, WA1QME/Ø 14, WBØJGT 12, WØLAE 1 WAØYNQ 10, WNØMCL 8, WØPT 6, WAØHLQ 4, KØHPF 2.

NEW MEXICO – SCM, Edward Hart, Jr., W5RE – Asst. SCM Joe T. Knight, W5PDY. SEC: W5ALR. RMs: K5KPS, W5UH. PAM W5UMG, W5PNY. New Mex. Road Runner Net (NMRRN) mee daily 3940 kHz at 1800 local. Mgr. W5UMG reports 580 check-i with 22 tfc handled. Southwest Net (SWN) meets daily on 35 kHz at 1915 local time. K5KPS reports 180 check ins with t handled 149. This net seems to be gaining ground after a summ

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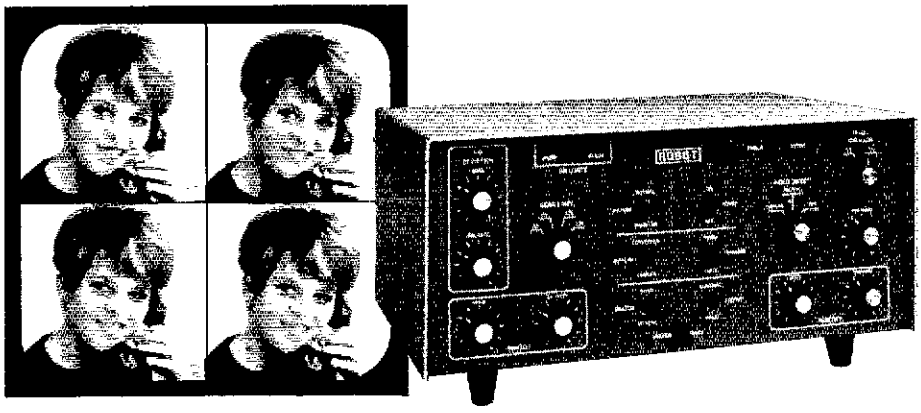

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slump, WB5KSS reports no tfc for June. He went thru a shoulder operation on May 30 and is recovering well enough to operate at K4CIO ED. W5HRS/0 reports tfc of 63 from Colo. He will be using new call WB0PVT from Colo. and W5HRS from Dte Park. W5SHJ, with help from WN5NEN made 50 contacts FD with 5 watts. W5RE, with WB5NJI and WB5ORR operated FD from West Mesa, near Albuquerque. Traffic: K5MAT 267, K5KPS 180, W5ENI 93, W5RE 51, W5UH 49, W5NUI 13, WA5OHI 10, WA5MIY 8, W5QNQ 7, W5SHJ 7, W5YQ 7.

UTAH – SCM, Ervin N. Greene, W7EU – Summertime has increased interest in outside activities and construction projects with several of the members building or buying new homes making it necessary to relocate or install new antenna farms. K7CLO reports he has contacted his fast state for 5BWAS. He also has just finished a new Heath SB-401 and HD-1410 keyer. W7DKB spending much of his time working and enjoying his Cabin at Brighton. W7HOI reports a new vertical phased array. WA7TSB passed his Commercial 2nd phone. Have reports from three groups who participated in Field Day. UARC operated with 15 operators from a site near Woodland. K7SAI, WA7VNQ and K7EYE operated full time making up their group. Ogden ARC were operating two miles out of Huntsville with 15 operators. WA7GTU is building an FB new home in Cedar City. He has a new facility at SUSC which is a delight to see. New remote site on Blowhard peak almost operation at this visit. New repeater on Utah Hill in SW part of the state should fill blank spot between the WR7AAA repeater and the Las Vegas area. Traffic: W7OCX 29, WA7TSB 23, W7DKB 14, K7CLO 12.

WYOMING – SCM, Joe Ernst, W7VT – With summer vacations over, fall and winter here, let's try to check into the Wyo. nets at least once a day. The Weather Net on 3920 at 6:45 AM MDT with K7NQX or W7SOT has timely weather reports for the Western United States. To handle traffic join the Wyo. Cowboy Net on 3950 at 6:45 PM MDT with W7SDA and his crew. K7VWA brings up traffic from the 12th Region Daytime SSB Net along with the CW group. Check-ins are needed regularly from our larger cities Cheyenne, Casper, Rock Springs, Laramie and Sheridan. On Field Day the Univ. of Wyo. Amateur Radio Club had fourteen members out in the snowy range on W7OBF/7. Four operators out of Lander at the Hart Ranch on WA7URP/7. And on Rattlesnake Mt. K7IKO and W7KHB of Cody. W7RSJ of Worland went to Billings and upgraded his license to Advanced. Congrats to new Novices WN7BGJ, WN7BNE. Traffic: W7TZK 41.

SOUTHEASTERN DIVISION

ALABAMA – SCM, Jim Brashear, WB4EKJ – Regret to report W4ERW a Silent Key. The weather was favorable for FD. WN4FZU, WN4JVK and WN4KWL received AENP Net Certs. WA4HTG, WN4JDH and WB5LXW AENP NCS Certs. K4VF off the air (except for 2 meters) while transceiver is repaired. WA4BCY, W4NCK, WB4OXX, and WR4SVI received Advanced Class ticket. The Conecuh Co. ARC now has ten members, is conducting Amateur Radio Classes for the public at Reid State Tech. College; have plans to add a duplexer to their 16/76 repeater. Officers of the Calhoun Co. RA are K8BHH/4, pres.; WA4QLB, vice pres.; K4ICP, secy.-treas. Officers of the Huntsville QRM Club are Jackie Bonner, pres.; Juanita Byars, vice-pres.; Butch Overton, Treas.; Francis Shelton, secy. Congrats to K4EBN on receiving the "President's Amateur of the Year Award" (Southern Sec. Country Cousins); the Hon. Gov. Wallace addressed the net and made the presentation. Congrats to K4OWV on receiving Amateur of the Yeard award presented by the Huntsville ARC. W4UAR invites anyone in the area to join in the AENW net Mon. nights at 2000 CDT on 10/.70. Enjoyed recent visit to the Mobile ARC meeting and hearing about the keyer designed and built by K4OP. Traffic: (June) WB4EKJ 231, WB4FZQ 129, K4OAZ 78, WN4JDH 61, K4LYY 61, W4LNN 52, WR4RCF 29, WB4IVY 15, K4CIU 14, W4ROS 10, WA4BDW 6, K4IMD 4, WA4MLK 2. (May) W4ROS 19, WA4HTG 17.

CANAL ZONE – SCM, Roderick J. Isler, KZ5PI – Fun was had by all during the Annual Field Day. Utilizing the call KZ5FD, and operating in three transmitter class, the Canal Zone was well represented. A respectful score was achieved by the combined effort generated by members of the CZARA. Any one desiring 6 meter activity with the Canal Zone, contact KZ5WA who is attempting Stateside contacts. Hams visiting the Canal Zone, remember 2-meter activity via KZ5ES 10/17 for any CZ contacts. Plans are already underway for the Annual Cross Roads of the World HAMFEST, sponsored by the Chagres River ARC in Jan. Congratulations to KZ5TSN a new Novice and many thanks to all who participated in Field Day.

GEORGIA – SCM, A.H. Stakely, K4WC – RM: K4ELR. GSN getting hot again.

Net	Freq.	Time(Z)/Days	QNI	QTC
CVEN No 1	3.950	1730 Su		
CVEN No 2	146.94	0140 Dy		
GSBN	3.975	2330 Dy	1140	106
GSN	3.595	2300/0200 Dy	132	52
NEGEN	3.975	1830 Su		

Sorry to lose WA4IWO to Jacksonville, FL. WN4IYB passed General, WA4GVJ passed Advanced. W4JM working on 160-meter antenna. K4ELR made PSHR. Field Day activity was well attended with lots of fun for all. BiCity VHF Society, WR4AIC, has W4HZ, pres.; WB4JUN, vice-pres.; W4AHA, secy.-treas. Columbus ARC now has new repeater, WR4AMY, 146.01/146.61. Silent keys now include WB4OOI and WA4EHU. Terrific hamfest by Atlanta RC netted 20 new ARRL members, more than 5000 in attendance and was a real professional looking show. Traffic: (June) K4ELR 83, WB4WQL 70, W4AAY 56, K4YRL 41, W4HON 28, K4WC 24, W4IM 6, K4PIK 5. (May) W4AAY 28, K4YRL 19, W4BTZ 5.

NORTHERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKH – SEC: WA4WBM. RM: WA4FBI/WA4WIW. PAMs: WB4VDM/75, W4SDR/40, WB4BSZ/VHF. Appointments: WB4HKP as OBS;

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WB4VDM OPS; W4CSS and WB4NIP OVSs. A number of ORS have been cancelled. Section Net Certs earned by K4IKY, K4PIC WA4MUV and WA4EHG on NFPN; W4COE, WB4DXN, K4KP W4KIX, W4LDM, K4VND, WB4SKT and W7EM/4 on QFN WA4BAX and WA4YCV on EAST; W4SIZ on GATOR; WA4HA on FPTN. Delivery of Vietnamese refugee traffic at Eglin AFB mad BPL for W4RKH, WB4NIP reports 6m very active. Transmitte hunts going again in Panama City on 2m fm. K4MZA and WA4IM have new repeater on .34/.94. VK3OR a visitor in Tallahassee durin July. The Fla. Sheriff's Boys Ranch has a well-equipped station visitors welcome. W4KFA received his PhD degree from U. of Fl WA4PWF graduated another Novice class. WB4PEJ concentrating o cw. WA4BSL hospitalized for two weeks. New Novice WN4NID ha 24 states worked; also active on traffic nets. The Orlando Hamfe was biggest yet; thanks to OARC for making time for 3 ARR meetings. WA4YCV active on NFPN from Brooksville. I recentl received updated lists of ARRL members and affiliated clubs in th Section; 1 more many clubs not listed. Be sure to keep Hq advised o your new officers via the Annual Club Report. Thanks to thos groups who sent me PD messages. Traffic: (June) WB4HKP/4 300 WA4EBI 250, W4RKH 226, WB4SKT 212, W7EM/4 103, WB4JHC 99, WB4DAD 54, K4DDY 37, K4CVO 36, WA4IWW 32, WB4NJ 25, WA4BAX 23, WN4NID 22, K4OER 16, WA4CRI 10, WB4TV 6, WB4VAP 6, WB4VMP 4, WA4EYU 1. (May) WB4SKT 173.

SOUTHERN FLORIDA – SCM, Woodrow Huddleston, K4SC SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4EBE, W4EI WA4GBC. PAMs: WA4NBE, W4OGX. New appointments WA4AYY EC Okeechobee; WA4KKE ORS. OOs reporting K4AVH, K4DAS, K4JPF, K4QG, WA4IVG. Clubs reporting Fiel Day activity: Fla. Atlantic Univ., Boca Raton, 12 operators; Ke West ARC, 8 ops, St. Petersburg ARC, 21 ops; Indian River ARC Cocoa Beach, 20 ops. W4YW received his ARRL 40-year pi K4DAS awaiting his Extra Class license. WN4LGT looking for h General any day. WB4AIH reports new Novices, WN4NLO an WN4QIT, graduates from his recent class. WA4JWN is a ne General, reporting a nice traffic total this month. WA4CEM has h new RTTY automatic cw identifier operational. The new 2-mete RTTY repeater for Pinellas County will use 2125 Hz mark and 229 Hz space (170 Hz shift) with repeater keying up only on RTT signals, no carrier or voice. WB4ALH is new 1st V.P. of Fl Sidebanders Assn. and is enjoying traffic nets with a new FR4C wo at recent Orlando hamfest. OBS/OVS WA4BMC reports she is activ on 5 Repeater Groups furnishing OBs, weather and traffic info, an handling accident reports. WB4ZSO got his Advanced ticket. K4I and WB4KSI participated in Hillsborough County Medical Eme gency Test. W6BIP, from San Francisco, was a recent visitor at th home of K4QG. WA4IVG vacationing in Colo. last half of June Traffic: (June) K4SJH 549, WA4IWN 194, K4SCI 188, WB4KSG/ 146, W4EH 115, W4DVO 101, W4IRA 91, W4WYR 87, WA4KK 79, WA4EIC 70, WA4GNI 63, K4TH 62, WB4AIH 57, W4BM 4 K4BLM 36, WB4AID 34, WA4HDH 34, K4QG 30, WB4ZSO 2 WA4IJH 23, W4DQS 21, K4CEV 18, W4GOG 18, W4IYT 1 WA4SCK 15, W4NTE 11, W4OGX 7, W4SMK 7, WA4IVG W4LK 4, WA4IWL 3. (May) WB4ZSO 55.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Marshall Lincoln, W7DQS – RM: K7NH PAMs: WA7KQE, W7HQO. Field Day reports were received fro Old Pueblo RC, Hualapai ARC, Superstition ARC, Tucson Dese Rats RC, Scottsdale ARC, Cochise ARFM Assn., and Ari Mountain Moguls. The Ariz. ARC has code and theory classes Wed. evenings at the Red Cross building. The Club's station, W7I is being used at Camp Geronimo for daily phone patches betwee scouts at the camp and their families in the Phoenix area. K7MT reports his 500-watt output linear is back in service. W7YS operate on 40 with a 5-watt rig on a camping trip in the White Mountain K7CC made the May Frequency Measuring Test honor roll with a average error on seven measurements of 0.15 parts per million. F reports copying the Armed Forces Day message on RTTY and C for the 15th consecutive year, and working all military stations o all bands and modes. He will be operating as ZF1CD in Sep WA7IZO had an average error of 13.1 parts per million in the FM K7NHL was host for a meeting of Pacific Area Staff and intereste guests in June. Attending were W6BGE, WA1ECM, WB6HC WA7ICK, WA7KQE, W7KZ, K5MAT, W7RE and W7DQS. June m traffic: Cactus Net QNI 1097, QTC 371; AIEN QNI 457, QTC 1 certificates to WA7VIM, W7PG, K7NMQ, W7RQ. Traffic: K7NH 216, K7CC 43, WA7VTM 33, WA7YKM 17, K7MIZ 9, WA7FXI WA7KQE 8, W7DQS 5, WA7JCK 4.

