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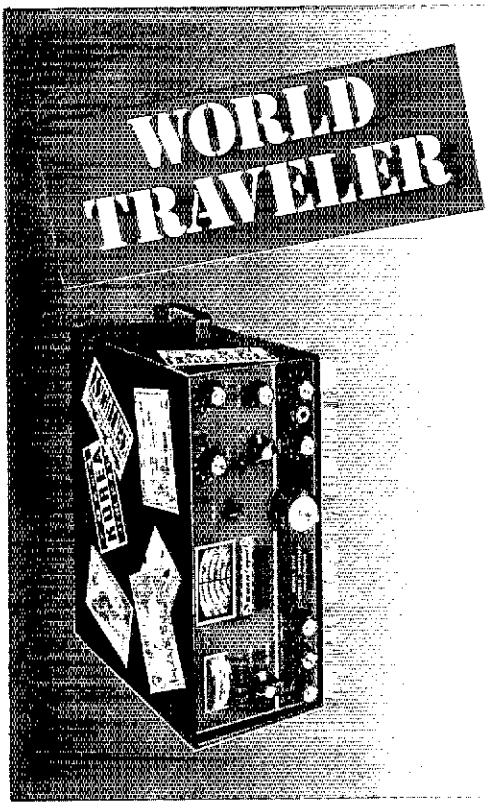

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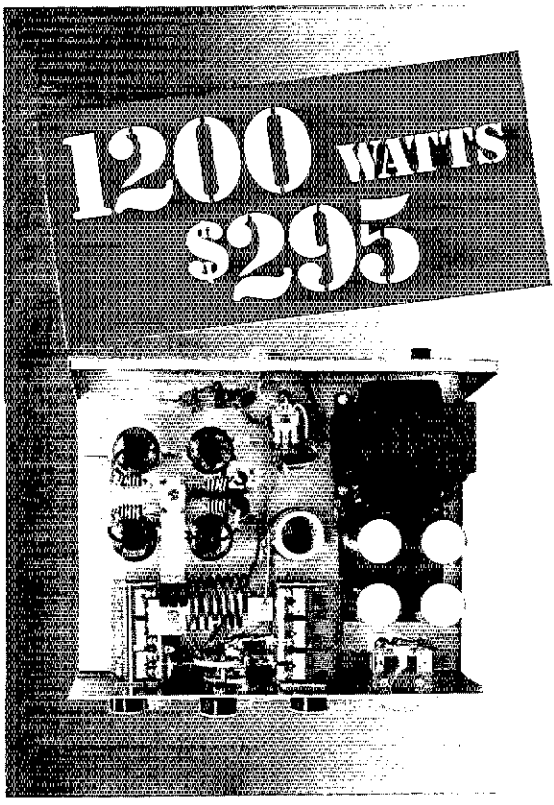

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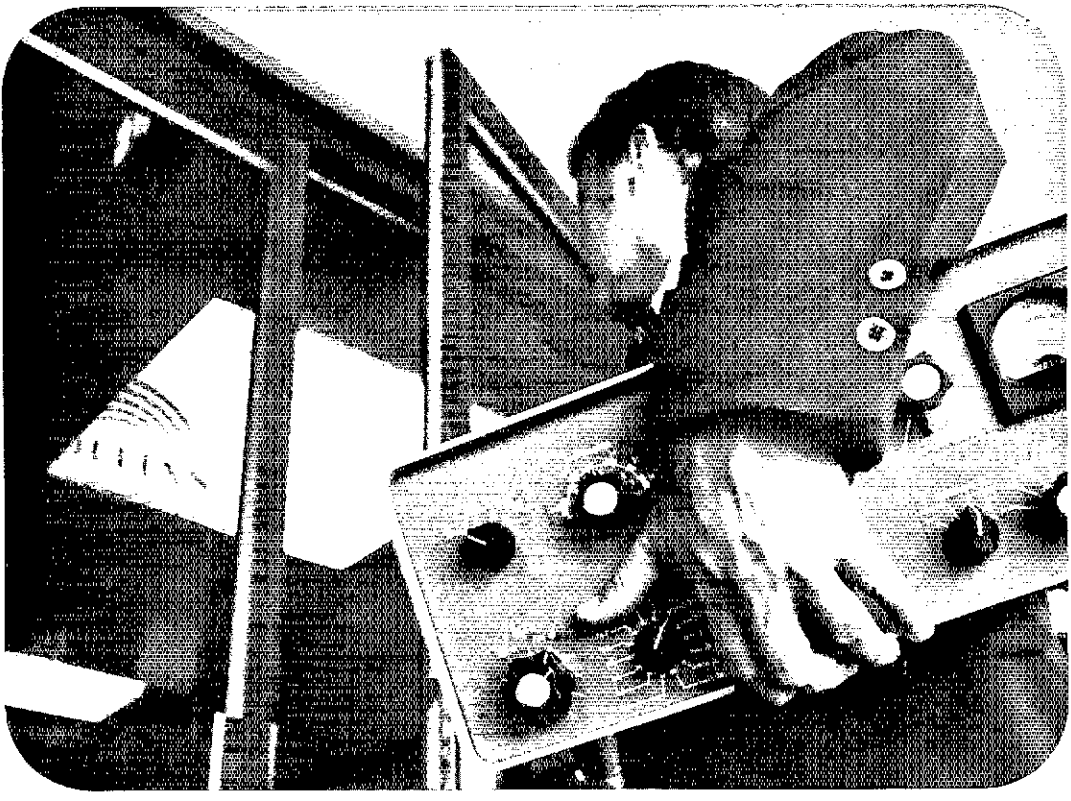

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OUR COVER

One of the toughest problems in vhf amplifier design, buying or building a suitable tuning capacitor, is solved simply by W1QVF. Details of a 6-meter version on page 24. The 2-meter rig is coming later.

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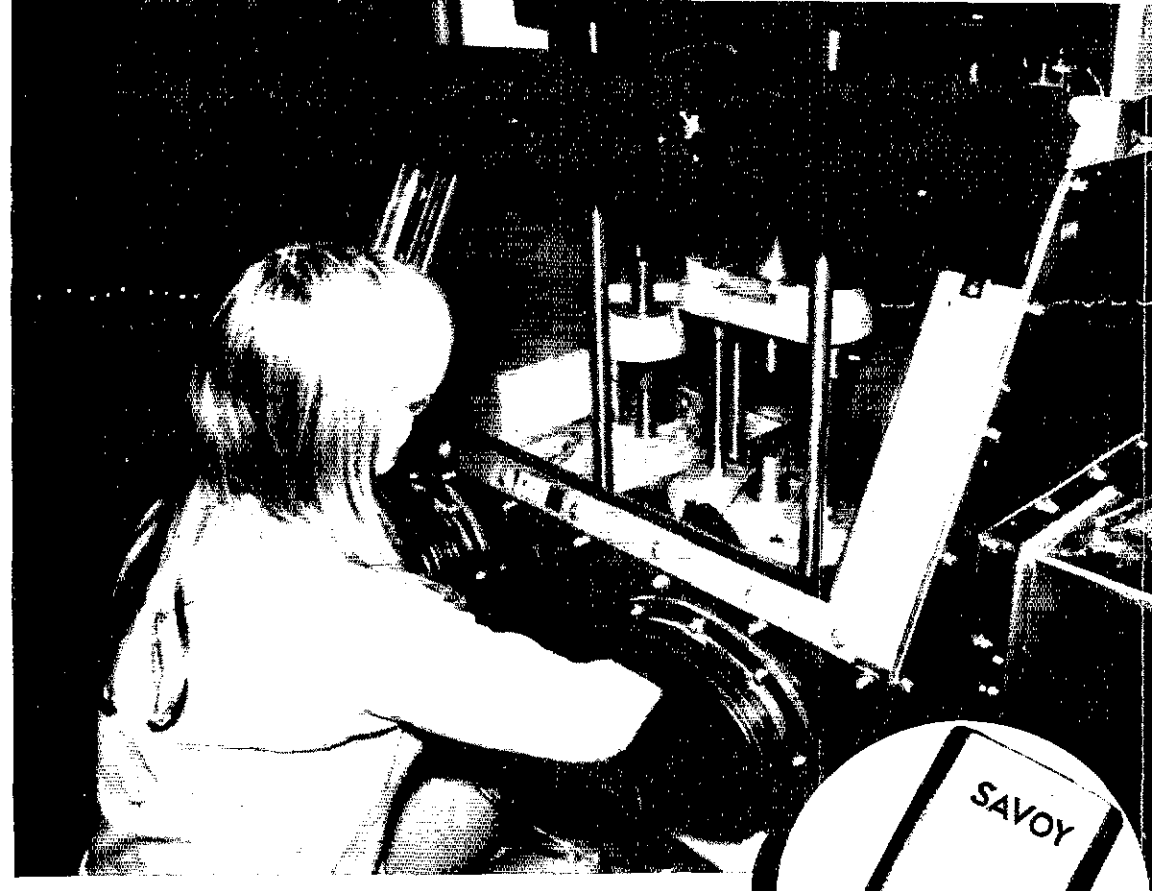

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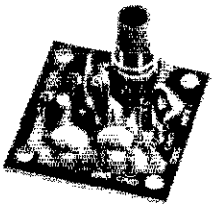

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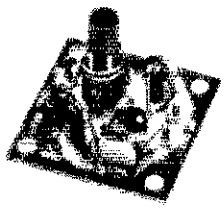

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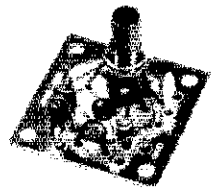

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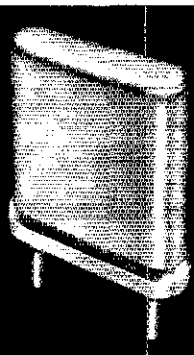

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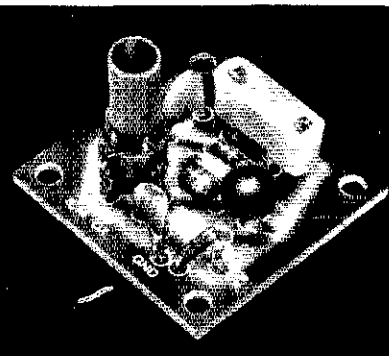

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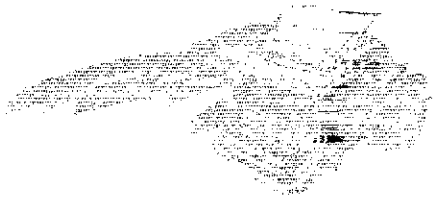
West Gulf Division

ROY L. ALBRIGHT. W5EY
107 Rosemary, San Antonio, Texas 78209

Vice-Director: Lester L. Harbin. W5BN
4515 Calmont, Fort Worth, Texas 76107

* Member Executive Committee

"It Seems to Us..."



THE STRENGTH OF ORGANIZATION

ORGANIZED amateur radio . . . "

Not an empty phrase, but one indicating strength and accomplishment. "Organized amateur radio . . . " meaning our American Radio Relay League, and all its affiliated clubs, and all the other amateur radio societies in the world, and the International Amateur Radio Union.

What brings this all to mind now is the fact that we are involved in preparations for another international telecommunications conference which will affect us to some degree. We have been faced with these conferences since the earliest days of radio; that we have fared well is due in no small measure to the effectiveness of our coalition. It becomes all the more remarkable when one considers how many different radio services have been and are pressing for additional space in the spectrum.

Coming next June is a World Administrative Radio Conference, which will convene in Geneva, to deal with matters relating to space communications. Why then? Because in the eight years since the last space conference there have been considerable technical advances and additional uses of the higher regions of the spectrum, and in order to maintain an orderly use of these frequencies it is now necessary to make some adjustments. Who decides that another conference ought to be held? The Administrative Council of the ITU, meeting each May, has the power to determine what portions of the Radio Regulations need review, and when. Last year the Council decided that the time had come for another look at space communications; it set a date two years away, so that national administrations would have sufficient opportunity to make their individual preparations for the conference.

In our country, FCC has solicited views of the U.S. telecommunications industry – essentially all non-government services (including us). This is accomplished through "Notices of Inquiry," invitations providing for an exchange of opinion between all interested parties, and thus gradually the official pre-conference position of the U.S. is emerging. Coordination with the Office of Telecommunications Policy leads to the establishment of a homogeneous national position. Simultaneously during the latter part of these procedures, the U.S. maintains liaison with other countries, offering its points of view for consideration and in turn evaluating the positions taken by other countries.

Where has organized amateur radio been through all of this pre-conference preparation? Right in the thick of it. The League has, where appropriate, and often in conjunction with Amsat, filed formal replies to the FCC Notices of Inquiry, stating the amateur requirements. Subsequent FCC issuances of revised drafts in every case have shown amendments to meet League requests – the present draft embodies the basic technical recommendations of Amsat as well.

With the responsibility for organizing and leading the U.S. delegation to the conference, the Department of State has begun government-industry meetings in order to put the finishing touches on the U.S. position; again, ARRL has (with Amsat) been the amateur service representative. The League expects to have one or more of its officers or staff as members of the official delegation – as it has at every international conference where amateur matters appeared on the agenda.

Another – and growing – strength of the amateur service lies in the International Amateur Radio Union. Even before the firm date of the space conference was known, the League (as Hq.) was urging other member societies of the Union to establish liaison with their government authorities and thus to play an active part in the formulation of their official positions. IARU Hq. (the League) has circulated documents to its member societies, bringing them up to date on what is currently happening in the various regions in conference preparation. Foreign travel by officers and staff, particularly WØDX and WIIKE, further solidify the amateur position. And IARU will have observers in attendance at the conference itself. The League and IARU are action, not just talk.

And so the amateur radio service will go to the space conference well prepared and well represented, because of the strength of organized amateur radio. Through this strength we have every expectation that adequate privileges for the amateur radio service will be provided. Your membership in the League helps immeasureably in this defense; without it, and the support of tens of thousands of your fellow members, the outcome would most certainly be less favorable to our cause.

QST

League Lines . . .

Regulatory reminders: (1) The class of license, as well as the mode of emission, determines operating privileges; thus, a General may not operate cw in the Advanced or Extra cw or phone bands. (2) All emissions must fall within allocated bands; thus a General may operate upper, but not lower, sideband on 7251 kHz for example. Same for an Extra or Advanced on 7201. Tnx to WB6ALX/8 for suggesting the clarifications.

One of the strongest reasons for having a League is as an information exchange. If you know something your brother hams could benefit by -- the Government attitude toward amateur radio in Upper Slobbovia, a low-cost source of supply for parts amateurs need in building, a gimmick or gadget, hint or kink to make operation easier -- how's for sending it along to Hq.?

Sharp-eyed K4THI, transplanted to the Southwestern Division, charges our September editorial with an inaccuracy -- that the vote of 6 in favor, 9 opposed, was on expansion of General class privileges within present voice bands, not an expansion of bands themselves. (There was no vote specifically on the latter subject; discussions at the meeting indicated about the same 6-9 division. THI's point is that they aren't necessarily the same directors in each case.)

The *Department of Communications, Canada, points out that a voice scrambler* (for privacy) advertised in ham magazines (not QST) is illegal in VE-land. Same for U.S., of course, where FCC regulations require plain language communications.

Heartiest congratulations to David S. Lloyd, VE3AW, chosen by the "Istituto Internazionale delle Comunicazioni" *for its 1970 Christopher Columbus humanitarian* medal -- in recognition of outstanding work helping the blind. The nomination, by ARRL director VE3CJ, pointed up a group activity, in which OM Lloyd is a kingpin, licensing and equipping more than 100 sightless VE amateurs.

Which reminds us -- are you looking for a worthwhile project, individually or through your affiliated club? Many hams and would-be hams who are sightless need such help, in particular for the assembly of gear. If you can spare some time, let the Library of Congress know. Address your comments to Bill West, Coordinator Tape Volunteers, Library of Congress, Division for the Blind and Physically Handicapped, Washington, D.C. 20542.

The League's Executive Committee has asked President Denniston, WØDX, to take appropriate action to protect our interests in the matter of certain amateur public service activities and message-handling (last month's editorial).

The National Association of Broadcasters, an ancient and honorable group with headquarters in Washington and a considerable budget, tried hard but failed to get a *commemorative stamp for the 50th anniversary of broadcasting. Little ARRL, up in the* wilds of Connecticut, got a stamp issued on its own 50th anniversary, not even that of amateur radio. So who needs a Washington lobby?

In each year 1965 through 1969, the number of clubs newly affiliated with the League totalled 61, 71, 95, 73, and 103, a general upward trend. As of *early October the* figure so far in 1970 is 81, with one more Executive Committee meeting to go. In any event it will be another banner year. If you aren't a member of an active club, you're selling yourself short -- join up with one and find out how much you're missing.

An Advanced General-Coverage Amateur Receiver

BY JOHN E. PITTS, JR.,* W6BD

THIS HOMEMADE general-coverage receiver, dubbed the GCR-100A, is the result of two years of almost constant spare-time development and construction.

After deciding to build the receiver a list of desired features was made, which included general coverage, freedom from strong-signal overload, the maximum frequency stability feasible, product detection, and front-panel band switching. Some weeks were spent in reviewing literature on receivers, including five years of back issues of *QST*. Ideas were culled from many authors, so no attempt will be made to give credit where it is certainly due. The design was intended to result in an "ultimate" receiver, so the first thought was to make the various stages plug-in, or modularized. This decision has already permitted quite a few modifications to be made without leaving the chassis full of holes. The various units are interconnected by means of RG-58/U cable and phono plugs and jacks, while power and control leads pass through Cinch-Jones plugs on the chassis.

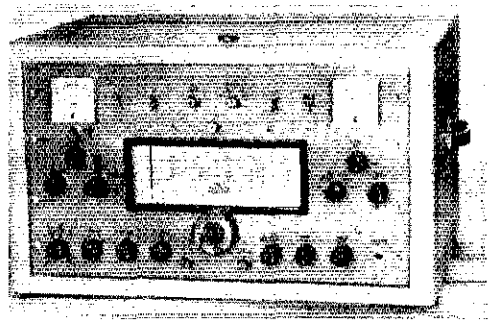
Since most double-conversion receiver instability comes from the first oscillator, it was decided that this stage would be made crystal controlled. The next step was to make the first i-f broadband by using a band-pass tuned circuit, and all selectivity, therefore, would be afforded by crystal filters at the second i-f. In order to prevent impulse noise from causing ringing in the filters, a noise silencer should follow the second mixer. The old standby developed in the 1930s by Jim Lamb was incorporated in the i-f strip.

Three degrees of selectivity were deemed necessary for ssb, RTTY and normal cw use, and one for razor-sharp QRM slicing. These filters, switched from the front panel, are manufactured by the Blackhawk Networks Corp., in Janesville, Wisconsin. The three bandwidths are 2.5 kHz, 1.0 kHz and 100 Hz, at the 3 dB points. It may be argued that this last is too narrow, but many times it has made the difference between a QSO and none at all.

The heart of the receiver is the VFO. To enhance the stability, regulated dc is furnished for both the filament and plate voltages, and power to the VFO tubes is left on 24 hours a day. The VFO will be described later.

The receiver provides continuous tuning from 3.5 to 30 MHz, divided into five bands, each band further subdivided into 500-kHz segments. Band switches in the various units are interconnected by gears and levers controlled from the front panel. The main tuning dial is calibrated in 10-kHz steps, and intervals of 1 kHz may be easily interpolated on the circular vernier scale of the Eddystone No. 898 dial. Dial calibrations are 4000 to 3500 kHz (the eighty meter band tunes backwards), 0 to 500 and 500 to 1000 for the remaining 500-kHz intervals to 30 MHz. In order to compensate for slight frequency differences in the crystals of the first oscillator, a CAL control is located just above the main tuning dial. It permits varying the frequency of the VFO sufficiently to place the frequency limits of the 500-kHz steps exactly on the end calibration points of the main dial. The receiver uses a total of 24 tubes. All important plate voltages are regulated by VR tubes. A separate power transformer is used to provide the VFO operating voltages.

*1068 Eden Bower La., Redwood City, CA 94061

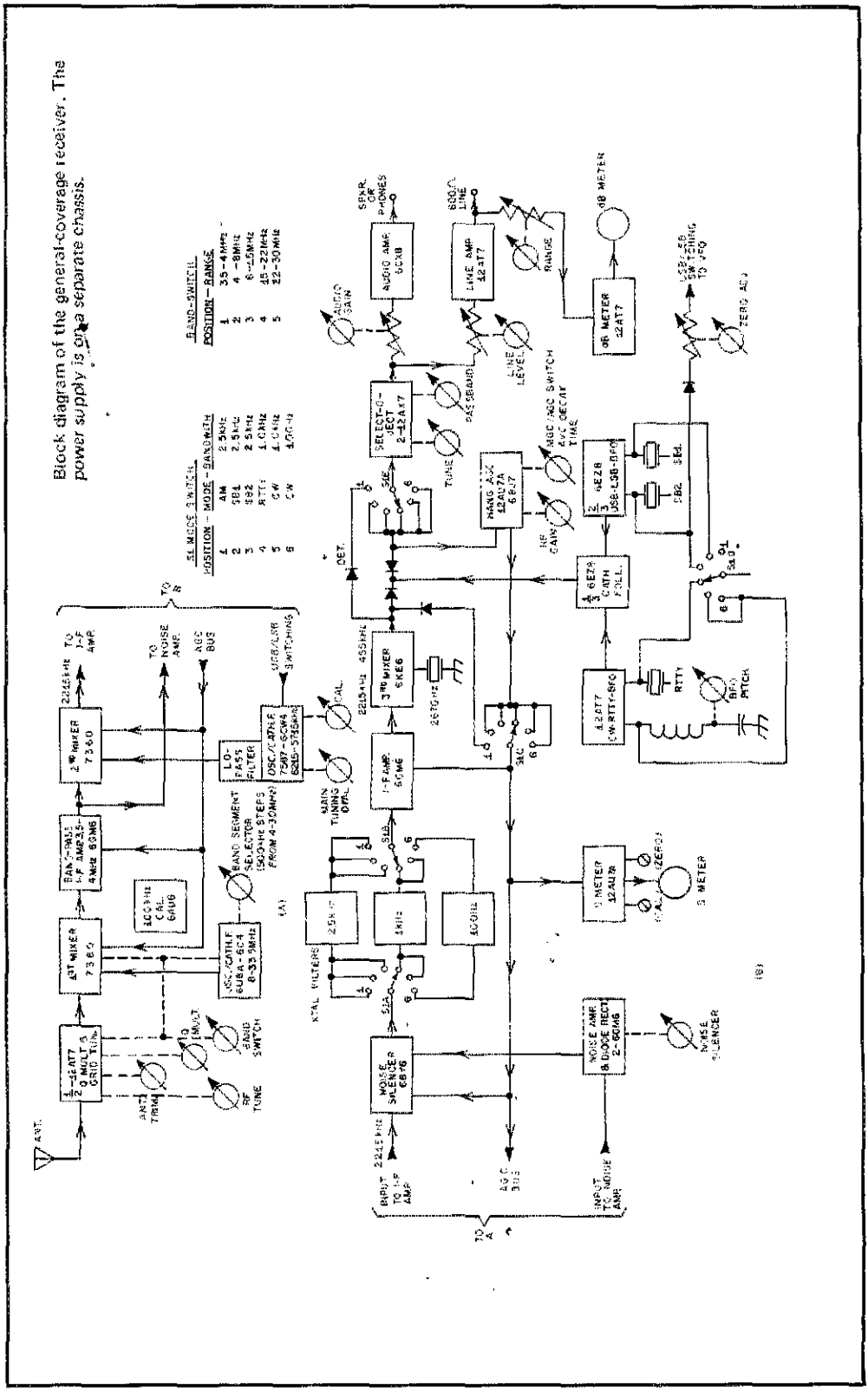


Front panel view of the General-Coverage Receiver (GCR-100A). Rf controls are grouped to the left of the main tuning dial and af controls are to the right.

Specifications

A laboratory-standard signal generator was used to align the receiver. Measurements were made in each 500-kHz segment of the range, and at better than half of the points the signal level for 10 dB S+N/N was less than 0.1 μV in an audio bandwidth of 2.5 kHz in the ssb mode. Changing the line voltage from 105 to 130 volts results in a variation of the audio beat note of less than 30 Hz on all ranges. Frequency drift measured 30 Hz over a two-hour period. Dial backlash is less than 50 Hz. A "hang" type age circuit is used for both ssb and cw with delay time continuously adjustable from 1 second to zero. The delay is generally left at themaximum. Two audio outputs are furnished, a 600-ohm line with a maximum output of +10 dBm for feeding an RTTY converter, and a 4-ohm speaker or 600-ohm headphone line to a jack on the panel. The ac output hum is at -40 dBm, almost inaudible.

The receiver exhibits exceptional freedom from cross modulation. Two tests have shown this: A neighboring amateur ran 1 kW input on ssb on 15 meters, just one block away. Unless the receiver


Block diagram of the general-coverage receiver. The power supply is on a separate chassis.
SL MODE SWITCH
POSITION — MODE — BANDWIDTH
1 AM 2.5kHz
2 SBL 2.5kHz
3 SBU 2.5kHz
4 RTTY 1.0kHz
5 CW 1.0kHz
6 CW 1.0kHz
BAND-SWITCH
POSITION — RANGE
1 3.5–4MHz
2 4–8MHz
3 8–12.5MHz
4 12.5–22MHz
5 22–30MHz
ANT.
ANT. TRIM
RF TUNE
BAND SWITCH
1st MIXER 7360
1st I-F AMP. 4MHz BDWD
100kHz CAL. BAND
OSC./CATH. F. 6U8A - 6C4 8–33.5MHz
BAND SEGMENT SELECTOR (500kHz STEPS FROM 4–30MHz)
2nd MIXER 7360
2215kHz TO 1st I-F AMP.
TO NOISE AMP.
AGC BUS
LO-PASS FILTER
OSC./CATH. F. 7587 - 6CW4 6215 - 5745kHz
SIDEBAND SWITCHING
MAIN TUNING DIAL
CAL.
2215kHz
455kHz
3rd MIXER 6KE6
1st I-F AMP. 6CW6
2670kHz
XTAL FILTERS
2.5kHz
1kHz
100Hz
S METER 12AU7A
ZERO
S METER
NOISE SILENCER 6BF6
NOISE AMP. & DIODE RECT. 2-6CW6
NOISE SILENCER
INPUT 2215kHz TO 1st I-F AMP.
INPUT AF NOISE AMP.
DET.
SELECT-O-SECT 2-12AX7
SIDE
TUNE
BASS/TREBLE
AUDIO GAIN
AUDIO AMP. 6CW6
SPKR. OR PHONES
HANG AGC 12AU7A 6BH7
RF GAIN
AGC/ANC SWITCH
AVC DECAY TIME
1/2 6EZ8 USB-LSB-BFO
CBZ
CBL
1/2 6EZ8 CATH. FOLL.
12AT7 CW-RTTY-BFO
RTTY
BFO PITCH
LINE LEVEL
RANGE
LINE AMP. 12AT7
600Ω LINE
dB METER
dB METER 12AT7
USB/LSB SWITCHING TO VFO
ZERO ADJ.

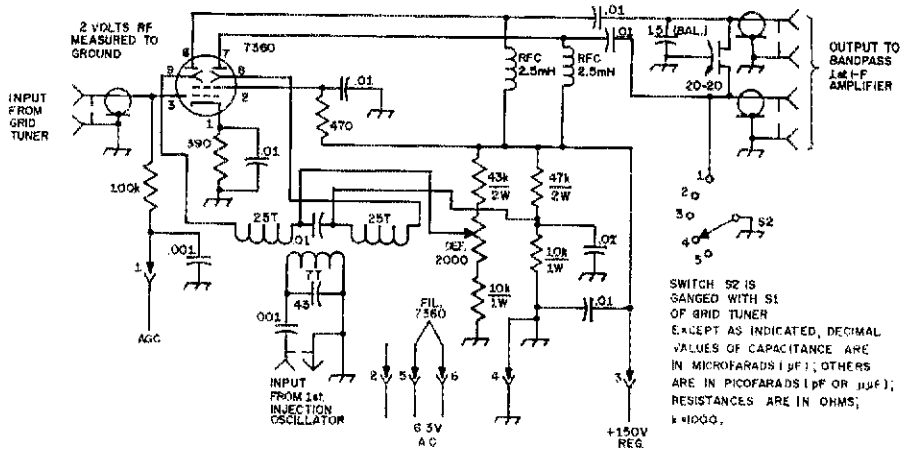


Fig. 1 — Schematic diagram of the 7360 first mixer. Plug numbers 1 through 6 refer to the Cinch-Jones plug connections to the main chassis.

was tuned to his signal it was impossible to tell he was on the air. Another amateur, less than 3000 feet distant, transmitted a signal whose strength was 0.1 volt at the antenna terminals of the receiver. No difficulty was experienced in working within 5 kHz of his frequency. Agc dynamic range is exceptionally good; audio output increases only 5 dB for a 100-dB increase in input signal above 1 μV. At the maximum input of 100,000 μV, the agc voltage is 4.

Inside The Cabinet

As shown in the block diagram, the first active stage is the 7360 first mixer. This tube has tremendous signal-handling capabilities — the reason it was chosen. One half of a 12AT7 is used as a *Q* multiplier in the 7360 grid circuit, but is seldom required. The high-*Q* grid circuit uses two toroid coils in a double-tuned arrangement with coupling provided by a small mutual-coupling coil in the common ground return of the two coils to prevent interaction with the coil in use. Band switching is as follows: 1) 4 to 3.5 MHz, 2) 4 to 8, 3) 8 to 15, 4) 15 to 22, 5) 22 to 30 MHz. On band 1, the oscillator injection voltage is removed from the first 7360 and one plate of the tube is grounded for rf. The tube then acts as an amplifier. The circuit is shown in Fig. 1.

The first oscillator uses the triode section of a 6U8A as a Pierce circuit followed by the pentode section which is used as an amplifier or frequency multiplier. A 6C4 is used as a cathode follower to feed the beam plates of the 7360. The band-segment switch on the panel is used to select one of 31 crystals to provide an injection frequency 4 MHz above the lower end of the desired frequency segment.

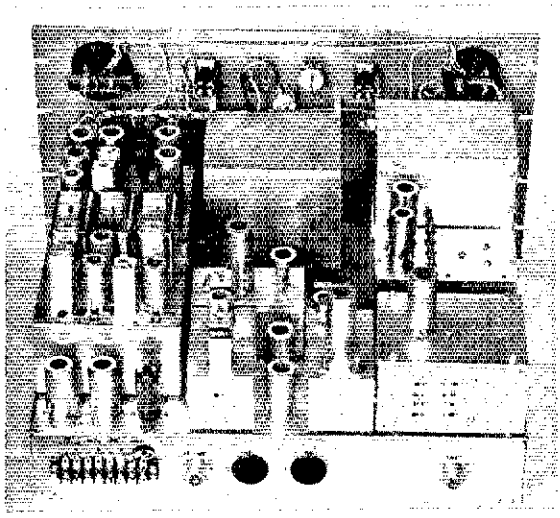
The output of the first mixer is fed to a band-pass amplifier, which is composed of two stagger-tuned TV sound i-f transformers to cover 3.5 to 4 MHz.

A 6GM6 amplifier between the transformers compensates for filter attenuation to provide unity gain. Agc voltage is furnished to both the 7360 and the 6GM6. The band-pass filter is followed by the second mixer, another 7360, also agc controlled. The injection signal for the second mixer is furnished by the main-tuning oscillator.

The VFO, shown in Fig. 2, is a Clapp oscillator operating between 6215 and 5715 kHz, tuning backwards. The tube is a Nuvistor pentode (7587), followed by a 6CW4 cathode follower. The oscillator uses very high *C*, with only 1.4 μH of inductance in the tank coil. Final inductance adjustment on the tank was effected by trimming the size of a brass slug at the base of the coil so that exactly 500 kHz was covered between 0 and 500 on the main tuning dial. The tuning capacitor is a J.W. Miller Co. No. 2101 whose maximum capacitance is 104 pF. It is perhaps one of the finest capacitors available for this purpose and uses ball bearings and ceramic insulation for the ultimate in stability and smooth operation. Because of the high-*C* tank, dial calibration is very nearly straight-line frequency. A feature of the oscillator is the use of only 154 degrees of the 180 degrees of capacitor rotation, for 500 points of dial spread. This affords a linear capacity change and a linear calibration at the ends of the dial. As shown in the interior view of the VFO, anti-backlash gears are used. The larger gear is on the capacitor shaft, while the smaller gear is driven directly by the output shaft of the dial.

VFO Construction

The VFO box is constructed of 1/4-inch-thick aluminum plate with milled edges, and assembled with No. 4-40 screws. Brackets were fabricated to mount the VFO assembly directly on the front panel, so that the dial and VFO are an integral unit. The resultant mechanical stability is excellent. No temperature compensation was found necessary, since the large mass of aluminum acts as a heat sink. Both VFO tubes are located inside the box. A stable temperature is maintained since the tubes are never turned off. The output of the 6CW4 passes through a single-section low-pass filter. A coaxial cable feeds the signal to the second mixer. Frequency calibration is effected by means of a 27-pF capacitor connected to the oscillator cathode. Its effective value is varied by adjusting



Rear view of the GCR-100A. The main i-f amplifier is at the left rear, with the audio output and dB meter tubes just above the terminal strip. The main-tuning oscillator is in the center next to the panel, with the two 7360 mixers and 3.5- to 4-MHz bandpass filter in the center foreground. To the right, the first oscillator is next to the panel, and the first mixer grid-tuning chassis with *Q*-multiplier is in the right foreground. Power, antenna, i-f output and control connectors are on the rear apron of the chassis.

the bias on two 1N64 diodes connected between the capacitor and ground. The CAL potentiometer varies the bias voltage. Changing from upper to lower sideband requires a proportional shift in the oscillator frequency. A 100,000-ohm potentiometer (Fig. 2) is used to shift the oscillator frequency the required amount when changing sidebands. The potentiometer is set for the required shift, then is switched in and out of the circuit when changing from one sideband to the other.

The output of the second 7360 mixer passes through the noise silencer. The cut-off voltage for the 6BY6 is furnished by a noise amplifier driven from the output of the band-pass filter. The noise silencer and its amplifier are located on the main i-f amplifier chassis. A threshold control is located on the front panel. The circuit is shown in Fig. 3, and is also briefly described in recent editions of the ARRL *Handbook*. Comparative tests between a 6BY6 and a 6BE6 (the latter shown in the *Handbook*) proved the 6BY6 to be a better performer. The 6BY6 shows slightly more gain when used as an amplifier in this circuit. A full-wave noise detector is used to prevent the possibility of a noise peak falling on the positive half-cycle, with the result that it would not appear as an output control voltage. This was pointed out in Lamb's original *QST* article.[1]

Since the frequency of the signal used to derive the noise-control voltage is different from the signal frequency handled by the 6BY6, no rf choke is necessary between the bridge detector and grid 3 of the noise-silencer tube. Semiconductor diodes are used as the positive clamp diode from grid 3 to ground, and also for the full-wave noise-voltage rectifier.

The same i-f transformer that feeds the second 7360 mixer also feeds the grid of the first 6GM6 noise amplifier. This tube derives its agc voltage through the i-f transformer secondary.

1 Lamb, "A Noise-Silencing I-F Circuit for Superhet Receivers," *QST*, Feb. 1936.

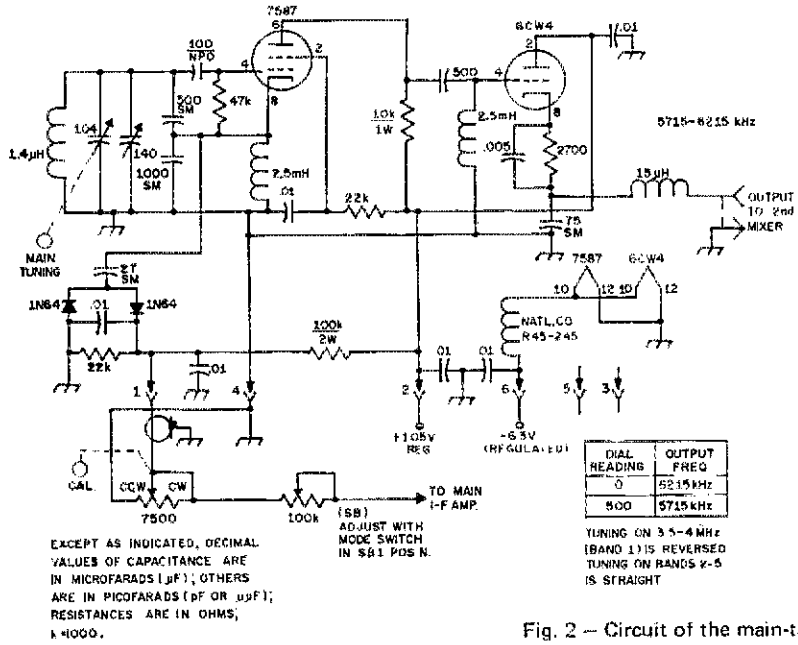


Fig. 2 — Circuit of the main-tuning oscillator.

Band-Pass Filters

The output of the noise silencer passes through one of three selectable crystal band-pass filters, operating at the second i-f of 2215 kHz. The 2.5-kHz filter is used for a-m and upper and lower sideband reception. The appropriate ssb BFO frequency is selected by the MODE switch. For RTTY and general cw operation, a 1-kHz passband filter, and either a crystal oscillator for RTTY, or a variable BFO for cw is selected by the MODE switch in either the RTTY or CW1 position. To really slice off the QRM, the CW2 position of the switch is used with the variable BFO to provide passband tuning of 100 Hz.

The band-pass filter output feeds a 6GM6 i-f amplifier at 2215 kHz, which is followed by a third mixer, a 6KE8, to produce an i-f of 455 kHz (approximately) for demodulation. This third i-f is used to prevent feeding a strong local-oscillator signal back into the input of the i-f amplifier. The third mixer injection frequency, at 2670 kHz, is sufficiently removed from the i-f input so that only the desired signal is passed by the input circuit.

On a-m, the 6KE8 output is detected by a 1N64 diode, while two 1N64s in a voltage doubler rectify the age voltage. On ssb, RTTY, and cw two 1N67s (back-to-back) are used, with injection voltage provided by one of four oscillators, three being crystal controlled and one the variable BFO. The BFO is adjustable from the front panel, and uses the same circuit technique as that of the CAL adjustment on the main-tuning oscillator. For all but the a-m mode, a hang-type age circuit affords fast attack and slow decay, with a front-panel adjustable decay-time control.

The output, now demodulated, passes through a Select-O-Ject audio-peaking and rejection circuit. This circuit is useful for notching out heterodynes. The output of the Select-O-Ject is amplified by 1), a 6CX8 triode-pentode for speaker and earphone operation, and by 2), a 12AT7 low-level amplifier to provide a 600-ohm output to feed a RTTY converter. A little "gold plating" is provided by a dB meter with a range of -20 to +10 dB.

Signal-strength readings are provided by a meter calibrated from -20 to +100 dB, with 0 dB equal to a signal input level of 1 microvolt. Calibration is also in S units. Only 4 volts of age are developed with an input of 100,000 microvolts. A 12AU7A tube is used as a balanced-bridge VTVM in the S-meter circuit. One grid is grounded and the other goes directly to the age bus. The final touch is added by including a 6AU6A as a 100-kHz calibrator. A push-button activates the calibrator.

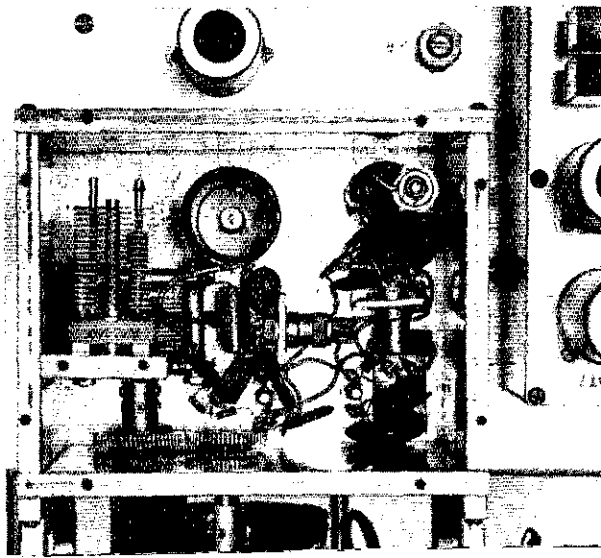
Physical Characteristics

The receiver is designed to withstand rough handling, and yet be adaptable to easy modification when desired. It has been shipped several thousand miles by commercial carrier, and has covered considerable ground in the trunk of an automobile, but has never failed to operate perfectly upon reaching its destination.

The front panel measures 10-1/2 x 19 inches. The 13 x 17 inch chassis is set back 2 inches from the panel to allow space for the main dial and various shaft couplings and controls. An old Super-Pro cabinet was repainted and now houses the receiver. The power supply is on a separate chassis. All chassis are aluminum. Separate power cables for dc and ac connect the power supply to the receiver through two 11-prong sockets on the rear of the chassis. The antenna input and 2215-kHz i-f signal output, as well as an 8-point terminal strip for speaker, muting, audio line, and cw sidetone are also at the rear. The bottom of the main chassis is covered by a plate. All power leads are filtered, both those for the power supply and the individual leads between units. The shielding is so effective that the receiver is virtually "dead" without an antenna connected.

Operating Features

All operating features are controlled from the front panel. The rf controls are grouped on the left side of the main-tuning dial, while those relating to audio are on the right side. Two controls determine the band to be covered. The desired band is selected by the BAND switch (bands 1 through 5). The 500-kHz segment to be tuned is determined by rotating the selector just above the BAND switch. The lower limit of the 500-kHz segment is indicated on a transparent dial illuminated from the rear. The RF TUNE control in the lower left-hand corner of the panel peaks the first mixer grid circuit for maximum gain. For all modes of operation, the RF GAIN control is normally left at maximum, because of the exceptionally flat age characteristic. The main-tuning dial fiduciary (CAL control) is so located that it is out of the way to



Close-up of the main-tuning oscillator with the cover removed. The 7587 pentode is in the center, with the main-tuning capacitor underneath the APC-140 padder. The 1.4-μH coil is in the center rear. The antibacklash gears can be seen toward the front panel. The 6CW4, power plug and low-pass output filter are on the right side of the compartment. The oscillator box is made of 1/4-inch thick aluminum plate.

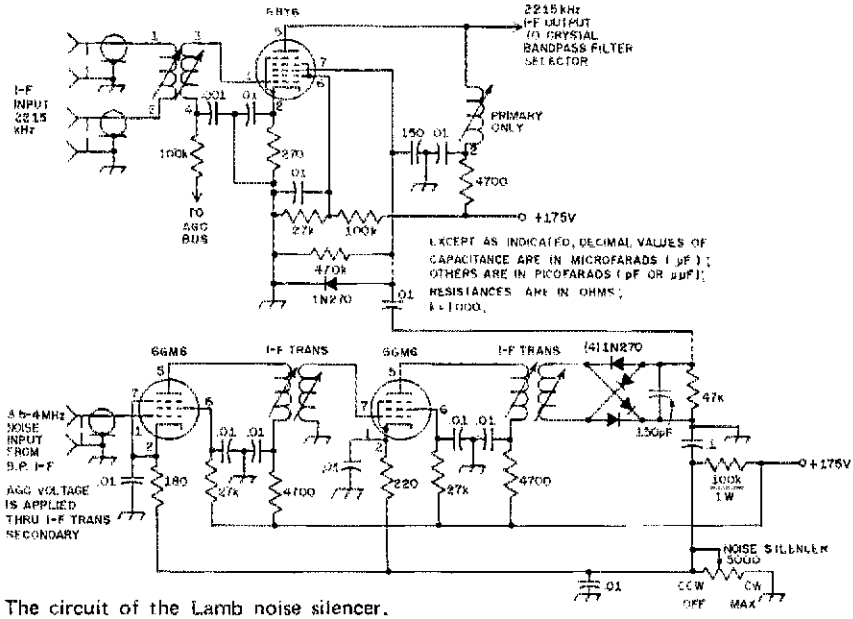


Fig. 3 — The circuit of the Lamb noise silencer. The salient features are discussed in the text.

prevent inadvertent adjustment, yet is conveniently located for use when necessary. The main tuning dial can easily be read to 1 kHz. The fact that the 3.5- to 4-MHz band tunes backward has not been found inconvenient. All other bands tune from left to right. As one might expect from a multiconversion superhet receiver, a few "birdies" are evident, but are not bothersome.

Observations

The project was a long-term endeavor. Preliminary design was started in the fall of 1965 and except for a few subsequent modifications was finished in April of 1967. Hindsight has revealed that the Select-O-Ject audio filter is not as necessary as had originally been thought, because of the excellent i-f filter characteristics.

One may wonder why the receiver was not transistorized. One reason is probably "inertia", but also, due consideration was given to signal-overload effects of the bipolar transistors available during the design stage.[2]

Since no equipment of this complexity can be modified or maintained without adequate information a complete instruction manual has been prepared, showing all diagrams, chassis interconnections, pertinent circuit voltages and alignment information as well as manufacturers' characteristics of some of the components. All tube types, control functions and connection data are stencilled on the chassis.[3] Visitors have found the receiver easy to operate and are pleased with its sensitivity and stability.

The receiver has been in continuous use for two and a half years, with no component failures to date. Operation has been gratifying.

Deep appreciation is given to the XYL for her patience during the construction of the receiver. She had only one request after it was finished — "Please don't build anything else for a long time."

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Schuler, "An All-Band 7360 Converter," *CQ*, October, 1966.

Jayaraman, "An Improved 7360 Converter for 14 and 21 Mc.," *CQ*, June, 1969.

[2] Modern semiconductors are capable of providing excellent overload-immunity characteristics. Dual-gate MOSFETs such as the RCA 40673, 3N140, and 3N141, and the Motorola type MFE-3006, MFE3007, and MFE3008 are as good as (or better than) most tubes when used in well-designed receiver front ends and i-f strips. Many modern ICs perform well in receiver i-f strips, their dynamic ranges being capable of a wide latitude of control when agc is used. Bipolar transistors, on the other hand, generally offer inferior performance in these same circuits when compared to tubes or FETs. — *Editor.*

[3] The author will supply Xerox copies of the complete circuit diagram for $1 each, plus 30 cents postage.

160/80/75-Meter Broad-Band Inverted — V Antenna

BY JAMES L. LAWSON,* W2PV

FOR SOME years the author has been greatly interested in DX, principally on the "easy" bands (40 through 10 meters), but also on 75 and 80 meters, and more recently on 160 meters as well. On 75 and 80 meters a square array of $\lambda/4$ verticals has been in use for 4 years, where phasing has permitted directional "beams" to be used. This system has been quite effective for reception, but probably due to grounding inefficiencies has not been really satisfactory for transmitting. On 160 meters a low (height about 30 feet) bent dipole has been in use, and even at that height many DX countries have been worked. Nevertheless, the author wished to improve both the (transmitting) effectiveness on 75 and 80 meters and the total 160-meter effectiveness. To this end he has designed and constructed a high inverted-V dual-band antenna; *high* to improve the effective low-angle radiation from the antenna and *inverted V* to accommodate all antennas on only one high support. The design criteria also included the hope of covering the entire 75/80 meter band with no tuning adjustments. The initial choice of the inverted V was also influenced by the idea that horizontal polarization from a sufficiently high antenna over ordinary ground[1] – and especially over poor ground – might be superior to vertical polarization. A horizontal dipole might be the logical best choice; however the dipole requires two expensive supports rather than just one for the inverted V. In any case, the inverted V appeared to be a good initial candidate for both 160 and 75/80 meters. The support required was a guyed tower 110 feet high and this was constructed in a relatively standard way using Rohn No. 45 sections and 3/16-inch stainless-steel guy wires broken up by insulators every 27 feet to avoid not only all resonances at the lower frequencies, but for all amateur bands which might be activated by nearby antenna systems.

Antenna Bandwidth

The bandwidth of an antenna has been defined in many ways, and it is necessary here to make clear a proper definition of bandwidth and just how it can be measured. A simple antenna radiating element can be thought of as a single resonant circuit containing lumped equivalent capacitance, C (element to ground), inductance, L (element to ground), and resistance, R (effective radiation and loss resistance). The effective Q of the circuit $L\omega_0/R$, where ω_0 is $2\pi f_0$ and f_0 is the resonant frequency of the antenna, would be a normal "electrical" parameter of bandwidth. The *total* electrical bandwidth, B_e (the bandwidth between frequencies where the reactance is equal in magnitude to the resistance) would be simply: $B_e = f_0/Q$. Unfortunately this "electrical" bandwidth is not the most useful definition of antenna bandwidth. It has become customary to cite antenna bandwidth, B, as the frequency band within which the voltage standing wave ratio, or SWR, remains under 2 to 1. This latter is a measurable property of an antenna system[2] and has become an acceptable standard for tolerable loads on linear amplifiers. Although transmission line losses would ordinarily not rise significantly with even higher SWRs, an SWR of 2 or less is a conservatively low figure for satisfactory transmission. I wish to emphasize here that for an SWR of 2 from a *practical* point of view the increased losses in the coupling and transmission system are generally negligible; even the indicated reflected power of 11 percent (at an SWR of 2) is *not* lost but in effect is rereflected into additional forward power at the driving point (linear amplifier coupling network). For these reasons, I will use B, the frequency interval between SWR equals 2 points, as the definition of bandwidth. In the event that an antenna is matched at the resonant point (an SWR of 1), B is simply related to B_e and in fact is just: $B = 0.7\, B_e$.

The bandwidth requirement for 160-meter transmission in this area of the northeast USA is quite nominal; for DX purposes it is only 25 kHz (1800 to 1825 kHz). To be sure, the next 25 kHz is permitted, but at lower power only, and is therefore not particularly useful for transmitting to DX stations. In any case 50 kHz is an adequate antenna bandwidth. It should be noted that for

*2532 Troy Rd., Schenectady, NY, 12309.

[1]Chief Signal Officer, Pentagon, Washington, 25, D.C., "Radiation from Antennas in the 2-to 30-Megacycle Band," *Radio Propagation Unit Technical Report* No. 2, July 1947, pp. 1-281.

[2]Author's Note: Almost all amateurs have an SWR meter available, but unfortunately have an unwarranted optimism on their reliability or accuracy. It is not uncommon for different SWR meters to indicate anywhere from 1.4 to 4 when the actual SWR is 2. This is chiefly caused by the (uncalibrated or variable) power calibration of the meter for both forward-and reverse-crystal detectors.

A great deal of mystery seems to have surrounded the electrical properties of the inverted-V antenna since it was popularized some years ago. Here, W2PV offers his analysis of how the system operates, and shows how to construct a practical two-band version of this effective antenna.

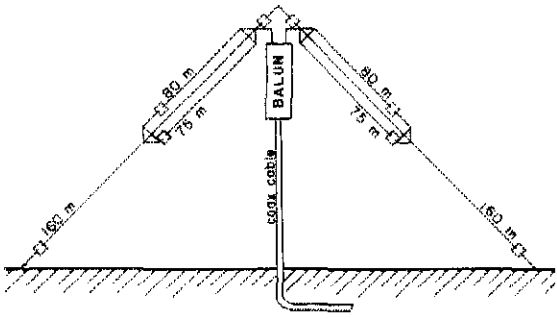

Fig. 1 — The initial two-band system described in the text.

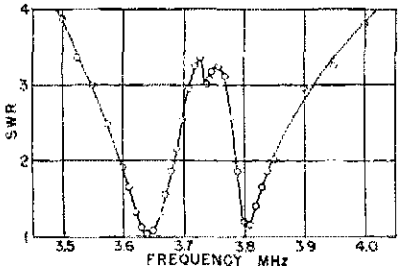

Fig. 2 — The 80-meter SWR curve for the system shown in Fig. 1.

reception such an antenna is quite satisfactory even a long way from resonance (e.g., 250 kHz) as the incoming noise level is so high that it will override receiver noise even with very large antenna reactance. Thus the *signal-to-noise* ratio will be *unchanged even over a very wide band.* For 75 and 80 meters it is desirable to have the full 500 kHz (3500 to 4000) available for transmission and, of course, reception. This is a very difficult matter to arrange without any tuning adjustments because of the large ratio of bandwidth to center frequency desired. Nevertheless, this has been virtually obtained in the design to be described later.

A Parallel-Wire 75/80/160-Meter Antenna System

One of the first attractive ideas was a trapped-wire system for the (three) desired band segments in much the way trapped-multiband dipoles have been used in the past. However the trap to separate 75 and 80 might be difficult and would not likely to be well behaved over the entire band.[3] Furthermore the simultaneous use of multiple-wire parallel antennas has been common and it was decided to try such an arrangement as shown in Fig. 1.

A single long wire would work as the 160-meter resonator and two appropriately trimmed parallel wires would serve as the 75- and 80-meter resonators. It was expected (see later discussion) that the bandwidth of 75- and 80-meter wires would individually be about 200 kHz, and that the combination might behave like two coupled circuits to produce a double-humped broadband (perhaps 500 kHz) circuit. This turned out not to be the case, as will be described. The antenna was strung as in Fig. 1 with the 75- and 80-meter wires on opposite sides of the 160-meter wire and separated from it by about one foot. The entire assembly was fed through a 1:1 balun. After construction it turned out quite easy to find the resonant frequencies of the three elements and to trim them to arrive at any desired frequency. It became immediately apparent that, although the resonance of the 160-meter wire behaved about as expected, the individual resonances of the two shorter wires were much sharper than either expected or desired. A typical SWR run for the 3.5 to 4.0 MHz band is shown in Fig. 2. As can be seen the 75/80 meter performance was of the correct qualitative behavior, but much too narrow in bandwidth. This sort of undesirable performance has also recently been reported[4], and as we shall soon see, is inherent for parallel-wire systems of this general type.

Expected Bandwidth For a Single Wire

At this point it may be helpful to calculate the expected bandwidth of a single-wire inverted V for 75 and 80 meters. Such a calculation can be easily made (approximately) by approaching the problem in either of two ways. The first is to consider the antenna wire leg ($l=\lambda/4$) as one conductor of a transmission line (with the ground as the other conductor). The input reactance, Z_i, of this open circuited length of line l is given simply by the low loss transmission line equations i.e.,

$$Z_i = jZ_O \cot 2\pi l/\lambda = -jZ_O \cot \theta$$

where $Z_O = 138 \log_{10}(4h/d)$ ohms h = average antenna height over ground d = diameter of the antenna wire in the same units Z_O, the characteristic impedance of the line, is typically several hundred ohms; indeed for h = 70 feet and d = 0.064 (No. 14 wire), Z_O = 650 ohms. Z_i is zero if $l = \lambda/4$ (at the resonante frequency), but at other frequencies near resonance:

where $\theta \neq \pi/2$, $Z_i = jZ_O(\theta - \pi/2) = jZ_O\Delta\theta$

Remembering that the total bandwidth, B, is 0.7 times the frequency interval between points where the reactance is equal to the radiation resistance of the antenna leg (here taken as 25 ohms or one half the resistance of the entire inverted V) we obtain:

$$B = 1.4 \times f_O \times 2\Delta\theta/\pi = 1.4 \times f_O \times 2 \times 25/(\pi \times 650) = 140 \text{ kHz at a center frequency of 3.8 MHz.}$$

This transmission-line model is convenient and simple; however, it is certainly not completely valid. For example, in a transmission line the E field is orthogonal to the conductors: such is not the case here where at the antenna open end a spreading E field occurs. Nevertheless the model should give qualitatively the right answer and probably a reasonable approximation to the quantitative answer.

[3] *Bob Polansky, W6JKR, "Low-band Converted-Vee Antenna," Ham Radio, December 1969, pp. 18-21.*

[4] *E.H. Conklin, K6KA, "Antenna Systems for 80 and 40 Meters," Ham Radio, February 1970, pp. 55-63.*

Another estimate can be made using a lumped constant model of the antenna leg. The *capacitance* of the antenna to ground can be obtained from standard formula[5] (in this approximation the voltage carrying outer half of the wire only is used) from which, in conjunction with the 25-ohm radiation resistance, the Q can be calculated, from which B is obtained:

$C = 0.24l/\log_{10}(2l/d)$ picofarads = 58 pF

$Q = 1/(\omega RC) = 28$

$B = 1.4 \times f_0/Q = 185$ *kHz at a center frequency of 3.75 MHz*

This model of the antenna is approximate because the antenna is really a distributed system; however, again, it should give a reasonable approximation to the expected bandwidth, B. An advantage of this approach is that one can also quickly estimate the effect of multiwire cages on the bandwidth using the electrostatic formula for C.[5] This shows that one can about double the bandwidth using several wires whose spacing is perhaps two feet.

These estimates show that the expected bandwidth of a 75- or 80-meter resonant wire inverted-V antenna should be perhaps 200 kHz, and in fact, such bandwidths are commonly cited for such antennas. However, the results shown in Fig. 2 show much narrower resonances, and this fact prompted an investigation into the behavior of the parallel-wire system.

Behavior of Parallel-Wire Antennas

Consider first just two wires, the long 160-meter wire and the shorter 75-meter wire as shown in Fig. 3. It is convenient first to ignore the mutual coupling between wires and also, for the time being, the radiation (resistance) effects. Let us consider the currents and voltages on the wires, each being regarded as a transmission line of high characteristic impedance, say, 650 ohms to ground. Let us now excite the antenna system by injecting a current, I, at its center (or driving point), at a frequency (and wavelength) which resonates with the shorter wire (say 75 meters). The ends of each line are open circuited, hence zero current points. We shall use the well-known property of transmission lines equating the product of Z_0 and the current at any point, iZ_0, to the voltage, e, at a point one-quarter wavelength away. Thus for the antenna wires, e is zero a quarter wave back from the open (zero current) ends. This makes the voltage zero at the driving point due to the shorter wire, but also zero at about the center of the longer wire *and* also at its center (about one-quarter wavelength away) it must be zero everywhere along the wire, and by the same simple theorem on transmission lines referred to above, the current on the long wire must also be zero everywhere. This reasoning shows that a system of wires of various resonant lengths driven at the resonant frequency of a given wire will show no reactive voltages or currents except solely on the resonant wire.

[5] "Radio Formulae," *Handbook of Chemistry and Physics*, Chemical Rubber Publishing Company, 37th edition 1955, pp. 2964, 2965.

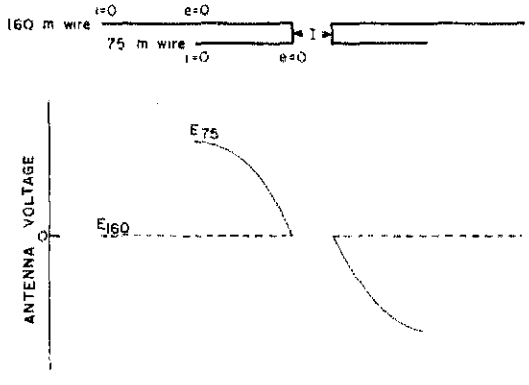

Fig. 3 — Currents and voltages on the two parallel wires. See text.

Field Relationships

We come now to an important concept in the formation of a radiated wave by a wire element, namely that the resonant current largely appearing at the driving end produces an external magnetic field, which must be directly related to the H field of the radiated wave, whereas the *electric* field, generated by the electrostatic field largely at the open end of the wire is directly related to the E field of the radiated wave. Since E and H are necessarily related to the impedance of free space so must the effective electrostatic field of the antenna be related to its driving current. Note now that if the two antenna wires are reasonably close together in terms of wavelength, the *current* will appear only in the driven resonant element, but the effective *electric field* is made up of not only that from the voltage, E, appearing on the current-carrying wire, but from the voltages on all the other wires (each carrying zero voltage and hence field). Thus, in order to radiate, the resonant wire (75 meters) carrying a given (central) current, I, must simply exhibit a sufficiently large end voltage, E_{75} to make up for the *screening* effect of the adjacent ground potential wires. In the case of *two* antenna wires the electric field is made up about equally by the field of the resonating element, and the nonresonating (zero field) element. This shows that the resonating element must have *twice* the voltage to generate the correct electric field as it would have without the second (screening) conductor. To state it more generally, with n parallel elements, the reactive voltage appearing on the resonating element is n times as large as it would have been without the presence of the other adjacent wires. Since the *bandwidth*, using a given radiation resistance, is inversely proportional to the magnitude of the reactive currents it also follows that the bandwidth of an element is reduced by a factor of n due to the presence of the other wires which screen the electric field.

Now that this principle is understood, it becomes easy to see that *short* elements are all effectively screened by longer elements, but the reverse is *not* true. The electric field of an excited long element will not be screened effectively by a

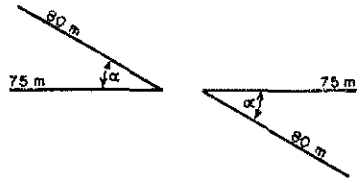

Fig. 4 — A plan view of two wires for the 80/75-meter band.

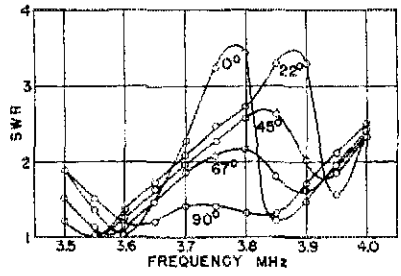

Fig. 5 — A series of SWR curves at different degrees of separation for the two antennas shown in Fig. 4. Note particularly the curve for 90 degrees of separation.

much shorter element, since its main field comes from its unscreened end. Measurements made on the 160-meter resonance of the antenna shown in Fig. 1 showed its bandwidth to be about 70 kHz, or essentially what was expected "theoretically." Furthermore the bandwidths of the individual 75- and 80- meter resonances are about 75 MHz or perhaps 1/3 of the originally "expected" values, but note that with the three wires present due to screening *it really should be narrowed by a factor* of 3. Also the shortest wire (75 meters) is narrowed most of all just as we now qualitatively expect.

We are now in position to improve the antenna of Fig. 1; the simplest technique is to separate the wires by fanning them out at an angle. A plan view of such an antenna for 2 wires for 75/80 meters is shown in Fig. 4.

This antenna was constructed; its erection and measurements provided an interesting Saturday project. A series of SWR-frequency curves were taken for different fan angles α and are shown in Fig. 5. The curve for $\alpha = 0$ (parallel wires) is different from that shown in Fig. 2 because the omission of the (screening) 160-meter wire broadened each resonance appreciably (as we now expect). As the wires are fanned out, resonant frequencies are somewhat spread due to changes in mutual and capacitance coupling effects in the wires. A steady improvement in behavior can be seen with increasing fan angles all the way to 90 degrees, where the curve now shows a very well-behaved double resonance shape exactly like that originally desired. Note the requirement to go *all the way* to 90 degrees for most effective performance. Actually at 90 degrees *three* important things occur: first there is no electric screening left due to orthogonal fields, second there is no mutual coupling effect due to orthogonal wires, and third – something which has not been mentioned up to this time – excitation of the system at a frequency exactly in between the two wire resonant frequencies results in good (radiated wave) radiation resistance. (In the parallel-wire case such excitation largely causes a high circulating current between the wires with little or no radiation.) These experiments suggest a good reason why orthogonal 2 band (such as 80/40 meter) inverted Vs have been used and seem to *work quite well, and they also suggest a good* possibility for the 75/80/160-meter system originally proposed.

Broadband 75/80/160-Meter Design

It appears that wherever two resonances are expected to be highly interactive (say within a single band to be covered) an orthogonal wire system is highly desirable. In the coverage of the frequencies desired, this indicates that the 75-and 80-meter wires be orthogonal. The question remains as to the best place to add the 160-meter wire to provide least screening of the 75/80 complex; this clearly would be at an angle of 45 degrees (just in between the orthogonal set). A plan view of this arrangement is shown in Fig. 6.

Measurements indicated that the screening effect is indeed tolerably small, i.e., the bandwidth of the 75/80 combination was narrowed only about 10 percent by the addition of the 160-meter

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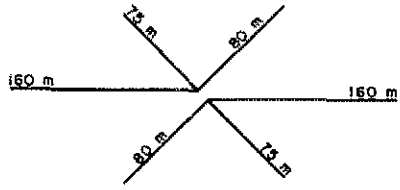


Fig. 6 — The final arrangement for two-band coverage.

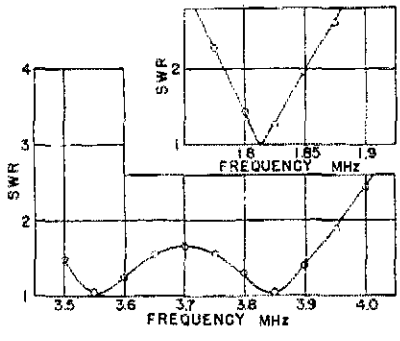


Fig. 7 — SWR curves for the system shown in Fig. 6.

A VTO for 80 through 10 Meters

Building a Varactor-Tuned Oscillator

BY DI MING LEE*

ONE OF the problems encountered in building a VFO is the mechanical difficulty in mounting a tuning capacitor and dial mechanism. This problem can be solved by controlling the VFO frequency *electronically*. By using a potentiometer to change the amount of reverse bias across a varactor,[1] the capacitance of the varactor will also change, Fig. 2. Therefore, the reverse bias voltage indicated on a dc meter can be calibrated to read the frequency of the VFO output.

This *VTO* (varactor-tuned oscillator) features an all solid-state circuit. The frequency stability is excellent. Unlike some VFOs which rely on harmonic output on the higher frequencies, this circuit provides fundamental-frequency output on the five amateur bands from 3.5 to 30 MHz. Band switching is accomplished electronically by using PIN[2] diodes. Electronic band switching offers the advantage of remote tuning. This means that the meter, the potentiometer, and the band switch can be housed in a separate unit. The VTO is tuned by turning the potentiometer. The output frequency is then indicated by the meter, M1, Fig. 1. The rest of the circuit, and the power supply, can be located (or concealed) somewhere else if desired.

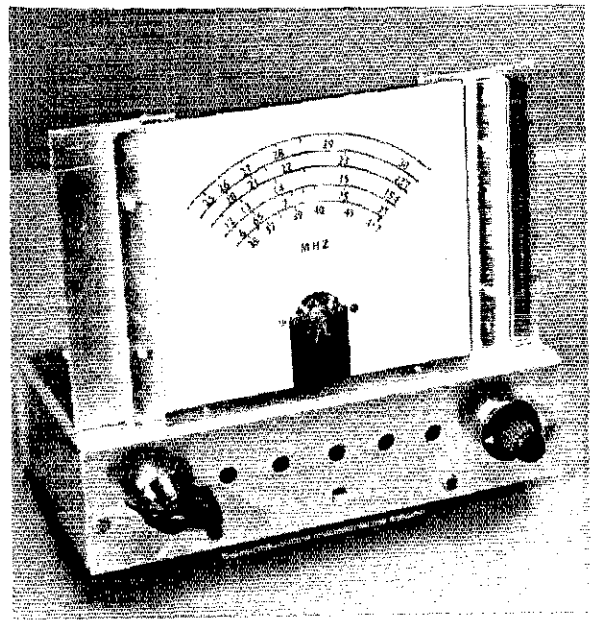
The low power requirements cut down the cost and size of the VTO. Current drain is about 120 mA at 15 volts.

Two MOSFETs are used; one for the oscillator, and one for the buffer stage. An rf power transistor is used for the output amplifier. The oscillator uses a common-drain configuration and is similar to the Hartley oscillator. The tuned circuit is designed for high-capacitance tuning. This factor, plus the low-temperature characteristics of the MOSFET, results in an extremely stable oscillator. Frequency stability is about .005 percent.

*540 Stony Brook Drive, Somerville, N.J. 08876.

1"Varactor Diodes in Theory and Practice," *QST*, March 1966.

2PIN diodes are used for switching, and as variable resistance attenuators in vhf, uhf, and microwave circuits. See Hewlett-Packard Application Note 904 for more information on PIN diodes and their uses — *Editor.*



Front view of the VTO. The frequency tuning control, R10, is on the right. The bandswitch selector is on the left. In a straight line are five holes for adjusting the slug-tuned coils. The meter shown here has a full-scale deflection of 200 μA. Some of the calibration marks are squeezed together.

The buffer uses another MOSFET. The buffer-stage isolation helps to provide chirp-free transmitter keying. The power amplifier is fitted with a small heat sink. The last stage is capable of delivering 2 volts rms into a 50-ohm load on the high frequencies, and 5 volts rms on the lower frequencies. The rms open-circuit voltage is about 20.

Circuit Description

The heart of the oscillator (Fig. 1) consists of the varactor tuning diode, and a coil arrangement employing PIN-diode switching. A Siemens varactor is used because it offers high *Q* at low reverse bias. Referring to the varactor's character-

Here is an idea article showing how to use varactor and PIN diodes to tune and switch a variable-frequency oscillator. Construction details have been omitted to enable the prospective builder to innovate. Component values are given to provide a starting point for the experimenter who wishes to try this circuit. Brands and types of semiconductors other than those listed should also be capable of providing good circuit performance.

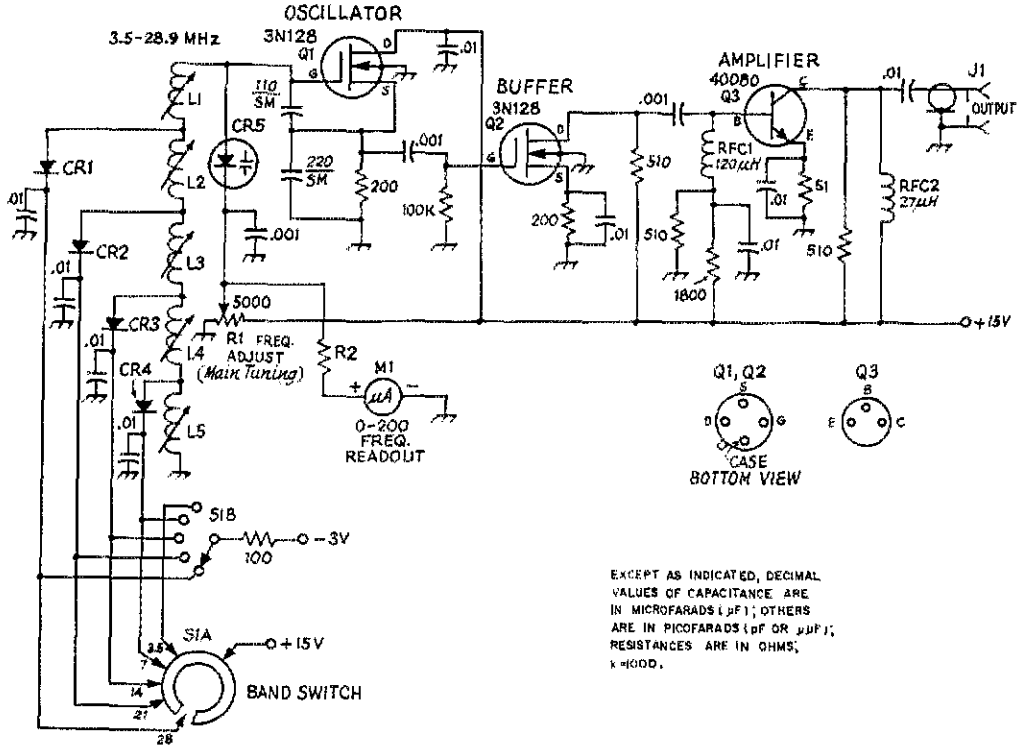


Fig. 1 — Schematic diagram of the varactor-tuned VFO. Capacitors are disk ceramic unless otherwise noted. Fixed-value resistors are 1/2-watt carbon. SM = Silver mica.

CR1-CR4, incl. — BA136 switching diode (avail. from State Electronics, 36 Rte. 10, Hanover, N.J., Siemens brand.

CR5 — Siemens BB109 varactor (avail. from State Electronics).

J1 — BNC coax fitting, single-hole chassis mount.

L1 — 0.306-μH slug-tuned inductor (J. W. Miller 4202 with 7 turns removed). J. W. Miller Co., 19070 Reyes Ave., Compton, Calif. 90221.

L2 — 0.238-μH inductor (J. W. Miller 20A156RBI).

L3 — 0.681-μH slug-tuned inductor (J. W. Miller 4202 with 3 turns removed).

L4 — 3.675-μH slug-tuned inductor (J. W. Miller 4203).

L5 — 14.7-μH slug-tuned inductor (J. W. Miller 4205).

M1 — 200-μA panel meter.

Q1, Q2 — RCA 3N128 MOSFET.

Q3 — Bipolar transistor, RCA 40080.

R1 — 5000-ohm linear-taper control.

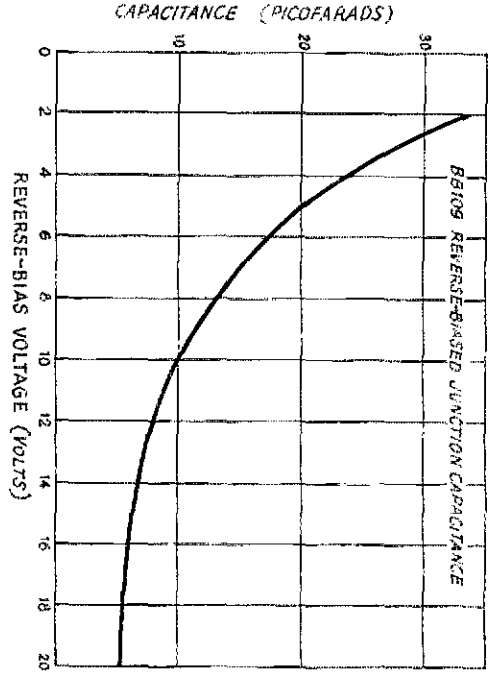
R2 — Select value to provide full-scale reading when R1 is set for maximum foltage. Will depend upon sensitivity of meter used.

RFC1 — 120-μH, 50-mA rf choke (J. W. Miller 73F124AF).

RFC2 — 27-μH, 300-mA rf choke (J. W. Miller 74F275A1).

S1 — 2-pole, 5-pos, ceramic wafer switch, single section. One section should be progressively shorting as shown in Fig. 1. May be necessary to use a two-section switch assembly to obtain contact arrangement shown (Centralab).

Fig. 2 — Graph showing the change in junction capacitance of the varactor diode as the reverse voltage is varied.



istic curve, Fig. 2, it can be seen that at the reverse bias increases, the capacitance decreases, and vice versa. The capacitance changes from 30 pF to 6 pF when the reverse bias is increased from 3 volts to 15 volts.

If electronic switching is not used, the coil taps to the band switch must be kept as short as possible. If not, the inductance of the wires will change the desired frequency and will lower the *Q*. Therefore, mechanical switching is not recommended.

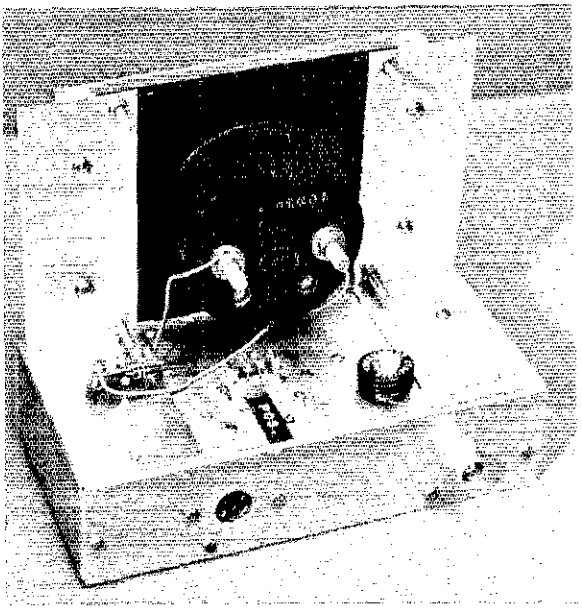
Referring to the schematic in Fig. 1, all five coils are used on the 80-meter band. When the band switch is in the 10-meter position, CR1 is forward biased to draw 20 mA. Forward biasing causes CR1 to conduct. This shorts out L2, L3, and L4, and only L1 remains for the 10-meter band. When CR1 is forward biased, CR2, CR3, and CR4 are reverse biased, causing all rf currents to flow through CR1 only.

Since the PIN diodes are installed close to the coils, the leads from the coil taps to the diodes are very short. The wiring from the cathodes of the diodes to the band switch can then be as long as necessary. This is because the wires are carrying only dc. All rf currents are bypassed to ground at the cathode side of the diodes.

Q1 is a common-drain oscillator, and frequency stability is good over a wide temperature range. The high input impedance of the FET has little effect on the *Q* of the tank circuit. Q1 is biased at a drain current of 6 mA. This quiescent point is in the middle of the linear portion of Q1's transfer characteristics curve. At this point, oscillators are easily started.

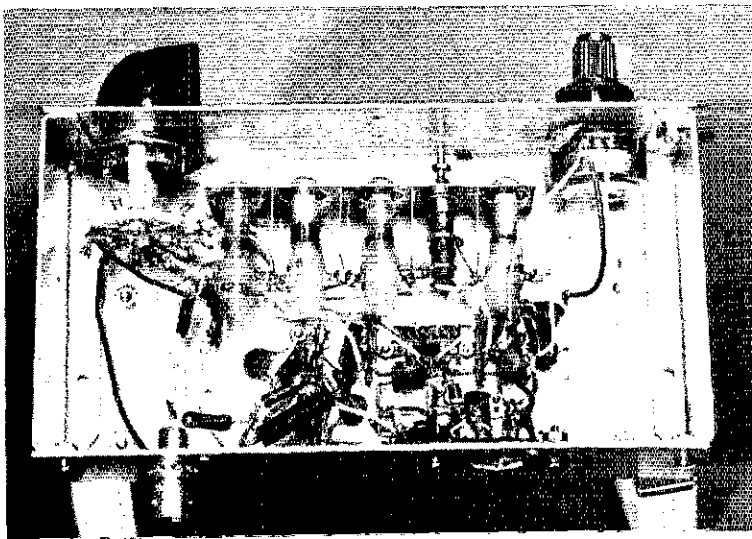
The rf voltage on the source of Q1 is coupled to the buffer amplifier, Q2. The high input impedance of Q2 results in minimum loading effect on the oscillator. This provides good isolation between the load and the oscillator. Q2 is a common-source amplifier. It is operated Class A, and is biased for a drain current of 6 mA. The voltage gain is 2.5.

Q3 is a bipolar transistor. It offers additional isolation between the oscillator, Q1, and the load connected across output jack J1.



Top view shows the four switching diodes plugged into an IC socket. The resistor at the left is a meter multiplier resistor. In the front row from left to right are Q1, Q2, and Q3. On the back of the chassis is the power receptacle and the coaxial output connector. All bias voltage requirements except the reverse bias for the switching diodes should be regulated and well filtered.

Amplifier stage Q3 builds up the signal level and provides added isolation between the oscillator, Q1, and the load connected to J1. Shielded cable should be used to connect the VTO output, J1, to the circuit with which it will be used. Use the shortest length of cable practicable. QST



Underside of the chassis shows the general layout. The varactor diode is soldered to the terminal strip on the far right.

A 3-500Z Grounded-Grid Amplifier for 50 MHz

Simple High Power for Owners of Medium-Powered Exciters

BY THOMAS F. McMULLEN, JR.,* W1QVF, AND EDWARD P. TILTON,** W1HDQ

MOST KILOWATT amplifiers for vhf service described to date have been grounded-cathode types, requiring no more than a few watts exciter power.[1] Such amplifiers are still probably the best way of going to high power for the owner of a small exciter or transverter; but on 50 MHz, at least, the 100-watt ssb transceiver is becoming almost standard. Throwing away most of the output of such a rig, in order to avoid over-driving a kilowatt amplifier, is hardly the ideal approach. Conversion to the grounded-grid amplifier, which has already happened en masse on the hf bands, is now logical for many 50-MHz enthusiasts as well.

If your vhf experience goes back to the days of neutralized-triode amplifiers, you've probably had your moments of sighing for the simplicity and moderate cost of triode vhf rigs of those long-gone times. The triode amplifier described here may satisfy some of that nostalgia. It is hardly low-cost, but it *is* simple. Though it uses a fairly expensive tube and socket, it will probably get you into the high-power class about as inexpensively as any method available, except perhaps for the total junk-box-and-surplus route.

The Eimac 3-500Z triode was specifically designed for grounded-grid service. One of the more recent arrivals on the grounded-grid scene, it is a zero-bias tube with slightly higher dissipation capability than the older 3-400Z. Having a maximum frequency of 110 MHz for full ratings, it seems like a good choice for 50-MHz amplifiers. This design requires only a single simple power supply, no more than two meters, no plate-tuning capacitor at all, and no neutralization, so it is attractive from the standpoints of cost and complexity, compared with any good alternative. The amplifier is capable of 600 watts cw output, at about 30 watts driving power. As a Class-B linear, single-tone conditions, its rated maximum PEP output is 750 watts.

*RFD Collinsville, CT 06022.
**VHF Editor, *QST*.

[1]"Kilowatt Amplifiers for 50 and 144 Mc.," February, 1964, *QST*; *Radio Amateur's Handbook*, 1966 — 1970; *Radio Amateur's VHF Manual*, all editions.

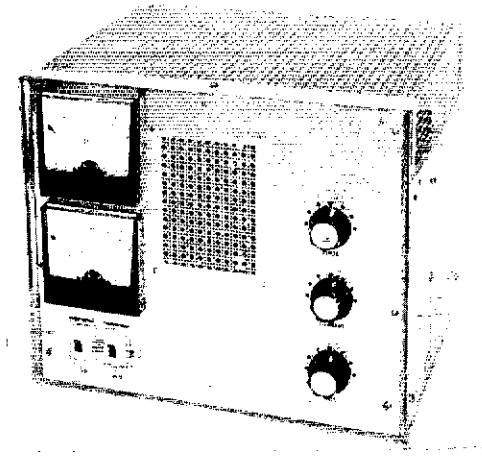
Circuitry

This amplifier uses a single-ended adaptation of what K2AYM termed "breadslicerless tuning," when he used it in a push-pull amplifier for 50 MHz a few years back.[2] Mechanical, electrical and parts-procurement problems encountered frequently with conventional tuning methods in high-powered vhf amplifiers are eliminated with this shorted-turn inductive-tuning system. There are no multiple ground paths, such as may be unavoidable in capacitor frames, and no troubles with arcing lead screws, which often develop after periods of use with rotating-disk capacitors. Only the output capacitance of the 3-500Z, and the small stray circuit capacitance, appear across the plate tank. The result is a nice large and efficient inductor; larger than the plate circuits of conventional hf amplifiers that may have a hard time reaching the 10-meter band, let alone 6.