LOS ANGELES – SCM, Eugene H. Violino, W6NEL – SE WA6DUC. RMs: WB6OYN, K6UYK. We can use more people the traffic nets, there is considerable Vietnamese traffic comi thru, and we should be doing our public service. W6WHK putting new antenna with a new Hi-gain quad, promises to be a big o W6AGK, the used tower specialist, is on vacation with mobile and expects to catch lots of fish this year. the 220 MHz ban activity is picking up very fast in this area, we have many repeate and the Henry Radio Co. has installed one on Catalina Island addition to their 144 MHz unit. Let's fill this band up, remembe the slogan "use it or lose it," beside it's more fun than 144 MH coverage with a small Yagi is tremendous. The local clubs will b having their Auctions in the following months so don't miss th opportunity to trade/sell your unused equipment, sell some and bu some so that the garage won't look empty. The Ramona RC a having trouble with their 40 meter dipole, they also have hee having disaster drills with the Red Cross in Alhambra. Field Day over, a lot of participation this year, with all the clubs activate W6UHY reported in from Aurora Peak, Nev. as a two operat effort. Clubs sending their messages received their usual credit, a many more messages received this year. The TelCo RC is alread planning for their yearly Christmas party, while most of us are st thinking about our vacation. WA6AYW is looking for material make a thirty foot tower, anybody have any antenna towe material? W6OAW putting up big Quad still says better to go slo

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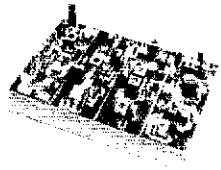

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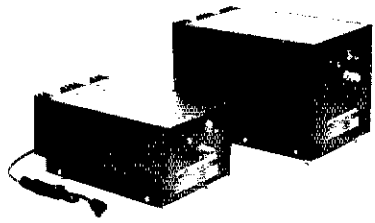

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during this warm wx, W6CE provided two large gas generators the United Radio RC of San Pedro's Field Day. Yours truly learn one thing about Field Day this year – everybody wants it but v few turn out to do the work. Hi. Net activities are not too heavy the present time as many members on vacation this time of ye but when school starts, watch out. WA6DUC has been under t weather and thinking of retiring as SEC so you public mind members might give some consideration to an active life emergency communications. To those members who haven't enter a CD contest, try it even if its for 2,3 or 4 hours, you will find thi very exciting sport, besides improving your operating ability. The contests are designed for our enjoyment and we are missi something by not taking advantage of them. WB6VZI reports ma activities CD, FD, and many other contests, the FD was hec though they lost two generators. W6OEO, repairing beam and in doing decided to rebuild all antennas. W6QAE QRL part time d to business. WB6IFD QRL while moving into new house. K6AS finally received modified license after six months, now QRL B scouts. W6ED becoming active again after being off for a long ti overhauling station. WB6JIB reports the Metro Net had check-ins. W6DQX very active during ITU week operating KL6IT thanks for the sample QSL. Traffic: K6UYK 354, W6INH 3 WA6TLV 200, WB6PKA 98, WB6FTB 76, W6QAE 36, W6OEO WA6ZKI 21, WA6BCO 16, WA6OTU 16, W6NKE 14, W6IVC 3.

ORANGE – SCM, Wm. L. Weise, W6CPB – Asst. SCM: Di Birbeck, K6CID. SEC: WA6IVA. RM/PAM: WB6AKR. The vac tion trip was terrific. Thanks to all for the well wishes. Field D provided lots of activity, particularly on CW. All clubs we working hard on most bands. Congrats to all who participate Officers for the Morongo Basin ARC are W6BPI, pres.; W6BQG, vice-pres.; WA6QYA, 2nd vice-pres.; WA6PTU, secy.; WA6AI treas. Good luck to the new officers. Congrats to 10-year old Ha Clever of Joshua Tree who passed her General Class exam. WA6YV now in his new QTH and on the air. Bill is also making a trip auto thru western Canada and Alaska, will operate W5HVT mobi The O.C. Degenerate Net meets Sat at 7 PM on 21.4 kHz. Look f WA6JBX. K6YNB reports his two-band moonbounce system nearly completed. During Field Day the Fullerton RC, W6UI operated a 2-meter and 80-meter QRP system by solar power a Muscle power. Muscle power was supplied by two bike generato attached to an "Exercycle." WN6GVT supplied the bike generat and muscle power and registered six miles on its odometer. QRP rigs had less than 1 watt output. W6CRW assembled the so power panels. W6DTR supplied the rigs and operated. Sixte contacts were made on 2 meters and eleven on 80 meters. Jim sa he could have worked the whole Field Day if they had tried hard K6GMI traded his old rig for a TS-520. As soon as Hal gets his hea repaired he will be back on 20 meters. Traffic: WB6VTK 17 WB6AKR 101, W6WRJ 93, K6GMI 61, WA6TVA 38, WA6YWS 2 K6GGS 18, W6QBD 8, W6CPB 5.

SAN DIEGO – SCM/SEC: Cy E. Huvar, Jr., W6GBF – (r recent unopposed election W6INI was declared SCM of this secti as of Oct. 24. I want to express my gratitude to all the amateurs their support in all the programs and functions during the past t years. Good luck to the Council and Clubs. I know you w continue your active efforts for the betterment of Amateur Ra under our new SCM. To the appointees my heartfelt thanks for yo outstanding jobs in keeping this Section ranking first in many are Please send station activity reports to W6INI this month. Rememb our Div. Convention in Ventura next month, I hope to see many you there. New officers for SD DX Club are K6PO, pres.; W6A vice-pres.; W6ABT, secy. treas. Nice to meet WA1BUM on his v to the Section. New repeater WR6AID on 222.94/224.54. K6SI and W7KAR operated KN6ITU during ITU week and made 12 QSOs. WA6ODQ was presented the Prescott Memorial award '74/'75 for his significant contribution to aviation using amate radio in Sheriff's Aero Squadron search and rescues. W6PT got fi CW DXCC in section. New Novices WN6MCO, WN6MME, Fa Class: W6SRS, W6TET: upgrading are WA6EUB, WA6HG WN6WQI, WB6SLY, K6SEW, WN6KAU. WA6MGP, WB6EO WA6RBP, WB6EMS. Congrats to WA6IIK on his 20 wpm cert ate. PSHR: WB6PVH. Traffic: WB6PVH 268, W6BGF 173, W6P 114, W6GBF 46, WA6IIK 34, W6DEY 33.

SANTA BARBARA – SCM, D. Paul Gagnon, WA6DEI K6EVQ. WB6MXM bought new ICOM IC-22A rigs. W6AMI has new IC-230, WA6JKM new TR-22, WA6YMU a new IC22, a WB6NCO a new SB-220. Mike and Key Club had a laser demo the General Tele. Co. rep. W6URP has returned to Port Huener after 2 yrs. in Saigon at XV5DA. WB6LLT gave a talk at Ventu Co. Club on antenna measurements, W6KW spoke at the San Barbara Club on Docket 20282. W6PAJ spoke on Oscar at Poinsettia ARC. Officers of the Santa Barbara Club are W6PO pres.; K6YX, vice-pres.; K6TZ, secy.; WA6MBZ, treas.; WA6BL facilities; W6UEI, WB6IGX, K6EVQ, dir. Many clubs were heard Field Day. The AREC in SB coordinated a Tri-County effort provide comms for a TV Telethon for the National Council Alcoholism, W1UHQ spearheaded the effort while WB6DH WB6MXM, WA6YKQ, WR6BKX, W6OVD, W6JJM, K6YX cover the outlying areas. The AREC in Ventura Co. provided comms fo 100 mile bike-a-thon to Mt. Pinos. Participating were WB6LN WB6RWY, WB6EDG, WA6TPL, WB6FLI, WA6DEI, WB6DH K6YLQ, WA6QLQ. The Section Net moved to 1730 Wed. on 393 Check-ins for June totaled 93. Join us. WA6WYD handled 103 m on Navy MARS. WB6KBI operating thru Oscar. WB6IYW a WA6MWH won the Ventura F-Hunt. WB6TGV worked Spain on watts. WA6WKQ won an award in the Ventura Cty Science Fa WB8BZG moved to Oxnard. W6PN back from Europe. W6BOL school in Fla. PSHR: WB6MXM 22, W6PQU 22, K6YX WA6DEI 42. Traffic (June) WA6MBZ 177, K6YX 172, K6QPH WA6DEI 53, WA6VBS 38, WA6BLS 35, WB6MXM 19, W6POU WA6OBT 2. (May) K6QPH 58.

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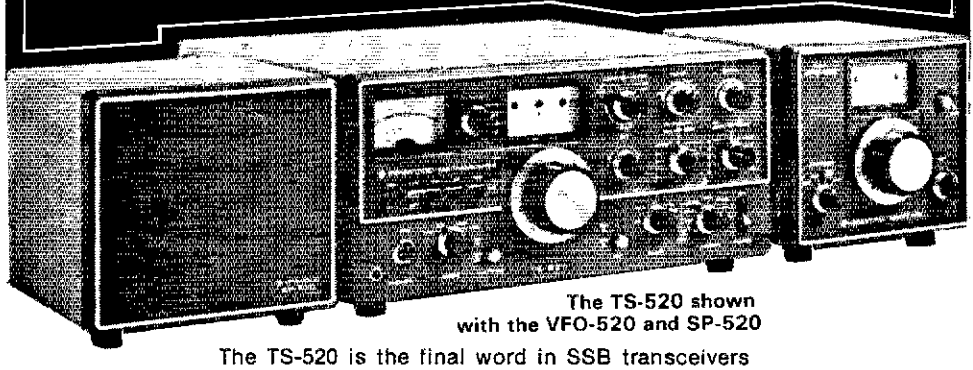

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requested extension on 20282 and FCC approved. Panhandle AR
meeting July 2 Red Cross Bldg., elected officers. Swapfest in Au
with Ed Juge sponsor main prize. Dallas QCWA meeting July
cancelled and set for July 26 Wyatts Mckgbd/Abrams. W5IZ
Silent Key. Make reservations Texoma now, see Dallas Telepho
Directory. Levelland Hamfest Aug. 2-3 overnite camping all hoo
ups. Hq. advises following no longer ARRL members WA5YK
W5HVF & W5GL. Apparently Dallas ARC has problems wi
semantics and relation to selection of Trustees/Technical office
W5SHN NTex SEC cleaning house and removing EC deadwood. T
following were renewed: W5GY, W5LGY, K5MWC, WS7Z
WB5EOY & W5SHN. WB5BAM's appt. cancelled 'cause he move
Summer VHF-FM meeting sked for Tempie Aug. 1, 2 & 3. W4BV
Prose Walker speaker. Oklahoma City has Ham Holiday same tim
W5SHN's request to each of you asking fill out his report and retu
to him direct was well prepared and deserves special considerati
by all of us. W5FYB's letter came in last, proves beyond reasonab
doubt Mr. Albright keeps up with his Homework. Congrats Roy,
a job "well done." FD has come and gone. Thus far RWK, W5RW
W5JYH/5. FtWorth Eg.-Sheet sez in part "semi-quote" Looks li
many hams are going"CB" faster and faster. K1FHN, the new ARR
Head of the Intruder Watch advises that facsimile stations, identifie
by the FCC as Japanese are on 3622.5, 3712.5, 3822.5 & 3980 kH
Now look, you guys and gals listen on 80 meters a "whole bunch
so hows to listen and give us a hand. K1FHN wants us to be sure
problem really exists before action is completed. Richardson W
N/E the "Chawed Rag" conducted a well prepared discussion
analysis of 20282. The Richardson WE is to be congratulated o
having such a fine editorial staff who have proper command of th
language from a descriptive standpoint. WA5IKU, Dallas 6-Met
expert reports "E" condx excellent June 5, 2310 to 2330Z worke
XE1GE, 40/S9 on 50.110 ssb. XE1G solid into Dallas for 2 hour
FX1IP others. Traffic: W5TI 214, WB5MTN 209, WB5MFQ 14
W5TYS 48, W5LR 10, WA5FAI 9, W5YK 8, WB5MDT 6.

SOUTHERN TEXAS — SCM, Arthur R. Ross, W5KR — SE
WB5CUR, PAM: WB5AMN RM: W5IGF. OOs reporting th
month: W5NGW, WA5LTQ, both from El Paso. OVS reporting th
month are WB5CIT, WB5HRI (May), K5LZJ (May & June
WA5FSR, WA5OCP. OO/ORS W5RBH has moved to WI-Land. OR
WA5YEA has new 1S900X. OPS K5HZR (former STex SCM) mad
BPL for first time ever! EC W5TFW reports WB5JDW new on 22
McAllen repeater group has new solid state machine. K5CA is th
new call of W5KSV; he is running the Novice class for Tideland
ARC in Beaumont. EC WA5TKR reports Grimes County repeate
.37/.97, operating with autocall; it is fully coordinated with Civ
Defense. OVS WB5CIT working plenty RTTY. WR5AGT, 449/44
still percolating. WB2GAV is now WB5OOW but operated
KL2ITU during ITU week — with FCC license displayed. PA
WB5AMN reports Houston area Emergency Net, 3965 kHz, 8 P
Wed., held "Alerting Procedure Drill" on June 7; 2 meters an
phone calls raised 18 stations for the ready and willing list. EC/OR
W5UJJ has new Heath Seneca. From THE BEAM, excellent bulleti
from Sun City ARC: W5FY and WA4PMM are new residents of
Paso. WA5ZSS moved to Houston: K5DIT has new Clegg FM27B
EC WA5ABA suffered loss of more than $300 when his home wa
burglarized. The STEN convention in Victoria June 6, 7, 8, was we
attended; ARRL VP W5OKE and wife were honored guests. Corpu
Christi has flock of new Novices: WN5OKM, WB5OER, WN5OK
WN5OOQ, WN5OKR, WN5OKO, WN5OLT, WN5ONO. Also
Corpus Christi, WB5LYN sends code practice 8:30 PM Central Tim
on Mon., Wed., Fri. on 21.175 kHz. W5YZ needs information o
"Units of Smell"; having trouble getting such information. Traffic
(June) K5HZR 579, W5UGE 413, W5KLV 259, W5UJJ 21
W5TQP 210, WB5CUR 165, WA5VBM 150, WB5AMN 10
WA5YEA 97, WA5RKU 34, WB5GIE 29, W5TFW 20, WB5IJR 1
WB5HIV 6, K5ROZ 4, K5RVF 2, WA5TWF 2. (May) W5UGE 21
WB5OOW 52, WB5FMA 27, K12ITU 10, WA5KFQ 10. (Ap
WB2GAV/5 10.