Plate voltage is shunt fed to the tube, to remove the possibility of high voltage appearing on the coupling loop or the antenna line. The output circuit is series-tuned, its variable capacitor serving as a loading adjustment, once the loop position is set approximately to the optimum position.

Driving power is applied to the filament circuit in a grounded-grid amplifier, so the tube filament

[2]Jones, "Six-Meter Kilowatt with 4-400As," *QST*, March, 1967.



The 50-MHz grounded-grid amplifier is a tabletop design only 10 by 12 inches in size. Grid and plate current are monitored continuously. Knobs at the right control input tuning, bottom, amplifier loading, center, and plate tuning, top. Illuminated switches, lower left, are in the filament and high-voltage primary circuits. Stainless steel molding, intended for counter-top use, covers the joints between the panel and other case surfaces.

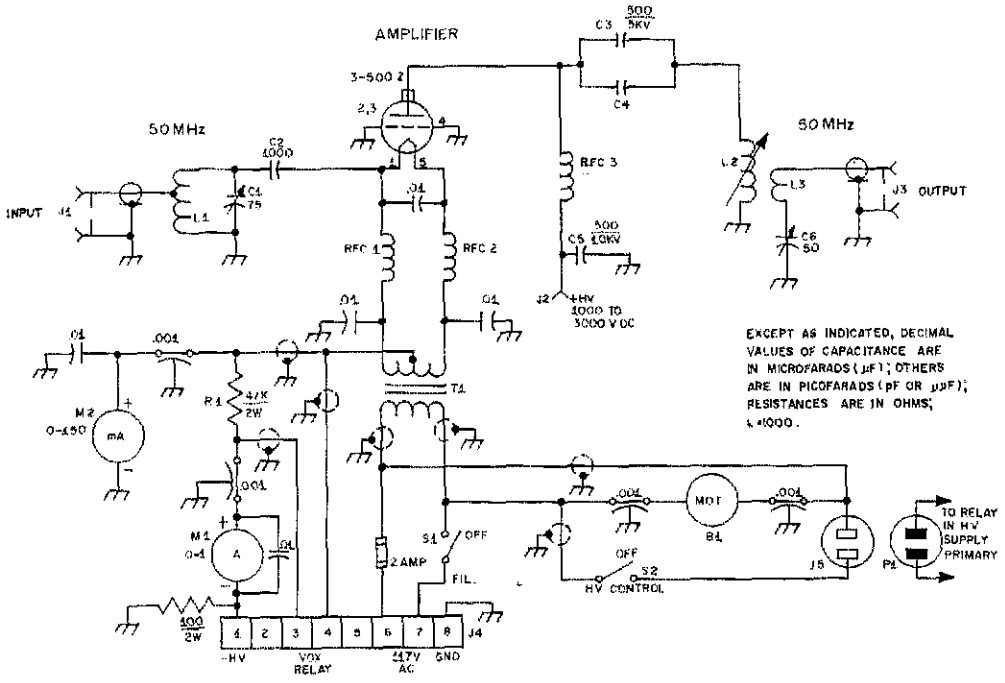


Fig. 1 — Schematic diagram and parts information for the 50-MHz grounded-grid amplifier.

B1 — Blower, 15 ft ^{3}/min. or more.
C1 — 75-pF variable (Johnson 167-4).
C2 — 1000-pF dipped mica.
C3, C4 — 500-pF 5-kV transmitting ceramic (Centralab 858S-500).
C5 — 500-pF 10-kV or more TV "Doorknob."
C6 — 50-pF variable (Johnson 167-3).
1 — BNC coaxial socket.
J2 — High-voltage connector (Millen 37501).
J3 — Type N coaxial receptacle.
J4 — 8-pin male power connector, chassis-mounting.
J5 — AC receptacle, chassis-mounting.
L1 — 4 turns No. 12 enam., 1 inch long, 1-inch diam. Tap 2 1/2 turns from ground end.
L2 — 3 1/2 turns 1/4-inch copper tubing, 3 1/2-inch diam., 5 1/4 inches long. Diameter is finished dimension, not that of form used for winding. See text and photo for turn spacing. Tuning ring is closed loop of 1/2-inch copper strip, 2 5/8-inch diam.
L3 — 1 turn, 3-inch diam., and leads, made from one piece of 1/8-inch copper tubing or No. 8 wire.
M1 — DC meter, 0 - 1 ampere (Simpson Wide-Vue, Model 1327).
M2 — 0 - 300 mA, like M1.
P1 — Ac plug, on cable to power supply.
R1 — 47,000-ohm 2-watt resistor.
RFC1, RFC2 — 21 turns each, No. 12 enam., 1/2-inch diam., bifilar.
RFC3 — 30 turns No. 20 enam., spaced wire diam., on 3/4-inch Teflon rod, 3 3/4 inches long. Drill end holes 1/2 and 2 3/4 inches from top.
S1, S2 — SPST, rocker type, neon-lighted (Carling LT1L, with snap-in bracket).
T1 — Filament transformer, 5 V, 15 A, (Stancor P6433; check any electrical equivalent for fit under 3-inch chassis).

must be kept above ground with rf chokes capable of carrying 14 amperes. These are bifilar-wound, as may be seen in the bottom-view photograph. The input impedance of such a stage is low (in the vicinity of 120 ohms) so a good match to a 50-ohm line from the exciter is made with the tap toward the top end of the tuned input circuit, L1 C1.

Most of the lower portion of the schematic diagram, Fig. 1, has to do with control, and is largely self-explanatory. The voice-control relay (if the exciter has one) shorts out R1, allowing grid current to flow, and making the amplifier operative, if the filament switch, S1, and the high-voltage-primary control switch, S2, have been closed. Feeding ac voltage to the high-voltage plate-supply relay through J4 and P1 as shown makes it impossible to apply plate voltage unless the filament and blower are also on.

Construction

The amplifier has a chassis of aluminum, 10 by 12 by 3 inches in size, with the tube socket centered 3 1/8 inches from the front edge. The sheet aluminum panel is 10 inches high. A decorative edging is made from stainless steel "cove molding," a material used by cabinet makers on counter tops, where a horizontal surface meets a vertical or corner. Sides and back are also sheet aluminum. Where they are not to be removable, for any reason, they are fastened together with pop-rivets. Tools and rivets for this work can be found in most hardware stores. If you do much building with metal, you'll find a pop-rivetting kit a good investment. Perforated aluminum "cane metal" is used for the top, and for covering the viewing hole in the front panel.

In winding the bifilar rf chokes, RFC1 and RFC2, pull the two wires tightly while winding them side-by-side on a suitable form of wood or metal. Leave this form in until the wire leads have been soldered in place, so that the windings are self-supporting. Then slide out the form and coat the windings with coil dope, to help keep them together and in alignment.

The grid terminals are on opposite sides of the socket, as seen in the bottom view. They are grounded to the chassis with very short copper straps, adjacent to each pin. These are 1/4 inch wide, and run through slots by the pins. They are soldered to the pins, and bolted to the chassis with No. 6 screws. Be sure that the chassis is clean and that a lock washer is used, so that a good rf ground is made. This could be important in getting the amplifier to operate stably in the vhf range.

Looking into the top of the amplifier, it will be seen that the hot end of the plate inductor, L2, is supported on the top of the two blocking capacitors, C3 and C4, which in turn are mounted on the Teflon rod that serves as the form for the shunt-feed choke, RFC3. The ground end of L2 is supported on a 1 3/8-inch piece of 3/8-inch copper tubing. The end of the coil is fitted with a heavy copper lug, such as is commonly used in high-current electrical circuits, but a suitable terminal can be made by pounding the end of the copper tubing flat, and drilling a hole in the flat portion. The end or terminal is held tightly on the support with a 2-inch brass bolt that goes through the terminal, the tubing support, and the chassis. Be sure to make this a clean, solid connection to ground; this is a high-current point.

Since it is effectively across the tank circuit, the shunt-feed rf choke, RFC3, must be a good one. It is strongly recommended that you make it yourself; we know of no ready-made rf choke that is as good as this hand-made one.

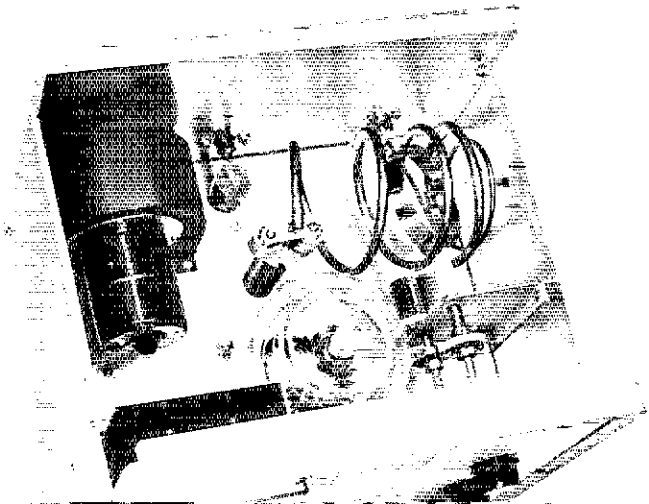
Teflon rod is slippery stuff. It will help if you can get a shallow thread cut in the form, to hold the winding in place. If you don't have a lathe, perhaps a machinist friend can do it for you. If not, a satisfactory winding job can be done as follows: Cut two lengths of No. 20 enameled wire, a bit more than 7-feet long. Clamp one end of the pair in a vise. Hold the other end in heavy pliers, and stretch the wires a bit, which will help to stiffen them. Now, feed the wire ends through one hole in the Teflon form, and wind the coil with the two wires bifilar, keeping them under considerable tension. Pull the ends through the other hole in the form, and bend one back tightly at the edge of the hole. Now remove one winding, and you will have an evenly-spaced coil that makes an excellent rf choke. This may take a little practice, but the results are worth the effort.

The blocking capacitors, C3 and C4, are sandwiched between brass plates. One is fastened to the top of the rf choke form with a sheet metal screw, and the other connects to the hot end of L2. The latter has a wrap-around clip of flashing copper for this purpose. Connection to the tube plate is made with braid removed from a scrap of coax. A strip of flashing copper 1/4-inch wide is also good for this. Use a good heat-dissipating connector, such as the Eimac HR6.

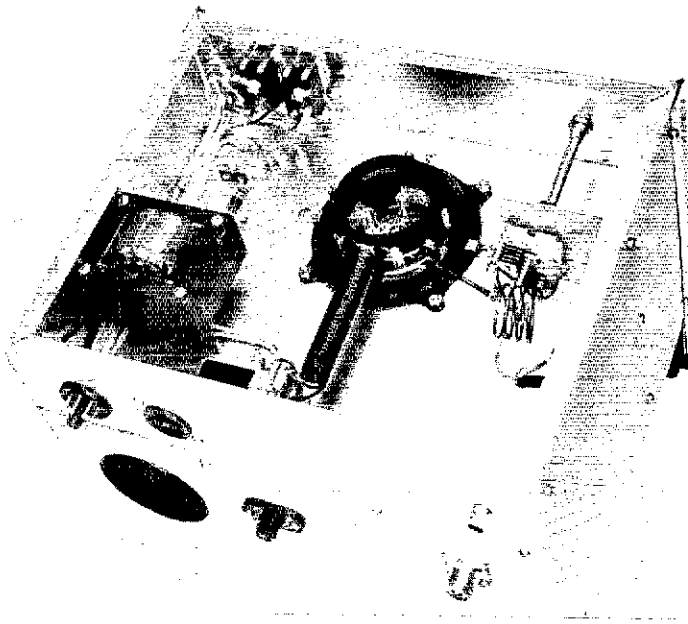
The shorted-turn tuning ring is centered between the first two turns of L2. The first part of the shaft for the ring is a ceramic stand-off. The main shaft is 1/4-inch diameter rod or thick-wall tubing, the end of which is tapped for 8-32 thread. The shaft runs through a bearing mounted in a bracket 4 inches high and 2 3/4 inches wide, that fastens to the chassis and the side of the enclosure. The output loading capacitor, C6, is also mounted on this bracket. It is one inch above the chassis, and the tuning-ring shaft bearing is 3 1/4 inches above the chassis. The input tuning capacitor, C1, is mounted under the chassis, with equal spacing between the three, for symmetrical appearance.

The output coupling loop, L3, is mounted just inside the cold end of L2. It can be adjusted for optimum coupling by "leaning" it slightly into or out of L2. Be sure that it clears the shorted turn throughout movement of the latter.

The coaxial output jack, J3, is mounted on the rear wall of the enclosure. A small bracket of aluminum connects it to the chassis, to form a good ground that is independent of the bonding between the chassis and the enclosure. Plate



Interior view of the 50-MHz amplifier shows the shorted-turn tuning system, plate coil and output coupling, upper right. The tuning and loading controls are mounted on a bracket to the right of the 3-500Z tube and chimney. Meter shielding is partially visible in the left front corner.



With the bottom cover removed, a look into the chassis from the rear shows the input circuit, L1C1, left, the bifilar filament chokes foreground, filament transformer and control switches. Opening in the rear wall is for air intake.

voltage enters through a Millen 37001 high-voltage connector, J2, on the rear wall, and is bypassed immediately inside the compartment with a TV "doorknob" high-voltage capacitor, C5.

The blower assembly is mounted on the chassis in the left rear corner. It draws air in through a hole in the back of the compartment, and forces it down into the enclosed chassis. The only air path is then back up through the socket and chimney (Eimac parts SK-410 and SK-406 recommended) and out through the cane-metal top of the enclosure. The blower has a 2-inch wheel turning at 3000 rpm. A larger wheel turning slower might do as well, and be quieter. The data sheet for the 3-500Z specifies an air flow of 13 cubic feet per minute, when the tube is operated at 500 watts plate dissipation. The ac leads for the blower motor come into the enclosure on feedthrough bypass capacitors.

The two meters are enclosed in an aluminum shield fastened to the front and side panels. Their terminals are bypassed for rf inside this shield, and the leads come through the chassis on feedthrough capacitors. Like all power wiring, these leads are shielded wire. The filament and high-voltage-control switches just below the meters are the rocker type with built-in lamps (Carling Electric). The high-voltage switch is not meant to control the plate supply directly, but rather through a relay, as shown in the 3000-volt power supply in Chapter 12 of the *Handbook*. (Fig. 12-37 in the 1970 Edition.) The plate meter is in the negative lead, so be sure that your power supply is compatible with this arrangement. Do not use this system where a potential difference exists between the amplifier and power supply chassis.

Use of shielded wire (Belden 8862) throughout, bypassing of all exposed points, and feedthrough capacitors wherever power leads pass through the chassis had the desired effect. With the amplifier running at full input, only the faintest trace of rf can be found on wiring outside the cabinet.

Adjustment and Use

The tube manufacturer cautions against applying drive to the 3-500Z without the plate voltage being on, so it is well to make initial tuneup adjustments with only a few watts of drive, and with reduced plate voltage. The input circuit tunes quite broadly, and will show very low reflected power on an SWR bridge connected between J1 and the exciter, if the tap on L1 is at the proper point.

With a 50-ohm load connected to J3, and with C6 near minimum capacitance, apply 1000 to 1500 volts through J2, and turn on the driver. Adjust the shorted turn inside L2 for a dip in plate current. Adjust C6 and the position of L3 with respect to L2 for maximum output, and retune the plate circuit with each adjustment.

The tuning range was adjusted to cover 49.8 to 52.7 MHz by changing the relative spacing of the turns of L2. The closer they are spaced at the shorted-turn end, the greater will be the tuning effect of the ring. The highest frequency is reached with the ring in a vertical plane (greatest coupling to L2) where it reduces the plate coil inductance by the greatest amount.

Since there is no tuning adjustment other than the ring, the total inductance of L2 is critical, and some experimentation with coil diameter and turn spacing may be necessary. The wrap-around lug at the hot end of the coil should not be soldered in place until you are sure that the coil is the right size. The various mounting dimensions that affect the tuning range are as follows: Grounded support for L2 – 1 1/8 inches from the right side of the chassis and 3 1/4 inches from the rear. RFC3 mounting position – 4 inches from the rear and 5 1/2 inches from the left side. Shorted turn – approximately centered between turns 1 and 2 of L2. The start of L3 bends from the stator of C6 to near the start of L2. The end toward J2 passes

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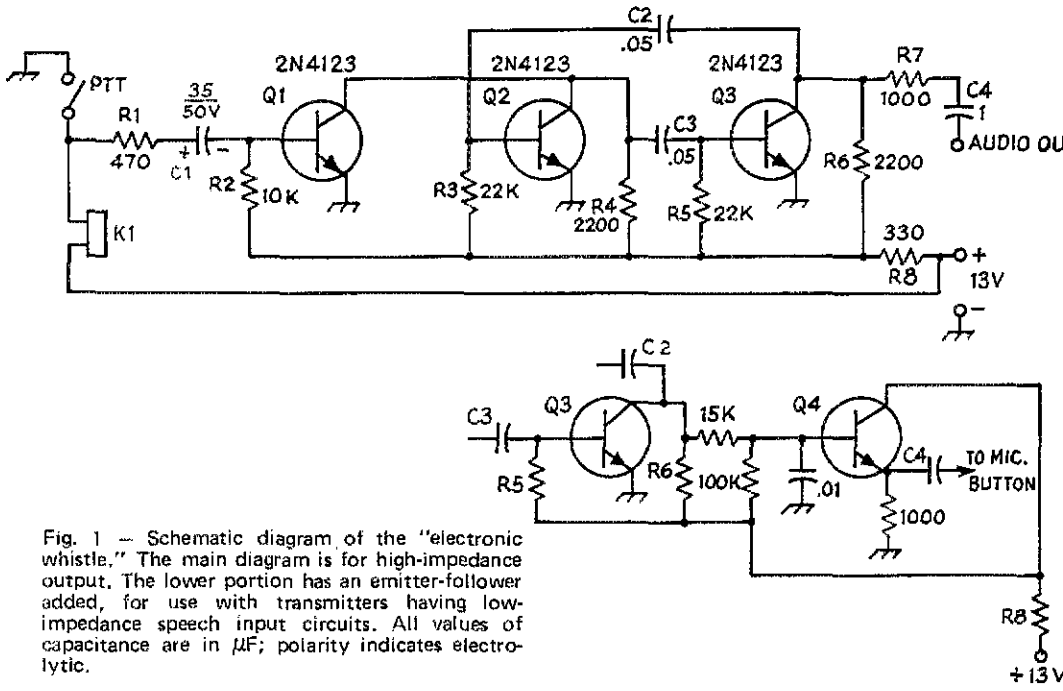


Fig. 1 — Schematic diagram of the "electronic whistle." The main diagram is for high-impedance output. The lower portion has an emitter-follower added, for use with transmitters having low-impedance speech input circuits. All values of capacitance are in μF; polarity indicates electrolytic.

Gimmicks and Gadgets

An Electronic Whistle for FM Transmitters

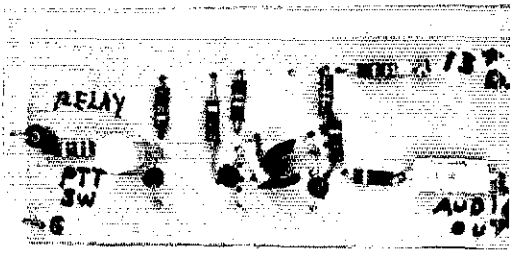
Automatic Tone Generation for Repeater Access

BY TIMOTHY LEE BRATTON,* WA5FTP

ALREADY MANY repeaters employ some form of tone access, and it seems certain that more will, as the number of repeaters grows. If FCC's Docket 18803 should go through as published in April, 1970, *QST*, all fm operators who work into repeaters will need "whistles" like this one. Anyone who has had the experience of his whistle "going dry" at a critical moment in repeater communications will appreciate the advantages of being able to make the access tone electronically and automatically, with the pressure of the push-to-talk switch.

The whistle-on device shown schematically in Fig. 1 was built for use with my Motorola 30-D transmitter, on a 1 1/2- by 2 1/2-inch piece of Vectorbord. It is nothing more than an astable multivibrator, triggered by a one-shot. When the push-to-talk switch is closed, actuating the transmitter relay, K1, Q1 goes from saturation to cut-off, and the multivibrator, Q2-Q3, begins oscillating with a period dependent on the values of R3, R5, C2 and C3. Values given result in a "whistle" of roughly 650 Hz.

*Department of Electrical Engineering Rice University, Houston, TX 77001.



Printed-circuit version of the "electronic whistle."

Oscillation ceases when Q1 turns on again. This is regulated by the values of R2 and C1, and is roughly 0.25 second with the values shown. The 470-ohm resistor, R1, protects the base of Q1 from current surges when the PTT is released.

The lower right portion of Fig. 1 shows an *emitter-follower added, for use with transmitters* employing carbon microphones. The value of C4

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PHONE PATCHING—ONE YEAR LATER

BY GEORGE P. SCHLEICHER,* W9NLT

It has now been well over a year since phone patching became a legitimate operation. A brief review of the developments of that year will be helpful to anyone who is contemplating phone patch operation, including automatic interconnection of amateur repeaters.

PHONE PATCHES became fully legal when telephone operating companies filed tariffs permitting "the interconnection of customer-provided voice transmitting and receiving equipment." Most of the Bell System operating companies filed these tariffs in 1968. In a few cases, they became effective before the end of that year. For example, in the territory served by Bell of Pennsylvania, and by the Cincinnatti Bell Telephone Companies, the tariffs became effective on the first of November, 1968. In New Jersey, Illinois and many other states the tariffs became effective on January 1, 1969. A few states lagged behind; the last Bell Company tariff to be approved was in Michigan, which became effective on March 9, 1970. The significance of these dates for an amateur radio operator is that the telephone company serving an individual could not accept an order for an interconnection arrangement until after the tariff became effective – and approval is controlled by each state's Public Utility Commission.

The independent (not affiliated with the Bell system) telephone companies have not been too prompt to file similar service offerings. There are about 2500 different operating telephone companies in the United States; this writer has not been able to find any organization that could say, authoritatively, which independents had filed tariffs that would permit interconnection and which had not. If you are interested in phone patching, call your local telephone business office and ask for information. Do not be surprised if they have never heard of phone patching or of interconnection. If that is the case, ask to be referred to someone in their sales or marketing organization. If that, too, fails, address your request for information to the president of the company.

While there are no reliable statistics on the number of ham phone patches, the AT&T Company has released the information that at the end of January, 1970, Bell Companies had installed 1147 of the manual voice connecting arrangements. It is reasonable to assume that most of these were associated with amateur radio stations, not only because of the publicity given to patching in amateur magazines but also because hams could take advantage of the interconnection privileges faster than could most commercial organizations.

The Telephone System

Amateurs have learned a few things about the telephone system, too. For example, most hams were under the impression that telephone lines had an impedance of 600 ohms. Many were surprised to learn that telephone instruments are designed to have an impedance of 900 ohms. So are local telephone offices. Telephone lines used for local exchange telephone service exhibit an impedance that varies widely with frequency over the voice band; the lines are generally considered to have an impedance of 900 ohms, however. If you compute the impedance of telephone cable pairs you will find that for wire gauges between 19 and 26, the impedance will fall in the shaded area of the graph shown in Fig. 1.

The impedance of a typical residence telephone line will depend to a large extent on the impedance that is connected to it at the local telephone office. Only if the line is relatively long, (over 4 miles or so) will the line begin to exhibit impedance characteristics close to the values indicated by Fig. 1. When phone patching through a voice coupler, the load presented to the "patch" circuit consists of the local telephone instrument in parallel with the telephone line, both as seen through the coupler.

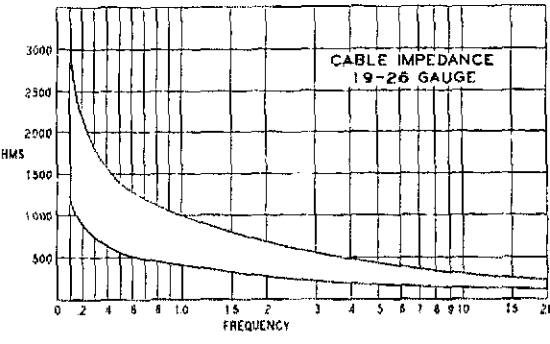


Fig. 1 — Graph showing the change of impedance with frequency (in kHz) of standard telephone cable using No. 19-26 gauge wire in twisted pairs. To be close to the values shown, the cable must be several miles long.

*1535 Dartmouth Lane, Deerfield, IL 60015.

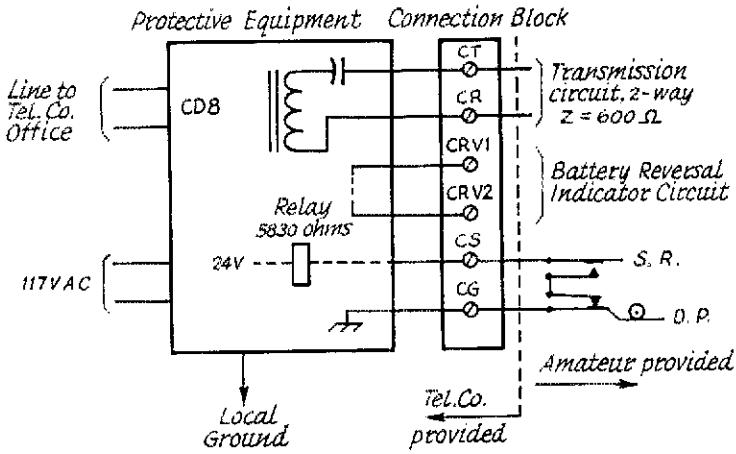


Fig. 2 — Interconnection diagram for a Bell CD8 coupler — one of the models used for "patching" into amateur repeaters. The contacts marked S.R. are normally open, and they are closed to activate the CD8. D.P. is the normally-closed dial-pulse connection. The battery reversal indicator (connections CRV1 and CRV2) is not required for amateur use.

The Circuit

This phone patch uses a hybrid circuit which balances with a network consisting of 478 ohms in parallel with .04 microfarad of capacitance suggesting that the effective line impedance may be slightly above 900 ohms.[1] The reason telephone companies recommend a 900-ohm phone patch is that it is the optimum impedance for connecting to a working telephone and line.

The confusion that has arisen about line impedance probably results from a practice of the telephone companies. They normally use transmission measuring sets having an impedance of 600 ohms when checking channels provided for broadcasters and private mobile radio systems. They recommend strongly that the customer's equipment be of 600 ohms, too, in order that the measurements will be representative of the way that the channel will perform when the customer's equipment is connected to it. This circumstance has caused many people (professionals as well as amateurs) to presume that all channel facilities are of 600 ohms impedance; such is not the case, however.

Voice Couplers

During the past year several technical developments have occurred, most of which have led to better understanding of the nature of a telephone interconnection and the kinds of circuits that can be used to do the patching. More is known about interfacing with the voice-coupler that the telephone companies provide. For example, the first version of the coupler was coded F-57948 and was arranged so that the sleeve of the input jack was directly connected to the metal stamping that formed the base of the coupler. Obviously, if the coupler was mounted on a grounded metal object such as a desk or office partition, a foreign ground was introduced into the phone patch circuit. The newer voice coupler (Model 30-A) isolates the jack from the coupler base. Both arrangements permit the phone-patch circuit to be balanced to ground, or to have either side grounded. Some of the telephone-noise problems introduced by the older coupler have also been eliminated.

A number of ham clubs and a few individuals have inquired about a coupler that would permit unattended dial operation of a telephone line. Such a coupler would permit telephone calls to be made from an amateur's car to a home station or a repeater site that was suitably equipped. The Southwestern Bell Telephone Company will provide such an interconnection, according to Don Chase, WØDKU.[2] In Chicago, the Illinois Bell Telephone Company has authorized the Chicago FM Club, operating WA9ORC, to interconnect. Phil Schuman, WA9TKA the club's PR man, reports that the interconnection arrangement is coded CD8. The installation charge for this device is $10 and there is a monthly charge of $4.10. These costs are in addition to the regular charges for a business telephone line. The connections to arrangement CD8 are shown in Fig. 2. As you might expect, this interface was selected because it will provide for telephone calls to be originated through the radio equipment on an unattended basis. A call *coming in* over the telephone line could not energize the transmitter, however; an operator would have to be present to complete such a call. Of interest is the fact that voice circuit connected to the CD8 equipment should be of 600 ohms impedance. That is probably because that the apparatus was originally developed for the connection of privately-owned dial switching equipment to the telephone line. Provisions are made to pass dial pulses coming through the radio system to the telephone line by means of the CS-CG circuit. Pulses for dialing would consist of momentary interruptions in the CS-CG circuit and would be at a nominal rate of 10 pulses per second (pps). More complete standards for telephone dial pulsing are shown in Fig. 3.

Ham clubs using these arrangements should be cautious about a few points. They will be

[1] Schleicher, "Phone Patching — Legitimately," *QST*, March, 1969.

[2] Chase, "The Wichita Autopatch," *73*, May, 1970.

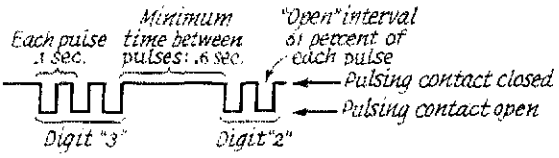


Fig. 3 – Timing diagram of standard dial pulses. The normal limits specified by the telephone company are 8 to 11 pulses per second with a break (open) time of 50 to 75 percent.

responsible for all telephone calls made on their line, whether the calls are authorized or not. This writer does not recommend an arrangement that makes it possible to dial into a repeater, putting the transmitter on the air unless adequate precautions are taken against transmitter operation by someone who has dialed a wrong number. Remember that patched connections do not enjoy either privacy or freedom from interference on the ham bands. The control equipment between the radio gear and the telephone company's coupler should be of "fail-safe" design to avoid falsely causing the telephone line to appear busy. The telephone companies now levy a service charge in cases where they make a visit to correct trouble and find that the trouble is caused by faulty equipment belonging to the customer.

Phone Patch Circuits

A number of hams – some authorities say most of them – are using push-to-talk operation rather than voice-controlled transmitting when they make phone patches. PTT does permit the patch circuit to be reduced to its most elementary form. More complicated circuits using hybrids have already been published; so have some arrangements for automatic (unattended) patching at repeater stations. A bibliography of these articles appears at the end of this article. Included are most of the articles that have been published in the last three years, and somewhere in this mass of material lies the answer to most of the questions that may be asked about phone patching.

Regulations

At the present time there is no indication that the FCC staff is considering any special rules to govern patched communications. We can expect, however, that monitoring stations will be listening. The main points to remember include:

1) Patched communications are third-party traffic. Special agreements, permitting such traffic, must exist between governments of the United States and any foreign country involved.

2) The rules on periodic station identification and prohibited language still apply to the amateur station transmission, even though a third party is speaking.

Some amateurs have been inquiring as to whether or not the voice coupler or its equivalent will continue to be required, or whether direct connection to telephone lines will be permitted. A special group was commissioned by the FCC to help resolve this question. The study, "Report of a Technical Analysis of Common Carrier/User Interconnections," was carried out by the special panel on common carrier interconnections of the Computer Science and Engineering Board of the National Academy of Sciences. In a letter submitting the report to the FCC, the chairman of the Computer Science and Engineering Board summarized the following principal technical findings of the study:

1) Uncontrolled interconnection to the common-carrier network as it now exists would be harmful.

2) The requirements of the tariff criteria limiting characteristics of interconnected lines are technically based and in accord with the operational limits of the common-carrier network as it now exists.

3) The nature of potential harm, criteria for protection against such harm, and the performance of various components of the telephone system can be specified explicitly enough to be understood and acted upon properly by people with normal technical competency.

It is reasonable to expect that protective interface equipment will be required for some time to come.

Toward A Better Mousetrap

In the future, new circuit arrangements will be developed and old ones will be improved. One fertile area for improvement, for example, is in the design of an automatic level-adjusting amplifier to be connected between the phone patch and the radio equipment. Ideally, such an amplifier would accept input levels over a wide range, 30 or 40 dB, and would adjust them to a narrow range of output levels. Such a compressor should be designed to ignore background noise, however. An amplifier

(Continued on page 58)

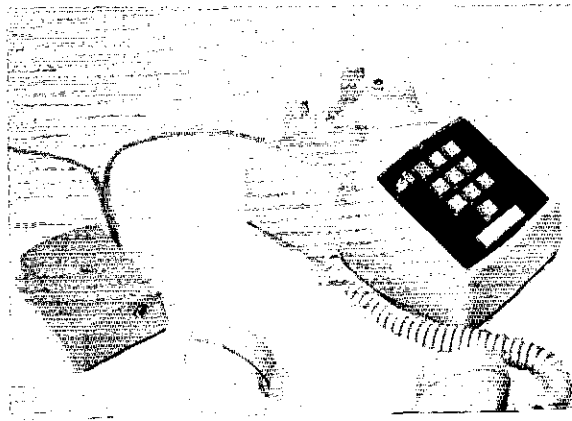


Fig. 4 – A Touchtone telephone instrument shown with the type 30 voice coupler. The left-hand plunger is raised to connect the coupler. At the time of installation, the turn button may be wired to disconnect the handset transmitter, receiver, or the entire handset.

• *Beginner and Novice*

A Station Control Unit for the Blind Amateur

There have been numerous articles describing equipment for blind amateurs. However, as far as we can recall, this is the first which features an integrated control unit. With it, the handicapped amateur needs only a receiver and transmitter, plus 120 feet of wire for the antenna.

BY LEWIS G. McCOY,* W1ICP

ANY NEWCOMER to amateur radio encounters a hobby that is loaded with problems that may appear insurmountable at first glance. Fortunately, most beginners are willing to learn and they gradually acquire the necessary know-how to operate a ham station. In recent work with a sightless newcomer, it became apparent that any simple problem is proportionally more difficult than the same problem would be to a ham who can see. If you don't think so, just try tuning up your rig with your eyes closed – or adjust an antenna system, or try to find a ham band on your receiver. While there are many devices and circuits available to aid the blind ham, we couldn't find one that combined the necessary equipment into one integrated unit. So this article describes a single unit that can be used with an antenna, transmitter and receiver to enable the sightless amateur to make all the necessary adjustments required to put his station on the air.

The Station Control

This unit has many features. First, and most important, it has a tone comparator fashioned after a circuit described by Blaney[1] a few years back. The tone comparator, Fig. 1, enables the operator to estimate voltages and currents in his rig with a high degree of accuracy. Q1 is a dc amplifier and Q2 operates as an audio oscillator. When any voltage from zero to one volt is applied to Q1, the voltage is amplified and fed to Q2. The pitch of the oscillator depends on the amount of voltage reaching the base of Q2. In the circuit shown, at zero volts, or very close to that value, the oscillator produces a pitch of a few hundred Hz. At one volt, the pitch increases to about 2000 Hz.

The voltage drop across a meter in the transmitter varies with the current flowing through the meter. When this change in voltage is applied to the comparator, the pitch of the oscillator will change accordingly. To determine what the meter is actually reading, S2 is switched to the calibrate position and R4 is adjusted so that the tone from the calibrator circuit matches the tone caused by the voltage which comes from the rig. The knob on R4 has a skirt that is marked in Braille or with notches amounting to 10 divisions. Most meters used in ham gear have 0 to 1-mA movements. Once the operator knows the calibration of his transmitter meter, it becomes a simple matter to relate that calibration to his comparator.

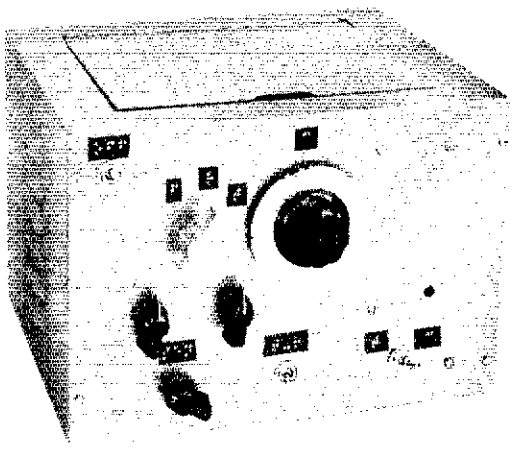
The second important feature of the station control unit is a simple pi-type Transmatch consisting of C1, L1, and C2. This Transmatch can be used with most random-length wires, where the end of the antenna is connected directly to the Transmatch. In order for the amateur to know when the Transmatch is properly adjusted, an SWR indicator is required. Normally, a 1-mA meter is used to check the forward and reflected power when adjusting a Transmatch. In this unit, an etched-circuit Monimatch[2] is used. In this case, the sensitivity control is connected in the forward position only. In the reflected-power position, full sensitivity is used. When the amateur adjusts his Transmatch, he switches back and forth with S1, looking for a high-pitched note on forward and the

*Novice Editor

[1]Blaney, "An Audio Meter for the Sightless," *QST*, April, 1963.

[2]See Fig. 1, Z1.

Here's Steve, WN1NFI, using his comparator. Listen for Steve on 80 and 40 from his permanent QTH at the Hillsdale Convalescent Home, Bloomfield, Conn.



Here is the completed control unit. All controls are marked in Braille. At the upper left corner is the ac switch, S4, and to the lower right, S1. Just below S1 are the knobs for C1 and C2 with the sensitivity control, R5, at the lower left. The toggle switch at the bottom center is S3. The comparator switch, S2, is at the lower right. The hole immediately above S2 is there to provide access to R3.

lowest possible pitch on reflected. We found that using another Monimatch in the line, but keeping the meter face covered, we could adjust the Transmatch by listening to the tones. Frankly, it was rather startling to find out just how easy it was to adjust for a good match.

The installation of the tone-adjusted Monimatch provides a bonus feature. By leaving S1 in the forward position, after the rig and Transmatch are completely adjusted, the Monimatch can be used as a side-tone monitor for cw operation.

One more feature of the control unit provides an antenna changeover relay. The relay is a surplus 117-volt ac unit (dpdt), and it is controlled by S3. In the unenergized position, the antenna is connected to the station receiver (with the Transmatch in the circuit). When S3 is switched to transmit, the relay is energized and the antenna is connected to the transmitter. While the extra relay contacts were not used in the unit shown, these contacts could be employed to mute the receiver during transmit periods.

How the Transmatch Works

So that the blind amateur will have some idea of how a Transmatch is used, a brief explanation is in order. Nearly all transmitters these days are designed to work into a 50-ohm load. Unfortunately, very few multiband antennas will provide this load. What is needed is a circuit that will transform the unknown load of the antenna and feed line to a 50-ohm load. That's where the Transmatch comes into use. This device is simply an adjustable rf transformer that takes the unknown antenna load and converts it to 50 ohms. For example, using the Transmatch shown, it is possible to take a 120-foot end-fed antenna, (the end being brought directly to the Transmatch) and match the antenna impedance to a 50-ohm transmitter on any band, 80 through 10 meters.

There is one more important point though – how do we know when our Transmatch is correctly adjusted to make this 50-ohm load transformation? Simple. The Monimatch shows us when we have the Transmatch correctly adjusted. The Monimatch is basically a section of transmission line with two coupling lines in it. The coupling lines are conductors that parallel the inner conductor of the transmission line. Rf power is coupled to these conductors and the rf is rectified by CR1 and CR2 and converted to dc so the current can be read on the meter – the audio comparator in our case.

When power is sent up the line from the rig to the antenna, the antenna takes all the power from the line and radiates it. However, for this to happen the impedance of the transmission line and the antenna must be exactly the same. Usually, this isn't the case. If the impedance of the antenna is different from that of the feed line, voltages and currents will be reflected back down the line to the rig. These voltages become standing waves. The ratio between maximum and minimum voltages (or currents) at any one point on the transmission line is called the standing-wave ratio (SWR). Getting back to our Monimatch, the coupling lines in the unit sample these forward and reflected voltages providing us with the relative magnitude of each. The Transmatch should be adjusted so that when S1 is in the FORWARD position, we get the highest possible pitch, and in the REFLECTED position, the lowest possible pitch. With these conditions, the Transmatch will be correctly adjusted to match the antenna system to the output impedance of the transmitter.

Construction Details

A bread-board version was built to check how the various units would work together. Everything appeared to be alright, so the final model was made. Difficulties immediately appeared because in wiring the unit, we used unshielded leads for the connections between parts. With the Transmatch in the same box the rf got into the comparator, causing hum and upsetting its operation. All of the leads were replaced by shielded wire (Belden type 8885) and the problem was solved. It might have been possible to put the comparator and audio amplifier sections in a separate shielded box in order to reduce the rf problems, but we didn't try this.

Aside from the need to use shielded wire, there is nothing particularly critical about building the unit. In arranging the layout of parts, the comparator and audio amplifier boards should be mounted on one side of the chassis and the Transmatch circuit at the other side. In the unit shown, the chassis is homemade, measuring 8 1/2 x 7 3/4 x 2 inches. It fits into a 10 x 7 x 8-inch cabinet.

The comparator components are mounted on an etched circuit board. Details for making etched

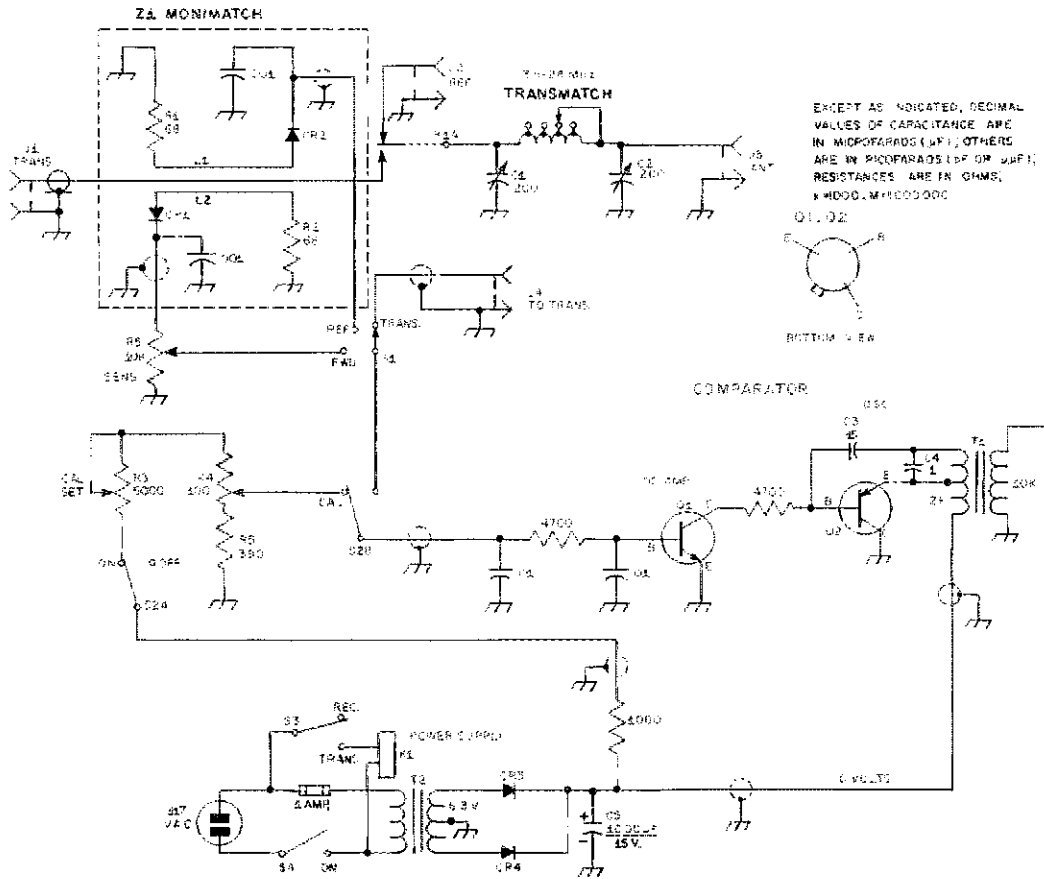


Fig. 1 — Circuit diagram of the control unit. Decimal-value capacitors are disk ceramic. Capacitance is in μF unless otherwise specified. Resistance is in ohms. All fixed-value resistors are 1/2-watt composition or carbon.

C1, C2 — 200-pF variable (E.F. Johnson 167-12 or similar).
C3 — 0.15-μF paper.
C4 — 0.1-μF paper.
C5 — 1000-μF, 15 V electrolytic.
CR1, CR2 — 1N34A germanium.
CR3, CR4 — Silicon 50 volts PIV or more, 1 A.
J1 — Coax chassis connector, type SO-239.
J2, J3 — Phono jack.
J4 — Transmitter terminal (as many contacts as required).
K1 — Relay (see text).
L3 — See text for details. Coil stock is B&W type 3019).
Q1 — HEP 641 or equivalent.
Q2 — HEP 51 or equivalent.
R3 — 5000-ohm composition control.
R4 — 100-ohm composition control, linear taper.
R5 — 10,000-ohm composition control, linear taper.
S1 — Single-pole, three- or-more positions (as required), wafer.
S2 — Dpdt toggle.
S3 — Spst toggle.
T1 — Transistor driver transformer. 10,000-ohm primary, 2000-ohm, c.t. secondary. Secondary used as primary in this application (Lafayette Radio type AR-109).
T2 — Power transformer, 117-volt ac primary, 6.3-V., 1.2-A secondarys (Stancor P-6134 or similar).
Z1 — Etched-circuit Monimatch. For construction details see Oct. 1969 *QST*. This issue is still available from ARRL for 75 cents.
Z2 — Integrated-circuit audio amplifier (RCA type KC-4003, available from Lafayette Radio).

[EDITOR'S NOTE: Barry Electronics, 512 Broadway, New York, NY 10012 will fill any order, for most parts, at manufacturer's current net price.]

circuits are giv en in the construction chapter of the *Handbook*.[3] Z1 is an RCA KC-4003 integrated-circuit audio-amplifier kit.

The Transmatch consists of pi network with a tapped inductor, L3. The inductor is 3-inch length of Miniductor coil stock, 1 1/4-inch diameter, 16 turns per inch. The coil is supported by solder lugs that are mounted on 1/2-inch high standoff insulators. In order to prevent the tapped turns on the coil from shorting to their adjacent turns it is necessary to indent every other turn on the coil, bending the wire in towards the coil axis. A short clip lead should be used for initially finding the correct tap point for a given band, with a particular antenna. After the correct shorting point is found, a solder lug can be installed on the appropriate turn. With the solder-lug end projecting above the coil it becomes a simple matter for the amateur to locate the correct tap by touch. *Make this adjustment with the power off.*

The etched-circuit Monimatch board is mounted on the rear wall of the chassis. The board should be attached with the etched side away from the chassis wall. The board itself should be 1/4-inch from the wall. In checking the Monimatch, we found that additional shielding was not required around its board. However, the leads from diodes CR1 and CR2, to R1, should be shielded.

When mounting the antenna relay, rubber grommets should be installed around the screws that secure the relay. This will reduce the noise caused by relay vibration.

Adjustment Procedures

It is practically impossible to guess what kind of transmitter each individual will use. However, there are some basic rules which should be followed. Never monitor a current or voltage from the B plus in the transmitter. Every tube transmitter has lethal voltages present, and in this case it is better to keep those voltages inside the transmitter case. During our tests the comparator was used with an Elmac AF-67. This rig has the metering circuit in the B plus lead so we opened the cathode lead of the 6146 amplifier, inserted a 10-ohm resistor, and then installed a 47,000-ohm dropping resistor from the cathode of the tube, see Fig. 2. This provides a range of 0 to 1 volt. This voltage is fed to S1 and the comparator input.

At this point it would be a good idea to expalin exactly what happens and what we are trying to read with the comparator. First, the metering circuits in most transmitters consist of a single meter that is switched to read various voltages or

[3] *1970 Radio Amateur's Handbook*, Chapter 20.

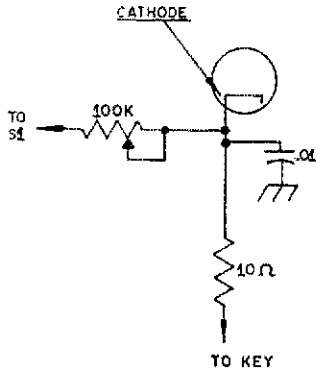
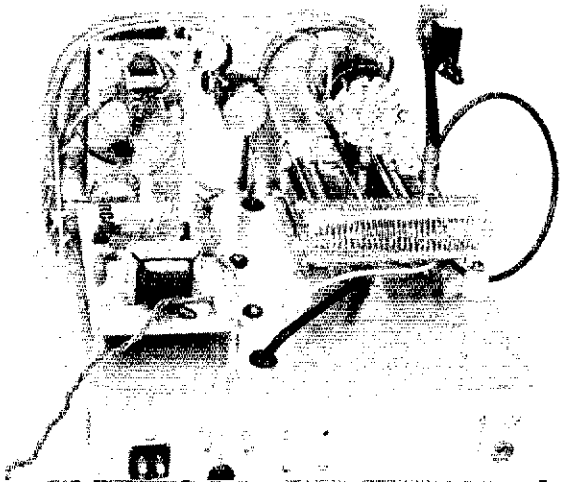


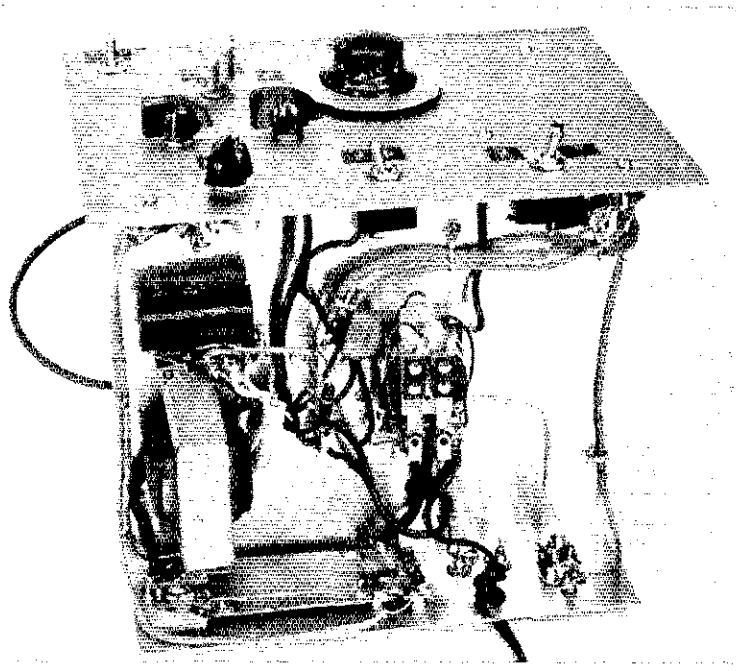
Fig. 2 — Test connection for determining the dropping-resistor value inserted in the cathode line in the transmitter. The 100,000-ohm control is set to provide 1 volt corresponding with a full-scale reading on the transmitter meter.

currents. The important point for the blind amateur to keep in mind is that the meter has only one basic range, usually 0 to 1 mA. Even though the meter face calibration may have a 0 to 300-mA range. The amplifier tube or tubes may draw 200 mA or more at full loading and this means the meter must be calibrated with a scale that shows these numbers.

Next, let's suppose that we have our comparator unit connected to a transmitter and we are ready to tune the rig. The skirt on the knob of R2 is marked in 10 equal divisions, either with Braille or with notches. First, the key is closed and the final amplifier tank is resonated for the lowest pitch (with S2 switched in the position that feeds the transmitter connection to the tone oscillator). The lowest pitch would correspond to the plate current dip shown on the transmitter meter, indicating that the amplifier tank is tuned to resonance. Next, switch S2 to the CALIBRATE position and adjust R4 so that the tone from comparator matches the tone caused by the voltage coming from the rig. By feeling the skirt of the knob, we can tell how many divisions we are from



The circuit board mounted on the front panel is the comparator section, and the one located on the chassis is the RCA audio amplifier. At the right on the chassis is the Transmatch. This circuit will handle transmitters in the 100- to 200-watt class. On the rear wall of the chassis (from the left) are the transmitter connection terminal and the antenna and receiver jacks. At the far right is the transmitter input fitting.



Mounted on the chassis wall is the etched circuit board of the Monimatch. At the center of the chassis is the antenna relay. Note the extensive use of shielded wire.

either the high or low end of the range. If we know what the calibrated reading of the transmitter meter is for full scale, we can easily divide that figure into 10 parts or divisions and quickly relate that to the marking on the knob of R4. Let's say that our meter is calibrated to 100 mA full scale. Half-scale would be 50 mA, one-tenth scale 10 mA, and so on. Also, suppose we had to load the PA for 70 mA of plate current at resonance. All we have to do is to get the tone for the seventh notch on R4, (counting from the low-pitch end of the comparator) to match the tone caused by the rig. This will mean adjusting the loading and tuning controls on the transmitter until we achieve 70 mA at resonance (or a "70-mA tone"). If you can think in terms of 10 divisions on the transmitter meter and the knob on R4, you should have an idea of how the unit is used. We haven't tried to cover grid tuning in this example, but the same technique applies. As long as we have points in the rig to measure the 0 to 1-volt plus range, it becomes a simple matter to tune any transmitter.

How do we know that the comparator actually *compares (no pun intended) with the full-scale* reading of the transmitter meter? The adjustment is quite simple. Set S2 in the CALIBRATE position and turn R4 so that the movable arm of the control is as far above chassis ground as possible. Next, switch S2 back to the TRANSMITTER position, then adjust the final tuning so that we have a full-scale reading on the transmitter meter. This will probably mean that the PA will be out of resonance for a short time but the momentary overload shouldn't hurt anything. Just don't hold the key down for more than a few seconds. Check the tone coming from the oscillator, then switch S2 back to the CALIBRATE position. Now adjust R3 so that the two tones match. The comparator is now adjusted. Keep in mind what was said earlier – we don't know what rig you'll be using, so the metering circuit might have to be adjusted or modified to provide a 0 - to 1-volt range for the tone oscillator. The simplest method for doing this is to install a 10-ohm resistor in series with the line to be checked and then insert a variable resistor (potentiometer) of 100,000 ohms in series with the line from the tone oscillator to the 10-ohm shunt, see Fig. 2. Adjust the variable resistor until there is one volt between the arm of S1 and chassis ground with the transmitter meter reading full scale. The value of resistance used for the variable resistor can be checked with an ohmmeter, then a fixed-value unit substituted for the control.

Adjusting the Transmatch isn't complicated. We recommend the 120- or 130-foot end-fed antenna as this is easy to tune up. With the antenna connected and the PA resonated, switch S1 to FORWARD and adjust R5 for the highest possible tone pitch. The coil-shorting clip position will *depend on the band in use. On 80 meters most of* the coil should be tried first. Switch S1 to REFLECTED and adjust C1, C2, and L3 for the lowest tone. You may have to retune the amplifier as you make these adjustments. What you are shooting for is a setting of C1, C2, and L3 that gives the highest tone in the FORWARD position, and the lowest pitch in the REFLECTED position. Once you find and note the settings, it becomes an easy matter to change bands.

This unit should make a worthwhile project for radio clubs or hams that are willing to lend a helping hand to handicapped amateurs. QST

KOX – Keyboard-Operated Transmisson on RTTY

BY JERRY HALL,* K1PLP

MOST PERSONS who operate RTTY, at one time or another, have had thoughts about fast-break no-switch RTTY operation. After all, look how easy and effortless it is to use voice-controlled break-in operation (VOX) with ssb transmissions. Couldn't keyboard-controlled break-in operation (KOX) on RTTY be just as effective?

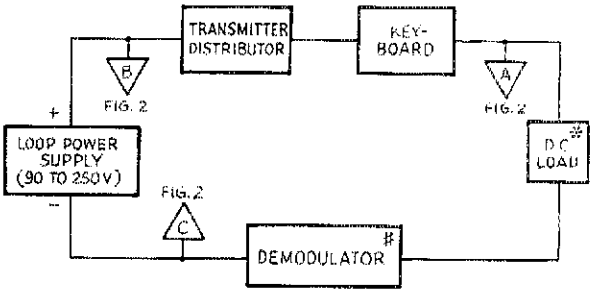
It certainly can be, and this article describes simple circuits affording keyboard-operated transmissions. Simply start typing at the keyboard, and the carrier comes on for your transmission. Stop typing and, after an adjustable delay, the carrier goes off and your station returns to the receive mode. Everything is electronically controlled, with no switches to throw. Using fast-break techniques, the half-duplex operation available to subscribers of the commercial landline services can be approached!

Local Loop Connections

A VOX-type circuit is wired into the local loop. This circuit, by sampling the loop voltage, detects the interruption of the local-loop current when any keyboard key is depressed, or when the TD is started. In turn, a relay is energized. This relay controls the switching of the station between receive and transmit. An adjustable time constant holds the relay closed for a brief period of time after the TD or typing has stopped.

The circuits presented here are intended for use in a system where the keyboard and TD are connected in series with a loop power supply and some form of dc load. Fig. 1 shows a typical local-loop arrangement where the TD, keyboard, printer selector magnets, and possibly the keyer section of an RTTY demodulator, are all connected in series. Points A, B, and C, shown in Fig. 1, are for connection of either KOX detector circuit shown in Fig. 2.

In Fig. 1, point C for most installations will be chassis ground or common, and points A and B will correspond to the keyboard-printer junction and the power supply output, respectively. In the Mainline fsk keying system of the TT/L[1] or the TT/L-2[2] where a polar-output keying signal is developed, point A corresponds to the junction of



* – *Printer, polar relay winding, current-adjust control, or other load.*

\# – *Keyer stage or polar relay contacts of demodulator, if not in separate loop.*

Fig. 1 — Typical local-loop arrangement, showing points for connection of KOX detector circuits.

the printer winding and the keyboard contacts, while points B and C correspond respectively to the positive and negative sides of the 80-μF filter capacitor. In any system where the demodulator keyer is used in the keyboard loop, it is important for proper KOX operation that the printer selector magnets be connected *between* the keyer stage and the keyboard contacts, as shown in Fig. 1.

Referring to Fig. 1, it may be seen that as long as the TD and keyboard contacts remain closed, the power-supply voltage is presented at point A, the input of the KOX detector circuit. When either a perforated tape or typing is started, the contacts open, and the voltage at point A momentarily drops to zero.

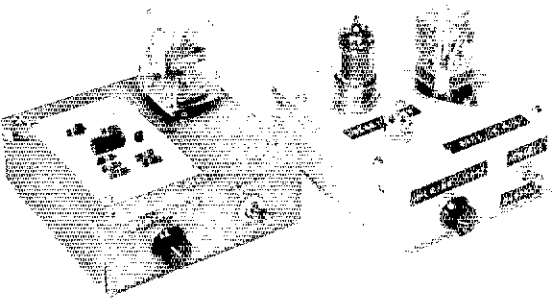
Detector Circuits

Fig. 2 shows detector circuits which may be used for KOX operation. That of Fig. 2A uses a 12AU7A or similar vacuum tube, the plate voltage for which may be obtained directly from the loop

* Assistant Technical Editor, *QST*.

1 Hoff, "The Mainline TT/L FSK Demodulator," *QST*, August, 1965.

2 Petersen, "The Mainline TT/L-2 FSK Demodulator," Parts I and II, *QST*, May and June, 1969.



Two versions of detector circuits for keyboard-controlled break-in operation on RTTY. The device shown at the left is transistorized, while the one at the right uses a vacuum tube. Small chassis boxes may be used for construction, as shown here, or either circuit may be incorporated into existing station-control equipment.

supply. The circuit of Fig. 2B may be used if a solid-state version is preferred. Operation resulting from the two circuits is identical. Power requirements for the vacuum-tube circuit are 120 volts dc at 8 mA, and either 12.6 volts ac or dc at 150 mA, or 6.3 volts ac or dc at 300 mA. The power required for the solid-state circuit is 12 volts dc at 5 mA.

Point A is the sampled voltage input to either circuit. Satisfactory operation will result with any dc level above 12 volts applied at this point. Point B represents the B+ connection for the vacuum tube, and point C represents the ground or common connection for either circuit.

In Fig. 2A, the first section of the tube acts as a direct-coupled inverter. R1 and R2 divide the loop supply voltage down to approximately +12 volts. This voltage is applied to the grid of the tube. The value of R1 will depend on the amount of loop voltage, as described in the section covering adjustments. With a positive voltage applied to the grid during the time when no typing occurs, conduction of the tube is heavy, keeping the plate voltage below the firing potential of the NE-2 lamp. When the positive voltage is absent, during the space condition of either the keyboard or the TD, the voltage divider at pin 3 biases this half of the tube at a very low conduction point. The plate voltage rises nearly to the B+ value, causing the NE-2 triggering lamp to fire, and applying a positive voltage to the grid, pin 7. This positive voltage also charges C1. With a positive grid, this section of the tube conducts heavily, energizing the plate relay and the external equipment connected to its contacts. When the keyboard or TD returns to the marking condition, the charge on C1 holds the tube at heavy conduction for a time determined by R4 and the setting of R3. As typing continues, C1 is repeatedly recharged.

Operation of the circuit of Fig. 2B is similar, with R6 and R7 dividing down the loop voltage. Q1 acts as a switch, turning Q2 on or off. The holding time is controlled by C2 and R8.

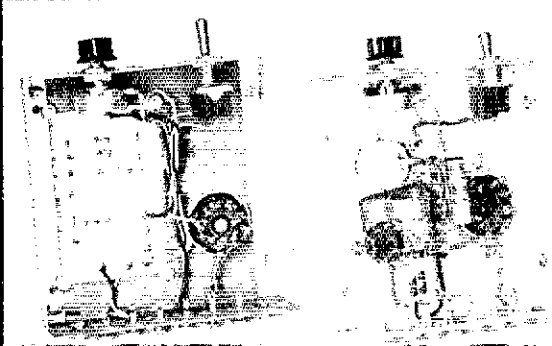
R3 and R8 are linear-taper controls, used as front-panel adjustments for varying the holding time as desired during operation. With the circuit values shown, the "dropout" delays may be adjusted from about 1/2 to 4 seconds. Different supply voltages have some effect on the operational ranges. Depending on your typing speed and your particular circuit requirements, you may wish to use different holding times. Values up to 10 megohms can be used successfully for R3, which will give maximum delay of nearly 20 seconds. Larger values for C2 may be used for longer holding times in the solid-state circuit.

In Fig. 2A, R5 provides for sensitivity adjustment, and also permits compensation for tube aging. Once set, this adjustment may normally be left, so need not be a front-panel control. The setting of this control has a slight effect on the operational range of R3.

Adjustments

After the circuit wiring is completed, if the tube version is being used, adjust R5 to its center, and close switch S1 before energizing the circuit. The final value for R1 should be determined experimentally, and will depend on the type of tube in use, and on the loop supply voltage. (A resistor-substitution box is handy for this task.) Start with a value of 2 megohms for each hundred volts of loop supply voltage, i.e., 2.2 megohms for a 110-volt supply. Then energize the loop power supply and the KOX circuit. The NE-2 lamp should be completely extinguished. If it isn't, substitute a lower-value resistance for R1. The final value for this resistor is not critical, but should be the largest common value which will keep the neon lamp completely extinguished.

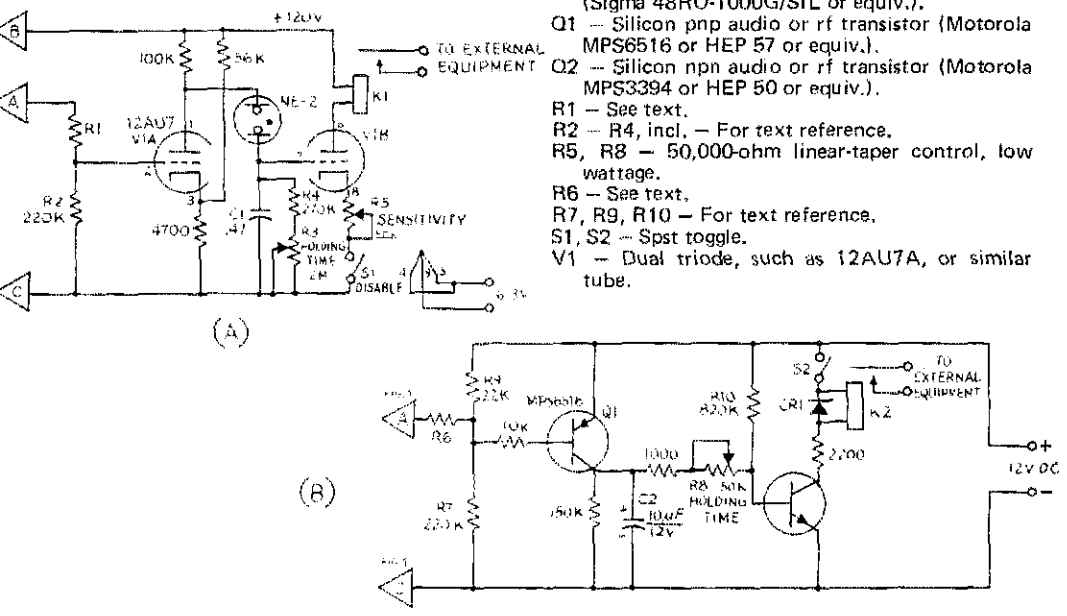
In the vacuum-tube circuit, now adjust R5 until the plate relay closes, then back off the adjustment until the relay just opens. Adjust R3 for minimum resistance, then tap the LETTERS key of the teleprinter keyboard one time. The relay should close for a moment and then open. If it remains closed, back off a bit more on R5. Now advance R3 and try again with the LETTERS key. The relay should stay closed a bit longer than before.



A view inside the two versions of KOX detectors. The solid-state version at the left uses a simple etched circuit-board pattern, but any other construction technique may also be used. Component layout for either circuit is not ciritcal. External connections are made through the use of screw-type terminal strips.

Fig. 2 — KOX detector circuits. At the builder's option, either the vacuum-tube circuit at A or the transistorized circuit at B may be used to obtain identical results. Capacitances are in microfarads (μF); resistances are in ohms, k = 1000, M = megohms. All fixed resistors are 1/2 watt.

C1 — For text reference.
C2 — Electrolytic.
CR1 — Any small silicon diode.
K1 — Plate relay, 10,000-ohm, spst contacts (Potter and Brumfield LM5 or equiv.).
K2 — Sensitive relay, 1000-ohm, spst contacts (Sigma 48RO-1000G/SIL or equiv.).
Q1 — Silicon pnp audio or rf transistor (Motorola MPS6516 or HEP 57 or equiv.).
Q2 — Silicon npn audio or rf transistor (Motorola MPS3394 or HEP 50 or equiv.).
R1 — See text.
R2 — R4, incl. — For text reference.
R5, R8 — 50,000-ohm linear-taper control, low wattage.
R6 — See text.
R7, R9, R10 — For text reference.
S1, S2 — Spst toggle.
V1 — Dual triode, such as 12AU7A, or similar tube.



The final setting of R4 should provide positive pull-in action of the relay when the LETTERS key is hit once. (Of all the keys, the LETTERS key has the shortest interruption of loop current.) This setting of R5 should also cause positive dropout of the relay after the BLANK or the T key has been struck several times, for all settings of R3.

If the solid-state version is being used, the only "adjustment" required is to select the final value for R6. The value should be found experimentally, and will depend upon the amount of loop supply voltage and how well it is filtered. Connect a milliameter to read the current through the coil of K2 (clip the meter leads across S2, leaving the switch open). With only the KOX 12-volt power supply energized, the current should be more than sufficient to close the relay – a few milliamperes. Now temporarily connect a jumper lead across R9, shorting it out, and again note the relay current. This current should be less than that required to hold the relay closed, something like 0.5 mA. If more than this amount of current is read, the value of R10 should be changed to 1 megohm. Now with the jumper removed, energize the loop power supply, and select the highest common value for R6 which provides approximately the same current as with R9 shorted out. For well-filtered loop supplies of 50 to 250 volts, values between 1.5 and 10 megohms will be required; lower values will be needed for lighter filtering. The final value isn't at all critical, but shouldn't be less than a half megohm per hundred volts of loop supply voltage.

Once the value for R6 has been determined, tap the LETTERS key of the keyboard one time. The relay should close for a short period of time, and then open. The time the relay remains closed should be adjustable with R8.

Operation

For either circuit, there is some slight delay on pull-in of the relay, so the first character you type may come out garbled on the receiving end. The use of two LETTERS functions at the beginning of each transmission is suggested, the first to turn the carrier on, and the second to assure that the receiving printer is in a position to type letters instead of figures.

For fast-break operation, there is no real need to use carriage returns, line feeds, or cw identification between short transmissions. (Of course you must identify your station every ten minutes.) When you finish your comment or question, even if right in the middle of a line, just type BK, or simply stop typing, and let the other fellow continue from there to the end of the line.

Soon after this circuit is incorporated, you'll discover that there are times when it is undesirable to have fully automatic operation. One of these times is when you are "reading the mail" on another QSO, with all of your station equipment "fired up" and tuned to zero beat. Should you then decide to make a carriage return with a few line feeds locally, your carrier plopping right in the midst of the QSO probably won't be appreciated. Opening S1 or S2 will disable the "automatic" circuitry, and perhaps save you an embarrassing moment. QST

Technical Correspondence

BEAMS WITH INVERTED-V ELEMENTS

Technical Editor, *QST*:

It might be of some interest to note that inverted-V type elements can be used as a full-size beam on an average lot. See Fig. 1. This arrangement is in use at my QTH and gives a good account of itself. My regular full-size doublet for 40 meters is utilized as a boom for the inverted-V beam. This, of course, permits full quarter-wave spacing for the three-element beam. The insulators are made from epoxy-board material with the copper etched off. A common cable clamp at the center of the regular dipole is used to support the cable and the inverted-V dipole via a 6-inch length of nylon rope. Both insulators are made the same way. The short length of rope allows the lower insulator to be at right angles to the top insulator.

Most hams have at least one doublet in the air. With this arrangement, they can get a beam at a minimum of cost. It works, it's cheap, it's easy to construct; in fact, this type of beam could be supported by a peaked roof top, making an ideal concealed antenna. — *Tom Marshall, W5LT, Box 181, Organ, NM 88052.*

NOISE FIGURE VERSUS TRANSMISSION-LINE LOSS, PART 2

Technical Editor, *QST*:

In my letter, "Noise Figure Versus Transmission Line Loss,"[1] I suggested that it is desirable in uhf and vhf communications to place the preamplifier of the receiver directly at the antenna to eliminate the effects of the transmission line loss, which may be significant at these frequencies. My neighbor, Don Halford, WØJVD, while agreeing with my main point, has presented some intuitive arguments which indicate that some of the reasoning which led up to this conclusion is in error: namely, that since the standing wave ratio of the line when connected to a low noise receiver is usally large compared to unity while usually it is near unity on transmitting, the losses on receiving tend to be much larger than on transmitting. I have considered this matter mathematically, and I find that his arguments are completely justified. The deterioration of the signal-to-noise ratio, under practical conditions, is approximately equal to the deterioration of the transmitted signal due to the transmission line even though the standing wave ratios are different. At any rate, the effect still is sufficiently large to justify the location of the preamplifier directly at the antenna.

In the mathematical treatment, the true input of the receiver is considered to be the input of the transmission line. The noise figure can be calculated by means of a well-known formula for the noise figure of two networks in cascade in terms of their individual parameters. While the calculation is not lengthy, its understanding requires a detailed knowledge of the theory of noise figures. Therefore it will not be given here. However, any reader wishing a copy may obtain it by sending me a self-addressed stamped envelope. — *Yardley Beers, WØJF, 740 Willowbrook Rd., Boulder, CO 80302.*

[1]See *QST* for April, 1970, p. 54.

INCREASED VERSATILITY WITH THE IN-LINE RF POWER METER

Technical Editor, *QST*:

I have recently modified Doug DeMaw's rf power meter that appeared in December 1969 *QST* and again in the 1970 ARRL *Handbook*. See Fig. 2. Even the most expensive wattmeter on the market does not offer all these features.

These modifications permit monitoring both forward and reverse power simultaneously in either peak or average values. An output jack is also provided for visually monitoring the modulation on a transmitted signal.

With S1 in the PEAK position, C1 and C2 will charge to the peak voltage across the resistor-meter combination, indicating the true value of the peak power. This is true so long as the time constant of

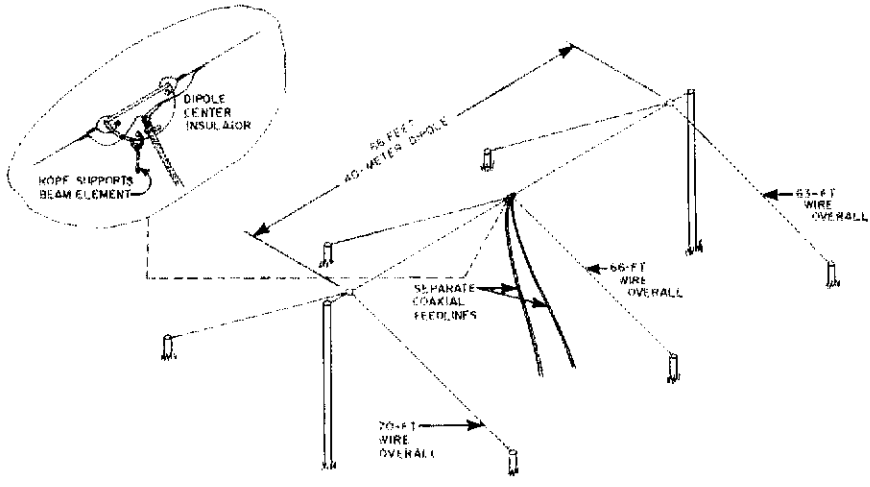


Fig. 1 — 3-element inverted-V beam supported by ordinary dipole antenna.

C1 and the associated meter and resistor is long as compared to the information rate (cw speed or syllabic rate). The 100-μF capacitor will, therefore, eventually charge up to the peak level of the voice pattern and this level will then be displayed on the meter. With an unmodulated carrier, the meter will read the same in either the PEAK or the AVERAGE position since the peak power is the same as the average. This is not true of ssb and high-speed cw. Only a peak-reading device of this type can measure the true peak-power output. Because of the time constant of the metering circuit and inertia and damping of the meter movement itself, this meter must not be considered an "instant peak-reading" meter, but rather a "peak reading" instrument. This was pointed out by WØTTK in his article.[2]

J1 is provided for modulation monitoring. This output must be sent to a dc oscilloscope, *not ac* since this output is a half-wave rectified waveform of the rf carrier. This jack could be used to observe a-m, ssb, and cw signals. The waveforms displayed by this method are an outline of one half of the rf envelope. S1 must be in the AVERAGE position in order to use J1.

The use of a second meter immediately informs you of abnormal operation of the antenna, and is well worth the effort and the additional cost to install. – *Walter E. Pfiester, Jr., W2TQK, Box 85, 1 Skadden Terr., Tully, NY 13159.*

[2]Bruene, "An Inside Picture of Directional Wattmeters," *QST*, April, 1959.

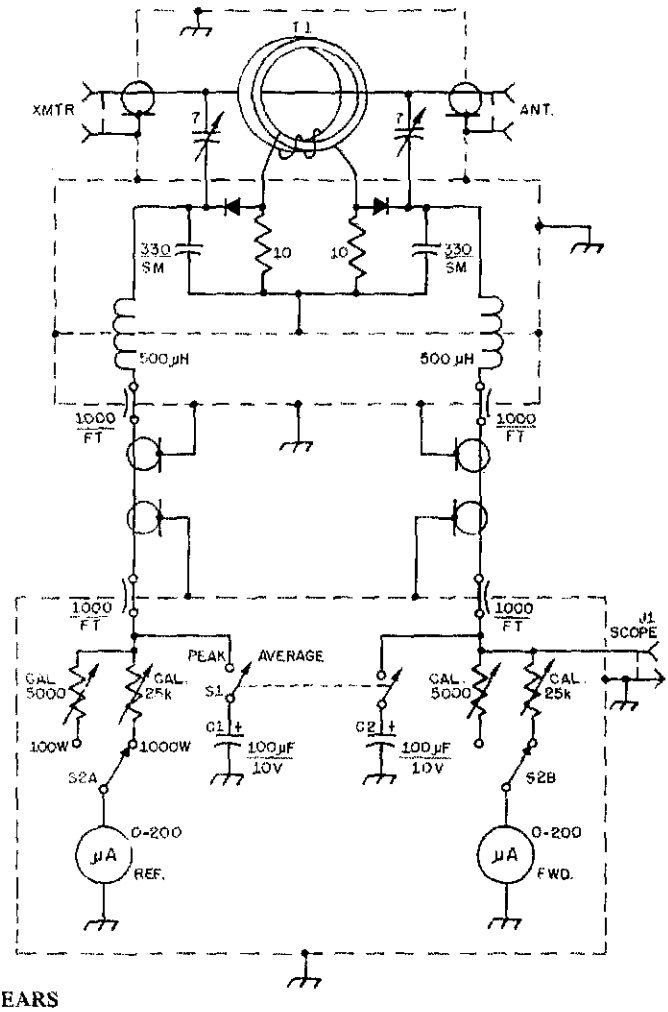


Fig. 2 – Modified version of the in-line rf power meter. See December 1969 *QST*, page 13, for identification of parts not listed below. Resistances are in ohms, k = 1000. Except for C1 and C2, capacitances are in pF.

C1,C2 – Electrolytic.
J1 – Phono jack.
S1 – Dpst.
S2 – Dpdt.

CATHODE BIAS FOR SWEEP-TUBE LINEARS

Technical Editor, *QST*:

In a recent issue of *QST*,[3] DeMaw described a simple linear amplifier using a TV horizontal sweep tube. Operating and protective bias is provided by operating the tube cathode at ground and supplying a negative dc voltage to the grid. Another method would be to ground the grid and screen of the sweep tube directly while returning the cathode to ground through a shunt regulator circuit. Operating the tube with the grids at dc ground might yield some stability advantages, particularly at vhf. While a Zener diode could be used as the regulator, it has the disadvantage that it is not readily adjustable.

Shown in Fig. 3 is an adjustable shunt regulator which was breadboarded for this application. The major portion of the tube cathode current flows through Q1, a pnp power transistor. The voltage on the emitter of Q1 is sensed with an adjustable voltage divider and applied to the base of an error amplifier, Q2. In this stage, a reference voltage is developed with three series silicon power-supply diodes. The output of Q2 determines the voltage at the base of Q1. The configuration we used has the advantage that the collector of Q1 may be grounded directly to the chassis, making an auxilliary heat sink unnecessary. With the components shown, the bias voltage may be adjusted from 3 to 10 volts. When set at 5 volts, a minimum current of 15 mA was required to establish regulation. Increasing the current to 500 mA caused a slight increase in regulator voltage corresponding to a dynamic resistance of about 1 ohm. The regulator was tested for a half hour continuously at 9 volts and 500 mA. The 6 X 6-inch piece of aluminum used as a heat sink appeared adequate. No problems should be encountered in using the regulator at 1 ampere under typical cw or ssb duty cycles.

Although a pnp silicon transistor was used at Q1, any of the popular and common germanium

[3]DeMaw, "Building a 'Skinnier Linear,'" *QST*, April, 1970.

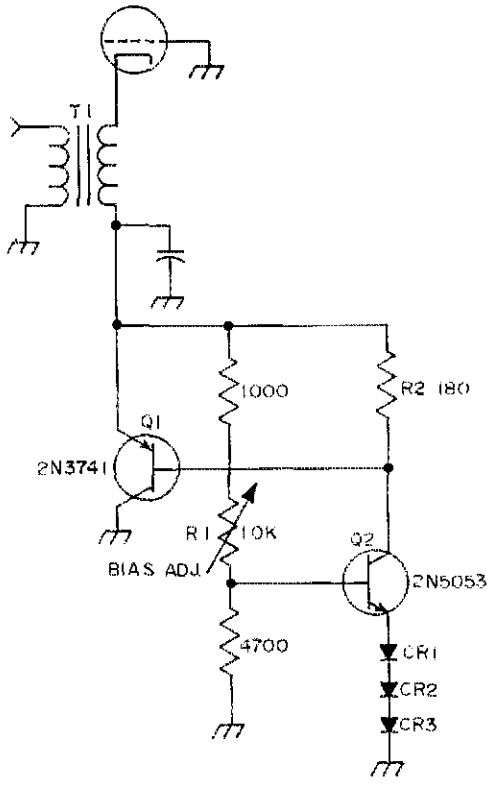


Fig. 3 — Shunt regulator circuit for biasing sweep-tube linear amplifiers. See text for parts not listed below. CR1 — CR3 incl. — Silicon power-supply diodes, such as 1N3194.

power transistors such as the 2N173 could be used. With changes in the divider network, the regulator may be operated at higher voltages. With R1 changed to 0.1 megohm and R2 increased to 2200 ohms, the regulator performed nicely in the 50-volt region, making it a candidate for use with a Class AB1 6146 amplifier. If several cathode-driven sweep tubes are to be run in parallel, idle current equalization[4] may be achieved with separate shunt regulators and a multifilar cathode rf choke. — *Mike Rigik, W7THL, and Wes Hayward, W7ZOI, Device Development, Tektronix, Inc., Beaverton, OR 97005.*

160/80/75-Meter Inverted-V Antenna

(Continued from page 20)

wire. Trimming the lengths of all elements to their best values was quite easy; in this case the wire elements were shortened by folding back and securing with a small electrician's "bug." The final SWR curves are shown in Fig. 7 and show excellent characteristics: bandwidths of 70 kHz for 160 meters, and 500 kHz for 75 and 80 meters.

[4]DeMaw, "Some Ground Rules for Sweep-Tube Linear-Amplifier Design," *QST*, July, 1968.