CANADIAN DIVISION

ALBERTA — SCM, Don Sutherland, VE6FK — I regret to repo
the passing of Calgary OT VE6IN CARA had quite a FD entr
VE6AMD did excellent job of coordinating. Kudos to VE6AM
(XYL) for her FD culinary skill. I understand the NARC, FD w
hampered by a deluge. Due to new work commitments VE6ALQ
resigning as PAM. VE6ALQ thanks all NCSs and net members wh
cooperated during his term of office. I am sure we all pass on ou
thanks to VE6ALQ for a fine job. Sorry to lose you Clare. I w
quite pleased to see that Repeaters VF6RPT and VE6HM had th
iniative to be registered in the new repeater directory. Wha
happened to the others, inertia or neglect? Congratulations t
VE6AIX on receiving his Advanced ticket. Traffic: VE6FS 7
VE6FK 38, VE6WN 8, VE6AHC 4, VE6WV 4, VE6AFJ
VE6AFW 2, VE6BC 2.

MANITOBA — SCM, Steve Fink, VE4FQ — The Peace Garde
Hamfest was a success, thanks to the Brandon and Minot Clubs. Th
Winnipeg Repeater, VE4XK, underwent a major overhaul whil
down for the 46/06 frequency change, and is now operating wit
increased range. We welcome ARRL Canadian Division Directo
VE2MS to Winnipeg, while we're all sorry to lose VE4CP to Calgary
and VE4EO who is QSY to Elin Elon. MTN has returned to a dail
schedule after operating on a summer schedule the past two months
MTN: 30 sessions, 154 QNI, 59 QTC. MEPN: 30 sessions, 801 QN
17 QTC. Traffic: VE4PG 88, VE4IX 20, VE4OW 20, VE4FQ 19
VE4EK 8, VE4JA 8, VE4QL 7, VE4DE 6, VE4CR 4, VE4IP 4
VE4XN 3, VE4AU 2, VE4HR 2, VE4LB 2, VE4LN 2, VE4AI 1.

MARITIME — SCM, W.D. Jones, VE1AMR — SEC: VE1SH
RM: VE1ARB. It is with deep regret that I report VE1LJ an

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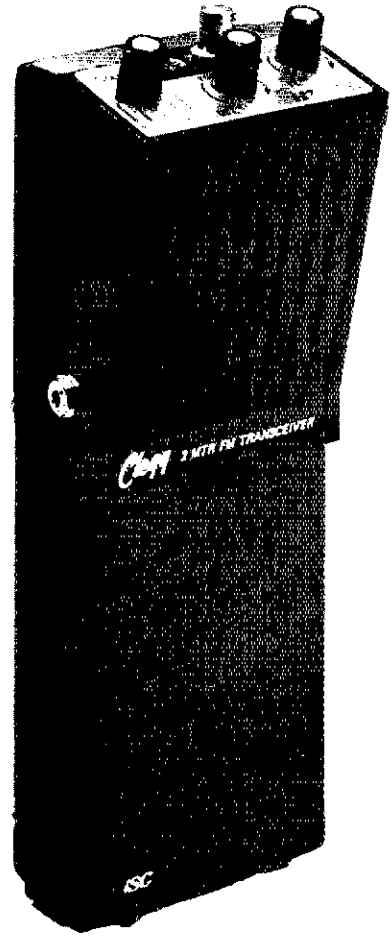

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VE1AQQ as Silent Keys. A few of the regulars were missing Field Day this year, VE1EV, Moncton and VE1LC St. John w not out. VE1AMN is newly active on 40 meters. Congratulation VE1ABU, VE1ADR and VE1ADF on the new Advanced tick APN reports ONI 91, QTC 90, sessions 30. Traffic: VE1ARB VE1AAQ 72, VE1ZH 63, VE1AMR 58, VE1ST 45, VO1GW VE1AMN 9, VE1AIU 5, VE1AFM 4, VE1BCB 4, VE1AMB 1.

ONTARIO – SCM, Holland H. Shepherd, VE3DV – VE3G ORS since Sept. 1, '74, is now a full fledged member of the N TCC. Ont. now has VE3SB, VE3AWE and VE3GOL in this e traffic group. On doctor's orders your SCM/SEC will be ta things very easy for the next few months. June traffic totals, PS and other items will show up in July's column. It was with su regret that we were informed on June 10 that VE3WT, Canadian Vice Dir., has tendered his resignation. VE3GNI has ta up the torch from the late VE3APN and has completed instruct White Caners with a successful passing of 8 new licensees. B VE3GJH is writing a book on the history of The Canadian YL Amateur Radio, and would appreciate receiving any information the "old stuff." Most parts of Ont. had ideal weather for FD '75 the SEC only received five messages from FD sites. What a pity many missed those easy bonus points. I enjoyed listening to interview on CBC radio of the OARC FD effort by VE3UD. You urged to get your registrations in for attendance at the R Convention being held in Ottawa in Oct. CARF, created in 196 given Canadian amateurs a national voice has moved to indivic membership from the previous Society. A Director's Letter noted that Pres. Dannals has appointed VE1SH to comp VE3WT's present term as Canadian Vice Director. Visitors to Museum of Science & Technology should visit the VE3JW Memo Station where they will meet VE3FCJ. Congrats to VE3HTV preventing a drowning tragedy. Traffic: (June) VE3GOL VE3SB 182, VE3HJA 168, VE3FQZ 119, VE3FRG 108, VE3G 83, VE3DPO 68, VE3GJG 68, VE3EHF 50, VE3GT 44, VE3D 33, VE3EWD 33, VE3ASZ 20, VE3ATR 17, VE3GCE WA8ETX/VE3 12, VE3EHL 9, VE3FHQ 9, VE3GEQ 7, (M VE3FGV 7.

QUEBEC – SCM, Larry Dobby, VE2YU – A successful F Day was enjoyed by both VE2CWI, West Island; and Westmins VE2CWR/3 with the welcome assistance from the Seaway Va Amateur Radio Club, Cornwall, Ont. A Flea Market, sponsored the MARC was held in fron of the K-Mart, Pointe Claire, on J 21, Westminster Amateur Radio School completed another g year with six new additions to the amateur fraternity, and mor write. The third annual Montreal Hamfest will take place at MacDonald College Farm Site on Aug. 3. All are welcome, and hope for good weather! An interesting exercise took place on J 18 which showed that a group of approximately 10 mobiles c be activated very quickly in aid of the apprehension of st vehicles. Traffic: VE2DR 118, VE2DRC 26, VE2APT 22, VE 20, VE2UY 4.

SASKATCHEWAN – SCM, P.A. Crosthwaite, VE5RP – Watrous Hamfest was a good success. I was very happy to see many amateurs and their XYLs enjoy the picnic style Ham VE5CU congratulated the amateurs for their efforts in SET. Pe scored topped those in Canada and ranked very high with thos the U.S.A. Traffic: VE5RP 5, VE5WM 4, VE5UI 2.

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CWF-2, kit $14.95

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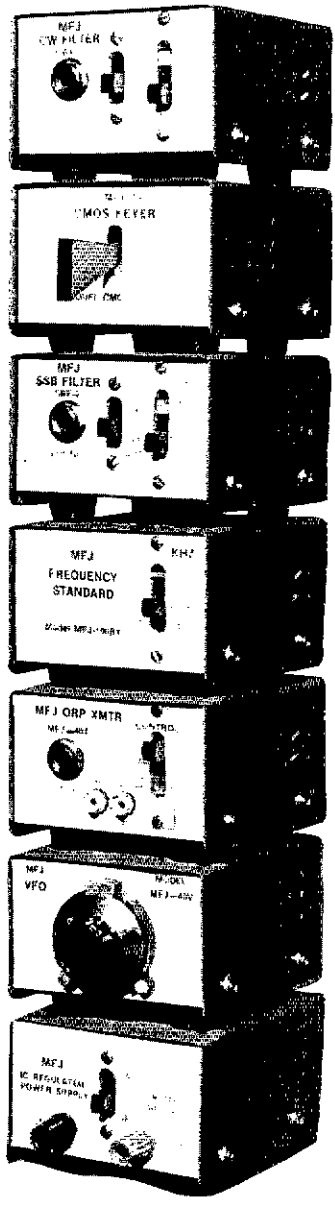

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Public Service

(Continued from page 69)

■ San Juan, PR, area — June 14. Communications were handled on the Noon Time Net and the Constitution repeater in order to alert the Coast Guard that W7DBU (aboard a sailboat) was safe and no search and rescue was necessary. — (W7IEU, SEC WA)

■ Repeater Log. According to reports received, repeaters were used to report 25 traffic accidents and related situations, 3 dangerous situations and 2 fires. The following repeaters were involved: WR3s ACH ADG AFZ, WR4ABR, WB4HAE, WR5s AAA APX, WR6s ACF AJL and WR9ABY.

■ *Special Activities. May.* Members of the Central Ohio AREC and the Scioto Valley ARC handled communications for a 2-day bike tour in the Columbus OH area on May 10-11. — (W8ERD, EC) Because of a rash of break-ins in Milford Township (MI), Chief Averaill of the Milford Police Department asked for the help of the Milford ARC. On May 17 the club spent about 100 man-hours in marking valuables. — (K8SWW, EC) Ten amateurs supplied communications during the litter pickup campaign in San Diego Co. (CA) on May 17. — (W6GBF, SCM) The Maser Net on 146.46 MHz simplex supplied communications on behalf of the police department and the YMCA during the Mansfield, OH, mini-marathon. — (WB8GGR, EC) The Richland Co. (OH) AREC provided communications for the third annual Cancer Society bike-a-thon via WR8ACQ. — (WB8GGR) W2HIK, WA8ZLP/2 and WA2FZW provided communications for a sailboat regatta on May 17-18 at Lake Hopatcong, NJ. —(WA2FZW) Ohio area fm'ers supplied communications for the Canal Fulton canoe races and the Gold Rush walk-a-thon on May 17-18. — (Massillon ARC "Feedback") On May 18 the Southeastern Connecticut Radio Amateur Mobile System provided communications for the United Cerebral Palsy organization of New London Co., CT. Twenty amateurs participated in the 20 mile affair. — (K1IGF) Traffic was handled on behalf of parade officials and various units of the parade in Ecorse and Melvindale, MI. Members of the American Legion, Veterans of Foreign Wars and JCs were represented in the parade. (WB8IFD, EC) About 400 amateurs and their families were present at the San Diego Amateur Radio Council's Amateur Radio Night on May 19. — (W6GBF, SCM) In Ontario, Lakehead amateurs supplied communication for the Region 6 annual ten-mile road race on May 19. — (VE3AYZ) On May 25, Lake amateurs supplied communication for EMO disaster test exercises. — (VE3AYZ) The Hamilton, ON, repeater was used to provide communications for a 25-mile bike-a-thon. — (VE3FHQ) Members of the Columbia Co. (NY) AREC provided communications along the route of a walk-a-thon for retarded children on May 31. — (W2KHQ, EC

June. On June 8, approximately 250 messages were handled during the first American-Canadian Diabetes Association bike-a-thon. The traffic was passed on two-meter fm in the Detroit, MI, and Windsor, ON, areas. — (WB8IFD, EC). On June 9, the Toronto area AREC and the Toronto FM Communication Society provided communications for the Canadian Equestrian Championships. Amateurs in the Toledo, OH, area handled communications for the Toledo Yacht Clubs Mills Trophy Race on Lake Erie, June 21. — (WA8HGH, EC). The Arctic ARC (AK) provided safety coverage of the Yukon 800-mile Marathon boat race on June 21-22. — (KL7CFX, EC) On June 21, members of the De Kalb, IL, AREC handled communications for a bike-a-thon on behalf of a local school for the mentally retarded. — (WB9IPX, EC) Kent Co., MI, amateurs assisted in handling communications for the Soap Box Derby on June 28. — (K8ONZ, EC). Powder Puff Derby contestants were provided with free message service by the Riverside CA ARC through the entire week of June 30. — (W6AQB). *July.* Kent Co., MI, amateurs provided communi-

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cations for the Grand Rapids Independence Day Celebration and Parade on July 4. – (K8ONZ, EC). Sixteen amateurs supplied communications during the Redwood City, CA, annual Independence Day Parade on July 4. – (W6DEF, EC). Toledo, OH, amateurs provided communications during the last leg of the Powder Puff Derby, which ran from Toledo to Boyne Falls, MI, July 2-7. – (WA8EWW). The Maple Ridge ARC supplied communications in the annual "Mission Maple Ridge Raft Race," in British Columbia. – (VE7FB, SCM). A cancer drive in Chambersburg, PA, was a success because of AREC communications. A base station was set up at the American Cancer Society Hq. and mobiles were sent to pick up pledges. – (W3ZUH).

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Winners of BPL Certificates for June Traffic

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	315	1065	962	61	2403
W8WYX	35	875	215	660	1785
W3VR	231	397	311	15	954
KØZSO	–	437	–	427	864
W6RSY	4	419	409	6	838
WBØHOX	112	360	303	19	794
K9CPM	29	410	124	222	785
K5HZR	13	283	279	4	579
K4SJH	69	275	201	4	549
WB2RKK	20	274	201	46	541
WA3UKZ	58	245	235	1	539
W2KAT/3	28	250	214	32	524

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WB5KEP/5	500	105	0	100	705

BPL for 100 or more originations-plus-deliveries

WA3ATQ	295	WØFIR	157	K5TTC	112
W5TI	211	WBØKWJ	119	WA3PHQ	106
WA3QYY	209			WA4FBI	106

BPL Medallions (see December, 1973 *QST*, p. 59) have been awarded to the following amateurs since last month's listings: W4RHZ W9MVE.

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.

New Apparatus *(Continued from page 47)*

silent alarm, where the display pulses at the ten-minute point, or an audible tone, similar to a telephone busy-circuit indicator, is selectable. When the alarm is activated, either silent or audible, simply pick up the clock and turn it upside down, then return it to the upright position and the timer is reset for another ten minute cycle. This action causes a mercury switch inside the clock to break and then make, recycling the timer. Quick resetting of the timer is possible with this novel technique.