Antenna Performance

Performance of the antenna system has been quite satisfactory. On 160 meters DX contacts have been made easily, and from comparative reports received, the author feels that performance is just about what was hoped for and expected. On 75 and 80 meters the expected good transmitting performance seems to have been realized. Reception of many DX stations has also been quite good, but there are many instances where a vertical antenna array is quite a bit better, i.e., when the DX station is partly obscured in local QRM (such as VE stations) on 75 meters. In actual fact it has been quite desirable to have *both* the vertical array and the inverted V antennas available so that the best choice for DX reception could be made experimentally.

Summary

1. It has been shown that orthogonal inverted-V antennas make an excellent dual-band system and provide good broadbanding for 75 and 80 meters.

2. A 75/80-meter inverted V has been built which efficiently covers the entire (500 kHz) band with no tuning adjustments.

3. Antennas should preferably be mounted away from (grounded) metal conductors such as towers or other non resonant antenna wires which tend to screen the electric field. Antenna *performance* at resonance is not especially hurt by screening, but its *bandwidth* is seriously reduced.

Gimmicks and Gadgets

(Continued from page 28)

can be adjusted to give the appropriate output level.

Most of the component values are not critical, except the *RC* products which determine timing. Since the frequency is low, almost any bipolar transistors can be used. Npn types are shown, but pnp will work with opposite polarity. The beta rating should be at least twice R3/R4, to insure saturation.

[EDITOR'S NOTE: The unit shown in the photograph was assembled and tested in the ARRL Lab. A 220-ohm resistor was used to simulate the relay coil resistance. The transistors were 2N3860. C1 was 25 μF. We were interested in seeing how much range of pitch could be obtained, and changing the value of C2 and C3 was most productive in this respect.

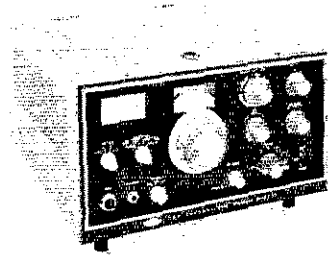
It was found that frequencies from about 600 to 1800 Hz could be produced, but as the frequency was made higher than obtainable with the constants given in Fig. 1 it was necessary to reduce the collector voltage in order to maintain oscillation. This was done by changing the value of R8, a component not used in the circuit supplied by WA5FTP. If a separate source of voltage for the whistle is used, the voltage itself can be varied, but if the car battery is used, R8 may have to be adjusted to drop the collector voltage to something around 6, for oscillation frequencies much over about 1000 Hz. We got up to about 1800 Hz with C2 and C3 having been reduced to .02 μF.]

Use your Zip code when writing ARRL. Use ours, too. It's 06111.

Recent Equipment

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

Allied A-2517 Transceiver



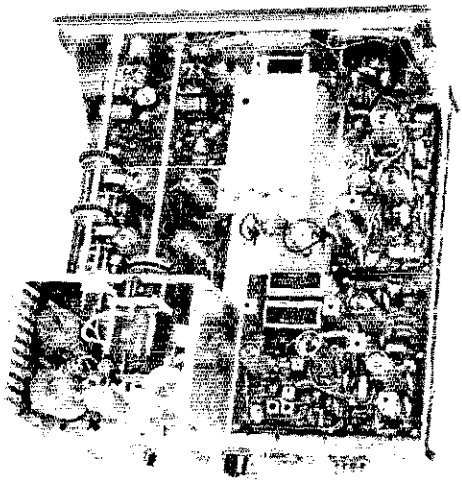
GENERALLY SPEAKING, transceivers in the 150-watt class are rather monolithic in design. Though each brand has salient features which set it apart from its competitors, functionally, the circuits used are fairly standard. In most instances more dollars buy more features and operating conveniences. However, the Knight Company has broken this stride with its A-2517 to offer the buyer a low-cost package with many of the equipment characteristics found only in higher-priced transceivers; (1) Hybrid circuitry to reduce heating, and lessen current drain; (2) Two receiver i-f bandwidths – 500 Hz and 2.4 kHz; (3) 1-kHz dial readout; (4) 25-kHz calibrator markers; (5) Receiver incremental tuning (RIT); (6) Metering of high voltage in addition to relative rf output, plate current, alc, and received-signal strength.

The block diagram of Fig. 1 pretty much tells the story of what takes place in the circuit. Rather than dwell on the drab details of how the signal passes from one stage to another, and what happens to it after it reaches its destination, we will take a look at two of the more interesting sections of the circuit – the i-f filters and the BFO. These circuits should be of interest to the ham designer who wishes to employ more than one lattice filter in a receiver or transceiver.

Crystal Filters

The circuit of Fig. 2 uses state-of-the-art rf switching. Here we have filters for two bandwidths, 500 Hz for cw operation, and 2.4 kHz for ssb use. Ordinary mechanical switching of such filters (rotary switches) would doubtless lead to unwanted capacitive and inductive coupling between the input and output terminals of the filter, seriously degrading performance. By using dc-controlled diode switching (CR1 through CR4) the switching components can be placed close to the filters, thus offering little (if any) deterioration in port isolation. The diodes are isolated from ac ground by means of resistances and inductances, and front-panel dc switching triggers the appropriate diode pair to place the required filter in the i-f signal path.

When operating the ssb mode, S1 provides a dc return for CR1 and CR2, while another section of the switch forward biases these diodes by placing dc voltage on their anodes. The diodes saturate, thus closing the electronic switch and placing FL1 in the circuit. At this time diodes CR3 and CR4 are nonconducting by virtue of the high reverse bias applied to them. Therefore, FL2 is effectively out of the circuit. Conversely, when S1 is set for cw operation diodes CR3 and CR4 are biased into saturation, allowing FL2 to function, while CR1 and CR2 becomes reverse biased to electrically remove FL1 from the circuit. This means, of course, that the switching leads to the front-panel control can be any reasonable length, and need not be shielded. Isolation between the input and output ports of the filters in this equipment is excellent. The skirt selectivity appears to be well



In this top-chassis view of the A-2517 one can observe the care which went into the physical design of the equipment. The major portion of the circuit is assembled in blocks, or modules, thus minimizing the clutter which would have resulted if the older-style point-to-point wiring had been used. The PA compartment is at the lower left of the photo, and is shown with its shield cover removed. The VFO is enclosed in the metal box (upper center) near the front panel. VOX controls are mounted on the L-shaped bracket attached to the rear of the VFO enclosure. Rubber belts (left center) are used to gang-tune the mixer and driver tank-circuit variables from a common control shaft – a scheme used by one American manufacturer in a popular kit-style transceiver. The i-f amplifier circuit board with its two lattice filters is visible at the lower right.

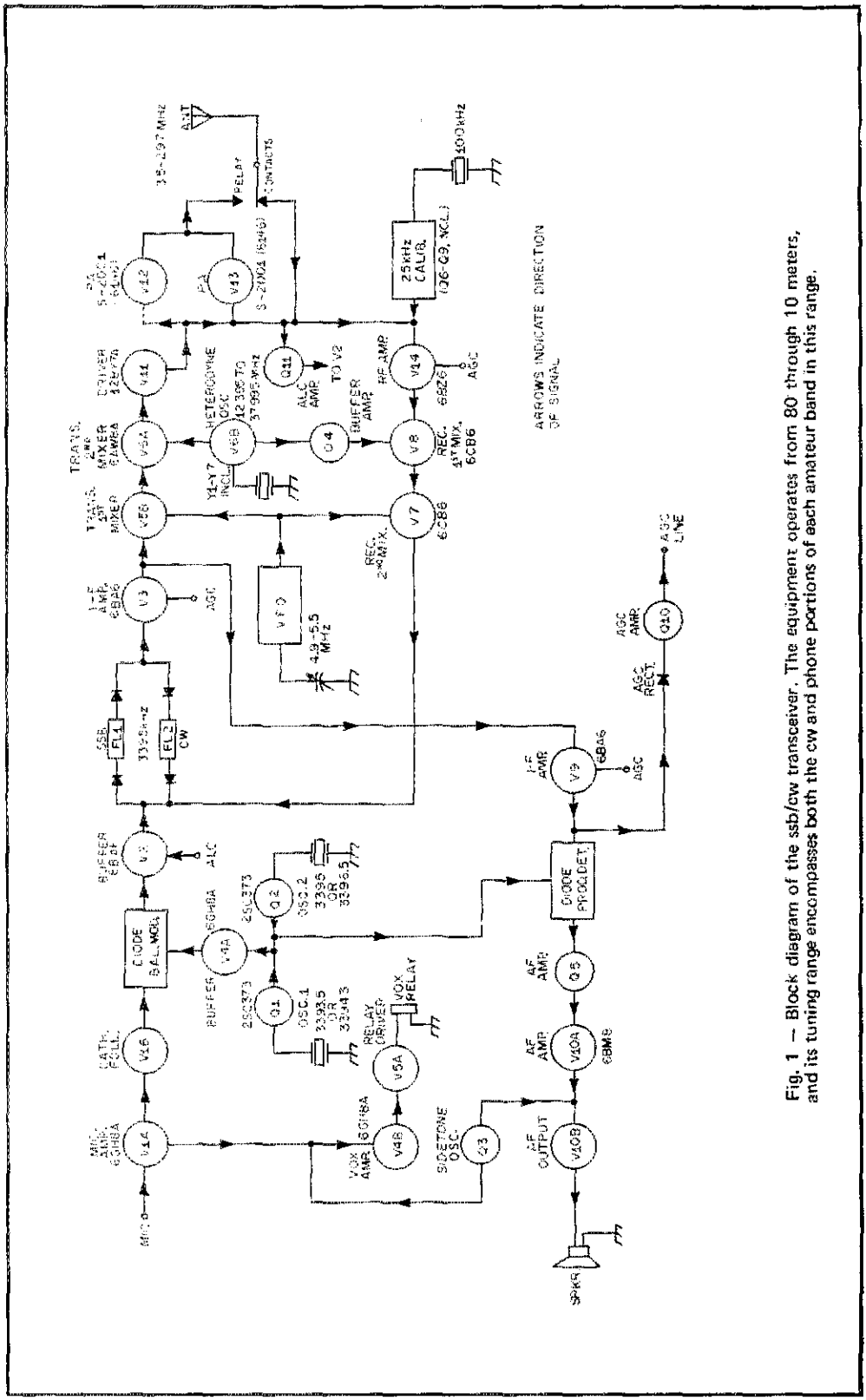


Fig. 1 — Block diagram of the ssb/cw transceiver. The equipment operates from 80 through 10 meters, and its tuning range encompasses both the cw and phone portions of each amateur band in this range.

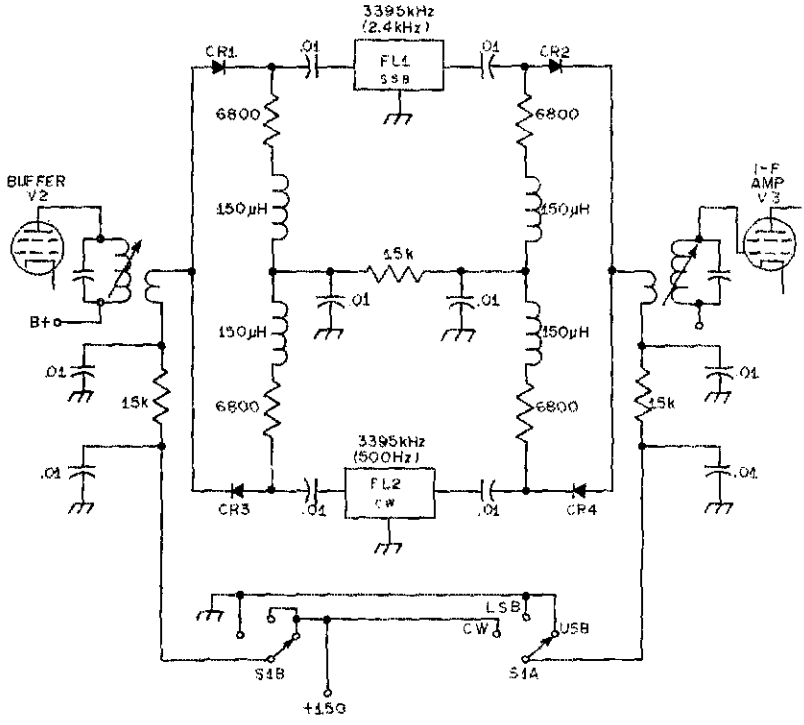


Fig. 2 — Schematic diagram of the filters and related switching circuitry. Resistance is in ohms. K = 1000. Capacitance is in µ F. The circuit discription is given in the test.

within the specifications set by the manufacturer. Suitable diodes for this kind of switching would be 1N914s or similar.

The BFO

The circuit of Fig. 3 shows the method used in the A-2517 to achieve BFO injection at the frequencies required for operation on cw, upper sideband, and lower sideband. This circuit uses a "teeter-totter" arrangement in which two separate oscillators are employed (Q1 and Q2). A combination of dc and mechanical switching is used. The dc switching activates either Osc. 1 or Osc. 2. Switch S1 places the desired crystal in the circuit.

The collectors of the transistors are in parallel so that a common tank circuit, L1, can be used. Diodes CR5 and CR6 establish a fixed value of forward bias by means of the approximate 0.3-volt barrier potential common to germanium junctions. When disabling either Q1 or Q2, the inoperative oscillator is reverse-biased by negative voltage applied to its base-emitter junction. This shut-off voltage is routed to the bias network through S1.

Trimmer capacitors are used in series with each of the four BFO crystals to permit their adjustment for the proper frequency relationship to the passband characteristics of the filters. The American equivalent to the 2SC373 transistors used at Q1 and Q2 is the Motorola HEP-55.

Some Other Features

Since this equipment is built and tested prior to delivery, there is little for the purchaser to do in order to get the unit fired up. The manufacturer supplies a complete kit of fittings for making the necessary connections to the transceiver. Included are fittings for attachment to the transmission line, accessory socket, key, and microphone.

A mating ac-operated power supply is available – the A-2518. It is built in an enclosure which matches the appearance of the transceiver. The loudspeaker is mounted in the power supply case, and faces toward the front of the cabinet so that the sound is not directed away from the operator.

The VFO has proven to be exceptionally stable, though we are unable to point to the circuit features that contribute to this immutable quality. It seems that the manufacturer has elected to keep that part of the circuit a secret by not including the schematic diagram in the operating manual. We inquired about this omission and were told that should the owner experience VFO problems he should have repairs made at an authorized service center. Hence, the circuit was not included in the composite schematic diagram. The VFO box is rather well sealed, so we made no attempt to peer inside. It was learned, however, that this assembly contains several transistors and diodes. A drift run was made on the VFO, beginning at a cold start and continuing for 2 hours. Drift was less than 2 kHz during the period – considerably better than that claimed by the manufacturer. Drift after full warmup was less than 50 Hz during any 1-hour period.

This writer has always believed that mechanical stability is as important a consideration as is the matter of electrical "hardness." Therefore, it is common practice to give all receivers, VFOs, and

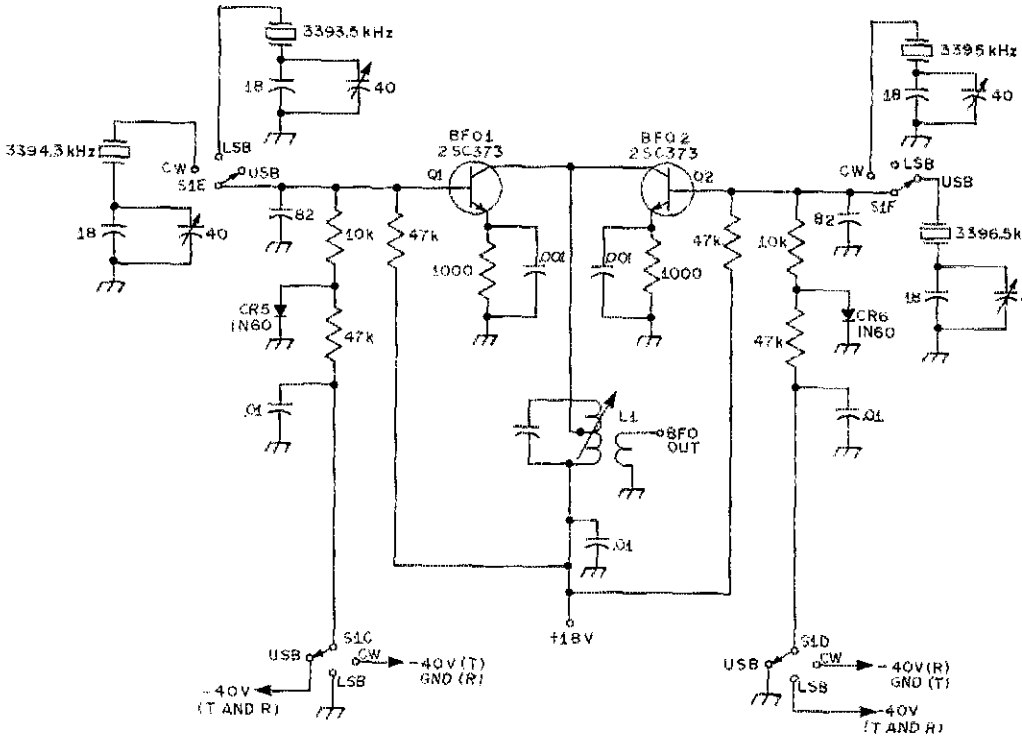
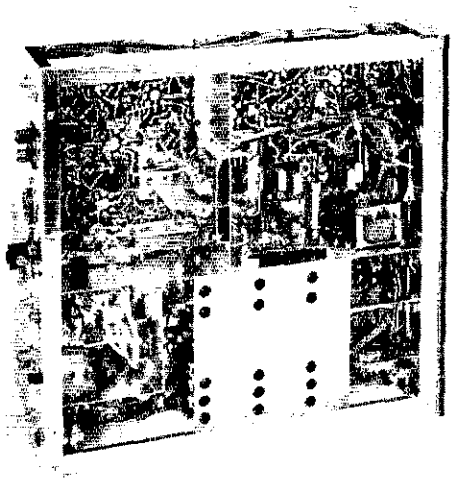


Fig. 3 — Circuit details for the two-transistor BFO. Resistance is in ohms. K = 1000. Decimal value capacitance is in μF. Others are in pF. Operation is detailed in the text.

In this view of the bottom side of the transceiver one can see the BFO circuit board with its four crystals in the compartment at the upper right of the photo. The 25-kHz calibrator is mounted on the shield divider, just below the i-f board. The enclosed portion of the underchassis contains the tuned circuits for the mixer and driver stages. Extensive shielding is used in this equipment to prevent instability and unwanted responses which could be brought about by stray coupling between critical points in the circuit.



transceivers the thump test . . . and with no small measure of vigor. The A-2517 was subjected to numerous whacks with a rubber-headed hammer. It was raised a few inches above the test bench and dropped. With a 25-kHz calibrator signal tuned in to zero beat, no VFO frequency shift could be noted. (The main-tuning dial was taped securely to the panel during this period of shake down.)

The single area of disappointment was reached when the accuracy of the dial was investigated. This free-running, gear-equipped mechanism has a remarkably smooth feel when it is tuned. But, the 1-kHz markers track only over a 25-kHz excursion. When tuning the dial a full 500 kHz, an inaccuracy of 13 kHz results. The error is 1 kHz over any 50-kHz segment of the range. No backlash has been observed in the 5 months that this equipment has seen almost daily use. Since few operators are interested in more than 25 kHz of a given band at one time, the tracking problem should be no hardship. It still beats having equipment with only 5- or 10-kHz calibration marks on the dial plate!

Provisions have been made for the use of an external VFO, thus enabling the operator to transmit or receive in a part of the band other than that to which the transceiver's VFO is tuned. Latest word from Allied Radio indicates that a companion outboard VFO (A-2519) is available for this equipment. We do not have the price information at this time, nor have we had the opportunity to test one of the pieces.

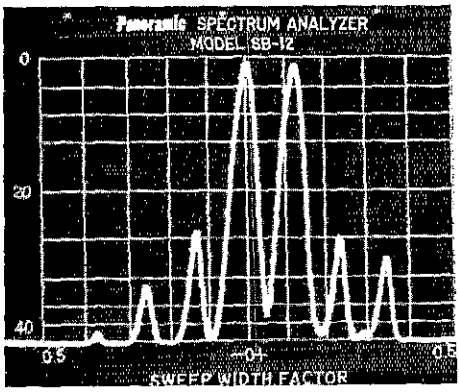


Fig. 4 — Spectral analysis of the A-2517 output signal under two-tone test conditions. The third- and fifth-order distortion products are down some 30 dB below the PEP output. (The Panoramic scale is calibrated in dB below a single-tone test, which is converted to the transceiver manufacturer's rating system by subtracting 6 dB.)

Knight A-2517 SSB/CW Transceiver
Height: 7 inches.
Width: 13 inches.
Depth: 13 5/8 inches.
Weight: 21 pounds.
Power Consumption: 315 watts.
Price Class: $400.
Distributor: Allied/Radio Shack, Chicago, ILL 60680.

This transceiver uses 14 vacuum tubes, 2 FETs, 13 bipolar transistors, and 29 diodes. During the 5 months that this unit has been in service (including hard use during contests) there has been no malfunction or deterioration in performance observed. Keying is clean and well shaped. The VOX circuit has sufficiently fast attack time to prevent clipping of words or code characters.

Physical Properties

The interior of the equipment is what the most critical engineer would regard as "sanitary." Most of the circuits are assembled on printed-circuit boards. All wiring exclusive of the modules is neatly harnessed and color coded. The PA stage is shielded from the rest of the circuits by means of a ventilated compartment made of heavy-gauge steel. The designer had the good sense to allow plenty of room in the PA box so that air could flow around the tubes and other heat-sensitive components. Also, it was a pleasant discovery to find that the PA tank coils were not packed tightly against the steel walls of the PA compartment – a really smart move for the preservation of *Q*.

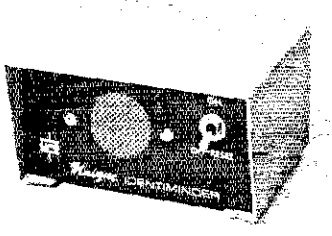
The cabinet is finished in a mottled charcoal gray, and is made of perforated steel. Chrome trim is used to impart a professional appearance. The knobs are made from light gray plastic and have chrome inserts. Elevator feet are supplied in the accessory kit for those who prefer to tilt the forward part of the equipment upward.

In summary, this equipment meets all of the advertised specifications with some margin to spare. The third- and fifth-order products are down in excess of 30 dB, as indicated on the spectral display of Fig. 4. Carrier suppression is in excess of 45 dB. Power output on 20 meters was 80 watts PEP when the results of Fig. 4 were obtained. The second harmonic output was also checked and found to be down 42 dB. – *WICER.*

QST ——— QST ——— QST

Unique Identiminder

IN THIS day of brief cw or ssb transmissions with rapid-fire exchanges of comments, questions and answers, it is sometimes easy to forget the identification procedures required at 10-minute intervals. The Unique Products Co. Identiminder is an instrument which reminds one when ten minutes have passed.



The Circuit

The device is totally solid-state and is battery-powered. With intermittent use, a 9-volt transistor-radio battery will last for months – an alkaline battery even longer. The circuit uses a silicon-controlled rectifier (SCR), one bipolar and three unijunction (UJT) transistors, a diode, and a few resistors and capacitors. Basically, operation depends on the charging of a low-leakage tantalum capacitor at a controlled rate. After ten minutes have elapsed, a UJT fires. A second UJT is used to stabilize the firing interval of the first from one 10-minute period to the next. The first UJT, as it fires, triggers the SCR which turns on an audio oscillator. A tone of approximately 1000 Hz is fed to the 1 5/8-inch speaker. Turning the device off stops the tone and discharges the timing capacitor. Immediately turning it on again initiates a new timing cycle.

The tone oscillator circuit used in the Identiminder is somewhat unusual, and one which might well be used for a sidetone oscillator or code-practice oscillator. See Fig. 1. With this

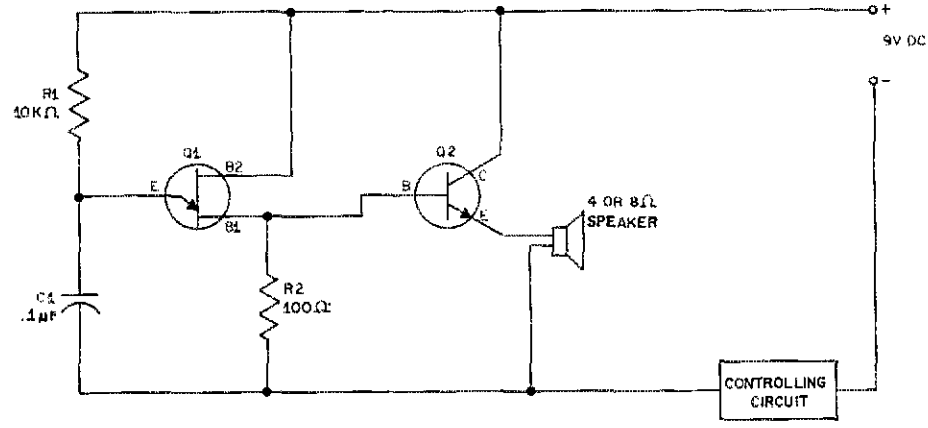


Fig. 1 — Tone oscillator circuit of Identiminder.
Q1 — Unijunction transistor, such as 2N5060 or equiv. Q2 - Any silicon npn audio transistor.

circuit, a small 4- or 8-ohm speaker can be driven without using an audio transformer. Q1 is a unijunction transistor, wired in a conventional relaxation-oscillator circuit. The values of R1 and C1 determine the frequency of oscillation, by controlling the rate at which the charge potential across C1 reaches the peak-point voltage or firing potential of Q1. When this voltage is reached, the base-one/emitter junction of Q1 becomes forward biased. C1 quickly discharges through this junction and R2. A positive trigger developed across R2 is fed to the base of Q2, a current amplifier. A pulse of current is caused to flow through the speaker voice coil. When C1 is discharged, the cycle repeats itself. The train of current pulses through the speaker coil establishes a crisp tone, rich in harmonic content, but pleasing to the ear. The value of R2 affects the volume (and the current drain on the battery).

Because of warmup in the semiconductor junctions, from a cold start the first 10-minute cycle of the Identiminder is several seconds longer than normal. Succeeding cycles are of constant duration to within a couple of seconds or less. A calibration control is accessible without removing the cover, and with a fresh battery the time interval can be set between approximately eight and eleven minutes. This calibration leeway can be used to compensate for battery aging.

The Identiminder is manufactured by Unique Products Co., 1003 South Fircroft St., West Covina, CA 91791, and is in the $20 price class. It is small in size, measuring 2 1/2 inches high, 4 3/8 inches wide, and 3 1/2 inches deep. Current drain from the 9-volt battery is 2.5 mA while timing, and 17 mA during the tone signal.

Because of its small size and no requirement for external connections, the instrument can be positioned in almost any convenient place around the shack. (As with most solid-state devices, it should not be placed on top of heat-generating equipment such as a transmitter or a power amplifier.) The Identiminder is furnished without battery but with an instruction sheet which is explicit in describing the method of battery installation and time-interval calibration. — *KIPLP*

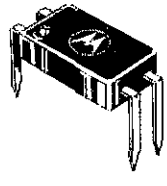
• Technical Topics

NEW MOTOROLA FETs

Motorola Semiconductors of Phoenix, Arizona has recently announced the availability of a new series of FETs which should be of particular interest to *QST* readers. These devices are numbered MPF120 through MPF122.

The chip is electrically similar to the more expensive MFE3006 MFE3008 series, but the new model MPF run contains built-in gate-protection diodes. Silicon Nitride passivation is still used — a boon to long-term stability.

These dual-gate MOSFETs are housed in low-cost plastic IC cases, rectangular in shape, and having four leads. This feature makes them easy to mount on circuit boards, and eliminates the need for transistor sockets. Since the components are only 0.155 inch thick, low-profile circuit board assembly is practical. The transistor body is 0.22 inch wide, and 0.280 inch long.

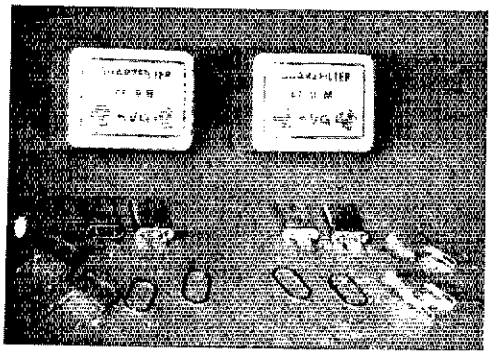


Some significant ratings are: V_{DS} - +25V, P_D - 500 mW, I_D - 30 mA dc, y_{fs} (fwd. transadmittance) - up to 20,000 μmhos. Frequency rating is up to 200 MHz, but it is quite likely that this series will offer good amateur performance up to 450 MHz.

Data sheets are available from Motorola Semiconductors, Box 20912, Phoenix, Arizona 85036. Single-lot prices are in the one-dollar class. — *WICER.*

• New Apparatus

KVG Crystal Lattice Filters



ONE OF the problems encountered by those who build amateur radio equipment is the matter of buying or building i-f filters for transmitters and receivers. Many of the commercially-available crystal band-pass filters, past and present, are both costly and difficult to secure. Furthermore, it is not an easy matter to find a filter that meets some special requirements. Spectrum International, distributor for the KVG filter line, has helped solve the cost and availability problem. It offers a filter selection which is capable of satisfying the design requirements of most ham builders.

KVG filters are available in a wide assortment of bandwidths, and are manufactured for use at 9- and 10.7-MHz intermediate frequencies. The XF-9A and XF-9B filters are designed for ssb use (9 MHz). Each has a different shape factor and stopband attenuation characteristic. Matching crystals for upper and lower sideband are available from the distributor.

Two filters are available for a-m use at 9 MHz — XF-9CC and XF-9D. The bandwidths are, respectively, 3.75 and 5 kHz. A 9-MHz fm filter (XF-9E) is offered in a 12-kHz bandwidth. The cw man has not been overlooked either. He can purchase the KVG XF-9M to provide an i-f bandwidth of 500 Hz. Matching BFO crystals are available for this filter also.

There are additional filters for use in fm i-f strips, and these are suitable for both a-m and fm work at 10.7 MHz. Bandwidths for these filters range from 12 to 36 kHz. The price spread for the line runs from $21.95 to $32.45 per unit. Dimensions in inches are 1 27/64 x 1 3/64 x 3/4, an ideal package size for miniature solid-state equipment.

Specifications sheets and a price list can be obtained from Spectrum International, Box 87, Topsfield, Mass. 01983. — *WICER*.

Hamfest Calendar

Germany — A gathering of American Hams in Germany is scheduled for November 14-15 in Schwaebisch Hall, Doland Barracks, Germany. The event will follow the USAREUR-USAFEMARS conferences to be held November 13.

25 years ago

November 1945

. . . We are back on the air, but only on u.h.f. The other bands are still held and being used by the military and it may take some time for their release. FCC is not in a position to accept applications for new licenses due to lack of funds. Congress has failed to provide more money. W1AW is on the air nightly by special authority for the purpose of broadcasting up-to-the-minute progress — on 80, 40 and 20.

. . . Phil Rand, W1DBM, introduces amateurs to the newly-developed "lighthouse" tube. His rig uses parallel copper bars for rough tuning and a small variable condenser for fine tuning. This rig easily goes to 700 Mc. About six-watts output. I had one which operated on 2130 Mc. as I recall it. A bonanza for the ultra-ultra boys.

. . . With the new 144-Mc. band in prospect, there is a timely article on how to find this new band by means of Lecher wires. Interesting.

. . . Byron Goodman, W1JPE, comes up with a four-tube superhet for 144Mc. Actually it is a three tuber if you omit the final audio.

. . . Considerably more complicated is a 21-tube all-purpose receiver described by Joseph Marshal. Takes five pages to cover the dope.

. . . George Grammer, W1DF, talks about waves and wave guides. This is in George's lucid style and he covers the field, but good.

. . . Ed Tilton, W1HDQ, back from the service, discusses the very highs.

50 Years Ago this month

November 1920

. . . We now have the long-awaited full report on the Bureau of Standards-ARRL fading tests, presented by S. Kruse of the Bureau. The first part describes the set-up and arrangements and how the tests were conducted. It is very comprehensive, indeed, and a lot of dedicated hams took part faithfully. The results will appear next month.

. . . Professor Hazeltine has Part II of his article on "Bulb Oscillators for Radio Transmission." He shows a number of circuits, including a polyphase oscillator and suggests this might be useful for feeding properly spaced antennas to produce desirable directive effects.

. . . Arthur J. Funk presents the cream of his numerous experiments with c.w. circuits. He winds up with four VT2s in parallel.

. . . Probably the first article on phone patches appears in this issue but it is called radiophone-telephone linking. Don't see any hybrid coils and the switching is done by a four-pole, double-throw switch. Automatic break-in, the author says, is not possible by ordinary radio. (It still is a little tricky even with SSB.)

. . . Long letter from Boyd Phelps who is puzzled by the different lengths of individual wires in a fan antenna. He concludes that perhaps one or two wires would be just as good as a large fan.

. . . The "Young Squirt" writes his second epistle to "The Old Man," Was the "Young Squirt" ever identified? — *W1ANA*

Hints and Kinks For the Experimenter

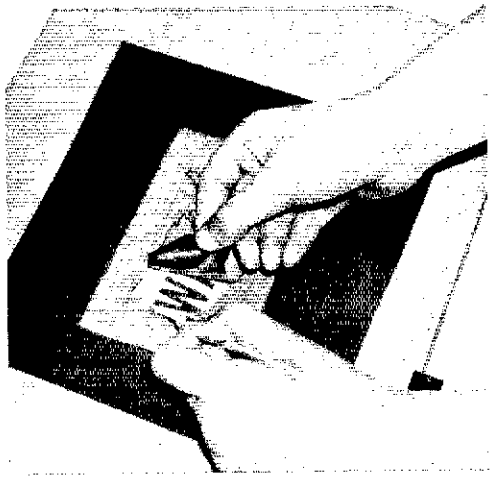
SILK-SCREENING QSLs

Since I wanted to change the call sign on my old Novice QSL cards, I decided to try the silk-screen process, which I hadn't used in many years. Several calls to art and paint stores helped me locate the supplies needed.

The film used in the silk-screen process is a two-layer material; the top layer is soluble (usually with acetone) and the bottom layer is a rather sturdy plastic. The film is placed over the art work or lettering, and secured with masking tape. Instead of using a pencil to trace the design, a knife with a narrow tip is used to cut through the soluble layer, but not through the backing. When a complete character is cut it can be carefully removed, or the area around it removed, depending on what the final stencil will be required to print.

When a complete film is cut, it is placed on a flat surface (soluble side up) and the silk is brought in contact with it. Since I wanted to use water-soluble paints, acetone was applied to the silk with sufficient pressure to penetrate the mesh and soften the film. After drying, the plastic backing is removed and the stencil is ready for screening of the first color. Ordinary masking tape on the film side of the screen is used to mask out all areas that could create a mess during screening. The silk I used was 107-mesh count stretched over a 9- by 12-inch wooden frame and fastened with ordinary paper staples. A square yard of the silk costs $2.25 and a square yard of film costs $2.45. The stencil can be removed from the silk-screen frame by placing it in lacquer thinner. The screen and frame are none the worse for the experience.

The screening of the first color requires that the item to be screened be indexed on the work area (I used a piece of 3/4-inch plywood scrap). Marking the area for the card with masking tape will suffice if perfect registration is not required. A hinge on the silk-screen frame will make your process deluxe, but nails or screws for registering the frame will do nicely.



The paints used in the silk-screen process are specially formulated and I would suggest experimentation with left-over house paints before attempting to screen a project. Enough paint to handle a dozen or so cards is poured into the frame away from the stencil openings. A squeegee is drawn over the silk with enough paint and pressure to force the paint through the screen onto the card. The frame is lifted and the card removed and placed in a safe location to dry. After finishing the cards a new stencil can be put on the silk-screen frame for a second color. – *Matthew V. Oreskovic, WA2JLF*

RF INSULATION PROBLEMS (AND SOME FEEDBACK)

Recently, in the ARRL Lab, we ran into several antenna problems and came up with some answers that we feel are worth passing along. In constructing a beam antenna that will appear in *QST* and the *Handbook*, we wanted to use a gamma matching system. Instead of the conventional variable capacitor and rod, a tubular capacitor was made up. In a search for materials to separate the two aluminum tubes in the capacitor section, it was decided that a nylon tube of the correct dimensions would be ideal. Unfortunately, it was far from ideal – in fact, a very poor choice. After adjusting the gamma rod and capacitor for a match, we noticed the aluminum tubing over the nylon tube getting warm; after running about 50 watts to the antenna for a few minutes, the tube got hot enough to be uncomfortable to the touch. At 1-kW input we actually burned our fingers. After experimentation, we found that nylon is a very poor insulator at radio frequencies.

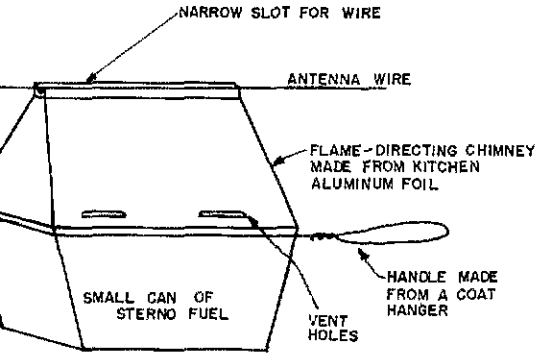
As if this wasn't bad enough, one ham called recently and informed us that the balun he was using in the kW version of the Ultimate Transmatch (July *QST*) was getting hot with only a couple of hundred watts input! In constructing the balun on the unit described in the article, Teflon was used as the wire insulation. In this particular unit, the balun showed no signs of heating no matter what the load, with well over 1000 watts going through it. In designing the balun, our concern was mostly with rf-voltage breakdown, simply because some very high rf voltages could be produced in the balun with certain types of loads. In the article we specified vinyl-nylon insulation (1000 volts or more) to be a suitable insulation. However, such material is not good in a coil where rf is present, and we erred.

The two considerations in choosing an insulation material are the dielectric constant and the

dissipation factor. At 10 MHz, Teflon has a dielectric constant of 2.1 and a dissipation factor .0002. Nylon runs 3.14 and .0214 at the same frequency. The dissipation constant represents the big difference. Teflon, of course, is rather expensive unless one can purchase it from a surplus outlet. While we don't have the exact figures on Formvar insulation, this appears to be an excellent material for rf windings, too. – *W1ICP*

A HOMEMADE TORCH

An effective soldering torch for antenna work can be made by fabricating a hood from aluminum foil and placing it on top of a can of Sterno fuel. It works well even on cold, windy days, though it requires great care when working around foliage because the flame is completely invisible. The cost is about 30 cents. – *William Mutch, WB2JPT*

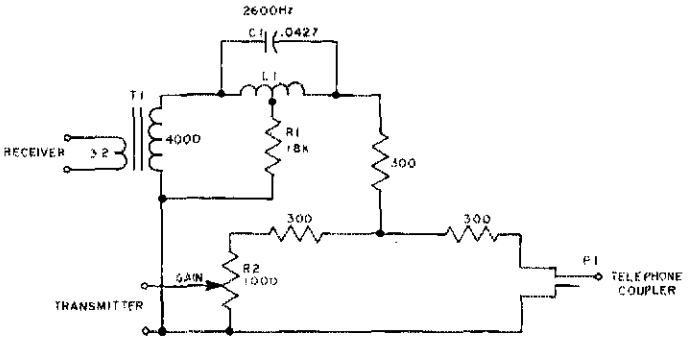


AN IMPROVED PHONE PATCH

Several improvements have been made to my simple phone patch that appeared in *QST*.[1] One transformer has been removed to reduce costs, and a "bridged-T" 2600-Hz filter is used, eliminating the possibility that the filter might cause low-Z loading of the line. This version has an intrinsic impedance of 900 ohms over the entire voice band. – *J. B. Berry, Jr., W4PME.*

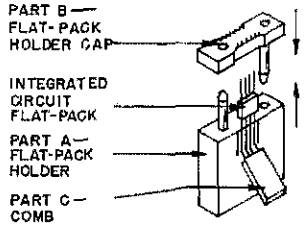
[1] Berry, "Technical Correspondence," *QST*, April, 1970.

Schematic of the simple phone patch. Fixed resistors are 1/2-watt, 5-percent-tolerance composition.
C1 – .04- and .0027-μF paper in parallel.
L1 – 88-mH surplus toroid coil.
P1 – Phone plug.
R1 – The value of this resistor may be varied from that shown. 18,000 ohms is correct for a toroid with a *Q* of 63.
R2 – Linear-taper composition control.
T1 – Output transformer, 3.2-ohm primary, 4000-ohm secondary (Lafayette Radio AR135).



INTEGRATED CIRCUIT FLAT-PACK LEAD BENDER

Bending integrated-circuit flat-pack leads quickly and accurately for mounting on printed circuit boards so as to achieve high density packaging with minimum damage to the flat-packs can be a problem. The present method requires manual bending of the leads to precise angles for fitting into mounting holes in printed circuit boards. The process is very time consuming and damage to the flat-pack frequently occurs.