This clock is powered from the 117-V ac watt outlet. A small power transformer mounted at the plug provides the required low voltage. The synchronizing source for the time base is the 60-Hz line frequency. When the clock is placed in well lighted surroundings, the display intensity will be bright and when placed in subdued lighting, the display will dim automatically. This feature is controlled by a photocell mounted on the front display panel. When power to the clock is lost temporarily, such as during power switch-overs, it will continue to run for several seconds. But, if the loss of power is for longer periods of time, the

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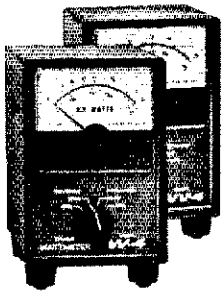

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VSWR Insertion		no more than 1.05:1	
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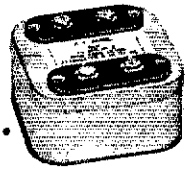

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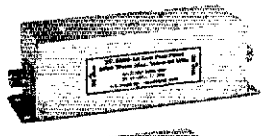

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clock will reset automatically to *0000* and display this time when power is restored to the clock. The *0000* will remain on the display until the clock is set to the correct time.

A Corvus Zulu 10 was run continuously for several months with no indication of error. It survived a "worst case" test of strong rf fields (several amplifiers, each with several hundred watts output, on the air simultaneously), which is remarkable considering the enclosure is made of plastic and the ICs don't have any rf shielding around them. The price class is $40 and is available from the Corvus Corporation, 13030 Branch View Lane, Dallas, TX 75234. – *WA1ABV*

World Above

(Continued from page 79)

about 3 minutes at a time. Stations on Channel 7 in Jacksonville and Panama City, Channel 8 Tampa and Channel 9 Orlando were identified in addition to Channel 13. A Channel 11 station thought to be in Tallahassee was also tentatively identified. Something should have happened on 2 meters on this day. We would like to get details on any unusual contacts or reception. Glenn Hauser also logged double-hop TV E_s DX in the form of YVVK Channel 3 Caracus, Venezuela, at 1200 CST June 30.

Another example of very high E_s ionization prevalent this season was the June 22 contact between yours truly and K3AAF on one end an K8CAY, Huntington, WV, on the other. This is a distance of about 280 miles which is a very short E_s hop. The strength of the signals and duration of the opening, along with the other signals being received at the same time, leaves little doubt as to the propagation medium involved.

Others reporting the very good 1975 season on six include WA1OUB in Manchester, NH. Bob says that conditions during the June QSO Party were the best ever for him with double hop contacts with California and New Mexico as well as W1HOY/KP4. Too late for the contest, but fun nevertheless, June 17 brought exchanges with K7PXI Arizona, K7ZOK Nevada and several stations in New Mexico and California. On the 18th, it was Arizona, Colorado, Idaho and Oregon as well as a few 6s. The same evening produced very short skip to Pennsylvania and Maryland with extremely loud signals. A check of 2 meters failed to turn up anything unusual, but E_s was noted on Channel 6. On the 19th the band was open to Texas, New Mexico, Colorado and Arizona with Nevada and Utah being added on the 22nd. The next night Bob had contacts with Washington, Oregon, Idaho, Utah and Montana, including a QSO with WA7GCS mobile in Oregon. Two new countries were added to the WA1OUB 6-meter total with TG9KJ being worked June 8 and WB2RLK/C6A in the Bahamas going into the log the next day. As many do, Bob keeps his log and submits his reports in Universal, or Z Time so the dates reported above reflect that. Bob notes that so far this year, the only states not worked on six are Wyoming, the Dakotas and, of course, KL7 and KH6.

In his OVS report spanning May 27 to June 15, WA2BLM White Plains, NY, sends along an equally impressive list of 6-meter contacts. Writing in *The Lambda* the newsletter of the mid-south Vhf Association, WB4LHD details a wild season noting QSOs lasting as long as an hour. K7ZCB says that, despite a slow start, his operation in Montana was a great success. June 13 was the turning point

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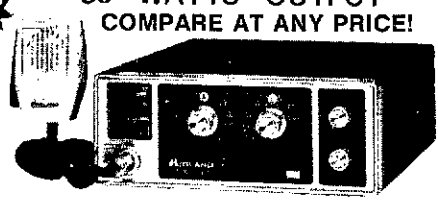

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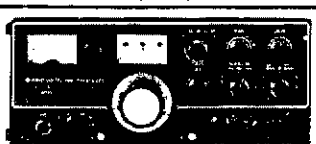

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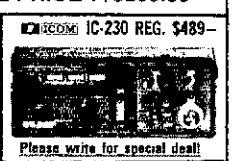

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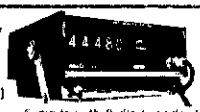

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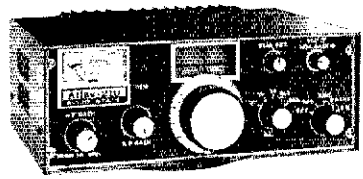
VOX Conversion Kit, for AC Console Model VX-5	45



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producing contacts with W5SFW Amarillo, TX, W5WAX Oklahoma, WB4BSZ Pensacola, FL and WA7KYM in Wyoming as well as several other 4s and a ϕ. The contest also good for Dave, bringing contacts with the East Coast and many closer in stations, but the day-of-days was June 22 with QSOs all over the country.

W7NFC of Athena, OR, thinks that June 22 may go down in history as one of the "good" days. Al says that the band opened at 1415Z to the 4s and 5s permitting contact with all states in these call areas. Later in the day it was the ϕs and 9s. When they faded out, the 1s came in. QSOs were accomplished with all New England states during he subsequent 45 minutes. A few days before, on the 18th, Al worked all call areas except the 1st including a contact into KP4. W8CNL has a similar story to tell. Ray found conditions good June 15, 18, and 19 with contacts in most of the U.S. and TG9KJ. He reports that KG4DS would like to get on 6 meters but is in need of a donation of some equipment. WB2TNC has offered a converter. Does someone have a transmitter sitting around gathering dust? If so, make suitable arrangements with W8CNL.

W7JEF writes that he has been having a field day, especially on the nights of July 1 and 2. In that opening John worked 137 stations bringing his total for the season to 378. That is a lot of happy Montana hunters. John pleads for more cooperation among the Midwest operators during double hop by not calling and breaking him when he has expressly asked for responses from the East Coast. It's hard enough to work the 1s, 2s, 3s and 4s he says, without having to sort them out through single hop QRM. John contends that some of the operating practices prevalent on 6 meters would make an hf DX man blush. While on the subject of poor, not to mention illegal practice, K7QFW, K7CAZ, and K7VNU, aoo of the state of Washington, were apparently victims of a hoax when, on May 27 they all heard a station signing KH6NS. A later visit to Hawaii by W7OVB turned up the sad news that Ed has been off 6 meters for some time. This should solve the mystery for anyone else who may have heard the signal.

A letter from W1HDQ cites good double hop conditions which existed over the July 4th weekend. On Sunday, the 6th, Ed found 10 meters open to Europe via multi-hop E_s. He tried some calls in that direction for crossband 6 to 10 contacts to no avail. Close listening failed to turn up any sign of European TV signals.

HL9WI writes telling of 50 MHz conditions in Korea. The last TE which Bill observed was on October 10, 1974 when he worked a couple of VKs after putting out word on 20 meters the previous day that he had heard them operating above 52.015 MHz which is as high as he is able to work. Sure enough, the grapevine worked and the Aussies got the word via a local 80-meter net. Talk about a good traffic system! Since that time, it has been only E_s for HL9WI. The action started on April 6 with a contact with KG6JDX and a few JAs. May 5 brought lunchtime QSOs with 24 JAs. Since that time, the band has been loaded. For example, on May 23 Bill worked 116 JAs. He didn't run out of stations to work in that session, but quit with writers cramp! The KH6EQI beacon was heard May 22 which is a real tantalizing tidbit. Incidentally, Bill reports that his automatic beacon is no more, as his keying wheel motor succumbed to the wide voltage variations prevalent at his Seoul QTH. Possible someone would care to come up with a replacement. One of those new solid state

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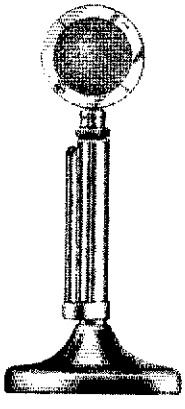

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jobs with a suitable regulated power supply would be just the ticket.

Closer to home, another DX note has come to our attention. K8LEE passes along word of a confirmed contact with YV5RA. Since the distance between Caracus and much of the country is shorter than the distance between the two coasts, this Venezuelan station should be workable by many of the 6-meter contingent if its operator remains active and watches closely for openings.

Not all 6-meter DX is worked on ssb. There has been more than the usual amount of cw activity this season. WBØPNW has been heard almost every time the band opens in his direction. The same goes for WB4OSN. W7FN has been worked several times from here. In the Philadelphia area, W3QKV is frequently at the key. Locally, W3TFA is often heard banging away with low power on 50.16 or 50.2. Am has also been in there with many reports received of E_s QSOs made with low power rigs. Fm isn't to be forgotten either. WA1IUI of East Hampton, MA, notes a long string of contacts made on 52.525 MHz via that mode using a GE Pre-Prog rig putting out 35 watts to a 5-element horizontal beam. Speaking of 6-meter fm, WB2IPX of Moravia,NY, is considering putting on a repeater from his 1300 feet above sea level QTH and welcomes comments on the idea.

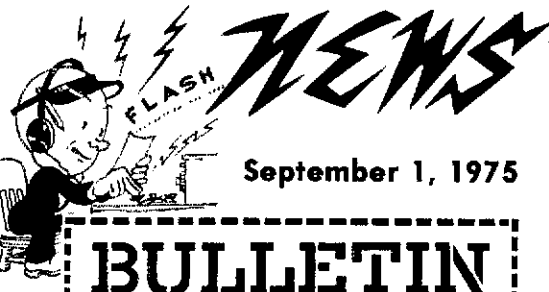
For certificate hunters, WB4NDT offers an attractive hunk of wallpaper to anyone joining the Interstate Single Sideband Net. An s.a.s.e. to Peter will bring full details on this scatter activity builder.

144 MHz With EME activity increasing at a rapid rate, it was only a matter of time before we could expect to hear a comment from a "low power" moonbouncer that the high power boys are hogging all of the DX! Kidding aside, W4WNH/8 makes the valid observation that many times the better equipped moonbounce stations tend to rework the same DX station over and over. Shelby understands and sympathizes with the desire to demonstrate that it can be done again but suggests that stations having previously worked the particular station several times refrain from calling at least during periods when conditions are optimum. Shelby runs 750-watts output to four, 16-element KLMs but must contend with 2 dB of feed-line loss. Receiving is via an antenna mounted 1.3 NF preamp.

VE2DFO wondered why SN7BAE's moonbounce signal wasn't very strong. Some checking disclosed that the preamp noise figure had degraded by 7 or 8 dB. Don was still hearing some signals including his own echoes but they didn't seem to have that normal punch. With repairs having been made, VE2DFO is back in the EME business. He would like to see more ssb activity via the lunar route.

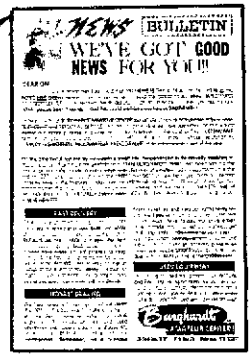
The Lyriads and Aquarids showers didn't pan out for K7CVT. Skeds with KØDAS, K5MWH, WA8GUB/Ø and WØUNM produced calls received only from one station, K5MWH. Wes reports the following ssb stations active in Arizona: W7FJM, WA7CTY, and WA7WWQ. This boosts the total of active 2-meter ssb stations to 21. Speaking of local activity, WB5CWR informs us that ssb station members are increasing in Oklahoma too. The principal frequency used is 145.1.

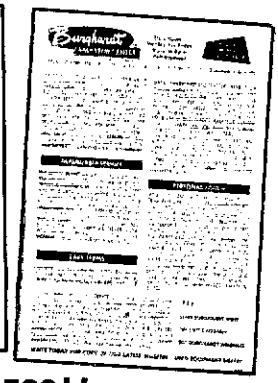
For about a year, W9LXM near Chicago and WB8QLW in the Cleveland area have been working to improve their 2-meter stations so they could QSO on a regular basis over the 340 mile path.

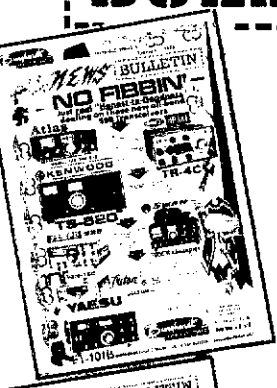


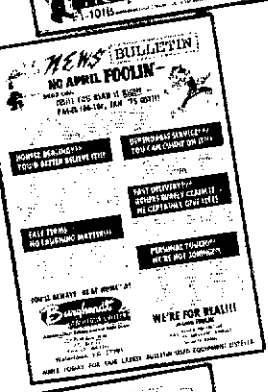
September 1, 1975

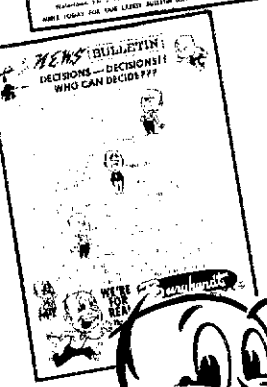
BULLETIN











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In future issues of QST, we'll no doubt be advertising at times specific products that we feel will be of interest to you. But, we want you to BE AWARE of our MOST PRECIOUS COMMODITY — which is ourselves — our policies, our terms, our guarantees, and our services. These, along with your CONFIDENCE, are our MOST important assets — and in terms of dollars & cents will NEVER be discounted!!

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Under anything but dead band conditions, K8AXU Marrietta, OH, recounts working Texas stations through local 2-meter repeaters on June 30 at about the time the E_s reports of WA5IYX and a TV DXer in Enid, OK, report high band TV channels open.

Late Flash

Sunday, July 20, produced a widespread E_s opening on 144 MHz. In the East it began about 2000 Z into Texas and Oklahoma, moved quickly up through Missouri and landed in Minnesota, Iowa, South Dakota and Western Wisconsin. Skip shortened up to the point that W9YYF near Chicago was worked from the DC area. Here in Maryland, signals lasted until after 2130 Z. An hour or so later K3GEG, who first alerted the local gang to the opening, worked through several VE1 repeaters. While the East Coast was having a field day with 0s and 9s, the cloud was being traversed in the other direction with signals from the South to New England, VE2 and VE3. WA4CQG Alabama reports working all of the 1s plus the two Canadian provinces.

More reports of this fantastic day are certain to follow next month.

420 MHz and Above K7CVT reports that W7LFX Tucson and W7GBI Scottsdale, near Phoenix, are probably the first to negotiate that mountainous path on 432-ssb. Now holding nightly schedules, they have been joined by WA7BBM Tucson. With the September contest coming up soon, WA2BLM White Plains, NY is ready for business on 432 and 220. The antenna on 432 consists of four, 46-element J Beams, while 220 chores are handled by four, 11-element Yagis. Contest schedules on both bands are desired.

Being new to 432, W3TMZ Mt. Airy, MD, is rather surprised at the poor QSL return experienced to date. This even includes stations for which Jack was the first Maryland contact. A station very active on 432 is W4NUS Charlotte, NC. Guy runs 475-watts output from a single 4CX250K feeding a 128-element beam on an Az/El mount. So far this fine set-up has netted 22 states and 8 call areas using both EME and tropo.

The Delmarva Peninsula boasts 4 active stations on 1296 MHz according to WA3QVN. They are W3BSV, W4JFU, W3AED and W3QQV. Wayne says he too is in the process of getting on, but as yet is receive only.

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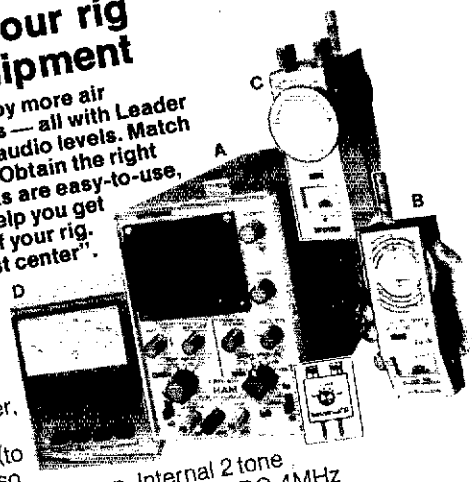

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(D) LPM-880 RF Watt Meter Measure RF x'mitter power output in the 0.5 to 120W range from 1.8 to 500MHz. Features pushbutton range selection with 50Ω load impedance. Also measures power losses in low pass filters and coaxial cables. - Complete with sturdy tilt stand. **$149.95**

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AC-400 AC supply 79
DC-35 DC supply 65
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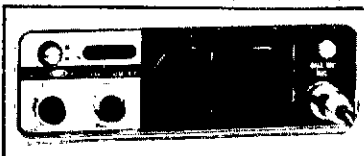

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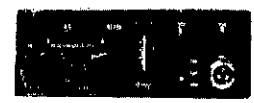

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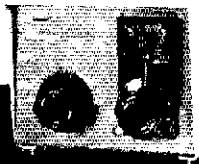

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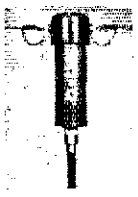

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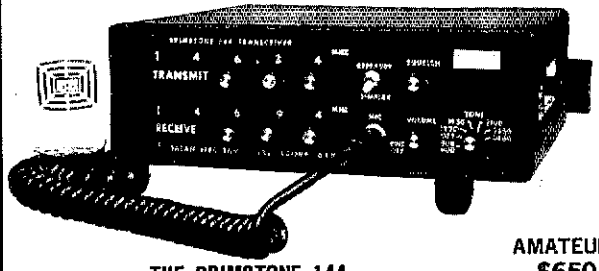

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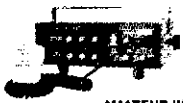

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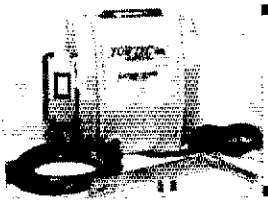

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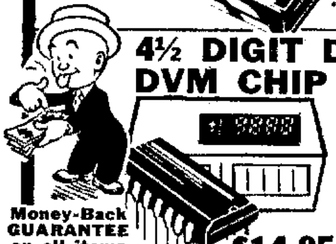

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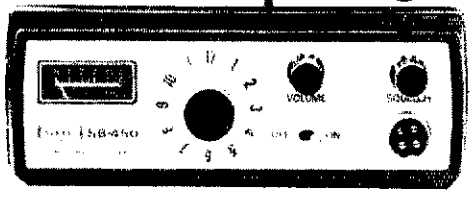

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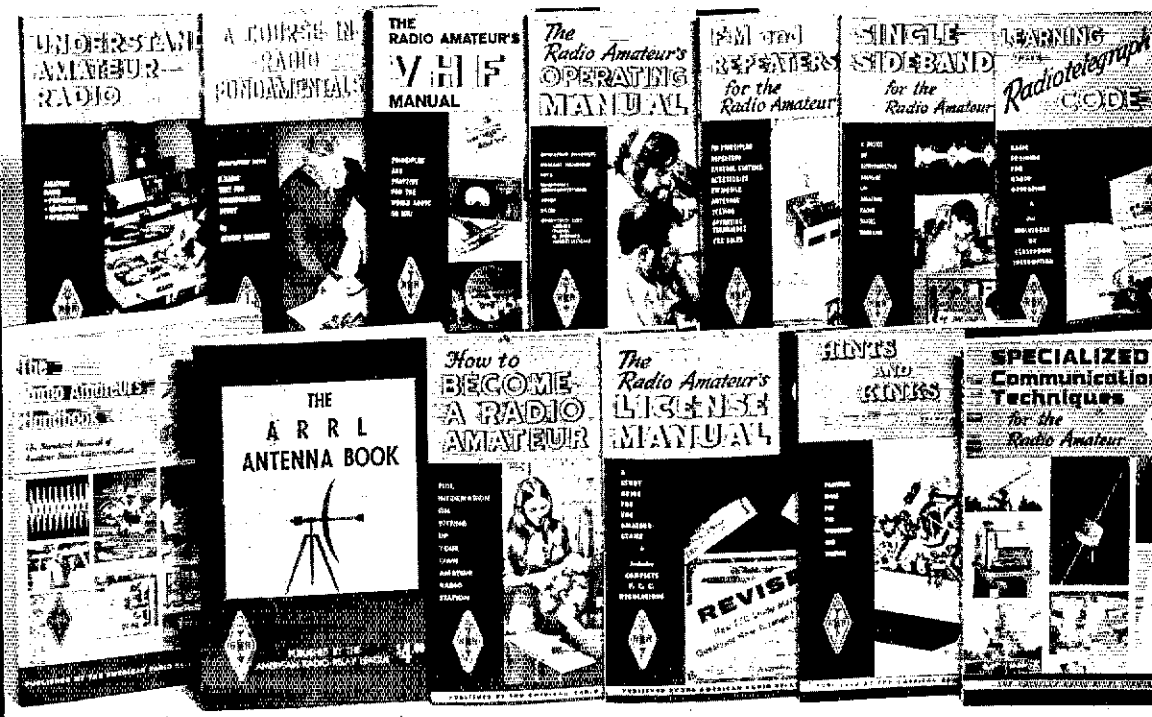

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THE AMERICAN RADIO RELAY LEAGUE, 225 MAIN STREET, NEWINGTON, CT 06111

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

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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., 2012 Rockingham St., McLean VA 22101.

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, Westbury NY 11590.

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.

THE New York Radio Club invites Hams to club meetings, 2nd Monday of each month, 8:00 PM at the Williams Club, 24 E. 39th St., NYC. For information: Box 614, NYC 10028.

RADIO museum now open. Free admission. 25,000 pieces of equipment from 1850 telegraph instruments to amateur and commercial transmitters of the 1920s. Amateur station W2AN. Write for information. Antique Wireless Association, Main St., Holcomb, N.Y. 14469.

PEORIA Hamfest — September 14, Peoria, Illinois. Same place as last year. Note change of date. For further details see Hamfest Calendar. Banquet Saturday, September 13, 5:30 PM at V. Junction — $6 per person. Two motels within walking distance. Reservation deadline August 30, cancellation September 8, 150 maximum, so get reservations in early. For hamfest tickets, $1.50 advance ($2.00 at gate) write Earl Kimzey, WA9SCA, RFD 1, Hanna City, Illinois 61536. For banquet reservations write Larry Pearsall, W9FDY, 2224 W. Herold Ave., Peoria IL 61604.

FOUNDATION for Amateur Radio annual Hamfest Sunday October 19, 1975 at Gaithersburg Maryland Fairgrounds.

FINDLAY Hamfest — Sept. 7, Riverside Park, Findlay, Ohio. For advance information, write Clark Foltz, W8UN, 122 W. Hobart, Findlay OH 45840.

FLEAMARKET Picnic — Garden State ARA, Sunday Sept. 14 PM — Telegraph Hill & Holland Roads, Holmdell NJ. Info, W2HXJ, W2DVR (201) 542-7388.

MUST Sell Drake R4B receiver — $270. John Davis, 260 E. 19th Street, Paterson NJ 07524. (201)279-4560.

QSLs???? "America's Finest" Samples 75c DeLuxe $1.00. Religious 75c. (Deductable) Sakkers, W8DED, Box 218, Holland MI 49423.

TRAVEL-PAK QSL Kit — Send call and 25c; receive your call sample kit in return. Samco, Box 203, Wynantskill NY 12198.

FREE Samples—Stamp appreciated. Samcards, 48 Monte Carlo Dr., Pittsburgh PA 15239.

QSLs, samples 20c. Fred Leyden, W1NZJ, 454 Proctor Av., Revere MA 02151.

QSLs 300 for $4.65, samples 20c, W9SKR, Ingleside IL 60041.

QSLs "Brownie" W3CJI, 3035A Lehigh, Allentown PA 18103. Samples with catalog 35c.

DELUXE QSLs, Samples 20c. Petty, W2HAZ, P.O. Box 5237, Trenton NJ 08638.

DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Little Print Shop, Box 9848, Austin TX 78766.

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. Second to none. Same day service. Samples airmailed 50c Include your call for free decal. Ray, K7HLR, Box 331, Clearfield UT 84015.

QSLs — Variety, value, quality, custom. Samples and catalog 20c. Alkanprint, Box 3494, Scottsdale AZ 85257.

RUBBER stamps $2.50 includes postage. NJ residents add tax. Clinton Hoar, W2UDO, 32 Cumberland Ave., Verona NJ 07044.

QSLs catalog. Samples 35c. Ritz Print Shop, 5810 Detroit Ave., Cleveland OH 44102.

CREATIVE QSL cards. Personal attention. Imaginative new designs. Send 25c. Receive catalog, samples. Wilkins Printing, Box 787-1, Atascadero CA 93422.

3-D QSLs — Increased returns assure users' satisfaction. Samples 25c (refundable). 3-D QSL Co., Monson 2, Mass. 01057.

COMPLETE 36 page QSL catalog! 300 cuts, stock and ink samples. Ten sample QSLs. 25c. Cornelison's, 321 Warren St., N. Babylon NY 11704.

CANADIAN Surplus Catalog and flyers $1. Etcox Electronics, Box 741, Montreal Canada H3C 2V2.

DO-it-urself DX-pedition, stay at ZF1SB, Cayman Is. Vertical antenna and Caribbean at your doorstep. Diving, fishing if band folds. Write Spanish Bay Reef Resort, Box 800T, Grand Cayman, B.W.I.

VP2M Land: Modern well equipped house overlooking ocean. Constant sea breeze. Hygain quad at 70 ft. $90 one week, $250 3 weeks, $43K for keeps! Beautiful & healthy island for retirement. Good housekeeper available. Doc Beverstein. 60 Amsterdam Ave., Toronto M4B 2C2. Phone 416-755-2117.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY NY 10012.

MEMPHIS is beautiful in October! The Memphis Hamfest, bigger and better than ever, will be held at State Technical Institute, Interstate 40 at Macon Road, on Saturday and Sunday, October 4 and 5. Demonstrations, displays, MARS meetings, Flea Market, XYL entertainment. Informal dinners Saturday night. Dealers and Distributors welcome. Talk-in on 3980, 34-94 and MARS. Contact Harry Simpson, W4SCF, Box 27015, Memphis, TN 38127 or telephone 901-358-5707.

CINCINNATI Hamfest: 38th annual, Sunday, September 21, 1975 at the New Stricker's Grove on State Route 128, one mile west of Ross (Venice) Ohio. Flea Market, contests, model aircraft flying, food and beverages all day. Advanced tickets $7, covers everything. $8 at gate. For tickets or further information: Carl J. Dettmar, W8NCV, 8630 Cavalier Drive, Cincinnati OH 45231.

CALL toll-free (800) 327-7798. 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.

SPIDERS for boomless quads. Heliarc welded aluminum. Al's Antennas, 1339 South Washington Street, Kennewick WA 99336.

VERY in-ter-est-ing! Next 5 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.

WE BUY electron tubes, diodes, transistors, integrated circuits, semiconductors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. (201) 354-2420.

MOBILE Ignition Shielding gives more range, no noise. Kits and custom systems. Literature, Estes Engineering,30 Marine Dr., Port Angeles WA 98362.

TELETYPEWRITER parts, manuals, supplies, equipment. Toroids. S.a.s.e. for list. Typetronics, Box 8873, Ft. Lauderdale FL 33310, W4NYF. Buy parts, late machines.

WANTED: An opportunity to quote your ham needs. 36 years a ham gear dealer. Collins, Drake, Ten-Tec, Swan, Kenwood, Tempo, Regency, Icom, Hy-Gain, etc. Trades, terms. Request catalog. Chuck, W8UCG, Electronic Distributors, 1960 Peck, Muskegon MI 49441. (616) 726-3196.

SWAP-N-Sell ads free in Tradio. Box 4391, Wichita Falls TX 76308.

AMSAT/OSCAR 6-7 slides, set of 5 — $1.25 Lift-Off and Equipment. Proceeds AMSAT, K6PGX, P.O. Box 463, Pasadena CA 91102.

WANTED, Make, Model and Serial Numbers of stolen ham gear, for big list. W7UD, 3637 West Grandview, Tacoma WA 98466.