A device in which an integrated circuit flat-pack can be mounted and held firmly while the leads are bent accurately, and without damage, to the necessary precise angles is the solution.

The integrated circuit flat-pack is placed on the flat-pack holder (Part A), and the leads are aligned in the grooves of the holder. The pins of the flat-pack holder cap (Part B) are aligned with the holder and the two parts are brought together to hold the integrated circuit flat-pack firmly in place. The leads of the integrated circuit flat-pack, which are sticking out at right angles from the holder, are initially bent down into the flat-pack holder grooves (Part A) using one's finger. The final bending is done by inserting the lugs of the comb (Part C) into the flat-pack holder grooves and combing downward over the flat-pack leads, thus making the precise required bend. The same procedure is then repeated on the opposite set of flat-pack leads.

The present tool is produced with grooves and bend-angles aligned for particular circuit board applications. Different board mounting-hole configurations require matching lead-bender grooves. Requests for further information may be directed to: Technology Utilization Officer
Manned Spacecraft Center, Code BM7
Houston, Texas 77058
Reference: TSP70-10117
– *NASA TECH BRIEF 70-10117*

One of our pit operators, relaxing while awaiting developments of a race under way. In the back ground are two of the four cranes used.

MIAMI VALLEY F.M. ASSOCIATION

public service through amateur radio

GOES TO THE

Boat Races

FOURTEEN MEMBERS of the Miami Valley FM Association (Dayton, Ohio area) provided communications for the Sixth Annual Regatta sponsored by the Dayton Motor Boat Racing Association held on August 23, 1970. This is one of approximately 500 regattas sanctioned annually in the United States and Canada. The net proceeds of this event are contributed to the local Children's Medical Center.

All operations were controlled from our station located in the judges stand. The start of each race was coordinated with either the inboard or outboard pit. Three members, with hand-held portables, were assigned the pit areas. Other members manned the two turn-judge boats, the two turn-rescue boats, and the four patrol (tow-in and rescue) boats. Portable units were used on the boats with several obtaining power from the electrical system of the boat. All movements of these boats were under the direct control of the race officials at the judges stand. We also provided a communications link to the emergency rescue units standing by at the race site.

Our equipment was in use for ten hours. Following is a recap of some of the traffic handled:

Start 5-minute timing (this is the time when the racers leave the pits. When one minute is left a large sweep-second clock is started and the boats move up on the starting line pacing themselves with the clock) - 24.

Buoy problems (hit by racers, drift realignment, etc.) - 7.

Disabled boat report - 22.

Tow-ins (each tow-in generally consisted of a pick-up command and routing directions from the judges stand to the boat, crane destination from boat to pit and a position assignment after drop of boat) – 15.

Man in water (this stops race and only traffic on air is for rescue) – 1.

Prior to the formal starting time our channel was full of traffic due to a malfunction of the timing clock. After location of the proper individuals, and use of a generous supply of fuses, belonging to several of our operators, the clock came to life. We also handled several requests to police officials on traffic and parking problems.

The equipment used by our operators included ten Motorola hand-held units (5 HT, 2 PT, 3H23), two Varitronics FDFM-25, one GE VC and one Hammarlund. The station at the judges stand used a 3-dB-gain ground plane.

The operations at the race were conducted on 146.94 MHz. The club repeater WB8CQK (146.34-.76) was used to pass information out of the race area as no telephone service was available at the site. When one of our operators realized he had locked his keys in his car, a help request went out on the repeater for a call to his home. His son arrived at the site just minutes before we secured operations.

Much of the success in our support of the races was due to advance planning, several operation instruction meetings, and pre-race site visits and communications checks.

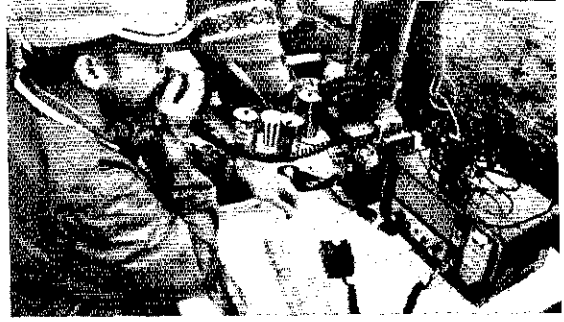
The only problem of any consequence that we encountered was due to the extremely high audio noise of some of the racing boats. Even with the use of earphones, there were times that the sounds of the boats were just too great. Also the sound pickup of mikes made for rough copy. However, by observing the position of the racers, we were able to pass our traffic. In one instance a change of microphone helped considerably.

Although this type of operation currently continues under a cloud of unfavorable FCC interpretation of our rules, we believe it an excellent example of the amateur body furnishing a public service and – perhaps more important – simultaneously providing self-training in practical, organized, disciplined communications.

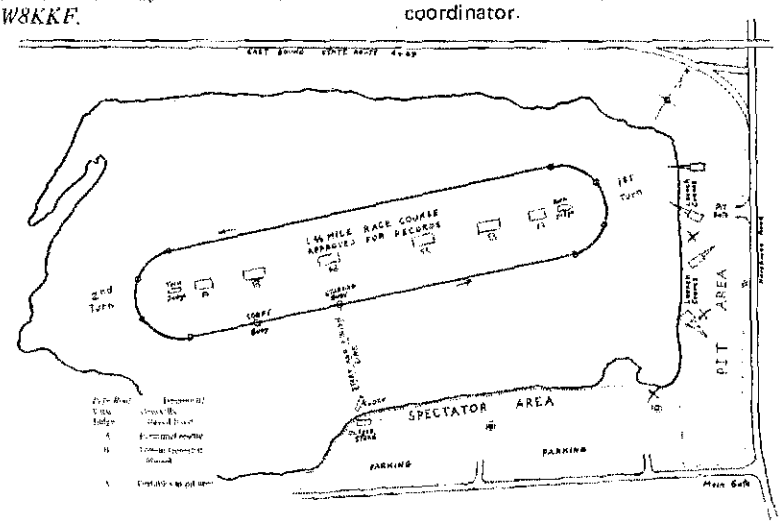
Personnel participating in this event were K8BSM-Jack; WA8DZG-Ron; K8EMN-John; W8JUK-Bob; W8KKF-Harry; WA8MCR-Bill; K3RKH-Bob; W8SLY-Milt; K8SNJ-Charlie; K8WGJ-Byron; WA8YNV-Dick; K8YQH-Jim; WA8ZUA-Paul; and K8ZYU-Wayne.

The chairman of the race committee, for this year, announced at the critique meeting that we had provided the most effective communications he had witnessed at any boat race.

As a result, we have been asked to provide our services for the three day National Races next summer. – *W8KKF.*



This is our position at the judges stand manned by Bob Fielder, W8JUK, who is our race chairman and coordinator.



Strays

1971 QCWA QSO PARTY

Starts: 2400 GMT Friday, February 12, 1971.
Ends: 2400 GMT Sunday, February 14, 1971.
This year's party is being sponsored by the Dallas Chapter of QCWA. Only members are eligible for the QCWA certificate and plaque donated by the National Headquarters, and only contacts with other members will count toward this award.

Overseas members can be contacted, as they too enjoy the fraternalism. This year, as last year to add interest, a simple point-scoring system will be incorporated. Count one point for each QCWA member worked. (Repeats on other bands of modes do not count, nor do non-members.) Multiply the points by the sum of the states, Canadian provinces, Maritime Mobiles, and countries other than the U.S. and Canada in which a member was worked, for the final score.

Your log should show in this order: contact nos., date/time in GMT, station worked, reports, band, QTH, name, and QCWA number.

Activity will be found near the following frequencies: *Cw:* 3580, 7080, 14080, 21080, 28080 kHz. *Phone:* 3980, 7280, 14280, 21380, 21445 and 28580 kHz. *RTTY:* 3595-3600, 7095-7100, 14080-14100, 21070-21075, 28070-28075 kHz. Mail your log by Mar. 14, 1971 to Mr. L. F. Heithecker, W5EJ, 1409 Cooper Drive, Irving, Texas 75060.

Stolen Equipment

On August 29, the following equipment was stolen: NCX-5 transceiver, Mark 2, Serial No. 9119; VX-501 external VFO, Serial No. 87-1226; NCXA external power supply and speaker, Searial No. 49-6442. Anyone with information is requested to notify their local police and Tom Hammond, KØRPH, 707 Ihler Rd., Jefferson City, MO 65101.

– • • • –

A Heathkit SB-301 receiver was stolen on August 8 from the AR club station, W9YT. The receiver was extensively modified and may be identified by its tunable BFO, audio filter, and five-position AGC switch. Anyone with information should contact Scott Ellington, WA9TPV, 21 S. Randall Ave., Madison, WI 53715.

– • • • –

The following items were stolen from the members of the PHDARA: HW-12, Serial No. R5172 and Citi-Fone Serial No. 33210. Anyone with information should notify local authorities and WAØKUH, 3706 N.E. 82nd Terrance, Kansas City, MO 64119.

– • • • –

The following equipment has been stolen: HP-13 power supply and HW-22A. The HW-22A is unserialized but it can be identified by the fact that the 11.190 MHz crystal can was "can-opened" and then resoldered. WA6YCW, 1230 South Wolfe Rd., Sunnyvale, CA 94086.

The radio club of Boulogne, near Paris, with Andre, F2UM, and Jacques, F9MR. The club has also an amateur TV station.

VISITING my Relatives in EUROPE

As much travelogue as ham radio, we publish this trip description by ex-YO2BO because of the delightful way it captures the flavor of our international brotherhood.

BY GEORGE PATAKI,* ex-YO2BO

Jacques, F9MR, in his hospitable home. He is the president of the radio club of Boulogne.

Art, ON8VE, also WA8UIC, in Brussels, Belgium, has proved he can work the world with a whip antenna on his balcony.

Bea, PAØXYL, and her husband Frits, PAØBEA; two friendly voices from the beautiful city of Amsterdam, Holland.

I HAVE THE largest family in the world; the members of my family are spread in almost every country, they belong to every possible religion, every race and every nation. They speak various languages, mostly unknown to each other, and they have the most different political beliefs. Some of them are rich, some of them are poor, but all of them are very nice people.

I like my relatives: I talk with them on the radio, I visit them when I have a chance and I invite them to visit me.

You can find my family listed in the 2 volumes of the *Radio Amateur Callbook*.

This year I have decided to see some of my folks in Western Europe and here are some of my travel notes:

LONDON.

I never had a chance to visit London before. I have seen it on TV, in the movies, I have read about it a lot, and I was very anxious to see it. On air, it is always a pleasure to talk with an Englishman, and especially I like their accent.

I wrote well in advance to the R.S.G.B., informing them that I *am coming for a short visit. I gave them the date and the time of my* arrival, flight number and the hotel where I had the reservation. I said in my letter that I would like very much to meet local amateurs, and to take some photos. I received no reply and during my stay in London I did not receive any messages from them. When I called them up, a girl answered that there is no radio amateur present there and she does not know where and how onecould be met.[1]

In contrast, Sylvia Margolis, whose articles in various magazines I enjoyed so much, came to see me. I never saw Sylvia before, but we *have met like two friends of many years.*

In London, after the customary sightseeing and shopping tours, I went to see Ben Zion, G5AIY (also 4X4IL) and his charming wife Devora, G5AJS (also 4X4NW). Ben Zion is studying at the Imperial College for his Ph.D. in seismology. We had a nice chat, talking about common friends and eating some real good English chocolate. In one moment I felt a little bit sorry for myself because I was *unable to meet a real English amateur (the G5s followed by 3 letters* are foreigners). Exactly in that moment the doorbell rang and entered the room Emanuel, G3ZKX. It was a great evening for me.

In London I recommend seeing the Westminster Abbey, Sylvia Margolis and the House of Parliament.

I don't recommend asking directions from the same policeman I did, because his Cockney dialect made me wonder which country I am visiting.

*34-24 76th Street, Jackson Heights, NY 11372

1Well, even ARRL Hq. has a bad day now and then.

PARIS.

Before I left New York I have received an answer from R.E.F. indicating that I should get in touch with Jacques, F9MR, the president of the radio club of Boulogne, near Paris. I know Paris quite well so I did not waste too much time sightseeing. But under my wife's psychological pressure, I had to take the shopping tour of the Galeries Lafayette; believe me it was a costly experience.

I called up Jacques, he picked us up at the hotel and took us to his radio club. This club has about 100 members, they have meetings and classes twice a week. The municipality of Boulogne gives them rent free space, including heating, electricity, etc. The club has a radio station F5KB (F1KB on vhf) and an amateur television transmitter on 432 MHz with Pierre, F2AC, as the licensee.

At the club we met Andre, F2UM. Later on, we all had dinner at Jacques's house with his family. No ultra-expensive, luxury restaurant could give us the food and the atmosphere we got in F9MR's home.

In Paris I recommend a tour of the city, including the museum of Louvre, a night club show, a lot of walking and especially visiting a hospitable French amateur.

I don't recommend visiting Rue de Pigalle with XYL as I did.

BRUSSELS.

Brussels is a nice and active city with many beautiful buildings, in gothic, renaissance or baroque styles, and romantic, narrow streets with hundreds of years-old houses.

Here I tried to meet Rene, ON4VY; I called him up but his wife told me that Rene is in Washington, D.C. She gave me the phone number of Art, ON8VE (also WA8UIC), who invited us over to demonstrate his station. Art is working in Brussels for an American company and is enjoying the reciprocal operating agreement.

The Belgian amateur radio association, U.B.A., has an amateur radio hour which is broadcasted once a month, on the short wave bands. This program is in French, Flemish and English; the announcer for the English program is Art, ON8VE. He is very proud because one of the many letters received after each broadcast said: 'Your amateur radio hour is very interesting and your announcer's English is quite good." I wonder – is this a compliment for an American?

U.B.A. publishes a monthly magazine – opening it at one end the magazine is called "QSO" and is written in French, opening it at the other end, it is called "CQ" and is written in Flemish.

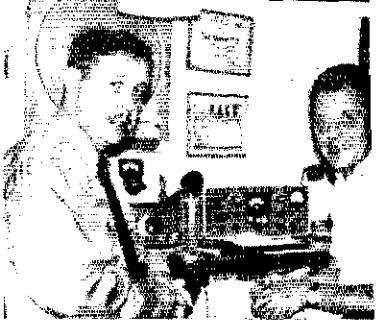
Getting a temporary license in Belgium (ON8 call) for any licensed amateur is easier and quicker that in most other countries. Since 1964, Belgium made the magnificent unilateral gesture of granting licenses to all, whether or not the other countries granted reciprocal facilities, believing that a generous, unilateral gesture might do more good internationally than a strict adhesion to the principle of reciprocity. Write for detailed information to Rene, ON4VY, and include 2 IRCs.

I recommend the sightseeing tour and meeting Rene, ON4VY. Don't recommend visiting a so-called "lace factory"; this is not a factory but a shady store, where everything costs double then in the established stores, mostly because of the fat commission your guide gets after your purchase.

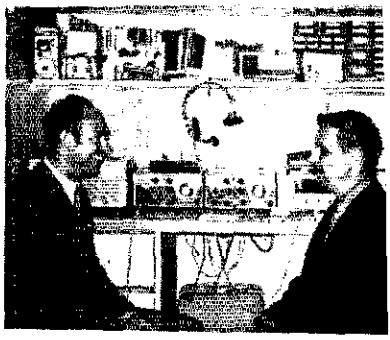
AMSTERDAM.

You probably know the saying: "God made the world, but the Dutch made Holland." In Amsterdam you will understand its meaning. Amsterdam is beautiful. Hundreds of canals and hundreds of bridges. Most of its picturesque windmills are only for decor, for those who want a "photo in the Netherlands," but some of them are still used for pumping water.

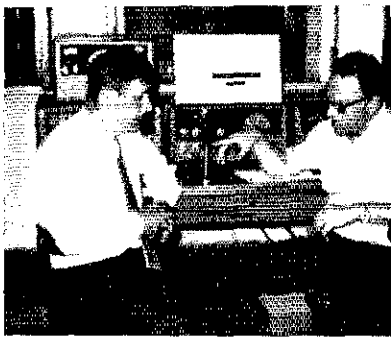
We crossed the Belgian-Holland border without realizing it; no wasted time with passport and custom inspection. I wish there would be more borders like this one.



Carl, DL9RE, in Frankfurt, Germany, is not only a strong DX-er but he also works hard for the local radio club.

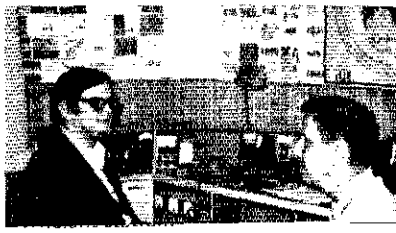


Gustav, OE7GB, in Innsbruck, Austria, has his station in a cabinet. He goes often to the mountain top for uhf contests.



Domenico, HV1CN, in Vatican City, never called CW without getting a dozen of answers. Good operator, good gear, good location and perhaps the callsign helps too.

Tony, I1JX, in Rome, speaks an excellent English and has a very efficient station.



The Dutch amateur radio organization was one of the few who answered my letter. Frits, PAØBEA, came to our hotel and took us to his home. His wife, Bea, is an active amateur, PAØKYL. Frits has used quite a few calls during his travels; he was PX1BE, 3A2CB, PAØBEA/DL, PAØBEA/M1, ON8QQ, etc.

In Amsterdam I recommend a boat tour on the canals and visiting a PAØ amateur.

I don't recommend sitting in the hotel lobby for hours as many American tourist do. Get out, walk through the streets, meet local people, eat delicious Dutch and Indonesian food.

FRANKFURT.

Frankfurt is a modern, prosperous city with lots of industries *and hard working people. Everything is done precisely, in time, and* "by the book". And fortunately now they have good books. English is spoken widely and the people are honest and courteous.

Here I visited Carl, DL9RE, a very active organizer and DX man. Carl told me that the Frankfurt radio club has about 250 members, and they have weekly meetings. The club issues a very good looking award "Worked all Frankfurt"; details from the club station *DLØFM* or the award custodian Joe, DL6QX.

The German amateurs are planning a new D.A.R.C. headquarters in Baunathai, near Kassel, which will be finished hopefully by the end of 1971. It will be a big building, with lots of room and activities like QSL bureau, club station, conference room, laboratory, etc. The money comes from the German amateurs. Volkswagen has promised a van for the QSL bureau as a gift.

In Frankfurt I recommend a bus tour of the city and visiting the *radio club on a meeting day.*

I don't recommend walking through a red light even if it is 2 o'clock in the morning and there is absolutely no traffic on the road, no people on the street, just a lonely and conscientious "polizei."

INNSBRUCK.

Innsbruck is a nice city situated in a beautiful Alpine setting. It is quite a miracle how the radio signals can get in and out from this place surrounded by such very high mountains. When I got to Innsbruck, I realized that I have lost the note with the names, addresses and phone numbers of the local amateurs. Since it was Sunday I could not even go to a radio store and ask for information. I called up the local broadcasting company "Radio Tirol" and they gave me the phone number of Gustav, OE7GB. This was quite a bit of luck because Gustav is a very active amateur. That evening he came home late, after working in a vhf contest. With 2 other amateurs, he spent 24 hours on the mountain top called Zugspitze, at more than 9000 feet altitude, making 236 QSOs on the 2-meter band, with stations in ON, OE, DL, I, F, HB9, OK, etc.

They have similar vhf contests several times a year and believe me, getting to the location is already a great achievement.

In Innsbruck I recommend attending a Tirolean folk dance and music show and a trip with the cable car.

In restaurants I don't recommend upsetting the *waiter, asking him to bring some water, when he is* pushing hard wine or beer; the most you can get is some sauce on your neck-tie.

ROME.

Rome "the Eternal City" has more tourist *attractions and warmer, friendlier people than any* other city I ever saw. I happened to know Rome because I spent 6 months there before I came to the U.S. So we did not go sightseeing, only shopping and visiting friends.

The amateur I called up was on vacation in Africa but his mother gave me the phone number of another amateur; the friend of her son. This was the way I got to Tony, IIJX, a student in *electronics engineering. Tony speaks an excellent* English and despite the fact that he started amateur radio only 2 years ago, he has already an impressive record. There is not too much club activity in Rome; even the A.R.I. headquarters and the QSL bureau are both in Milan. Taken individ*ually, the amateurs of Rome are very hospitable* and their friendliness compensates any language barrier.

Presently Italy has no reciprocal operating agreement with any country. Recommend strongly a lot of sightseeing and eating local specialties. I don't recommend buying anything from the "papa-

Isidoro EA4DO, his wife Asuncion EA4EM, and his son Isi, are the most famous dynasty of radio amateurs in Madrid.

Visiting the DX QTH of Albert, HB9TU, (left), with John, W2DQC, (center) from Yonkers, New York.

CT1VE, Silvio, in Odivelas, near Lisbon, welcomes visiting foreign amateurs. He is a film camera man for the Portuguese TV.

ggalli"; the local street vendors, who are offering "excellent bargains" but are selling only junks.

VATICAN CITY.

The Vatican is more than a State in a State. It is interesting to visit this city, located on a tiny territory, with about 500 citizens, and which exetcises such a powerful influence on hundreds of millions of people.

You can visit the famous St. Peter's basilica, spend hours in the extremly interesting and rich museum, but most of all you have to meet Domenico, HV1CN. This is the only one amateur radio station located inside the Vatican.

Domenico is in charge with a part of the Radio Vatican and is a very nice person indeed. He lives in Rome, outside the City of Vatican and at home his callsign is I1CNS. He let me operate the HV1CN station until the pile-up scared me off.

His set-up is very unusual; he has a beam on the top of a tower and a quad on the top of another tower. But the station is located in a tall building, higher than either one of its antennas. Everything is on a hill, so the location is excellent and I suspect that the callsign helps also.

Recommend visiting the museum of Vatican and the basilica.

Don't recommend to try to enter St. Peter's basilica with uncovered knees; the guards could push you over the Italian border.

LUCERNE.

Switzerland is not only the land of the cuckoo clocks and secret bank accounts. It is a marvelous country with charming people. It is quadrilingual; German, French, Italian and Romansh is spoken in various cantons. English is also widely understood. Coming from Italy through the St. Gothard pass, the sights are magnificent but frightening. In the name of U.S.K.A., the Swiss amateur radio association, I received an answer to my letter from Albert, HB9TU. Albert is an electrical engineer with Philips. He is an active amateur not only from his home town but he has a dreamy DX QTH, a 2nd home 20 km from Lucerne, in the wooded mountains, overlooking a beautiful lake, with a panoramic view of the snow covered mountain tops. The house is quite far from the nearest village, it is not even connected to the power lines; Albert has his own power generator. I visited Albert with John, W2DQC, from Pleasantville, N.Y. who was taking the same trip with me. Albert told us about his travels and how he has operated from Fernando Po as FAØTU, then to various European countries as PA9DM, OZ8ZK, HB9TU/SMØ, etc.

In Switzerland I recommend traveling only by car, bus or train, so you can enjoy the scenery; no planes at all.

I don't recommend to try to explain the word "air-pollution"; they just don't understand it.

MADRID.

I was always fascinated by the Spanish music and the proud and dignified movements of the Flamenco dancers. I like the Spanish floklore so much that if I would not be Hungarian (born in Romania), I wish I would be Spanish.

Madrid, the old city, has more flavor than the modern part. I met here a dynasty of radio amateurs: Isidoro, EA4DO, his wife Asuncion, FA4EM, and their son Isi, the 2nd operator of EA4DO. Isi is a student in pharmacology and is the most active amateur of the family. I recommend enthusiastically a Flamenco show, a restaurant out of the reach of the noisy mass of tourists, good local food and lots of Spanish music, and perhaps a bullfight.

Between 1 and 4 P.M., don't recommend doing anything else than eat and sleep; it is the siesta time and it is respected religiously by everybody.

LISBON.

Lisbon is an interesting city with narrow, winding streets going up and down on the hills, with houses decorated with colorful tiles and people exuberating a typical Latin friendliness.

Here I have met Silvio, CT1VE, his friend Fernando a future amateur, and Silvio's beautiful wife, Candida. Once I had a QSO with Silvio, I mentioned to him that I shall go to Lisbon and he gave me his phone number. Things like that happened to many amateurs, but I was fortunate enough to take the trip, call him up and meet personally the "man behind the mike." I could not wish for better friends than the people I met in Lisbon.

Silvio, CT1VE, is a film camera man with RTP, the Portuguese Radio-Television, he lives in Odivelas, just outside Lisbon and he welcomes visiting foreign amateurs. His station is a modest one by American standards but you have to remember that the average income of a CT1 is well below the income of a W, and the price of a good American station is much cheaper here than in Europe.

Recommend having a chat with a few CT1 amateurs, in a typical Portuguese restaurant, eating freshly-grilled sardines, listening to sad songs of fado, and drinking local wines.

Don't recommend tasting too many kind of wines before your flight to New York because you may board a plane to Brazil or Mozambique.

AT HOME AGAIN.

At the end of our trip, we have returned home exhausted but happy and satisfied for what we have seen in Europe. I wish honestly I could invite to New York all the wonderful people we have met there, showing them the American branch of my family.

Any foreign radio amateur visiting New York City is invited to contact my welcoming committee and I shall do my best to bring him together with American amateurs, take him sightseeing and if he is interested, to show him my place of work: CBS Television.

I hope next time I shall visit my relatives in West Indies. QST

—•••—

Changes of Address

Please advise us direct of any change of address. As our address labels are prepared in advance, please allow six weeks notice. When notifying, please give old as well as new address and Zip codes. Your promptness will help you, the postal service and us. Thanks.

160-Meter Contest

Operating Tips by W1BB

The ARRL 160-Meter Contest, authorized by the Board of Directors just this past May, premieres Dec. 12-13, 1970. October *QST* carried the full rules for this initial event. What you don't usually find in rules, however, is a *modus operandi*. If you're unfamiliar with the band, you too will welcome a few tips from Mr. 160 Meters – W1BB, of course!

Conditions: 160 is not a good daytime band, except for very local QSOs. There are lots of broadcast harmonics on the band plus all sorts of noise. The band is enjoyable only after dark (somewhat like 80 meters, only less so). Conditions peak at dusk and sunrise. This is the time to work DX. East coast to west contacts are best at west coast sunset time, say a half hour before and an hour after their sunset time. European DX will peak twice, once at our sunset time and once at their sunrise time. QSB is prevalent. Slow sending and sending "double" are helpful in circumventing this condition.

Where to look: One must scan the band carefully where DX is expected. For example, you'll find that east coast stations tend to work near 1800 kHz while west coast operation takes place near 2000 kHz. EU DX works a little in our band near 1800 khz, but mostly between 1825-1830 kHz. This used to be a clear section just outside of 1800-1825 permitting DX to get through. When the new regulations went into effect it spread the W/VE QRM into this area. Top banders are voluntarily cooperating to keep the 1825-1830 kHz. DX "window" open. VK signals will be found around 1800-1804 kHz., early mornings just after sunrise. ZLs will be found around 1885 and JAs from 1905.5-1907.5 kHz.

Antennas: The biggest and highest antenna possible is a big help. An inverted V is an excellent choice. A good number two choice would be a top-loaded vertical with ground radials. The inverted V is particularly good being quieter on receive than the vertical. For a rule of thumb, each leg of the V should be 129 feet long and trimmed with the aid of an SWR meter to bring the SWR down to 1/1.

Current Operation: Currently activity is about 50/50 phone and cw. There are quite a few ssb stations on although still quite a lot of am operation. However, 95% of real DXing is done by cw only, simply because it gets through the poor conditions in better fashion.

Operating efficiently on 160 is about like any other band as to procedures, except that it is harder to work DX.

3-500Z Grounded-Grid Amplifier

(Continued from page 27)

between the first two turns of L2, clearing the tuning ring in any position of the latter.

Once you have determined that everything tunes properly, and you are familiar with the "feel" of the amplifier, apply higher voltages, up to the maximum of 3000. The plate current with no drive should be about 160 mA. If you feel better with a bit less static plate current, it can be lowered by inserting a small (0.1 to 0.4 ohm) resistor in series with R1 and the filament center-tap. A Zener diode, 2 to 9 volts, 10 watts, could do this job, as well.

Keep the amplifier tuned for maximum output at all times. Do not decouple to reduce output; cut down drive and/or plate voltage instead. Initial adjustment for linear operation, either ssb or a-m, requires a scope. With a little experience you will have no trouble recognizing conditions that provide good linearity, and those that result in flat-topping and splatter.

Maximum output, minimum plate current and maximum grid current should all occur at the same setting of the plate tuning. If they do not, the output loading is over-coupled, or there is regeneration in the amplifier. Do not expect a tremendous plate-current dip at resonance. With proper loading the dip is plainly visible and smooth, but not of great magnitude.

Operating conditions for the 3-500Z, as given in the manufacturer's literature or in the tube data section of the *Handbook* provide a good guide to proper operation. The amplifier can be run effectively with as little as 1000 volts on the tube plate, so varying the ac voltage to the plate-supply high-voltage transformer is a convenient way to control the power level. In most vhf communication there is no reason whatever to run near the legal power limit, and any 50-MHz station should include provision for running less. With just one power supply, and no critical operating conditions, this amplifier makes operating courtesy and consideration for others on the band easy. When you need the power, you'll have it at your disposal, quickly, without fussy readjustment of operating conditions.

Phone Patching

(Continued from page 31)

that would do this would be ideal for maintaining transmitter modulation at the proper level and might be useful in controlling the level of signals applied to voice couplers.

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ARMED FORCES DAY 1970

COMMUNICATION TEST RESULTS

THIS YEAR'S annual Armed Forces Day communication tests sponsored by the Department of the Army, Navy, and Air Force once again proved to be a highly successful event.

Eight military radio stations, WAR (Army), NSS (Navy), and AIR (Air Force) located in the Washington, D.C. area; A6USA (Army) and NPG (Navy) in San Francisco; A5USA (Army) in Fort Houston, Texas, and NSSAM/NPGAM (Navy aircraft East and West coast) conducted the communication tests on 16 May 1970. The tests included military-to-amateur crossband operations and receiving contests for both continuous wave (cw) and radioteletypewriter (RTTY) modes of operation.

Crossband Results

WAR, NSS, NPG, and AIR had a combined total of 8208 QSOs during the twelve hours and forty-five minutes devoted to the military-to-amateur crossband portion of the communication tests. Included in this total were 197 air/ground QSOs made by Navy aircraft on the East and West coast. Commemorative QSL cards have been mailed to all contacts that could be identified in the Spring 1970 issue of the *Radio Amateur Callbook Magazine*. Any amateur who has not received a QSL card confirming his contact should address a request for confirmation to the appropriate station, or Armed Forces Day Contest, Attention: Headquarters, U.S. Air Force, PRCOM, Room 5B531, The Pentagon, Washington, DC 20310. This request must include the amateur's call sign, the station worked, time of contact, and the frequency utilized by the military station.

Shown here at MARS station WAR is (l. to r.) SSG Earl Jarrett; Mr. Joseph H. Ziglinski, Asst. Chief MARS Army, W4DIN; Mr. Edward S. Liscombe, Chief MARS Army, K4KNV/W1ZBQ; SFC Nathan Pumphrey, Chief Operator, WAR.

CW Receiving Contest Results

There were 420 perfect entries for the 25 wpm cw Broadcast Message originated by the Secretary of Defense. A Certificate of Merit has been mailed to all those individuals who submitted a perfect contest entry. The complete text of the 25 word per minute Morse Code Message is printed below:

— R — 162100Z May 70
— FM WASHINGTON DC
— TO ALL ARMED FORCES DAY PARTICIPANTS
GR 200 BT
ARMED FORCES DAY HAS TRADITIONALLY BEEN DEDICATED TO THOSE UNIFORMED AMERICANS WHO SERVE THE DEFENSE NEEDS OF THE UNITED STATES AT HOME AND OVERSEAS PD IT IS ALSO APPROPRIATE THAT ARMED FORCES DAY BE DEDICATED TO THE MANY THOUSANDS OF VOLUNTEER CIVILIAN RADIO AMATEUR OPERATORS WHO CONSTITUTE THE LARGE MAJORITY OF THE MEMBERSHIP OF THE DEPARTMENT OF DEFENSE SPONSORED MILITARY AFFILIATE RADIO SYSTEM DASH MARS PD SINCE 1948 CMM CIVILIAN MARS MEMBERS CMM THROUGH THEIR SUSTAINED DEDICATED EFFORTS HAVE PROVIDED AN AUXILIARY COMMUNICATIONS SERVICE TO THE MILITARY DEPARTMENTS WHICH IS BOTH HIGHLY VALUED AND DEEPLY APPRECIATED PD PRESENTLY CMM THESE PUBLIC SPIRITED INDIVIDUALS ARE ASSISTING THEIR MILITARY COUNTERPARTS IN HANDLING HUNDREDS OF THOUSANDS OF WRITTEN MESSAGES AND RADIO TELEPHONE CALLS EACH YEAR BETWEEN OUR SERVICEMEN AND THEIR FAMILIES AT HOME PD THIS UNIQUE AND UNPRECEDENTED VOLUNTEER SERVICE HAS ENHANCED THE MORALE OF OUR SERVICEMEN AND THEIR FAMILIES TO A TRULY INESTIMABLE DEGREE PD I COMMEND ALL OF YOU FOR YOUR EXCEPTIONAL CONTRIBUTIONS OF TIME CMM TALENTS AND MATERIAL RESOURCES IN BEHALF OF OUR SERVICEMEN AND THEIR FAMILIES AND EXTEND TO YOU MY BEST WISHES FOR SUCCESS IN ALL YOUR FUTURE ENDEAVORS SGD MELVIN R LAIRD CMM SECRETARY OF DEFENSE BT
QRU AR

RTTY Receiving Contest Results

There were 597 perfect entries for the 60 wpm RTTY broadcast message originated by the Secretary of Defense. A Certificate of Merit has been mailed to all those individuals who submitted a perfect contest entry. It should be noted that there were more perfect radioteletypewriter contest entries than cw, demonstrating the increasing competence of the amateur radio operator in this mode of operation. The complete text of the RTTY message is almost identical to that for cw, with only minor changes in phraseology. QST

K3ONW/3 **REPORTED BY AL NOONE,* WA1KQM/WB6SAZ**

HOW WAS your Field Day? Judging from the 1313 entries received (up somewhat from last year), for the majority of participants it was highly successful; for some, there were problems encountered; for others, total disaster.

To give you some idea of activity, there were 11,762 participants utilizing 3259 transmitters for a grand total of 753,765 contacts. If even a third of these stations were set up in a real emergency situation, amateur radio would play a very important part in disaster communications.

Entry-wise, Class 2A was the most popular with K8KRN/8 , the Northern Ohio Amateur Radio Society leading the field of 246 entries. Following closely behind was Class 3A, 210 entrants, lead by W5WMU/5, the Lafayette ARC of Louisiana. Completing the Top Three was Class 1A, 173 entries, with WØAA/Ø, the Minnesota Wireless Association on top.

Competition was keen in the 8A Class with VE3VM/3, the Niagara Peninsula ARC winning in a close race with W9SW/9, the Chicago Surburban Radio Association. It is interesting that their score of 20,907 was not only equal to, but greater than that of both the 9A and 10A Class Leaders. Congratulations on a job well done.

The only other close race was in Class 4A where the Top Three went as follows: WA6LXN/6, West Valley ARC, 21,602; W1AX/1 , the Connecticut Wireless Association, 21,036 and W4SKH/4, the Oak Ridge Radio Operators Club, 20,155. How's that for a battle!

For at least the second year in a row W2RJ/2, the Englewood ARA, Inc., has successfully operated 15 transmitters simultaneously, quite a feat in itself. Their 1970 score of 40,318 was almost 10K higher than last year.

Class B entries were lead by WA8LRE/8 , (1 transmitter category) with a score of 14,767. K6YNB/6 in taking the 2 transmitter category with a score of 16,168, appears to have broken a long standing record high of 10,854 set by K5DGI in 1959.

*Asst. Communications Mgr., ARRL.

1971 FIELD DAY

JUNE 26-27

CLUB AGGREGATE MOBILE SCORES

Radio Amateurs Mobile Soc.	25,767
Mich. State Contesters.	6693
Mobile ARC of So. Bend. Ind.	4873
Long Island Mobile ARC.	3415
Beacon Radio Amateurs.	3332
Lee De Forest RC of Hemet (Ca.).	344

The ARRL Contest Advisory Committee is currently reviewing Field Day rules and would welcome your ideas. Members of the CAC are W1AX, K2CPR, W3GRF (chairman), W4BRB, W6CUF, W8DB, W9RQM, WAØSDC and VE2NV. Coordinating the study of FD rules is CAC vice chairman Roger E. Corey W1AX, 60 Warwick Drive, Westwood , Massachusetts 02090.

And remember, next month ARRL will sponsor its 1st 160 Meter Contest, December 12-13 (see p. 92 October, *QST*). If you haven't done so already, be sure to write today for the necessary forms. An addressed stamped †10 envelope will bring you all that is needed.

W4ABK/4

Soapbox

Somehow a moth worked his way into the final cage and prohibited operation. – WA8SLW/3. God bless our lawnmower engine, twenty six hours with only one sparkplug change. – W8BVU/8, K9PKQ at the end of the power cable kept complaining that every time the coffee pot came on, his new IC Keyer would quit working. – K9GSC/9. After being completely set up, Murphy struck! A table collapsed with LWC and his rig falling to the floor. What a let down! – K8BXU/1. The climax to the whole day was when W7DZH backed his car over his ice chest full of food. – W7DZH/7. I feel that the novice station provision should be extended somewhat if possible. – K7MNZ/7. Field Day was a great success. Our only trouble started at 0400 GMT, when the fog rolled in, water-logging our rigs! – W6KQH/6. In our group of 20 operators, Mike WB6ABK, who is blind, made the most contacts (226). He logged his QSOs in Braille. – W6CX/6. Frustration is a group of eager beaver hams who want to have a Field Day, when none of the group had ever participated in one before! – WB4NTB/4. At the time of this writing I am about 22 miles East of Raliegh, N.C. trying desperately to reach the Post Office before the Midnight postmark deadline.(He made it) – K4BUJ/4. W3KT looks fearless under a yellow light bulb! – K3BKG/3. Lots of fun?? – K2AA/2. Any success we may have had in running up a score is directly trace-able to the full co-operation of the city. – K2YCJ/2. That solar flare toward the end of the contest really messed things up. – VE2ND/2. Our site was on a ranch in coniferous trees, almost pioneering but Murphy found us. – VE7IP/7. We all had a lot of fun operating from a fixed station. Can't wait until we can operate from the field and get all those multipliers. – WB2MUK. Let's see now, 255\$ QSL cards at 5 cents each! – W3FDU/3. One member and crew set up completely in wrong location. He was found one hour prior to start and had to repack, move and re-set up! – W4CUF/4. There were only three of us but we decided to enter in Class 3A. We operated continuously the entire period. – WA5PIF/5. You wouldn't think it gets cold down here in Mississippi in the middle of June but we nearly froze to death saturday night. Thanks for a great contest and see you again next year. – K5KIR/5. At the last minute we could not use the MARS van and 10KW generator because of its use on an emergency mission. – K5FHU/5. Suggest that next year you give bonus points for working all states. – K5FIQ/5.

Check Logs: W1BNB, W1MV/1, WB2EEA/1, W2LOQ, WA2ITE, WA2VLK, K4VGO, W4JUK, WB4CEQ, W8HKT, W8MXO, W9IJ, WA9TUI/9, WN9DKS, KH6DE, CT2AT and EL2BZ.

SCORES

Class A stations are clubs and groups in the field with more than 2 operators. Scores are tabulated according to the number of transmitters operated simultaneously at each station. The figures and letters following each call indicate the number of valid contacts, the dc input powers used, the number of participants at each station and the final score. The "power classification" used in computing the score is indicated by the letters A, B, C or D after the number of QSOs shown. A indicates power up to and including 10 watts (multiplier of 4); B indicates power over 10, up to and including 50 watts (multiplier of 3); C indicates over 50 watts, up to and including 200 watts (multiplier of 2); D indicates over 200 watts (multiplier of 1).