COMING to Florida? Use our club station or your own rig and our all-band antennas to work DX or your home town. All hams welcome. Details — H.E. Saxton, W4QED, c/o Spanish River Inn, Delray Beach FL 33444.

BUILD your own radio desk/console cabinet. Design drawings, photographs, $4.75. Bill Morris, WA5RSC, P.O. Box 20302, Oklahoma City OK 73120.

SERVICE by W9YKA. Professional grade lab, FCC commercial license. Amateur and commercial SSB-FM equipment. Repairs, calibration, modifications, consultation. Low overhead, reasonable rates. Write or call Robert J. Orwin, Communications Engineer P.O. Box 1032, La Grange Park IL 60525. (312) 352-2333.

BUILDERS Teflon stock. Write W9TFY, Frank Wirt, Alpha IL 61413.

MANUALS for ham gear before 1967. Large s.a.s.e. for quote on specific manuals. W0JJK, Hobby Industry, Box Q864, Council Bluffs, IA 51501.

DISPOSE of 450 old magazines. 350 QSTs beginning Jan. 1931 — 1930s, 1940s, 1950s, all solidly complete. Plus 100 CQs, 73s, others. Boxed, ready to go. $75. Bob Farmer, 3009 No. Columbia, Plainview TX 79072.

UPGRADE your ham license NOW. Let Posi-Check help you. Original, expertly devised, multiple choice questions and diagrams covering all areas tested over in FCC exams. IBM sheets for self testing. Keyed answers with explanations. Novice Class — $3.35; General Class (including latest rules and regulations) — $5.10; Advanced Class — $4.65; Extra Class — $4.90. Also newly revised Radiotelephone third class elements 1, 2, and 9 — $9.50. First class postage prepaid U.S.A. Air mail 25c extra per copy. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines IA 50322.

WANTED: Mobile telephone equipment such as Delco, GE, etc. Also heads, duplexers, decoders. Gred Hyman, WA2OTG, 19 Sicard Ave., New Rochelle NY 10804. (914) 636-2494.

MOTOROLA HT220, HT200, Pageboy, and other popular 2M FM transceiver (Standard, Regency, etc.) service and modifications performed at reasonable rates. Hatfield, WA4FRV (804) 272-8403.

DRAKE R-4B, MN-4, MS-4, Heath DX-60B, HG-10B VFO, IM-18, (all used less than 6 hours), plus tube tester, keys, crystals, 24-hr. clock, relay, dummy antenna, and innumerable accessories. Asking — $650. George Mooza, WA1GQX, 32 Locust Ave., Lexington MA 02137.

ICOM, Swan, Larsen, CushCraft and KLM. W0NGS, Bob Smith, Electronics, 1226 9th Ave., North, Fort Dodge, IA 50501. (515) 576-3886.

SELL: Yaesu FTDX560 factory reconditioned — $375. WB8JIR, 3804 Westchester, Jackson MI 49203.

51S1 WANTED: W7FFF, 4108 E. Mitchell Dr., Phoenix AZ 85018.

TRADE—Sell: FB-7 and SW-3 with coils and power supplies. Parkin Crystal set and Audion panel. S.a.s.e., W6GPB, 522-Third St., San Rafael, CA 94901.

WANTED: CE600L, SP600JX, Swan 600T 600R custom two meter gear, Electronic organ, 16MM camera & projector Meg/Opt 2,1/4 X 3 1/4 Uher Nagra III Sync recorder. John Waskowitz, 35-30 73rd St., Flushing NY 11372.

TOROIDS — 44 and 88 mHy 6 — $3.00 P.P. M. L. Buchanan, P.O. Box 74, Soquel CA 95073.

160 METER top loading section for verticals — $34.50 ppd.; 80 meter section — $31.50 ppd. or write for info. Bill Turney, WA0RFF, 1414 East 9th, Hutchinson KS 67501.

MIDDLESEX Electronics — fall catalog — surplus gear, components, etc. Send s.a.s.e., 21 Freestone Ave., Portland Conn. 06480.

DEFECTIVE SB-104 wanted. Send complete history of defects, present condition, purchase date, serial number, modifications, accessories, lowest cash price, telephone number. Write, don't phone. All letters answered. Wolheim, 41 Silversmith Lane, Levittown NY 11756.

COLLINS KWS1 transmitter, 75A4 receiver, mint condition. Original owner. Little used. Asking $1,000. W2CSZ, 4 Elizabeth St., Glen Cove NY 11542.

MOBILE Ops. Tired of ignition noise? Please send SASE for info on shielded ignition systems. Summit Enterprises, 20 Elder Street, Yarmouthport MA 02675.

RTTY, Hal Tuned ST-6, autostart, AK1, in Hal desk-top cabinet. Model 28KSR page printer, manuals on both with other extras. Will Ship. Quinten R. Grider, Rt. 1, Box 58, Lone Wolf OK 73655.

DX-100 — $45; DX-60 with HG10 — $90; Ameco TX-62, — $50; HQ 100A — $90. Kurz, 2711 29 St., Zion IL 60099.

BRAND new DeLuxe R4C Triple Conversion Receiver ha communication, original price — $549, never taken out of bo will sell for — $449. Mrs. Alexandra Marotta, 7512 Jamai Avenue, Woodhaven NY 11421.

HAM Buy Lines, send name and address for literature. Iacopel 1720 77 St., Brooklyn NY 11214.

SELL: QSTs 1960 through 1973. Best offer. Frank Hocke 2924 Elmcrest Drive, St. Charles MO 63301.

SAVE, Save, Save — Discounts on tubes, transistors, antenn speakers, rheostats. Taied Electronics R-2 Pine Tree Hill Ros Newton CT 06470.

WANTED: R-100 Knightkit receiver assembly manual. Buy borrow. K9QLS, 359 Hawthorn, Glen Ellyn IL 60137.

RTTY picture tapes. List, 16c stamps. WA9UGE, 601 S. Dods St., Urbana IL 61801.

E-Z Way 60' crank up tower, self supporting, $450. Derfler, 2 Hale Dr., Sumter SC 29150.

RTTY demodulators: ST-5 with autostart, $125; ST-5 wi autostart, AK-1, $170. Both new, tuned, complete. UPS preps 48. Fred Firestone, WB9IEE, 806 N. School St., Normal 61761. (309) 452-4032.

WANTED: Part for "Hammerlund" HQ. 150 — (Z2) crystal fil assembly (2nd I.F.) No. 26125-G1 for retiree. Harry Wrenno 1809 Bertman Ave., Springfield IL 62702.

FOR SALE: HP-410b 500 MHz VTVM, 2'er, HE-45b, 4X250 and sockets, OS-8 o'scope, 1200V xformer, 12 dc to 110 inverter xformer, 12 dc to 110 ac Rec. vehical supply, 25 100 mA supply, HV caps 12 dc to 110 ac Rec. vehical supply, kv 100 mA supply, HV caps 600 and 1000V. WA3CSP, Millert PA 16396.

WANTED: 25 watt 150 to 165 MEG element for Bird Wattmeter, and 250 or 500 watt 2-3 MEG dummy load. B Muff, 316 Betvue Lane Balboa CA 92661.

QST mid 1933-1969 complete except 6 issues. All in binde except last 6 years. ARRL handbooks 18 issues 1930-19 "Radio" handbooks 1935-1938. Offers? H. Wickenhiser, W2E 8 Chelsea Rd., White Plains NY 10603. (914) 592-7939.

MINT 75A4 with vernier knob & 628-1, Wanted, Charlie Fujikura, 1-27-9, Tabatashinmachi, Kitaku, Tokyo, Japan 11

WANTED: Used Hygain vertical 18AVT/WB. J. Gallagh K2KN, RD2 Beaver Rd., Lagrangeville NY 12540. (91 223-5910.

HW101, CW filter, HP23 AC supply, SB600 speaker, all wi manuals, all excellent. — $325. George Briggs, 515 E. 75 St., N NY 10021, (212) 628-3986.

TOWER 75' crankover, with four-element, four-band bea antenna and Ham-M rotator — $750 FOB. Swan 350 wi ac/speaker and dc power supplies, and ext. four-xtal osc. — $2 FOB. R. Davis, W9KK, RR1, Box 12, Colfax IN 46035. (31 324-2442.

HEATH SB-301, 401 — $400. Ted Lucas, RD 9, Box 53 Chambersburg PA 17201. (717) 264-2905.

WANTED: HP-65 programs to trade. WB6PAV, PO Box 684 zip 90504.

SELL for best offers, QSTs from 1937, Lucille Dickinson, 1 Adams Street, Delmar NY 12054.

INTERNATIONAL friendship, emergency communicatio public service, monthly publication "Worldradio" trial su scription, two issues — $1, 2509-A Donner, Sacramento 95818.

WANTED — Drake TC-2 transverter. Call collect (21 688-3204. Charles Blust, W8FTS, 3913 Kay Dr., Stow 44224.

CLEANING shack — HW-101, Gonset Communicators, old QS 73 and CQ, much more. Send s.a.s.e. for list. K8ILR, 2 National NW, Grand Rapids MI 49504.

SBE-144 For Sale, 12 channel, includes xtals for 52/52, 94/9 16/76, 22/82, 25/85, 28/88, 31/91 and 34/94. Includes two l power cords and 6 (six) amp power supply — $220. WB0CR Don Lundell, P.O. Box 283, Brooten MN 56316.

WANTED: Swan receiver 600R, 600RC, 600RC/SS16 Pritchard, W1BRC, 75 Allerton Road, Naugatuck CT 06770.

SALE: Swan Mark II linear — $450. Heath Twoer with vibra supply — $40. Bud crystal calibrator — $10; Dumont 30 Oscilloscope — $60. BC221 frequency meter — $30. You p shipping. K2YFE, Box 25, Lanoka Harbor NJ 08734.

FOR SALE: Lampkin type 105-B micrometer frequency me complete with operating instructions and chart, — $95. Includi shipping. Jack Rhodes, 2700 Burdick Avenue, Victoria Canada V8R 3L9.

HW-16 VFO, SB-600 — $125. Factory aligned, never us Hy-gain vert. ant. — $50. Marvin Lee, 5219 Nichol Av Anderson IN 46011.

WANTED: Collins mechanical filter F455FA15-1.5 kC. Selli Collins general coverage crystals for S-line, KWM-2 — $5 ea two Motorola T1375AB desk sets, never used — $215 ea Johnson 250-39 TR switch — $19; B&W model 426 low p filter — $11.50. Radio filter FL-8-B — $6.50. Bee Walt WA3WRD, 7 Long Lane, Rd 2, Hummelstown PA 17036. (71 566-6098.

TWO meter Regency HR212, all channels with popular crysts P109 station power supply. Heath 202-3 mobile antenna. cables, manuals. Mint condition — $320 firm. WA3WBI, Da 80 Shady Drive, Indiana PA 15701.

FOR SALE: Drake SW-4A sw receiver, mint condx, certified check pse. Includes matching MS-4 speaker — $285. Will trade for Heath SB-303 revr. Clean. Bob Blythe, 67 5th Ave., Koppel PA 16136.

WANTED: A good used Collins 51S-1 receiver, state price and condition. W3AUL Norman Swayne, 815 W. 15th St., Tyrone PA 16686. (814) 684-3051.

PHILLIPS code, complete bound copies — $10 postpaid. Dr. Hess, W6CK, Box 19-M, Pasadena CA 91102.

FOR SALE: AN/SRR-13A navy receiver set w/power supply, manual, 2 scheme. Excellent condition — $360. De Sousa, WN5OCL, Tel. (713) 498-0194.

WANTED: Keyboard, keyer. Lowry, 31 Midwell, Wethersfield CT 06109.

SELL: HW-16, like new — $90; GTX-200 with extra xtals and ac supply — $225. Will ship. WA7RGZ, Box 871, Snowflake AZ 85937.

FOR SALE: Late 51S1 and 55G1. Also, late KWM-2, 512B-4, and power supply. KH6FMT, Box 758, Koloa HI 96756. (808) 742-2002.

FREE: 8 extra crystals of your choice with the purchase of a new ICOM IC-22A at $249. With the 10 crystals which come factory-installed in the IC-22A, this gives you a total of 18 crystals! For equally good deals on Collins, Drake, Ten-Tec, Kenwood, Regency, Swan, Atlas, Midland, Alpha, ITC-2000, Standard, Tempo, Genave, Hy-Gain, Antenna Specialists, CushCraft, Hustler, Mosley, and others, write or call Hoosier Electronics, your ham headquarters in the heart of the Midwest, and become one of our many happy and satisfied customers. Hoosier Electronics, P.O. Box 2001, Terre Haute IN 47802. (812) 894-2397.

WANTED: Collins 70K-2 or 312B-5 PTO and 75S-1 receiver, working or not. State price and condition. W5FR, 1919 Ramada, Houston TX 77058. Phone (713) 488-9517.

WANTED: Millen 92200 Transmatch, K0GIN, 1822 Sun Valley Drive, Jefferson City MO 65101. (314) 635-9439.

WANTED: DOW/KEY 110ac coaxial relays. Advise condition, price. W1BB.

DRAKE T4X-B, R4-B, AC-4, MS-4 — $685. WB6UTA, 10823 Bismarck, Northridge CA 91324.

HEATH HX-10 needs expert to place in operating condition. Manual available. Must be within driving distance. Chet Kozlowski, 31 Meadow Dr., West Warwick RI 02893.

HEATH SB-102, SB-600, SB-610, HP-23B and HyGain 14AVQ — all in mint cond. all for — $480 or best offer. U ship. WB2LUM, 24 Crown St., Hicksville NY 11801.

HENRY 2K3, mint — $550. Henry 2K4, mint — $650. Demonstration and pick-up only. Hammerlund MC-100, single-section 100 pF, dual-bearing, silver-plated air variables — $1.25 each; 10 for $9.00; 100 for $75 plus shipping. J.M. Hoffer, W1DL, 24 Cherry Road, Framingham MA 01701. (617) 872-5084.

SELL: SB101 with cw filter HP23A — $350; SB200 — $200; HW22A — $75; Ron Horner, 63 Park Drive, Warwick NY 10990.

SBE-144 2M FM w/ac supply, 34-94, 94, 16-76, 22-82, 28, 88, 01-61, 10-70 Mint — $189. Lafayette HA 460 6 meter — $59. WB5NIG, 12203 Spring Grove, Houston TX 77072. (713) 495-5035.

HALLICRAFTERS FPM-300 MK II, tempo RBF-1, watt and S.W.R. meter plus some coax and other goodies. All like new. First — $400 gets it all. You pay shipping. W5OPW, 2300 Hardy, Lot-G, Spring, TX 77373.

SIX meter HA-460 transceiver — $90. Frank Poplawski, WA2UDD, 101 Bergen Ave., Clifton NJ 07011.

TEKTRONIX 545 oscilloscope for $375. DC-30MHZ, triggered sweep, sweep delay, requires letter series plug-in. K plug-in — $50, CA dual trace DC-23MHz plug-in — $110. All in excellent condition. Harry Powers, 220 Cobb Street, Athens GA 30601. (404) 549-0276.

SELL HQ-170 AC VHF in good condition with spk. — $200 firm. Recently checked for alignment. Stephen Powers, 41 Elsie Road, Brockton MA 02402. U-pay shipping.

ROBOT SSTV monitor, mint — $225. or trade for ST-6, FM, Atlas. WA6LML, 26760 Shadowwood Rancho Palos Verdes CA 90274.

WANTED: Hy Gain model 400 antenna rotator. Also, for sale Num Echron clock with 10 minute timer — $10, and Heath HD-10 keyer — $20, both in excellent condition. K2TWK, (201) 573-9743 after 7 PM.

DRAKE R4A, T4X, MS4, AC4, — $425. Excellent condition, now on the air. Prefer local sale for demonstration and pickup. W2IZ, 9 Greenview, Pequannock NJ 07740.

HR-10B, factory aligned, GUD — $75 or best offer, Johnson TR switch — $15. RME 4300, needs work, no schematic — $10. WB5KYE, Box 907, Los Fresnos TX 78566.

WANTED: Collins 30S-1. Condition unimportant if priced right. K8WSR, 44903.

FOR SALE: HRO500 with L.F.10 low frequency pre-selector. Like new — $895. W6WQX. (415) 434-3123, (415) 325-5424 (nights).

DRAKE TR22 with HEP 75 modification, VHF engineers HT 144 handie-talkie all above with crystals and accessories. Best offer. K2MMT, (914) 946-6119.

2KW linear — $100. Complete rack mounted, needs tuning and checkout, 2 extra 4-250A.s. U Ship or pickup. WB2FGJ, 141 Line Road, Trenton NJ 08690.

DISCOUNT prices plus full warranty on new guaranteed items. CDE Ham-2 117.00; Belden 8448 rotor cable 12c/ft; CD44 89.95; Hygain TH6DXX (240 list) cost 192; Mosley classic 33 179.00; 18HT hytower (260. list) 208.00; 15% discount Triex W, MW towers, supermast-FOB Calif; Belden 8214 RG8FOAM 22c/ft; RG62B/U 8c/ft; Centralab 100pF/15KV transmitting cap 5.95; CDE .001/10KV doorknob 1.95; Raytheon 811A 15.00/pr; Fullwave bridge rectivier 1.5A/400P IV 95c; Longwire: 22GA/7STD phosbronze 2.50/1000FT; quote TS520, Atlas 210; old tubes (IV, 7V, etc) write needs. Collins. Prices FOB Houston. Prices good until Oct 1; Madison Electronics, 1508 McKinney, Houston TX 77002. (713) 224-2668. Nite/weekends (713) 497-5683.

FOR SALE: Heath SB-301 receiver. Excellent condition. Professionally wired and just realigned. Contains all 10M crystals. Price — $185 firm. Walt Petersen, W2JDH, 13Hemlock Dr., Parlin NJ 08859. (201) 727-0069.

WANTED: 2 element 40 meter beam; 4 element 20 meter beam; D-104 microphones; Heathkit phone patch; speech processors. Send best prices to: Explorer Post 211, 111 St. Easton Road, Glensice PA 19038. (215) 886-1859.

SELL: Hy-Gain 5 element Tri-Band beam, worked 315 countries — you pay shipping $60, K7ABV, Eric Martin, 3608 5th Ave., South, Great Falls MT 59405.

SALE: Swan 700 CX and 117 XC, 8 months old, excellent condition — $500. William L. Pope, 1813 Meadowlard Dr., Union City TN 38261. (901) 885-4737.

DRAKE for sale: SPR4, T4XB, MS4, AC4 all mint — $725. Robert Gardner, 80 Olive Court, Iowa City, IA 52240. (319) 354-2970.

WANTED: Used Hygain (10-40) or (10-80) vertical antenna, reasonable, T.M. Leonard, 8 Parkside Dr., Lake Katrine NY 12449.

INSTRUCTROGRAPH Model 500, fine condition with 12 tapes $62. John Bittens, WN8RDU, 6463 Buckingham Drive, Parma OH 44129.

KLM Echo II, amplifiers, antennas, available now. Also carry Regency, Mosley, Towers etc. Radios Unlimited, 86 Balch Ave., Piscataway, NJ 08854. (201) 752-4307.

HAMMARLUND SP600JX17 receiver, excellent — $225; URA-8A RTTY FSK converter (2-CV89A converters, 1- CM-22A comparator, cables), excellent — $175; 2- Northern Radio Model 115 VFO's, excellent — $85 each; All FOB, with manuals. Paul Beavin, WB9PEL, 3540 Deerfield Pl, Columbus IN 47201. (812) 379-9628.

HEIGHTS tower free standing four 18' section crank-up including five foot tilt-over base — $575 is 1/2 cost. W8BKR, 147 Fairview, Cortland OH 44410. Phone (216) 637-8676.

QUAD — new, boxed "Gem" boomless — $125. Shipped within USA. W2RQD, 9492 Hayes Road, Marcy NY 13403.

VIDICON 7038 — $15; 7262A — $15; 8844 — $20. Peterson Scanner — 50 MHz — $25. WB2GKF, Stan Nazimek, 506 Mount Prospect Avenue, Clifton NJ 07012.

HEATHKIT sale: SB-100 xcvr W/SB-600 speaker, HP-23A supply — $275; SB-630 station console, — $65; HM-2103 load/wattmeter — $35. Contact WB2GWU, P.O. Box 568, Jamaica NY 11424. Phone (212) 647-2730.

SELL: mint Drake T-4XB, R-4B, AC-4, MS-4, 10-160. Johnson match box. All accessories. S.A.S.E. M. J. Billings, 2114-Albemarle Road, Brooklyn NY 11226.

WANTED: Argonaut, cheap, repairable; Robinson, 1934 Benham, Fort Wayne IN 46805.

WANTED: Used SR-50 calculator; excellent condition. W9JU, 3009 Mayfair Drive, Kokomo IN 46901.

DRAKE TC-2, SC-2, SCC-1, CPS-1; for 2M CW/SSB/AM — $290. R-4A, T-4X, MS-4, AC-4, w/extra xtals — $575. Heath 6'er and 2'er, $30 each. All gear in excellent condition. You pay shipping. WA8RQJ/6, 357 Chestnut No. 25, Carlsbad CA 92008.

WANTED: Hallicrafters RCVR, good condition, particularly XS25 or XS28. Dehenseler, UN Box 20, New York NY 10017.

FT-101, latest, perfect — $485 or offer. Heath HM10-A dipper — $30. Tatar, 1625 North Park, Cleveland Hts. OH 44106.

COLLINS "S-Line": 75S-3B, 32S-3 & 516F2, 312B4, 30L-1, absolutely mint — $1875. Paul Capetz, 701 Bubbling Well Dr., Glendora CA 91740. (213) 335-7355.

HALLICRAFTERS HT-44 with PS-150, 120V ac supply (retubed) — $160. SX-117 Revr — $170 both with cables and manuals — $320. W2UI, 427 Oakland, Maple Shade NJ 08052.

HAMMARLUND HQ120 wanted, reasonable. W3FYW.

WANT: 75A-2. Thurtell, R.1, Paw Paw MI 49079. (616) 657-6401.

COLLINS KWI 1000 watt am, cw transmitter — $1800; Collins 75A4 receiver, serial 693,2 filters — $300. Both like new. Both for $2,000. Pick up. Firm. Elwood Brewster, RFD 1, Grafton NH 03240. (603) 523-4558.

RARE Hallicrafters HA-10 LF/MF converter, 85kc-3 MHz — $25. Wanted: Galaxy RF550A wattmeter. K2EGI, 5 Stratford Pl., N. Babylon NY 11703.

WANTED: Swan 510-X crystal oscillator. Cheap. Also, information on good 75 meter antenna. John C. Lewis, WA4JUB, Box A, Lebanon TN 37087.

YAESU FT101B with cw filter and blower: FV101B VFO; SP101B speaker; FL2100B linear; FTV650 six meter transverter; YO100 monitor scope. All like new, $1000. Philip Schwebler, W9GCG, 4536 N. 50 St., Milwaukee WI 53218.

EXTRA rig — Yaesu FT-101B in mint condx with cw filter, fan and desk mike, all for — $550 since not used much. Pick up only. W2DYS, Bill Farone, 586 Palisade Ave., Teaneck NJ 07666. (201) 836-5244.

WANTED: National XCU-303 Deluxe crystal calibrator. Converters NC-300C1, NC-300C2 and NC-300C6. For Sale, Heath HD-11 Q-multiplier — $10; Viking 122 VFO — $15; HG-303 transmitter — $20. You ship. K9UKX, 51625 Chestnut Road, Granger IN 46530.

CRYSTALS airmailed: Novice, active FT-243, all frequencies, minimum five 40M, 15M, 10M — 99c each, 80M $1.75. Less than five, 80M $1.95, other $1.50. Airmail 20c/crystal, 1st-cl 15c. Free listings, 160M-2M. Bob Woods, WØLPS. "Crystals since '33". C-W Crystals, Marshfield MO 65706.

SELL: Heathkit HW-101 with extra VFO assembly, HP-23B, mint condition. Best offer over $300. HW-7 — $45. WA2ANB, Bill DeLorenzo, 16 Laurel Drive, Port Jefferson NY 11777. (516) 473-2957.

HALLICRAFTERS HT-32A excel. cond. — $175. WNØOSS, Gary, 4004-7 Place N.W. Rochester MN 55901. (507) 288-8239.

HALLICRAFTERS SX-117, HT-44, PS-150-120. Superb condition physically and electrically. First offer over $350. WB8VCX, Rte. 2, Osceola MI 48750. 739-5551.

SELL: Heath HW-101, 400 hZ cw filter, HP23B ac ps. Less than 2 hours on air. XII. cond. David Welton, 920 W. 5th N, Provo UT 84601. $295.

HAMMARLUND HX-50 160 meter coils wanted. WA7SRE, Rt. 3, Box 194-C, Milton-Freewater OR 97862.

FT 101 with fan, mint condition — $450. Norman Barnes, 1938 Carteret, Pueblo CO 81004. Phone 564-1182.

BUY-Sell-Trade. Write for monthly mailer. Give name, address and call letters. Complete stock of major brands, new and reconditioned equipment. Call us for best deals. We buy Collins, Drake, Swan, etc. SSB & FM Associated Radio, 8012 Conser, Overland Park KS 66204.

DONATION: Recent amateur gear, enough for two base stations, whose value would better be served in a worthwhile purpose. Send description of need and s.a.s.e. to WA5BQA, 823 West Grant Street, Baton Rouge LA 70802.

WANTED: Lakeshore handhopper VFO. WB2AMI.

JOHNSON Challenger XMTR 80-6M am/cw — $50; Lafayette HA-800B revr 80-6M — $100; HE-48C spkr — $5; 25 xtals — $5; package deal — $150. WA4KVM, 3205 Tacon St., Tampa FL 33609.

YAESU FT-101/B/E owners — For detailed Service Notes on ALC circuit, send dollar (creditable towards dues) for July Newsletter of International Fox-Tango Club. Or s.a.s.e. for free club information and sample newsletter. Milton Lowens, WA2AOQ, 3977F Sedgwick Ave., Bronx NY 10463.

SELL: New unopened cartons, Atlas 210 and AC console — $650 and TS-520 Kenwood — $580; used mint Swan 700CX and 117XC — $600; nice Drake TR-4C, RV-4C and AC-4 — $850; Collins KWM-2 and 516F-2 — $750; Tempo One and ac — $425; will trade up or down. Looking for 2 meter FM synthesized gear. Richard Schark, 417 North Perry, Ottumwa IA 52501. Phone (515) 682-5741.

HT-220 Hi-Band, 4 freq, universal — $250. Jim Stephens. (714) 565-7294.

CE 100V — $250; Drake 2C — $175. Both mint condx, FOB, WA2YUY, Terry, 137 Selborne Chase, Fairport NY 14450. (716) 223-7887.

COLLINS 51-J4, case, handles, works good — $400, FOB Los Angeles, WA6MSO, (213) 641-2200.

COLLEGE forces sale: Heath SB-102 transceiver, HP23A supply, SB-600 speaker, HDP-21A mike. Excellent condition. Total price — $385 UPS. All cables and manuals. Not sold separately. Keith Muller, WB2DZJ, Box C-1143, Bucknell University, Lewisburg PA 17837.

SELL: Drake R-4C with 4NB, 160 and 10 meter crystals, mint — $450; AC-4, — $85; Clegg 27B with P-011, both — $350. WA2LQP, Apt. 844-5G, Governors Island NY 10004.

WANTED: New or used tower sections — preferably Rohn 25 or 45. Rusgrove. (203) 582-6865.

COLLINS — 75A4 Ser. 4399 3KC and .5KC filters, spinner knob — $400; R4A with MS4 — $300; 2NT with never used HA5VFO — $150. All mint condition. You ship. P.H. Smith, WA9VLW, 2210 Lefeber Ave., Wauwatosa WI 53213.

ICOM — IC 22A For Sale, Waranteed, 2 meter FM transceiver, mint — $220. J. Fraits, 511 Rialto Ave., No. 8, Los Angeles CA 90291.

QUALITY stainles threaded, washer, hardware! Discount month! Walt, W8BLR, 29716 Briarbank, Southfield, Mich. 48076.

WANT to buy: 1933-34 Packard car radio, has 6V dynamotor power supply and Packard nameplate on tuning head. K8CCV, 5471 Norquest Blvd, Youngstown OH 44515.