Class-A Call-Area Leaders

(Calls in bold-face type represent over-all class leaders)

1A	2A	3A	4A	5A	6A	7A	8A	9A	11A
K8BXU/1	W1HEB/1	W1DC/1	W1AX/1	K1MUI/1	W1HH/1	W1EKT/1	W1BEE/1	W3IGM/3	W5ANR/5
WB2IXE/2	K2KIR/2	K2BK/2	W2MU/2	**W2AOH/2**	W2LI/2	K2AA/2	K2IQ/2	WB4GCS/4	W9YH/9
W3NNL/3	W3ABT/3	K3MTK/3	K3SSC/3	W3AI/3	**W3SK/3**	W3FDU/3	W3RCN/3	W6TOI/6	
K4VFY/4	K4HEX/4	W4IZ/4	W4SKH/4	W4CA/4	W4CUE/4	K4BFT/4	K4MC/4	VE3NAR/3	12A
K5LIB/5	K5RWK/5	**W5WMU/5**	W5SH/5	W5SWS/5	K5QHD/5	W5SC/5	K6EAG/6		VE3WF/3
W6VZT/6	WB6ATW/6	W6HS/6	**WA6LXN/6**	W6ISA/6	W6VB/6	K6QEZ/6	W9SW/9	10A	
W7LRA/7	W7EKB/7	W7KH/7	W7JN/7	WA7KEV/7	W7AIA/7	W7BB/7	WØAL/Ø	W1NY/1	13A
W8NP/8	**K8KRN/8**	W4FU/8	W8FY/8	**W8ICS/8**	WA8MTX/8	K8BYI/8	VE3VM/3	W6SDJ/6	
W9EB/9	WA9LOT/9	WA9AXD/9	W9EK/9	WA9UHY/9	W9PCS/9	WA9EOW/9		W9JZ/9	W7DK/7
WØAA/Ø	WØIW/Ø	WAØIOT/Ø	WØFQU/Ø	WAØERT/Ø	. . . . .	WØOUI/Ø			15A
VE1DH/1	VE2ND/2	VE3JJ/3	VE3PRC/3	VE3SOO/3	VE2CAR/2	. . . . .			W2RJ/2

1A

W@AA/@	Minnesota Wireless Assoc.	626-	AB-10-	10,266
WB2JXE/2	AR Soc. of St. Peter's College	754-	AB-	6-	9746
W9FB/9	Lake County ARC	1069-	BD-15-	8821
W3NNL/3	Schuylkill River Rats	819-	AB-	4-	8734
WA9AUM/9	Silly Darn Contesters	902-	B-	4-	8718
K4VFY/4	non-club group	843-	AB-	3-	8404
W@DX/@	Newton ARA	402-	A-	5-	7836
W6VZT/6	Four H Minus One Club	759-	AB-	4-	7521
K5LIB/5	Caprock AR Soc.	965-	ABC-	25-	7063
W5YL/5	Thibodaux ARC	1095-	C-	18-	6970
W8NP/8	Massillon ARC	523-	A-	12-	6736
W3IN/3	*non-club group*	*838-*	*BC-*	*4-*	6672
K2BMI/2	Old Fat Albert and the Gang	739-	B-	3-	6651
K5YAA/5	non-club group	1012-	C	3-	6272
W8BVU/8	Cooley H.S. ARC	312-	A-	4-	6016
K4VHC/4	non-club group	905-	C-	4-	5830
WA9TXE/9	South Milw. ARC	904-	C-	6-	5824
W8TFZ/8	Aviation RC of North American Rockwell	621-	ABC-	12-	5785
W@ELN/9	St. Louis University ARC	589-	B-	8-	5701
K4KE/4	non-club group	868-	C-	5-	5648
W4ABR/4	Johnson City RA	847-	BC-	7-	5632
K9LOD/9	Midwest ARC, Inc.	897-	BCD-	5-	5630
K3QBD/3	First State ARC	369-	AB-	12-	5422
W@AWB/@	non-club group	576-	BC-	4-	5407
WA5NLJ/5	Baton Rouge ARC	522-	B-	15-	5298
K8BXU/1	Newington AR League	393-	ABCD-	3-	5119
K@KYK/@	Tri-State ARC, Inc.	769-	C-	11-	5014
WA@PFP/@	non-club group	504-	AB-	8-	4945
W1QI/1	Candlewood ARC	524-	B-	16-	4926
W9EJ/9	Soc. of Radio Operators	753-	C-	27-	4918
K2AHB/2	Will's Warriors	774-	BC-	7-	4847
K4TBN/4	Peach State Contest Operators Soc.	683-	C-	5-	4498
W@URN/@	Hy-Gain ARC	747-	C-	3-	4482
WB4PQM/4	Shamrock High ARC	452-	B-	4-	4468
W5RBY/5	New Mexico Ridge Runners Wireless Assoc.	546-	BC-	6-	4456
W4NN/4	Eglin AR Soc.	706-	C-	10-	4436
W5HTK/5	Enid ARC, Inc.	676-	CD-	12-	4426
W8AL/8	Canton ARC	435-	AB-	28-	4414
W4QEE/4	Mobile ARC	686-	C-	6-	4396
K@ZEF/@	Epresi's Antenna Farmers	447-	B-	3-	4223
K3EBO/3	Maverick ARC of Delaware	423-	B-	16-	4207
WA3JBW/3	Brandywine HS ARC	378-	B-	8-	4002
WA@PHZ/@	Hamster VHF–UHF Club	512-	ABC-	9-	4173
K@SOQ/@	Hastings ARC, Inc.	558-	C-	16-	3948
K1LRK/1	non-club group	298-	AC-	3-	3916
W6VLD/6	McDonnell Douglas Aeronautics RC	436-	BC-	8-	3905
K8WBL/8	*Xavier University Army ROTC RC*	606-	C-	6-	3836
K8VQP/8	non-club group	604-	C-	3-	3824
WA@JXT/@	Forx ARC	402-	B-	8-	3818
VE1DH/1	Saint John ARA	565-	AC-	8-	3814
WA@WBG/@	Hastings Wireless	568-	C-	3-	3808
K@ZFL/@	Mountaineers	550-	C-	3-	3799
WA6MIW/6	Imperial Valley RC	577-	C-	4-	3662
K@NL/@	Hiawatha ARC	507-	C-	21-	3642
W8ARH/8	Motor City RC	539-	C-	10-	3634
K2TKE/2	Ward Melville HS ARC	530-	C-		3580
K9VWQ/9	Point Radio Amateurs	496-	C-	8-	3576
WA4KPI/4	Huguenot HS ARC	525-	C-	7-	3550
W7LRA/7	Utah ARC	524-	C-	25-	3544
W6UW/6	Santa Clara County ARA	557-	C-	4-	3542
W8BUI/8	West Park Radiops	319-	B-	4-	3471
W9ICL/9	Neenah-Menasha ARC	319-	B-	7-	3471
W@OUT/9	Old Uncle Tom & Nefuse	543-	C-	6-	3458
W3EAN/3	Reynolds-Rapp	536-	C-	5-	3416
W@LSD/@	Glenwood Amateur Soc.	502-	C-	6-	3412
K6BET/6	non-club group	501-	C-	5-	3406
VE1CBC/1	CBC Halifax ARC	498-	BC-	10-	3376
W@ZSJ/@	Mitchell ARC	523-	C-	12-	3348
WA6TAP/6	non-club group	518-	AC-	4-	3320
W7FO/7	Butte ARC	475-	C-	14-	3250
W8FQ/8	Lima Area ARC, Inc.	474-	C-	25-	3244
W9KGY/9	Freeport Area ARC	469-	C-	12-	3214
W7VNE/7	Anaconda ARC	458-	C-	18-	3148
W4BFB/4	Mecklenburg AR Soc., Inc.	457-	C-	8-	3142
K@OYM/@	Mid Mo. ARC	420-	AC-	12-	3132
W8AJW/8	West Park Radiops	420-	C-	9-	3120
WA1BZS/1	Wallingford AR CD Club	453-	C-	3-	3118
W9CHD/9	The Poison Ivy Rainmakers Wireless Assoc.	484-	C-	4-	3104
K9MFI/9	non-club group	483-	C-	3-	3098
K3OBF/3	Troop Nr. 93	458-	C-	4-	2948
WA@TIR/@	Bandhoppers RC	588-	C-	9-	2928
WA8BBB/8	Derby Wireless Assoc.	534-	BC-	10-	2909
VE4AA/4	The Winnipeg DX Club	480-	C-	9-	2900
W1WE/1	Windsors 1st Wet Feeters	442-	C-	4-	2852
K7CBP/7	*Klamath Basin ARA*	402-	C-	4-	2812
W4YUU/4	non-club group	432-	C-	3-	2797
K@IXG/@	Grand Island AR Soc.	432-	C-	11-	2792
W7OBE/7	Univ. of Wyo. ARC	396-	BC-	8-	2778
W7AFQ/7	Teledyne-Wah Chang Radio Amateurs	396-	C-	9-	2776
WB4HPC/4	International Harvester ARC	428-	C-	11-	2768
WA@OJX/@	Roosevelt HS ARC of Des Moines	424-	C-	4-	2744
W6KQH/6	San Luis High ARC	382-	C-	4-	2692
K@KBX/@	Benton County ARC	381-	C-	4-	2686
WB2YAO/2	non-club group	270-	B-	4-	2675
K4JLA/4	Spartanburg ARC, Inc.	348-	C-	9-	2670
W2PGS/2	Oswego County ARA	433-	CD-	15-	2642
WA5SNW/5	GDG ARC	403-	C-	3-	2618
W2OFQ/2	Rome RC, inc.	367-	C-	12-	2602
WB8EDZ/8	Explorer Post 288	396-	C-	5-	2576
K8NGQ/8	non-club group	362-	C-	5-	2572
VE4DE/4	Elin Flon ARC	327-	C-	3-	2562
WA@QIT/@	Arrowhead Radio Amateurs	356-	C-	5-	2546
VE3HK/3	Elliot Lake ARC	355-	C-	3-	2530
W@KUY/@	non-club group	337-	BC-	5-	2509
K@IDJ/@	Ornate Order of Bloodshot Eyeballs	346-	BC-	9-	2503
K1JFI/1	Roger Williams VHF Soc.	249-	B-	15-	2441
W2RVK/2	IBM-Owego RC	332-	C-	6-	2392
WB9CMS/9	non-club group	326-	BC-	3-	2374
K9ENM/9	Communicators	354-	C-	10-	2324
VE7ASC/7	Chilliwack ARC	318-	C-	10-	2308
W1EOA/1	Wellesley AR Soc.	301-	BC-	10-	2296
W9OWT/9	La Salle Peru RC	309-	C-	5-	2254
WB8DGW/8	Ohio Lid Assoc.	330-	C-	3-	2234
VE1ZH/1	Greenwood ARC	339-	C-	8-	2234
VE3GOG/3	Dryden ARC	262-	C-	4-	2182
WA9RPD/9	P.P.C. ARC	328-	C-	4-	2168
W8PIF/8	M&M ARC	289-	C-	8-	2134
K4LDR/4	Pete's Privateers	288-	C-	4-	2128
WA@UVG/@	Iowa City ARC	176-	B-	4-	1984
W8DYY/8	Mound ARA	263-	C-	9-	1978
W4BSJ/4	Delta ARC	251-	C-	3-	1906
K@ALC/@	The Benches	284-	C-	3-	1904
WA@GMX/@	non-club group	283-	C-	3-	1898
K@TVI/@	Canton RC	247-	C-	12-	1882
WA9PBZ/9	Pike HS RC	245-	C-	8-	1870
W8EE/8	Gahanna Lincoln ARC	203-	AC-	4-	1810
K8DXE/8	Mason County RC	263-	C-	10-	1778
WB2UKI/2	Budweiser Bombers Assoc.	257-	C-	3-	1742
WA9RPQ/9	Explorer Post 121	248-	C-	8-	1688
K9VHB/9	Ottawa RC	418-	B-	4-	1654
W8OMY/8	non-club group	239-	C-	4-	1634
WN8GFM/8	Columbus ARA	110-	B-	8-	1600
WA3LTA/3	Brandywine HS ARC	117-	BC-	8-	1512
K4RHH/4	LARC SSBers	185-	C-	25-	1510
W7UDA/7	Bonner County ARC	216-	C-	9-	1496
W9KIZ/9	non-club group	232-	C-		1392
W8RTR/8	Canton ARC	82-	B-	28-	1338
W@AJA/@	Coon Valley ARC	150-	AC-	5-	1330
WA@RNP/@	non-club group	153-	C-	5-	1378
VE7BWI/7	Beaver Valley ARC	152-	C-	8-	1312
VE3NDR/3	*North Dorchester ARC*	185-	C-	9-	1310
VE1AQ/1	Truro ARC	181-	C-	10-	1286
WA3OBI/3	New Carrollton ARA	92-	B-	4-	1228
WB2VPY/2	Chemung Co. AREC Assoc.	92-	C-	11-	1152
WA@VYB/@	non-club group	121-	C-	4-	1126
W@ZWY/@	Sioux Falls ARC, Inc.	149-	C-	22-	1094
WA@YKN/@	Minnesota Automatic Noise Limiters	115-	BC-	4-	1093
W@RTK/@	Theodore Roosevelt ARC	148-	C-	6-	1088
W8UHN/3	Friendly AR Transmitting Soc.	117-	B-	4-	1053
WA9VYB/9	H.A.W.K.S.	136-	C-	7-	1016
W5ABF/5	Mineral Wells ARC	122-	C-	10-	932
W4JLK/4	The Three Gooches	29-	A-	3-	922
W5EHM/5	University of Texas ARC	120-	C-	6-	920
K8HUH/8	non-club group	107-	C-	3-	842
W6UUS/6	Convair ARC	177-	CD-	8-	788
W1MY/1	Northern Conn. ARC	59-	B-	3-	731
WN3MIS/3	Adams Co. ARC	28-	B-	3-	652
WN@AMK/@	Woodland Key Clickers	42-	C-	6-	642
WN5AAS/5	non-club group	30-	B-	3-	630
WA@ZTP/@	Davenport AR Soc.	35-	C-	3-	610
W4AKH/4	Fort Pierce RC	177-	C-	5-	554
WA@ZHI/@	non-club group	39-	B-	5-	551
WA2GFK/2	Floral Park Memorial HS ARC	57-	CD-	4-	536
W3CDI/3	Baltimore Polytechnic Institute RC	106-	C-	6-	516
W1VSR/1	non-club group	33-	B-	4-	497
WN2HM/2	non-club group	28-	AC-	4-	386
K3RZX/3	Bureau of Mines ARC	191-	C-	5-	382
WN@WXS/@	non-club group	27-	C-	3-	362
WB8AST/8	RAI-BEC ARC	109-	B-	5-	327
WA9ABI/9	Jay AR Soc.	55-	C-	3-	310
WA2CAN/2	George W. Hewlett HS AR Assoc.	54-	C-	7-	308
WA5BUI/5	non-club group	144-	C-	4-	288
WA2EDR/2	Nogatch and Friends	40-	BC-	4-	273
WA6HRS/6	non-club group	8-	C-	1-	10

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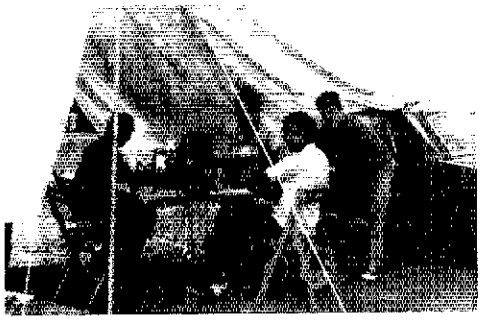
K8KRN/8	Northern Ohio AR Soc.	1953-	AC-	18-	16,622
W8QBC/8	Oak Park ARC	1745-	BCD-	23-	14,941
K5RWK/5	Richardson ARC	1706-	BC-	22-	14,040
W8DB/8	Miami Valley ARC Soc.	1969-	BC-	14-	14,325

VE2ND/2	Montreal FD Assoc.	1733-	BC-	7-	14,211
KZ5AT/5	USAFSO MARS	1876-	BC-	15-	12,666
WA9LOT/9	non-club group	1308-	BC-	5-	12,327
WØIW/Ø	Arapahoe RC	1100-	AC-	12-	12,080
K2KIR/2	R.A.G.S. Eschewers	1234-	AB-	8-	11,978
WØYT/9	Badger AR Soc.	1803-	C-	6-	11,618
W8LT/8	Ohio State Univ. ARC	1382-	BC-	16-	11,238
K4HEX/4	Lynchburg ARC	1118-	AB-	30-	10,868
WA2DYL/2	General Dynamics-Electronics Era RC	1486-	BC-	12-	10,545
WB6ATW/6	Southern California Amateur Network	1305-	ABC-	20-	10,522
WA5CKF/5	Irving ARC	1573-	C-	12-	10,038
W8BE/8	K&W Soc.	1564-	AC-	11-	9916
W4SEL/4	Georgetown, Ky. ARC	1560-	C-	5-	9760
W7EKB/7	Hellgate ARC	1387-	ABC-	7-	9670
W3ABT/3	Univ. of Pa. ARC	1251-	BC-	5-	9624
WA5WFR/5	HARC"s Rejects	1300-	BC-	9-	9280
VE1FO/1	Halifax ARC	1314-	BC-	16-	8687
W8COE/8	Kanawha RC	1324-	C-	25-	8544
W2HO/2	Boiled Owls of N.Y.	1022-	BC-	10-	8232
WA7JRL/7	Desert Krauts	1282-	C-	5-	8092
WA5WJI/5	non-clubgroup	1218-	C-	9-	7908
WA2BCK/2	Cheektowaga ARC	1210-	C-	5-	7880
W9IU/9	Kokomo Firebird RC	929-	BC-	35-	7827
WA3KKB/3	The Boys on the Band	983-	BC-	5-	7750
K9BGL/9	Belleville AR Foundation	968-	BC-	5-	7750
WØAV/Ø	Wilcox ARC	1142-	C-	6-	7652
W1HEB/1	Middlesex ARC	1100-	BC-	20-	7509
WA2LQO/2	Grumman ARC	797-	ABC-	15-	7463
WA5VAQ/5	Explorer Post 72	1192-	C-	10-	7352
WB3OF/8	Northern WV Field Day Assoc.	935-	BC-	4-	7329
KZ5PA/5	Cross Roads ARC	1367-	CD-	9-	7326
W3ONP/3	Chesapeake ARC	744-	B-	35-	7296
WØEBE/Ø	Southwest Missouri ARC	1097-	C-	20-	7182
VE1HE/1	Dartmouth ARC	1057-	C-	22-	7142
KP4BFE/4	Sabana Seca ARC	1090-	C-	10-	7140
WØLB/Ø	Jayhawk AR Soc.	1064-	C-	26-	6984
W5LM/5	Temple ARC	624-	BC-	12-	6957
WØMXW/Ø	Rochester ARC	1057-	C-	35-	6942
WA5IIS/5	non-club group	1017-	BC-	7-	6845
W5PDO/5	Los Alamos ARC	997-	AC-	14-	6794
K7MNZ/7	Aberdeen ARC	1032-	C-	9-	6792
K4HYB/4	Charles E. Newton, Jr. ARC	1026-	C-	10-	6756
WA9UMU/9	Nicolet HS ARC	1001-	C-	12-	6606
W5ABD/5	Westside ARC	1054-	C-	14-	6524
W4KVK/4	Henderson ARC	1042-	C-	16-	6452
WB8AKO/8	non-club group	972-	C-	6-	6432
WA9IMY/9	Explorer Post 373	877-	BC-	17-	6297
K9MIE/9	Illinois Valley RA	946-	C-	6-	6276
W9HHX/9	M.S.O.E. RC	883-	BC-	12-	6258
W5HF/5	Northwest Arkansas Repeater Soc.	1416-	CD-	7-	6247
VE5NN/5	Regina ARA	776-	BC-	20-	6208
K2KKH/2	Walton RA	934-	C	-	6204
W6KA/6	Pasadena RC	497-	AB-	13-	6120
VE7EZ/7	Victoria Short Wave Club	857-	AC-	16-	6066
W3PSH/3	Keystone ARC	605-	B-	6-	6045
K4BV/4	Daytona Beach ARA, Inc.	907-	C-	32-	6042
K7SKW/7	Mt. Baker ARC	873-	C-	20-	6038
W3OK/3	Delaware-Lehigh ARC	905-	C-	16-	6030
K2OQJ/2	St Peters Prep RC and Clifford Gezietvirf RA	805-	BC-	7-	5984
K4KDI/4	Va. Tech. ARA	929-	C-	6-	5974
W4FXU/4	Rowan AR Soc.	883-	C-	11-	5898
K4IA/4	Ft. Myers ARC	880-	C-	9-	5880
K2AQI/2	Maplewood ARA	879-	BC-	12-	5866
K9CIU/9	RA Megacycle Soc.	847-	BC-	14-	5775
K2JD/2	Band Dit-Dalis	862-	C-	-	5772
W5YM/5	Univ. of Arkansas ARC	855-	C-	6-	5730
WØBLK/Ø	Black Hills ARC	854-	C-	4-	5724
W6TJ/6	Riverside County ARA	819-	C-	7-	5714
WØSOE/Ø	Wichita ARC	852-	C-	23-	5712
VE3RAM/3	Ottawa Valley Mobile RC	848-	C-	18-	5688
WB2AMV/2	Raritan Valley Marauders	848-	C-	4-	5688
WØBRI/Ø	St. Louis Field Day Club	874-	C-	-	5644
WA6IYJ/6	non-club group	871-	AC-	6-	5638
W5BGW/5	North Ark. AR Soc.	870-	C-	12-	5620
VE5AA/5	Saskatoon ARC	833-	BC-	20-	5610
KH6RS/6	Maui ARC	832-	C-	6-	5592
W3ZPF/3	Bowie ARC	894-	CD-	12-	5525
WA6LTM/6	Hamilton High ARC	778-	AC-	5-	5518
WA9FSZ/9	Indianapolis Red Cross RC	848-	C-	16-	5488
WØEIT/Ø	Albert Lea Spiderweb ARA	812-	C-	8-	5472
W9YB/9	Purdue ARC	810-	C-	11-	5460
WA2PNU/2	Larkfield ARC	770-	AC-	12-	5352
VE5MA/5	Moose Jaw ARC	581-	BC-	12-	5304
W9UDU/9	Racine Megacycle Club	767-	C-	21-	5202
W8DSO/8	non-club group	774-	C-	20-	5044
WØWYV/Ø	Bellevue ARC, Inc.	700-	C-	14-	5000
W6MSO/6	Inglewood ARC	528-	ABC-	26-	4971
W3ALD/3	Lake Shore ARA	717-	C-	10-	4902
WA6RIZ/6	non-club group	744-	C-	6-	4864
W2MO/2	Livingston ARC	493-	B-	20-	4837
WA1HRC/1	WELI ARC	734-	C-	-	4804
KØDKZ/Ø	Beaver Patrol	642-	BC-	7-	4782
K8UTT/8	Tin Lizzy Club	728-	C-	12-	4768
WA9UMN/9	University of Illinois	650-	BC-	11-	4765
K6LDA/6	Crescent Bay Emergency AR Net	666-	BC-	11-	4738
K2BR/2	Southern Counties ARA	656-	C-	15-	4736
W4BUW/4	Patrick Henry ARC	687-	C-	7-	4722
K9HDH/9	Elkhart Red Cross ARC	718-	C-	7-	4708
K5KIR/5	Northeast Mississippi ARA	682-	C-	5-	4692
W6KWO/6	Marina ARC, Inc.	712-	C-	12-	4672
W8CQK/8	Battelle Columbus RC	678-	C-	8-	4668
W8KGG/8	Huron Valley ARA	638-	C-	13-	4628
K8EMY/8	South East ARC	582-	AC-	6-	4620
WØLQ/Ø	Bell ARC	698-	C-	15-	4588
W8HCI/8	non-club group	613-	BC-	12-	4555
WØYOR/Ø	non-club group	656-	C-	10-	4536
K3ONW/3	Adams Co. AR Soc.	646-	C-	10-	4476
K1RQE/1	Portland Amateur Wireless Assoc.	670-	C-	10-	4420
WA5THM/5	Civil Offense Specials	782-	CD-	8-	4413
VE4BB/4	Winnipeg ARC	623-	BC-	12-	4368
WØMOW/Ø	Goldfield RC	627-	C-	6-	4362
W8YPT/8	Chippewa ARC	614-	BC-	19-	4353
K7LIX/7	Southern Ore RC	623-	C-	12-	4338
W4NYK/4	Blue Ridge AR Soc.	651-	C-	8-	4306
WØMG/Ø	N.E. Iowa ARA	525-	AC-	-	4276
W4IRE/4	Forsyth ARC	601-	AC-	10-	4218
WSQJA/5	Explorer Post 920	593-	C-	8-	4168
UKE,G.MIK,SCHOL,FOX,HUD		580-	ABC-	6-	4155
W9IBM/9	Konemico Amateur Operating Soc.	592-	C-	6-	4152
K2ECU/2	Lockport ARA, Inc.	589-	C-	25-	4134
WAØRAX/Ø	Albert Lea ARC	586-	C-	9-	4116
K2LSA/2	State Line RC	557-	ABC-	8-	4099
W8LFI/8	SWHG RC	569-	BC-	4-	4086
K8VAN/8	PHARO Club	547-	C-	7-	4082
WA9WHV/9	Lawrence Central HS ARC	609-	C-	3-	4054
K4FDS/4	Tyndall ARC	1031-	BCD-	4-	4050
WB4QNX/4	IBM ARC of Boca Raton	573-	C-	15-	4038
WA9FSB/9	SSG RC	566-	C-	4-	3996
WAØDGW/Ø	Steele County ARC	563-	C-	5-	3978
WA6APW/6	Bay Hill Toppers	557-	AC-	5-	3958
WA9YYY/9	Nightly Absurdities for the Sleepy Amateur Net Assoc.	549-	BC-	8-	3927
W4PED/4	North Augusta Belvedere RC	512-	C-	15-	3872
WØKB/Ø	Ottumwa ARC	541-	C-	14-	3846
K5JOA/5	Miami ARC	559-	C-	10-	3754
W9AZK/9	Chicago Radio Traffic Assoc.	525-	C-	7-	3750
W2JUG/2	West Jersey Radio Amateurs	503-	BC-	13-	3735
KØGZL/Ø	Sand Hills ARC	517-	C-	10-	3702
W4NLX/4	Indian River ARC, Inc.	791-	BCD-	9-	3699
WØJUI/Ø	North Iowa ARC	481-	C-	17-	3686
W5ZDN/5	Central Texas ARC	514-	C-	12-	3684
VE7ARV/7	Vancouver ARC	437-	AC-	11-	3646
WA2LDQ/2	Webster Explorer Radio Post	541-	C-	10-	3646
K8VNQ/8	Mountain State Transmitters	539-	C-	11-	3634
W3SJ/3	St. Joseph's College ARC	498-	ABC-	11-	3631
WB8AAJ/8	Shores ARC	537-	C-	4-	3622
WØLN/Ø	Winona ARC	284-	ABC-	4-	3600
W9EBN/9	Grant County ARC	495-	C-	21-	3570
W@AZR/Ø	Austin Area ARC	463-	BC-	13-	3558
WBØBQG/Ø	3M ARC	491-	C-	19-	3546
K5SAM/5	Edmond AR Soc.	413-	BC-	10-	3545
VE6MR/6	NAIT ARC	517-	C-	9-	3502
W3HZW/3	Kent County ARC	313-	AB-	11-	3438
K4BEZ/4	Humboldt ARC	492-	C-	8-	3352
KZ5CZ/5	Canal Zone ARA	454-	C-	15-	3324
W5QGG/5	Midland ARC	432-	BC-	6-	3291
WA3K7A/3	non-club group	441-	C-	3-	3246
WB8EKJ/8	non-club group	536-	C-	5-	3216
W3EI/3	Baltimore ARC	435-	BC-	10-	3213
WØHT/Ø	Flint Hills ARC	413-	BC-	9-	3168
W5ES/5	El Paso ARC	416-	BC-	13-	3147
K8TII/8	Henry County ARC	384-	BC-	20-	3139
W7YH/7	Montana State Univ. ARC	454-	C-	6-	3124
WØKII/6	Dunsmuir ARC, Inc.	420-	C-	-	3120
WB6NVY/6	Redwood HS ARC	403-	C-	15-	3018
WA9VXX/9	Fountain Bluff ARC	549-	CD-	10-	3009
WB2HKM/2	Hauppauge Field Day Group	383-	C-	5-	2898
W9HHJ/9	Northland ARC	545-	CD-	-	2862
WA8IKP/8	Lindy's Raiders	312-	AC-	4-	2796
W8CWO/8	Steubenville ARC	362-	C-	-	2772
K5WPH/5	Sun City ARC	394-	C-	25-	2764
WB4UTG/4	Communication Experts	382-	C-	4-	2692
VE4QD/4	Brandon ARC	600-	CD-	18-	2688
WA5KAS/5	Trans-Texas Joint Effort	346-	C-	5-	2676
W2BE/2	Tryion RC	331-	AC-	12-	2622
WA6GYI/6	Cal Poly ARA	284-	BC-	12-	2580
VE7NA/7	Nanaimo ARC	423-	C-	11-	2538
K2VSU/2	Mount Vernon HS RC	316-	C-	12-	2496
W2LCA/2	North Country RC	316-	C-	5-	2496
K4NU/4	Brightleaf AR Club	302-	C-	12-	2412
W8GET/8	Lorain County ARA	326-	C-	7-	2356
KØHFX/Ø	non-club group	563-	AD-	7-	2307
W8JAK/8	Dayton Firebirds Club	463-	CD-	11-	2295

WB2NUW/2

K8LUC/8



KP4ID/4

W5ABD/5

WØIN/Ø

W9CCU/9

WA6BAI/6

K4FU/4

WA5PPJ/5	Watonga ARC	186-	B-	7-	2274
K5FHU/5	Holloman AFB MARS Club	895-	BC-	9-	2253
WB4LHQ/4	non-club group	308-	C-	5-	2242
WB2WGF/2	Mid-County Net	198-	B-	9-	2182
WA9VKN/9	The 15 Meter Woodstock Nation	295-	C-	3-	2170
WA9BRF/9	Argonne ARC	269-	BC-	-	2146
W2RHM/2	Black River Valley ARC	253-	C-	7-	2118
WA3MVR/3	non-club group	353-	C-	3-	2118
WA5IPE/5	Wheat Straw ARC	247-	BC-	3-	2115
K4GG/4	Manatree ARC	250-	C	10-	2100
W0CIW/0	non-club group	266-	C	8-	1996
W5RAB/5	Brownwood ARC	228-	C-	5-	1968
VE5BO/5	Northern Saskatchewan ARC	219-	C-	6-	1914
W0FLO/0	Pine Ridge ARC	216-	C-	8-	1896
KH6GLU/6	Aloha DX Club	232-	C-	2-	1792
W4AB/4	Broward ARC	704-	BD-	-	1746
W7KJ/7	non-club group	217-	C-	5-	1702
WA0HOU/0	Blue Valley ARC	183-	BC	16-	1701
WA9HIH/9	Elmwood Park Civil Defense	170-	BD-	7-	1698
W8QLY/8	Mahoning Valley ARA	216-	C	11-	1696
K5EWN/8	VHF'ers	141-	B-	8-	1669
W2ZJ/2	Elmira ARA	177-	C-	8-	1662
WA8EHC/8	Mt. Vernon Contest Club	177-	C-	4-	1662
W9CZH/9	Winslow AR Soc., Inc.	207-	AC-	7-	1648
W9KTL/9	non-club group	194-	BCD-	4-	1620
W0IWU/0	McPherson ARC	168-	C-	6	1608
WA9AUW/9	Valley VHF Club	199-	C-	9-	1594
WN0AMD/0	Wichita ARC/Novice	110-	B-	7-	1590
K8UZW/8	Parma RC	164-	C	10-	1584
W5SRW/5	Mesilla Valley RC	197-	C-	5-	1582
W7YN/7	Nevada ARA	216-	BCD-	9-	1549
W1BD/1	Central Vermont ARC	190-	C	10-	1540
W9CIS/9	non-club group	156-	BC-	4-	1498
WB4ICJ/4	Space Center AR Soc.	739-	C-	5-	1478
WN9AJT/9	The Nomads	88-	B-	4-	1392
K7KDI/7	Explorer Post 308	122-	C-	6-	1332
WA2DRF/2	Herricks HS RC	112-	C-	3-	1272
WB2FLF/2	Queen of Peace HS RC	183-	CD-	2-	1272
K0VKN/0	Ft. Hays QSOers	97-	CD-	6-	1232
W6GWT/6	Marks' Mars Men	107-	C-	4-	1042
WA3LUM/3	North Catholic HS ARC	38-	A-	7-	1030
K4VFA/4	Cory's Fiasco	104-	C-	3-	1024
WA5YTF/5	Austin Airport AR Soc.	93-	BC-	4-	1009
WA2EDJ/2	Ogdensburg ARC	66-	C	10-	996
WB6UHI/6	Brasspounders ARC	166-	C-	7-	996
K1HGS/1	Twin State RC	89-	C-	6-	934
W8HYJ/8	non-club group	51-	BC-	3-	930
W1NRG/1	Meriden ARC, Inc	363-	C	15-	926
WA4WCP/4	Suffolk ARC	100-	CD-	5-	906
WA1IRY/1	Sharon ARA	77-	BC-	7-	880
WA9YUK/9	Chiburban Mobileers	78-	C	6-	868
WA7NSK/7	Beaverton ARC	161-	C-	4-	758
W7VJD/7	Lewiston & Clarkston ARC	245-	C-	6-	690
W5FQ/5	The Murphy Attractors	220-	B-	3	660
W0RCH/0	Pioneer RC	242-	CD-	-	595
WN0AIK/0	Explorer Post 11	28-	C-	5-	568
K2PWK/2	Princeton YMCA	59-	C-	8-	534
WA0TAQ/0	non-club group	219-	BCD-	4-	456
W3VI/3	Huntingdon County ARC	222-	ACD-	-	449
WA8ZYT/8	The Big Time Operators	116-	C-	3-	232

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W5WMU/5	Lafayette ARC	2960-	BC	21-25,727	
W4IZ/4	North Florida AR Soc.	2333-	ABC	45-20,086	
W4FU/8	Ohio Valley ARA	1955-	BC	14-15,326	
K4EU/4	Louisville's Active Radio Operators	1838-	ABC	12-14,7400	
W5GKT/5	Texas DX Soc.	1820-	BC	12-14,255	
W4ABK/4	Kentuckiana RC	1823-	BC	15-13,445	
W9AXD/9	Rockford ARA	1776-	ABC	10-13,342	
W9LM/9	Northwest ARC	1818-	BC	21-13,330	
WA0IOT/0	Independent ARC	1388-	BC	11-13,166	
W8CO/8	Columbus ARA	1941-	BC	2-12,728	
W4UC/4	Five Flags ARA, Inc.	1986-	C	25-12,716	
W9DBZ/9	NAFI RC	1764-	BC-	8-12,470	
W9CQO/9	Ozaukee RC, Inc.	1060-	AC	25-12,044	
W9AA/9	Hamfesters RC	1669-	ABC	29-11,870	
W4RUL/4	Greeneville ARC, Inc.	1363-	ABC	13-11,276	
W5LL/5	Tombigbee ARC	1698-	C	20-10,988	
K3MTK/3	Suburban ARC, Inc.	1530-	ABC	25-10,933	
W6HS/6	La Crescenta Valley RC	1001-	ABC	12-10,865	
W6IOS/6	Palisades ARC of Culver City, Inc.	1352-	AC	25-	9982
VE3IJ/3	West Side RC	1265-	BC	20-	9791
W9BFO/9	S. Eastern Ill. Ham Soc.	1455-	C	15-	9530
W8VVL/8	Queen City Emer. Net	1398-	C	20-	9510
W1DC/1	1200 RC	1414-	BC	13-	9372
WA4IXA/4	Knox Church RC	1077-	BC	14-	9164
K6YA/6	Foothills AR Soc.	984-	ABC	24-	9089
W0FRH/0	Johnson County ARC	1297-	BC	25-	9075
W4TRC/4	Kingsport ARC	1345-	C	40-	8870
W3CKT/3	New Carrollton ARA	1331-	C	11-	8786
WA5SOD/5	Central Okla. VHF ARC	1307-	BC	40-	8672
W4CVY/4	Columbus ARC, Inc.	1243-	C	10-	8458
W7KH/7	Western Washington DX Club	1260-	C	17-	8360
W5KHB/5	Old Natchez ARC	1219-	C	15-	8314
K2BK/2	Overlook Radio Soc.	1226-	BC	29-	8192
W0OJY/0	Prairie Dog ARC	1317-	C	12-	8102
W6NI/6	East Whittier RC	962-	ABC	11-	8066
K6CLZ/6	Aerojet ARC	1097-	AC	15-	7778
WB8DFZ/8	Shawnee Hills ARC	1054-	ACD	6-	7754
W3CI/3	Springfield ARC of Montgomery County	1133-	C	12-	7598
W4POP/4	R.A.T.S.	1540-	CD	29-	7478
K5SLD/5	Arlington RC	1125-	C	13-	7450
W8QXO/8	Newark ARA	1007-	BC	13-	7297
W5TSV/5	Pampa ARC	1073-	C	15-	7238
K1JMQ/1	Lexington HS RC	1074-	BCD	12-	7214
K4EGF/4	Seymour-Johnson AFB MARS Group	1065-	C	14-	7190
W5KA/5	Austin ARC	774-	BC	20-	7187
W1GB/1	Hamden ARA	1051-	C	16-	7106
W9MJL/9	Vermilion County ARA	1023-	C	27-	6938
W5UK/5	Greater New Orleans ARC	1014-	C	15-	6884
WA8TGX/8	Greenville HS ARA	659-	AB-	9-	6740
W8MAA/8	Central Mich. ARC	907-	ABC	20-	6521
W1USV/1	Trumbull ARC	891-	C	17-	6346
W5GZG/5	Dallas Ten Meter Net	930-	C	12-	6180
K5VOZ/5	Lawton Fort Sill ARC	889-	C	21-	6134
W2DMC/2	Crystal RC	921-	C-	6-	6126
WA3UZR/3	IBM ARA	855-	BC	15-	6065
W0BRN/0	Three Rivers ARC	826-	C	10-	5956
WB9BPW/9	Scott ARC	858-	C-	7-	5948
W1AQ/1	Associated Radio Amateurs of So. New England	817-	BC	18-	5916
K8WWK/8	Assoc. for Advancement of Amateur Radio	792-	BC	13-	5840
W7GV/7	Old Pueblo RC	825-	C	25-	5750
W8GFG/3	Shenango Valley AR Field Day Group	791-	ABC	7-	5736
VE2JB/2	Radio Amateur de Granby	812-	C	12-	5672
VE3CCR/3	Cooksville ARC	842-	C	15-	5652
VE3DRT/3	Sky-Wide ARC	796-	C	23-	5576
K4KQ/4	DADE RC	811-	ABC	15-	5542
W0RKG/9	Tippecanoe ARA	1462-	CD	25-	5525
W2RP/2	Westchester ARA	749-	C	10-	5494
W3VV/3	McKean County ARC	769-	C	17-	5414
WB4ABT/4	Southern Peninsula AR Club	701-	C-	6-	5366
W9OFR/9	Joliet AR Soc.	1410-	BD	15-	5360
K6ASU/6	Nevada County ARC	756-	C	10-	5336
W6ZB/6	San Leandro ARC	746-	ABC	20-	5178
K9TSM/9	Goshen ARC	758-	C	12-	5148
K5WOD/5	Springhill RC	717-	C-	8	5102
WA7MYG/7	Sagebrush ARC	714-	C-	9-	5084
W0VZG/0	Pilot Knob ARC	699-	BC	15-	5063
W1FUF/1	Tri City ARC, Inc.	649-	ABC	20-	5036
W6AB/6	Satellite ARC	726-	C-	9-	4956
W9INL/9	Bloomington ARC, Inc.	558-	BC	12-	4949
K2LYO/2	Salem County RC	683-	C-	5-	4898
WB2DHO/2	The Hilltoppers	628-	BC-	4-	4889
VE4DU/4	Southwestern Manitoba ARC	681-	C	14-	4886
W8YDK/8	Milford ARC	577-	AC	15-	4826
VE2CVR/2	Club de la Vallee du Richelieu	666-	C	17-	4796
W2IJ/2	Massapequa ARC	642	BC	20-	4775
VE3AC/3	Sudbury & District ARC	564-	BC	10-	4767
W0NH/0	Missouri Valley ARC	881-	BCD	14-	4752
W0EMA/0	Explorer Post 11, BSA	658-	C-	8-	4748
W7DP/7	Walla Walla Valley RAC	621-	C	14-	4726
W6PMI/6	United ARC	517-	AC	14-	4680
VE7FG/7	Fort George ARC	641-	C	20-	4666
K0GIA/0	Air Capitol Tech-ni-chat ARC	643-	C	30-	4658
W0LCP/0	Hibanders and NSWA	737-	BCD	24-	4620
WB2RLU/2	Fair Lawn ARC	441-	ABC	16-	4604
W1OP/1	Providence RA, Inc.	631-	BC	-	4592
WA2BPO/2	Airborne Inst. Lab ARC	628-	C	11-	4568
W9CCU/9	Wheaton Community Radio Amateurs	640-	BC	12-	4539
WA2DEY/2	Desperate Eight Youngsters	508-	BC-	8-	4527
K0THD/0	Davenport Iowa AR Soc.	618-	C-	6-	4508
W9GOP/9	Allison ARC	610-	C-	9-	4460
W7PXI/7	Valley RC of Eugene	606-	C	12-	4436
WA5ILT/5	non-club group	546-	BC-	7-	4420
W2ITZ/2	Chaminade HS RC	634-	C-	-	4414
VE6ASN/6	Border RC	591-	BC	16-	4397
WA0QHO/0	Pawnee ARC, Inc.	543-	AC	17-	4334
VE3HSQ/3	Quinte ARC	735-	BCD	6-	4328
W0CBL/0	Northeast Missouri ARC	670-	CD	8-	4282
K5VFO/5	Kirtland AFB ARC	571-	BC-	5-	4244
W0IN/0	Brainerd Area ARC	552-	C	11-	4112
W6YAA/6	Fullerton Jr. College ARC	519-	BC-	6-	4058
K1JGJ/3	Joe's Place	566-	BC-	3-	4047
W6AK/6	Sacramento ARC	486-	ABC-	-	4023
K3ZAC/3	Warminster ARC	429-	ABC	25-	4003
K7AYF/7	Shy-Wy RC	529-	BC-	9-	3989
WB9AIH/9	Ridgewood Radio Electronics Club	404-	BC-	9-	3956
VE3SWA/3	South Waterloo ARC	465-	BC-	-	3944
WA2FHP/2	North Bergen ARC	593-	ABC	4-	3933
W4OLB/4	Smoky Mountain ARC	520-	BC	12-	3926
WB0AGP/0	Storm Lake ARC	606-	BCD	20-	3902