FOR SALE: 50' Universal tower, Ham II rotor, TH6-DXX antenna — $300; L-4B Drake linear amplifier — $400 plus shipping. Barry Rounds, Box 416, 315 Fourth St., Wheatland CA 95692. (916) 633-2280.

SELL: Heath SB101, cw filter, retubed, alligned by Heath 7/7 Perfect — $325. MN4-matchbox — $55. Yellin, 8 Ismay, State Island NY 10314.

VHF For Sale: E-Z-Way No. 74840 concrete mount ground pos for RBX-60 or RBS-50 — $99 (you pay freight). Ravtrac Horizon VI L 2kW six meter linear amp — $399; Kenwood R-599A receiver — $325; Gonset Communicator IV for 220 MH — $160; pair of Clegg C Line Conv for 6, 2 meters 14 MHz twis — $30; AQK-144 stacking kit — $49; AR-6-Ringo — $15; Willia T. Murphy, K3ZSG, 206 Hancock Ave; Norristown PA 1940 Tel: work — (215) 592-3862, home — 272-0558.

MAGNUM six for Drake — $100; Beams — 5 element Wilson 20 never assembled, 6 element Wilson 15, good condition, Mak offers. Bay area only. W6NUT, Box 31365, SF CA 94131.

SELL: Drake C-4 console — $295; Heath Monitor scope SB61 — $60; structural glass Gem Quad 3 element quad - $15 Ham-M Rotator — $75; Henry 2KD-2 linear — $395; home brev ARRL antenna transmatch box 160M to 10M — $60. All abov sweet and mint. W6UCJ (213) 342-5654.

SBE-34 — excellent, with microphone — $190. Valiquet, 1 Cour Michele, Palos Hills, IL 60465.

FAHNESTOCK clips wanted for project. Will pay fair price Must be Type 5 with tail lug, 1 3/8 X 3/8. Need several hundred W8NBP, 1748 W. Hanley, Mansfield OH 44904.

WANTED: Collins 180S1 antenna tuner, CP1 crystal pack - used. W5NN, 1006 Ashford Pkwy, Houston TX 77077.

SWAP — Have new color VTR, new CCTV camera. Need Atla 210, 3-el tribander, FM gear, etc. W6DOM, 6017 Maiurca Cour 5an Jose CA 95120.

GONSET GSB-100 — $150; WRL Duo-Rander 84 with mobil supply — $125; Mobile XMTR with VFO — $10; Lafayett HA-350 Revr — $150; HE-30 RCVR — $30; 10 meter XCVR - $10; 6-brew xmtr — $15; 160-20 meters. Roberts, 509 Green briar, Auburn IN 46706.

REGENCY HR-2B in unopened carton. — $190. Plus $3 UP shipping charges. Joe Trombino, 940 Alpine Road, Marion I 52302.

HAMMARLUND HQ170A receiver with matching speake Excellent condition — $165. Bob, WA1RQB, 15 Pinoak Lane Westport CT 06880.

SWAN 240, ac, speaker — $150. QST 1930-1970. — $3 per yea WA2NCP, Box 313, Chester NJ 07930. (201) 879-6723.

SB104, HP1144, SB604, filter, — $1000 PP, GC1093 — $50 PP HM10A G.D.O. — $30 PP. Wanted: 312B4/B5. WB5FQV (504 866-3406.

ALL SOLID State Swan SS-200, absolutely perfect condition no modifications — $545. Collins 180S-1 kilowatt antenna tuner has vacuum variable, roller coil, turn counter dials, no mod fications, excellent condition, cost — $745, sell for — $195. Do Burns, 4410 Reading Rd., Dayton OH 45420. (513) 256-0345

SELL: KWM2A — $750; 516F2 — $125; 32 S3 — $550; 31 S1 - $1200; 75 S3B — $500; Kenwood TS 900 w/ac p.s. — $700. M A. Maurer, 12617 Solvang, N. Hollywood CA 91605.

SALE: KRAFT 1975 7 channel RC radio, new, 53 MHz, airplanes, 4 motors, many accessories including Field Bo electric starter — $500. K4TSJ (804) 583-4297.

SALE: Heath HP13B unassem., — $65; HP23B used 1 wk — $4 GD-1 dipper — $10; fixable Gonset GSB100 — $6 SP600-JX-26 — $225; Want 4CX300 sockets & Kenwoo TV502. Steve Chastain, WA7SJV, 724 E. Jackson St., Medfor OR 97501. (503) 779-8092.

SB-104 owners club — Covers related Heathkit equipments. Sen s.a.s.e. for details to Chuck Harrison, RD 2, Box 1, Main Stree North Stonington, CT 06359.

SELL: 75A4 with 3 filters, low serial — $375; Heath HX 1 Marauder — $175, FOB, used at W2AYJ, 33 Pearsall St Babylon NY 11702.

SELL: Heathkit HW-202, HWA-202-1, HWA-202-2, magnet antenna, and .94 .52, .19/.79 crystals. Mint condition, one ye old. — $275 new — $220. Bill K. Klomparens, WB8QWQ, 12 South Prarie, Kalamazoo MI 49007.

FOR SALE: QSTs from Jan, 1960-December 1966, goo condition. Best offer. R. Holloway, 10 Maplewood Dr., Ballsto Lake NY 12019.

SELL: Complete Heath station, mint condition, DX-60 tran mitter, HR-40 receiver, HO-10 VFO, Astatic mike, matchin speaker, antenna relay. $150. C.J. Blair (W5JCP) Route On Carrollton MS 38917. (601) 237-6619.

TEMPO FMH 2 meter Handy Talkie, Tiny Tone Pad, five se crystals, AC/charger, NiCads, case, rubber antenna. Brand new $300. Kellersman, 1433 Redding Road, Fairfield CT 0643 (203) 259-7033.

TOROIDS: 88 or 44 mH, — $6.60/dozen postpaid in U.S Telecommunications. Box 4117, Alexandria VA 22303.

FREE: NCX-D mobile supply with purchase of Nation NCX-3/NCX-A transceiver for $225. Mint condition, includ cartons, cables, manuals. Johnson 6N2 transmitter, ideal fo Oscar, including power supply and crystal for 145.920 MHz. $90. WB4UOX, 12001 Turf Lane, Reston VA 22091.

WANTED: CX-7 dead or alive, write price, condition, symptom Sell, URM26A, manual. Trade for 2 mtr or HF rig. Ro Pohorence, 2334 Regal Court, Lawrenceville GA 30245.

DISCOUNTS on all Astatic, Electro-Voice, and Shure microphones. Astatic D-104 w/UG8 PTT stand; 32.68. EV 619; 35.53, and Shure 444; 25.87. All units new and guaranteed. Include 90c for shipping w/check or request COD. Write for free brochure; Advance Sound Company, 781 Deer Park Road NY 11746.

FOR SALE WRL duo-bander 84 with AC supply — $100. Philip Ott, 807 Dodge, Bedford IA 50833.

DRAKE 2-C, excellent condition — $140. Ronald Schmechel, 1845 W. Abbott Ave., Milwaukee WI 53221.

TR-22, fully complete with all crystals. With HA-201 10-watt amplifier — $210. Rick Vander Heide, 1730 Clearbrook, Grand Rapids MI 49508.

HAMMARLUND HQ-215, in excellent condition, w/manual — $175. W1HZ, 369-2390.

WANT KWM-2A and mobile accessories. Must be mint, no dirt, no scratches. Have Leica equipment, will trade or pay cash. K4GNE, 947 Waterway Dr., Fort Myers FL 33901. (813) 481-0018.

HOSS-Trader, Ed says "We refuse to be undersold! Remember, if you didn't buy it from the Hoss, you paid too much. Shop around and get your best price, then call the Hoss last." Demo Atlas 210 transceiver — $489 Demo TR4-C — $479; new display Swan 700-CX — $509; Demo T4X-C — $469; Demo HR-2B — $179; Demo Icom 230 — $389; New Rohn 50 Ft. foldover tower prepaid — $339.95; Demo Ham 2 Rotator — $112.95; Hoss Trader Specials — Drake TR4 — $369; R4-C $429; Professionally wired Heath-Kit SB 303 receiver — $359.95; New Collins at Old Prices: Atlas-180 — $439. Moory Electronics Company, Box 506, DeWitt, Arkansas 72042. Tel. (501) 946-2820.

TRITON I w/pwr — $500; TR-22, xtals, case — $150; Heath GR-900 TV, new, less cabinet, — $450. Lou Macknik, 14151 Hopi Road, Apple Valley CA 92307. (714) 247-8582.

WANTED: Heath HP-24 AC power supply. George Skinner, 2100 South Ocean Lane, Fort Lauderdale FL 33316.

WANTED: Book, Ham Antenna Construction Projects by J. Stanley, price to WN8TEH, Paul Deitrick, 6th St. NW, New Phila OH 44663.

WANTED: Motorola WT-220 & pocket mate. K4NBN, Del Popwell, 1946 Sweetbriar, Jacksonville FL 32217. (904) 733-9518.

SELL: Never used! Transformers — all 110/220 PRI with secondaries: 110V 2A — $30; 6V 13A & 110V 1A — $15; 900V 1A & 6.3V 10A — $20; 4CX1000A & socket — $75; variable caps: Jennings 500 pf 5kv vacuum — $20; 150 pf 2kv (air) — $10; 100 pf 2kv (air) — $7; 17X14X81/2 tilt-a-view cabinet — $12. Jim Gulvin, Box 1747, MAFB NJ 08641.

WANTED: Collins 30S-1. Alan Gray, W3ABO, 856 Azalea, Rockville MD 20850, (301) 424-0774.

SELL: 40 year accumulation — 394 QSTs with 17 binders, 150 Radio, CQ & 73, miscellaneous handbooks, etc. Entire lot — $80, S.a.s.e. for list. K6GOU, 1341 Lincoln Ave., Pomona CA 91767.

5BWAS your goal? Get a concise accurate "Insta-Gress" Record Book showing which states are worked, confirmed and those still needed — all at a glance! Avoid repeated log searches and lost information. Order now! $4.98 postpaid US/VE, $5.98 elsewhere. Richard Norlev (WA1CFT) PO Box 543QJ, Derry NH 03038.

FOR SALE: Swan 700CX/SS-16B transceiver; 230XC spkr/power supply; 508 VFO; FP-1 phone patch — $750; Drake T-4XC transmitter with AC-4 power supply — $500. W4KGR, J.R. Reagan, 1515 Woods Dr., Apt. 202, Winston Salem NC 27106. (919) 924-5379 (Nite) (919) 767-5250 (weekday).

IS your radio gear or test equipment just sitting and collecting dust? Buyers and Sellers radio brokerage can work for you. See our display ad.

FOR SALE: Atwater Kent Model 36 receiver with original speaker and power supply. In perfect working condition. W. H. Wiley, P.O. Box 52, Montara CA 94037.

EXPERIMENTERS! NPN transistors. Switching, a.f., and r.f. 100 hfe, 270 MHz., 15c. All guaranteed. No. 100I6C from: Parts, 3361 S. Wabash, Chicago IL 60616.

WANTED: Bell & Howell Course — Electronics Technology. Paul McGrath, 130 South Lake St., Hamburg NY 14075.

NEARLY invisible ham or swl Hertz antenna. 130 foot long stranded stainless steel wire with miniature insulators — $12.80. Wilcox Electronics, Box 1331, S.L.C., Utah 84110.

FOR SALE: Collins R390-A w/rr in cabinet, & manual. Very clean, A-1 condition, digital readout, .5-32 MHz — $350; National NC300 xtal filter, cabinet — good condition — $75; RCA AN/SRR1 20 freq. recvr. 14-550 Kc. 3-bands, illuminated projection dial, Fair condition, cabinet — $125. W1DWD, Bill (617)447-2311.

COLLINS gear wanted — 351 D-2, CC2, CC3, 312B-5, 637T-2. A.J. Cascio, WB9PVH, 5321 Greenbriar LN., Madison WI 53714.

BARGAIN — Robot Monitor 70, camera, Model 80-two lenses, complete, like new — $450 fob. Reason for selling — prolonged illness. Harry Pennington Jr., 134 E. Agarita, San Antonio TX 78212.

SWAN 350 with Swan 117 A.C. power supply, also Swan TV 2B transverter — package deal only, — $350, plus shipping. R. Kostowski, 2207 Cashin Dr., Burton MI 49509. WA8WMG.

MAGNUM Six for Kenwood T599, TS511 — First $100 takes. W7KMC/6, 614 No. Citrus, Vista CA 92083. (714)758-1768.

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In the RTTY mode, you can transmit at standard data rates of 60, 66, 75 or 100 WPM, as well as an optional 132 WPM, 100 baud. In addition to the complete alphanumeric keys, you get 17 punctuation marks, 3 carriage control keys, 2 shift keys, a break key, 2 three-character function keys, a "DE-call letters" key and a "Quick brown fox . . ." test key.

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The DKB-2010 also has a three-character memory buffer which operates in either the RTTY or CW mode, allowing you to burst type ahead without losing characters. A 64-character memory buffer is also available as an option. Key function logic in either mode is governed by LSI/MOS circuitry. All key switches are computer grade.

The DKB-2010 is available assembled or in kit form. Should you choose the kit, you'll find construction easy — the unit consists of three assemblies: power supply board, logic PC board, keyswitch PC board, and pre-assembled wiring harness.

Any way you look at it — as an easy-to-build kit, a complete assembly, as a CW keyboard, or an RTTY keyboard, the HAL DKB-2010 is a real breakthrough for every amateur. It adds a whole new dimension to the exciting world of amateur radio. Once you've used the DKB-2010, you'll wonder how you ever got along without it!

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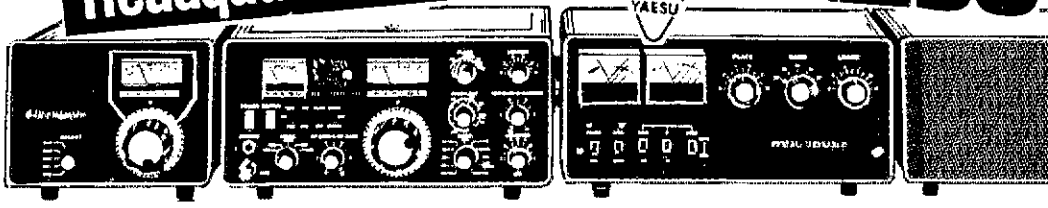

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