W9GFD/9	Prairie ARC	510-	C-20-	3860	W1AX/1	Connecticut Wireless Assoc.	2236-	BC-21-21,036
W5AHB/5	Deming ARC	509-	C- 5-	3854	W4NKH/4	Oak Ridge Radio Operators Club	2529-	BC-17-20,155
W3AVK/3	West Branch ARA	508-	C- 6-	3848	W1ARR/1	Murphy's Marauders	2052-	ABC-19-18,876
W9AFG/ø	West Nebr. Tech ARC	454-	C- 7-	3774	W8EY/8	Van Wert ARC, Inc.	1627-	B-28-15,643
WA5VBC/5	Explorer Post 296	508-	AC- 9-	3744	K6BAG/6	Pacifico RC	4181-	ACD- 9-15,131
W8NCM/8	Springfield ARC	907-	CD- -	3743	W9FK/9	West Allis ARC, Inc.	2068-	C-17-13,608
W6YX/6	Stanford ARC	490-	BC- 3-	3720	W7IN/7	Mountain Moguls	2040-	AC-18-13,360
K6QHO/6	South Bay AR Society	648-	ACD- 8-	3677	WØEQU/Ø	Al Sar Ben RC	1854-	BC-20-13,060
W6NWO/6	Young Ladies RC of L.A.	607-	C-16-	3642	K3BSC/3	Belmont RC	1928-	BC-23-12,780
W2BMW/2	Tri-Boro Radio Club	321-	B-13-	3489	W2MU/2	Niagara Frontier DX Assoc.	1933-	C-12-12,598
WØKUU/Ø	non-club group	442-	C-16-	3482	W2LQ/2	Holmdel ARC	1326-	ABC-38-11,992
W9WWI/9	Clark County ARC, Inc.	385-	AC-12-	3436	W2OYH/2	Morris RC	1488-	BC-28-11,288
W7NBR/7	Spokane Radio Amateurs	472-	C-13-	3432	W5SH/5	Kilocycle Club	1498-	BC-40-11,118
WA9CJN/9	Kishwaukee RC, Inc.	340-	BC- 8-	3392	W7IO/7	Arizona ARC	1673-	BCD-50-10,951
W4NV/4	Tidewater ARC	465-	C- 9-	3390	W2NVB/2	Durland Radio Explorer Post 51	1552-	C-16-10,312
WA3AOE/3	Explorer Post 328 RC	372-	ABC- 9-	3354	W2SE/2	New Providence ARC, Inc.	1442-	BC-32-10,116
WA2EOP/2	S for Lunch Bunch	426-	AC- 8-	3294	W2SEX/2	ARA of the Tonawandas	9084-	C-16-10,054
WAØTAO/Ø	Three Rivers RC	410-	C- 8-	3260	W6HE/6	Conejo Valley ARC	1461-	ABC-20-10,051
W2DLL/2	Key Klickers ARC	418-	ACD-12-	3248	WØMNM/Ø	South Platte AR Soc.	1498-	C- - 9988
W8ET/8	Findlay RC	574-	BCD-12-	3240	W5AC/5	Memorial Student Center ARC	1092-	BC- 8- 9902
W8EIR/8	Thunder Bay ARC	402-	C-10-	3214	K9RAS/9	Motorola Engineers	1506-	C-16- 9836
W5IPI/5	Terry County ARC	400-	C- 8-	3200	WA2LDS/2	Wayne ARC	1432-	BC-26- 9503
W4YFK/4	Northern Kentucky ARC	428-	BC-20-	3180	W6LEZ/6	Richmond ARC	1396-	C- - 9376
W8SP/8	Mountaineer ARA	430-	C- 9-	3180	VE3PRC/3	Peel ARC	1387-	C-15- 9322
VE3AWI/3	Bluewater RC	394-	C- -	3158	VE3NSR/3	North Shore RC	1403-	C-16- 9218
WB4KLF/4	Wenoca Twin City ARC	481-	ABC-10-	3158	WAØUGU/Ø	P.H.D.A.R.A.	1283-	AC-57- 8818
W8TV/8	ARC of Riverdale School	388-	C-18-	3128	K3OTY/3	Etna RC	1288-	BC-31- 8615
W2FNW/2	Matawan Boro CD	338-	BC- 8-	3104	K1JMR/1	Norwood ARC	1086-	ABC-25- 8568
W1ACT/1	Fall River ARC	366-	BC-10-	3072	W6NKY/6	Edgewood AR Soc., Inc.	1195-	ABC-20- 8503
WA2DZG/2	North Shore ARC	357-	AC- 5-	2970	W4BRB/4	West Palm Beach ARC	1196-	BC-11- 8496
WØGWX/Ø	Lee's Summit RC	539-	BCD-25-	2949	WA2DNR/2	Colonie Central HS RC	1192-	BC-10- 8155
K1NQG/1	Fidelity ARC	349-	BC-13-	2918	K9JSI/9	La Porte ARC	982-	ABC-18- 8101
W7DZH/7	Eagle Rock RC	353-	C-13-	2918	WB2ZEA/2	non-club group	800-	B- 7- 8000
WAØNQA/Ø	Independence ARC	591-	CD- -	2900	K8UCB/8	Cascades AR Soc.	1146-	C-18- 7876
VE3ICD/3	Barrie ARC	349-	C-20-	2894	VE2ARC/2	Montreal ARC	1134-	CD-25- 7786
K2UCP/2	Woodbridge RC	329-	BC- 8-	2856	VE3MRC/3	Metro ARC	1125-	C-14- 7750
K1AVL/1	Swamp Yankees	257-	BC- -	2849	W9IKN/9	Elgin AR Soc.	1285-	CD-18- 7730
WB4NTB/4	Murray State Univ. ARC	338-	C-10-	2828	W4IYU/4	Middle Tenn. AR Soc.	1151-	C-12- 7706
WA6BAL/6	Tulare County ARC	336-	C-12-	2816	W8ZPF/8	CRES AR & Electronics Club	954-	BC-20- 7394
VE3ARC/3	Ottawa ARC	338-	C-21-	2810	G3TYL/W9	Hoosier Lakes RC	1064-	C-30- 7384
WA8JQA/8	Murphy's Subterranean Circus	368-	C- -	2808	W6LUC/6	Santa Barbara ARC, Inc.	1015-	BC-15- 7267
VO1BN/VO1	Splinter Group	303-	BC- 9-	2750	W6PM/6	Miraleste HS ARC	964-	AC-10- 7244
WA9YEM/9	Nahape RC & Explorer Post 339 ARC	322-	C- 7-	2732	W3BN/3	Reading RC	1026-	C-25- 7156
W9LMP/9	Clinton County VHF RAC	294-	ABC- 8-	2726	K4IXG/4	Platinum Coast ARC	989-	BC-11- 7033
K4KNR/3	Mahanoy Valley Brass Pounders	344-	C- 5-	2664	W2YKQ/2	Lake Success RC	884-	ABC-12- 7032
WA5PIF/5	Tomball ARC	305-	C- 3-	2630	W3CSL/3	Monessen ARC	974-	AC-23- 6898
W6PMK/6	North Peninsula Electronics Club	453-	ACD-16-	2606	WA3DFM/3	Two Rivers ARC	982-	C-20- 6892
WA9ZSV/9	Calumet Area Teenage ARS	291-	BC- 8-	2591	K9VHF/9	Hamilton-Southeastern HS ARC	879-	BC- 8- 6729
WØUVI/9	Peoria Area ARC	587-	BCD- 6-	2559	W2DMM/2	QRP Chapter One NYC ARC	609-	AB-21- 6673
WB6ZLM/6	Woody's Woodpeckers	320-	AC- 4-	2550	W4BFM/4	Decatur ARC, Inc.	904-	C-22- 6644
W4JNB/4	Muscle Shoals ARC	288-	BC-10-	2540	W3FH/3	ARINC and Comsat ARC	890-	ABC-12- 6553
VO2AI/2	West Labrador ARC	284-	C- 8-	2504	K3BKG/3	Southern Chester County ARC	877-	BC-25- 6520
WØZRT/Ø	Bismarck Area RC	412-	CD-10-	2448	W8CSE/9	Michigan City ARC	802-	BC-31- 6384
W9EJH/9	Madison County ARC	402-	C- 9-	2412	W5OK/5	Electron Benders ARC	930-	C-20- 6380
KH6WO/KH6	Honolulu ARC	267-	C-25-	2402	W1KWX/1	Valley ARC	914-	C-12- 6284
WA9GWM/9	Big Thunder ARC	278-	C-11-	2268	WØRR/Ø	Heart of America RC	889-	C-10- 6134
W7EK/7	Cascade RC	276-	C- 7-	2256	W8MF/8	Calhoun ARC	825-	BC-35- 6055
W4EVN/4	Lumber River Radio League	214-	BC- -	2090	K2CT/2	Albany ARA	750-	AC-11- 5942
WAØOPO/Ø	Lyons Jr. High ARC	304-	C- 7-	2024	W9AML/9	Central Illinois RC	546-	ABC-16- 5785
KØJOQ/Ø	Crete ARC	371-	CD- 4-	2019	K9GXU/9	St. Clair ARC	685-	BC-15- 5754
WØCKE/Ø	Minneapolis ARC	902-	C-16-	2004	K3TGM/3	Wm. Penn ARC	721-	BC- 7- 5732
K9ONA/9	Six Meter RC of Chicago	165-	BC- 7-	1985	W4OHA/4	Middle Georgia MARS/ARC	734-	BC- 7- 5695
W4ZA/4	Richmond ARC	797-	BC-25-	1978	W2GLO/2	Nutley AR Soc., Inc.	669-	BC-23- 5584
WAØOIU/Ø	Lowry ARC	130-	B- 8-	1970	KØBCT/Ø	Jim Gilbert & Friends	686-	BCD- 7- 5489
WA9IZW/9	club group	228-	C- 6-	1968	W8BI/8	Dayton ARA, Inc.	746-	ABC-20- 5407
K7NDX/7	Clearwater Valley ARC	185-	BC- 8-	1937	K4VFV/9	Allen Co. AR Tech. Soc.	740-	BC- 9- 5369
W8LCU/8	Grand River VHF RC	189-	C- 7-	1934	K4WCC/4	Fort Belvoir ARC	757-	C-19- 5342
WA5WCK/5	Red River Rats	219-	C-12-	1914	WA3NYY/3	Explorer Post 6 AR Soc.	712-	AC-15- 5320
K8PXR/8	Western Reserve ARS	429-	ACD-12-	1893	K7NWS/7	Boeing Employees AR Soc.	792-	BCD-30- 5289
VE4NE/4	Dauphin ARC	172-	C- -	1852	W2ZV/2	Brookhaven Nat'l Lab ARC	957-	BCD-12- 5260
VO1DL/1	Humber Valley ARC	174-	C-12-	1844	K8PBO/8	Mayhams RC	625-	BC- - 5236
VE3TCD/3	Elgin AR Society	186-	AC- 8-	1776	WA7IRN/7	The Committee	700-	CD- 5- 5227
KH6ERU/KH6	non-club group	192-	C- 7-	1752	WB2ENJ/2	Trenton Wireless Assoc.	470-	AB- 5- 5168
WB4RCB/4	Carteret-Craven ARC	147-	C- 5-	1682	W3PGA/3	Aero ARC	692-	C- 7- 5152
K8SCH/8	OH-KY-IN VHF Radio Soc.	148-	BC- 8-	1533	WB6CYL/6	Westinghouse ARC	878-	CD-11- 5029
W9BXR/9	Mon Co A R E C	107-	BC-10-	1493	W5NIR/5	N.W. Ark. ARC	665-	C-14- 4990
W2SV/2	Sunrise Radio Club	481-	B- 7-	1443	W1ANB/1	Capeway RC	654-	C-10- 4924
KØLUZ/Ø	non-club group	721-	C- 5-	1442	WB6GYK/6	Estero ARC	687-	C- 8- 4922
W8CPO/8	Explorer Post 73	105-	C- 3-	1430	VE3BAJ/3	Brantford ARC	639-	BC-18- 4891
K2KT/2	Polytechnic RC	132-	C- 5-	1392	W8AX/8	Thumb ARC	677-	C-11- 4862
W2QVV/2	Niagara RC, Inc.	227-	CD- -	1359	KØLIR/Ø	St. Louis ARC	1134-	BCD-25- 4844
W8GQN/8	Straits Area RC	150-	CD- 8-	1352	WA6TOW/6	Coastside ARC	482-	ABC-13- 4660
WA5SIM/5	Aberdeen ARC	74-	C- 4-	1244	VE3SXC/3	Essex County VHF Soc.	559-	BC- 8- 4643
WØHRN/Ø	Spencer AR Klub	488-	C- 6-	1176	WA8MBR/8	Intercity RC	587-	ABC-10- 4621
WA6AEG/6	Mountain View HS RC	49-	C- 5-	1094	W7NDC/7	Spokane Diatwisters	600-	C-20- 4600
W8RCC/8	Babcock & Wilcox ARC	377-	C-16-	954	W2DQ/2	Suffolk County RC	616-	AC-13- 4568
WA3JKB/3	non-club group	449-	C- 4-	898	W8ZNUW/2	Teaneck PAL RC	435-	ABC-11- 4551
W2MQQ/2	Bronx HS of Science ARC	259-	A-D-12-	754	WA9SIP/9	Woodlake ARC	571-	BC-11- 4535
K4CPO/4	Nashville ARC	295-	BC-17-	648	WA1AXK/1	Whitman ARC, Inc.	496-	ABC-20- 4501
W8EXA/8	Twin Sault RC	334-	D-16-	334	W3QV/3	Philmont Mobile RC	586-	BC-12- 4397
K8COA/8	Tusco RC, Inc.	90-	BC- 4-	198	K4NP/4	Brandon AR Soc.	695-	C-18- 4370

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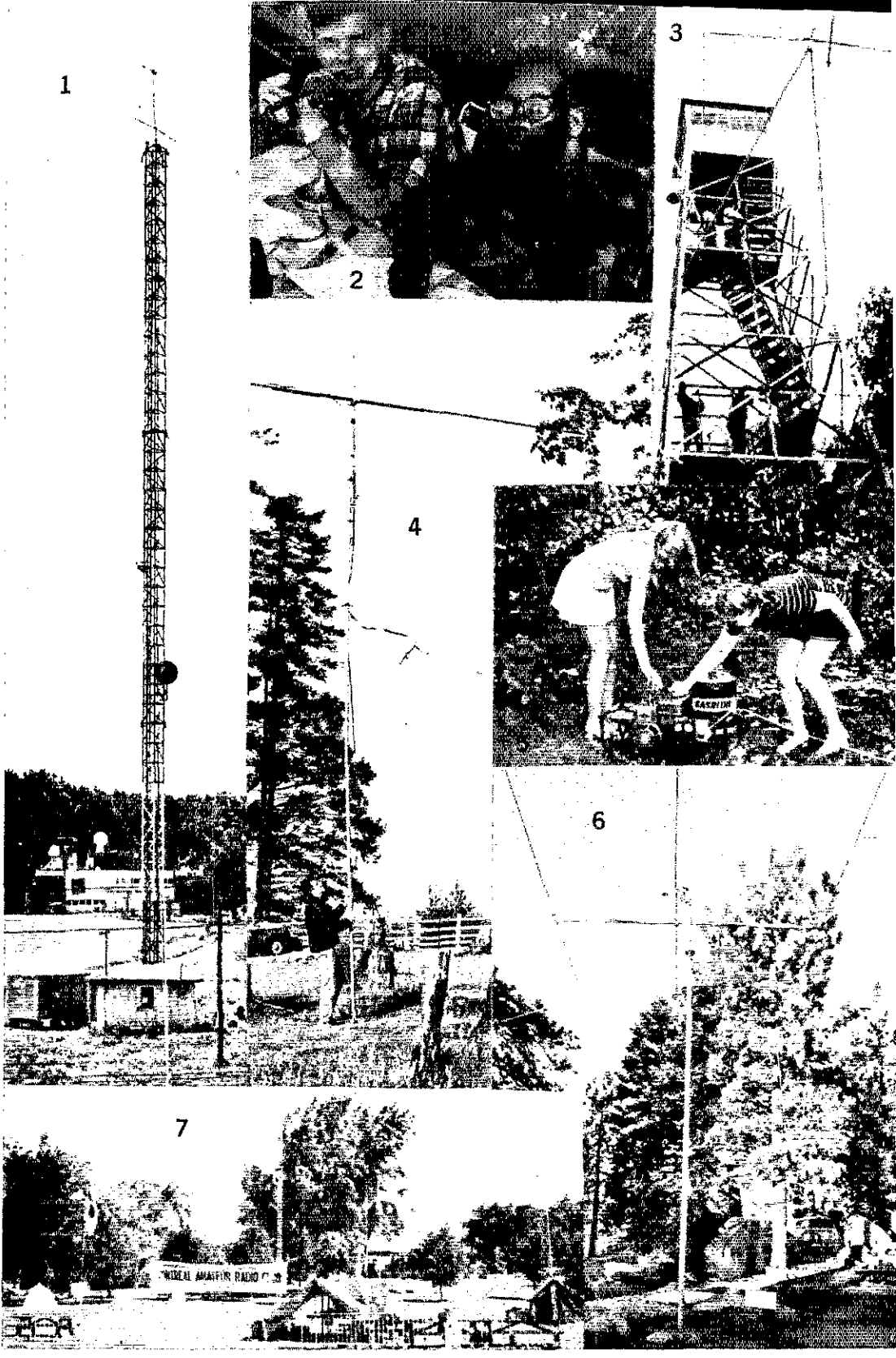
WA6LXN/6	West Valley ARC	2526-	BC-16-21,602	



1-7 W3RCN/3, WØFLN/9, W8LT/8, VE7ANE, K1LPL/3, K6BAG/6, VE2ARC/2.

W5DI/5	Central Ark. Radio Emergency Net	587-	BC- 4-	4350
VE3ZM/3	Guelph ARC	706-	C-20-	4236
W8RRR/8	LaPeer County ARA	488-ABC-15-		4210
W2SA/2	SRTA/MRC	587-	AC- 5-	4160
VE3AJ/3	Lakehead ARC	749-	CD- 8-	4153
WB4MZT/4	South-Eastern Virginia Wireless Assoc.	586-	C- 9-	4136
K2ERQ/2	IBM ARA	504-	BC- 9-	4048
K4KH/4	Triangle ARC	467-	BC-17-	4025
WA8IISA/8	Austintown Fitch HS ARC	496-	C- 6-	3976
K6BI/6	Santa Cruz County ARC	621-	CD-15-	3961
W1SYB/1	Newport County RC	603-BCD-29-		3928
K6QX/6	Antelope Valley ARC	694-BCD-17-		3923
WB5BBI/5	Wichita AR Soc.	513-	C-10-	3878
VE7UI/7	North & West Vancouver ARC	439-	BC-11-	3832
W8FO/8	Toledo RC	464-	C- 7-	3784
VE3HB/3	Oakville ARC	453-	BC- 8-	3760
KØGFV/Ø	Iowa Missouri ARC	425-	BC- 9-	3745
W4GZX/4	Cleveland ARC	661-	CD-11-	3743
WA8ZGE/8	Euclid Sr. HS RC	480-BCD-10-		3731
WAØNPZ/Ø	Ramsey RC	472-ABCD-12-		3716
W8HXR/8	Clinton County ARA	397-	BC-10-	3610
W8LXE/8	Detroit Metropolitan RC	395-ABC-10-		3556
WA8GZE/8	AREC CD RC	418-	BC-12-	3547
W4VMT/4	Biscayne ARC	385-	AC-10-	3512
W4TJM/4	Polk County Civil Defense Amateur Comm. Soc.	265-ACD-13-		3489
WA8MCQ/8	non-club group	345-ABC- 7-		3382
WØGZ/Ø	Mt. Pleasant ARC	411-	BC-15-	3275
W3UDX/3	Butler Co. ARA	356-	BC-10-	3241
W3UU/3	Harrisburg ARC	673-	CD-15-	3185
W8SWS/8	Piqua RC	544-BCD- 9-		3140
K2VNT/2	Metuchen "Y" RC	350-	C-19-	3100
W8VY/8	Kalamazoo ARC	266-	BC-12-	2965
VE7ARM/7	Richmond ARC	251-	BC- 8-	2813
VE7IP/7	East Kootenay ARC	274-	BC-11-	2650
W8EBG/8	Champaign County ARC	273-	C-	2 58
WA6LOM/6	CONARC	195-	AB- 4-	2579
K2YBN/2	Rancocas Valley ARA	271-	BC- 6-	2534
W7KYC/7	*Portland ARC, Inc.*	455-	CD-12-	2519
WØHSC/Ø	North Dakota State Univ. ARC	253-	C- 6-	2518
K3UIB/3	Naval Compound ARC and Explorer Post 681	595-ACD-25-		2465
WA3LWL/3	American Electronic Labs RC	177-	AC- 6-	2410
WB6TCD/6	*Simi Valley ARC*	198-	BC-12-	2344
W1NEM/1	Hartford County ARC	271-	CD-14-	2258
K7CCH/7	Coos County RC	236-	C- 5-	2216
W5KEG/5	Camden ARC	176-	C- 5-	1856
W9BIL/9	Moultrie AR Klub	101-	C-10-	1606
WA9ZSW/9	Suburban Communications Net	118-	AC-	1586
WA9LJV/9	*Waukegan VHF Soc./ARC*	106-	C- 6-	1436
W7JTR/7	Panaramaland ARC	250-	CD- 5-	1079
WØASM/Ø	O'Brien County ARA	341-BCD-10-		855

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W2AOH/2	*Bergen ARA*	1921-ABC-16-		16,594
W8ICS/8	Indian Hills RC	1676-	BC-30-	13,569
W6ISA/6	Southern Pac AR Contest Soc.	2336-ABCD-11-		12,819
W6IBT/6	Citrus Belt ARC	1795-	AC-11-	12,070
W3AI/3	R.F. Hill ARC	1720-	BC-28-	11,829
W6ZF/6	Orange County ARC	1657-ACD-24-		11,777
K2AE/2	*Schenectady ARA, Inc.*	1655-	C-40-	11,130
W6MRO/6	Newport AR Soc.	1231-	BC-38-	11,121
W8ACW/8	Genesee County RC	1626-	C-26-	10,756
W6UL1/6	Fullerton RC	1390-ABC-21-		9988
K2USA/2	Fort Monmouth ARC	1464-	CD-16-	9922
K3HKK/3	Nittany ARC, Inc.	1162-	BC-19-	9866
W8HLD/8	Catalpa AR Soc.	1364-	BC-28-	9495
W2MMD/2	Gloucester County ARC	1363-	C-	9378
K8BYX/8	MLMHUFOSCFMLFDS	1353-	BC-28-	9217
K1MUJ/1	Eastern Conn. ARA	1265-	BC-21-	9167
K6LI/6	NBARA	1282-	BC-25-	9159
W4CA/4	Roanoke Valley ARC	1306-	BC-	9064
W8NJH/8	Stu Rockafellow AR Soc.	1244-	BC-10-	8797
K8LUC/8	Evendale AR Soc.	1254-	C-16-	8744
WA9UHY/9	Wabash Co. ARC	1235-	BC-15-	8658
WA4TFZ/4	Albemarle ARC	1154-	AC-	8148
WAØERT/Ø	Story County ARC	1041-	BC-17-	7545
K6FB/6	HP ARC	1014-	C- 9-	7284
WA8WJE/8	Rochester HS ARC	904-BCD- 9-		7215
WA8LVE/8	*non-club group*	1188-	BC- 8-	7116
W6PIY/6	West Valley ARA	992-	BC-	7102
W8JUU/8	Van Buren County ARC	963-	C-20-	6978
K6DKX/6	San Carlos Civil Defense RC	989-BCD-11-		6676
WA2SCZ/2	West Jersey RC	834-ABC-11-		6349
W8TQE/8	Adrian ARC	833-BCD-		6189
W5SWS/5	*Chetimachi ARC*	804-	C-11-	6024
WA1DGW/1	Somerset ARC	628-	BC-20-	5817
W5WX/5	Panhandle ARC	760-	AC-20-	5766
W3WK/3	Friendship ARC	691-	BC-22-	5644
KØOKI/Ø	Kansas City ARC	925-	CD-17-	5535
K9GSC/9	Yellow Thunder ARC	639-ABC-20-		5495
K6GIP/6	Monterey Park ARC, Inc.	804-BCD-20-		5478
W6GNS/6	non-club group	709-	BC-	5407
W2CHT/2	GRAM	734-	C-12-	5404
WA8UPU/8	Hazel Park ARC	718-	BC-25-	5404
W9DUP/9	The Du Page RC	810-BCD-14-		5371
K9LZM/9	non-club group	687-	C- 9-	5322
WBVPV/8	Cuyahoga Falls RC	974-BCD-18-		5242
K1BWB/1	Bow RA	620-	C-18-	5120
W4POX/4	Portsmouth RC	650-	C-	5100
W3EQ/3	Haverford Twp. Emergency Radio Net	536-	BC-17-	4686
K9WZL/9	Elk Grove ARC	829-ACD- 8-		4678
W9VT/9	Tri Town ARC	612-	C-21-	4672
WØDE/Ø	Tri-State AR Soc.	569-	BC-18-	4650
W6PFV/6	Racoon Mtn. DX Club	889-BCD-10-		4549
W2BX/2	Cumberland RC	575-	BC-15-	4528
WB2GPR/2	non-club group	576-	C- 6-	4456
W3BTG/3	Balt. Amateur Radio Fed.	549-	BC-14-	4402
WBBAP/8	Scioto Valley ARC	748-	CD-15-	4312
W9CFQ/9	Fox River Radio League	583-BCD- 5-		4101
WB2KFG/3	Pope's Pirates	420-	BC- 5-	4060
W3ZIC/3	Fort Venango Mike and Key Club	342-	AC- 7-	4044
WA9IYL/9	Greenwood ARC	386-ABC- 6-		3918
W8KEA/8	Midland ARC	578-	CD-10-	3828
W9YCR/9	Quad-City ARC, Inc.	417-ABC-22-		3795
W4MOE/4	Buncombe County ARC	393-	C- 9-	3558
VE3SOO/3	Algoma ARC	313-	AC-13-	3102
WA8PSE/8	Opequon Radio Soc.	269-	C-10-	2814
WA7KEV/7	non-club group	245-	BC- 6-	2611
WAØVMT/Ø	Keith County ARC	212-ABC- 8-		2550

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W3SK/3	Penn Wireless Assoc.	2792-ABC-37-		20,866
W2LI/2	Tri-County Radio Assoc.	1986-ABC-22-		15,521
W4CUE/4	Birmingham ARC	2205-	BC-21-	15,148
W6VB/6	TRW Systems ARC	2037-	BC-36-	15,058
K5QHD/5	Garland ARC	1786-	C-	12,116
W2ZZ/2	Bergenfield AR Klub	1691-ABC-14-		11,950
K6SYU/6	*Anaheim ARA, Inc.*	1647-	BC-	11,711
W4BBB/4	Radio Amateur Club of Knoxville	1707-	C-17-	11,442
W6CX/6	Mt. Diablo ARC	1368-	BC-20-	10,646
KP4ID/4	Radio Club de Puerto Rico	1471-	BC-15-	10,340
K2YCJ/2	Communications Club of New Rochelle	1193-ABC-16-		9985
WA8MTX/8	Monroe County Radio Comm. Assoc.	1337-	AC-14-	9554
WA6GFY/6	Lockheed ARC	1107-ABC-12-		8796
W8ID/8	Seneca RC	1458-BCD-16-		8508
W6MLK/6	Hi Frequency Amateur Mobile Soc.	1008-	AC-12-	7970
W6OT/6	Oakland RC	1008-	BC-20-	7692
W9PCS/9	York RC, Inc.	978-	BC-16-	7680
W3PIO/3	South Hills Brass Pounders & Modulators	1011-	BC-12-	7677
WIHH/1	Chelmsford RA	932-ABC-15-		7307
K3CSG/3	Abington ARC	982-	BC-16-	7188
WB9AME/9	Beloit ARC, Inc.	836-ABC-12-		6868
WA9AJV/9	non-club group	792-	C-11-	6152
K6IS/6	North Hills RC	727-ABC-14-		6070
W9CAE/9	Chicago ARC	716-	BC-18-	5744
W2CVT/2	Poughkeepsie ARC	674-	BC-15-	5465
W5QEG/5	AR of Southwest Louisiana	634-	C-17-	5204
W1BIM/1	Central Mass. ARA	612-	BC-11-	5152
W6BXN/6	Turlock ARC	835-ABCD-14-		5090
WA3JZB/3	Luzerne Co. Races	694-BCD-22-		5080
W7AIA/7	Clark County ARC	879-BCD-20-		4931
K3IEC/3	Cumberland ARC	582-	BC-10-	4910
VE2CAR/2	non-club group	685-	C-14-	4910
W3EEL/7	Clallam County ARC	657-	CD-16-	4906
VE1ND/1	Central New Brunswick ARC	997-	CD-20-	4818
WA6BGS/6	ARC of El Cajon	633-ACD-16-		4662
K1USN/2	Fourth Navy-Marine Corps MARS	796-	BD-12-	4322
W2RAK/2	Flatbush RC	444-	BC-25-	4110
W6SG/6	Marin ARC	443-	BC-35-	4008
WA1SUY/1	Lowell Tech ARC	384-	AC- 6-	3980
W2ZE/2	*East Brunswick ARC, Inc.*	317-	AC-12-	3498
W7UMX/7	Whidbey Island ARC	428-	CD- 7-	3297
VO1AA/1	S.O.N.R.A.	180-	BC-11-	2947
K9UXZ/9	National Trail ARC, Inc.	305-	CD-10-	2819

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K2AA/2	South Jersey RA	3007-ABC-75-		20,413
W3EHJ/3	Maryland Mobileers ARC	2555-ABC-40-		17,017
K6QEZ/6	Ampex Employees ARC	1612-	BC-25-	15,076
K4BFT/4	Huntsville ARC	1997-	BC-21-	14,118
W1EKT/1	Quanapowitt RA	1873-	BC-40-	13,564
K8BYI/8	Southeastern Mich. ARA	1612-ABC-16-		12,208
W5SC/5	*San Antonio RA*	1398-ABC-37-		11,035
WA9EDW/9	Barrington AR Soc.	1547-BCD-		10,670
WB4LKY/4	Dade County ARPSC	1626-BCD-16-		10,277
W3SGJ/3	Beaver Valley ARA	1241-	BC-25-	9526
WB4BYP/4	Limestone ARC	1217-	BC-13-	9159

W6RO/6	Associated Radio Amateurs of Longbeach, Inc.	1264-BCD-24-	8711
K6EO/6	Corona-Norco Gang	824-ABC-20-	8242
WØOUI/Ø	Denver RC, Inc.	957-ABC-12-	7890
W7RB/7	Lake Wash. ARC	924-BCD-16-	7054
K6QEH/6	Hughes Fullerton Employees Assoc. ARC	873-ABCD-	6596
W7VE/7	ARA of Bremerton	696- BC-11-	5816
WA6YST/6	Barstow ARC	605- C-15-	5230
K4HTA/4	Vienna Wireless Soc.	556-ACD-17-	4729
W8HHF/8	Toledo Mobile Radio Assoc.	537-BCD-20-	4609
K9IXS/9	Elkhart HS ARC	306- BC-16-	3711

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VE3VM/3	Niagara Peninsula ARC	2347- BC-20-20,907
W9SW/9	Chicago Suburban RA	3086- BC-40-20,868
W3RCN/3	Rock Creek ARA	2489- AC-55-17,722
K4MC/4	Raleigh AR Soc.	2373- BC-20-16,254
K6FAG/6	Hayward RC	856-ABC-27- 8815
W1BFT/1	Hopkinton ARC	919-ABCD-21-7970
W3GV/3	Radio Assoc. of Erie	879-ABC-20- 7302
WØAL/Ø	Empire RC	828- AC-13- 6828
K2IQ/2	Utica ARC	535- BC-18- 5747

9A

VE3NAR/3	Nortown ARC	2546- BC-69-18,141
W3JGM/3	Howard County RC	939-ABC-15- 9291
W6TOI/6	Downey ARC	688-ABC-22- 7262
WB4GCS/4	No. Brevard RACES	460-ABC- 9- 4820

10A

W9JZ/9	Four Lakes ARC	1951- BC-40-16,056
W1NY/1	Hampden County RA	1234-BCD-20- 9881
W6SD/6	San Fernando Valley RC	983-BCD-12- 5834

11A

W9YH/9	Twin City ARC	3825-ABC-50-26,873
W5ANR/5	Fort Smith Area ARC	1703-ABCD-25-10,251

12A

VE3WE/3	Scarborough ARC	2286-ABC-40-20,004

13A

W7DK/7	RC of Tacoma	2339- BC-40-17,937

15A

W2RJ/2	Englewood ARA, Inc.	3966-ABC-61-40,318

CLASS B

Grouped in this listing are the scores of portable stations manned by one or two operators. Where two persons participated, the call of the other operator (if known) is shown following that of the amateur whose call was used. Figures following the calls indicate number of contacts, power and final score.

WA8LRE/8 + K8MMM	1079-	B-14,767
W2IBQ/2 + W2BBA	693-	BC- 8464
WA9EBR/4 + K4CKJ	1084-	C- 6704
WA7KIY/7	377-	AB- 5789
W6ANB/6 + WB6TBL	599-	AB- 5654
K8HKM/8 + WA8LWK	769-	C- 5084

Class-B Call-Area Leaders

(Bold Face=Over-all class leaders)

1 Transmitter	2 Transmitters
WA1JQT/1	WA1KSY/1
W2JBQ/2	WA2DFI/2
WA3FGS/3	K1LPL/3
WA9EBR/4	K4BUJ/4
WA5KXG/5	W5ZNN/5
W6ANB/6	K6YNB/6
WA7KIY/7	W6PVF/KL7
WA8LRE/8	K3PCS/8
WA9SEO/9	K9LAE/9
WØUOW/Ø	. . . . .
VE1ASN/1	. . . . .

WA8UDS/8 + WA8RCN	569-	BC- 4814
WA3FGS/3 + WA3GUL	729-	C- 4774
WA9SEO/9 + WA9HEU	747-	C- 4682
WA8SLW/33 + WA8VGK	684-	C- 4304
WØUOW/Ø	301-	B- 4264
WA7IZO/7 + WA7MJJ	409-	B- 3881
W4UGJ/3 + W3YVO	395-	B- 3755
K9CJM/9 + W9LIZ	367-	B- 3703
WA6EUZ/6 + WB6UKR	201-	A- 3618
K8PAO/8 + K8RWS	529-	C- 3574
WAØTEY/Ø + WAØYGF	345-	B- 3505
W2VLJ/2 + K2SAO	237-	B- 3400
VE1ASN/1 + VE1AMC	330-	C- 3370
WA3ERJ/3 + WA3JOA	345-	ABC- 3367
WAØRKR/Ø + WAØKKQ	507-	BC- 3353
KØOAV/Ø + WAØODW	525-	C- 3350
WA3IEM/33 ++ WA3EKM	489-	C- 3134
W3ER/8 + K8WFJ	301-	B- 3109
WA3BLE/3 + WA3DTO	329-	BC- 3080
WA6CGR/6	170-	A- 3060
VE7ZZ/W7 + VE7AZT	425-	C- 2950
W4UDS/Ø	437-	C- 2822
W6WX/6	509-	CD- 2789
WØMOQ/Ø	284-	B- 2756
WA6MWA/A/6 + WA6KTS	391-	C- 2746
W8PGW/8 (2 oprs.)	424-	C- 2738
K8UZX/8 + K8VAH	389-	C- 2544
WA8KXG/5 + WA5UHG	387-	C- 2522
W3LDD/3	347-	C- 2482
WA4WTO/4	369-	C- 2414
W7KYV/7 + WA7HNH	366-	C- 2396
WB4MRI/4	364-	C- 2384
K5LQU/9 + K7RNO	349-	C- 2372
WA5RES/5 + WA5MGC	344-	C- 2264
WAØNVZ/Ø	229-	B- 2261
WB6WMN/6 + WB6ZKA	114-	A- 2252
KØKLH/Ø + WAØOOU	330-	C- 2180
W9VOO/9 + W9VAK	291-	C- 2146
WA8AZA/8 + WA8AZB	257-	C- 2142
VE3DOP/3 + VE3FLE	193-	B- 2137
W6VOD/6 + W6YGC	355-	C- 2130
WA9EIC/9 + WA9IAC	154-	B- 2079
WØCWQ/Ø + WØNRT	278-	C- 2068
WAØQOZ/Ø + WAØTOG	293-	C- 1958
W5KTA/5 + WA5THT	390-	CD- 1892
WA1JOT/1 † WA1LZJ	246-	C- 1876
WAØATY/Ø	270-	C- 1820
WA2EQA/2 + WB2ITD	246-	BC- 1814
K5KGM/7 + K9VER	171-	B- 1739
WØAGK/Ø (2 oprs.)	254-	C- 1724
WA8LAV/8 + WB8BYD	167-	B- 1703
WØAHH/4 + WB4LQA	217-	C- 1702
WA6ZPI/6 + WB6OUI	230-	C- 1580
K7IDX/7	230-	C- 1580
WØZO/6	99-	B- 1537
WB6IAT/6 + WB6QOO	343-	D- 1529
WA9ZGN/9 + WB9CXZ	216-	C- 1496
K1EUM/1	171-	ABC- 1471
WA3MMK/3 + WN3ODM	129-	BC- 1450
WA2EXI/2 + WA2EMU	174-	C- 1444
WA3AXZ/3 + WN3NGV	268-	CD- 1376
WA7ILC/7 + WA7MUQ	103-	B- 1327
WA7DRO/7 + WA7CYP	186-	C- 1316
K6BXI/6	80-	B- 1280
WØJFN/9	174-	C- 1244
W7DRA/7	57-	A- 1226
WØYQ/Ø (2 oprs.)	141-	BC- 1174
WA3BGN/1	104-	B- 1136
WA5VVI/5	122-	C- 1132
WN4ODH/4 + WN4QLP	101-	B- 1109
WN9COA/9 + WN9CJB	59-	A- 1108
WAØMHB/Ø	118-	C- 1108
VE7AAQ/7 + VE7BZA	60-	AB- 1024
W2PXL/2	59-	B- 997
WB9CNS/9	92-	BC- 956
WA4SYD/4	177-	D- 931
WA9OMO/9	86-	C- 916
WAØUNS/Ø	84-	C- 904
KØIOG/Ø + WAØEAE	200-	CD- 858
VO1CAJ/1	84-	BC- 839
WA6ABP/6 + WN6QZB	166-	A- 664
WB5AIM/5 + WB5AAU	328-	C- 656
VE3CTR/3 + VE3CSN	209-	B- 627
WN5ABR/5	56-	C- 616
WA5NHJ/5	66-	C- 596
K4ARP/4	262-	C- 524
WA5KOX/5 + WA5MLW	262-	C- 524
WAØUAS/Ø + WØSIB	51-	C- 506
W7WYG/7 + WA7LAM	95-	D- 485
WA2KZV/2	216-	C- 432
WN8GDN/8	24-	B- 416
WA6FDB/6	1-	B- 409
WB6JJE/6	139-	AC- 404
K4BGF/4	11-	A- 398
WA5HNJ/5	131-	B- 393
WA1KBZ/1	100-	C- 380
K4JD/4	10-	A- 380
WA1IQJ/2	187-	C- 374
WN6PZL/6	123-	AB- 374

K8EEG/Ø	9-	A-	362
VE3EIM/3	9-	B-	322
W1HDQ/1	4-	A-	272
W2UCZ/2	131-	C-	262
WB4JXL/4 + WB4KPF	31-	C-	262
N4PCL/4	127-	C-	254
WA9ZXZ/9	122-	C-	244
K1GAX/1	1-	A-	218
W2PA/2	2-	B-	218
WA5UOR/5 + WA5SXR	107-	C-	214
WNØZRG/Ø + WNØBVF	58-	B-	174
K4OZQ/4 + K4AEK	75-	AC-	166
WA9IILU/8	71-	AC-	146
WA7LFP/7 + WA7KWY	17-	C-	102
WN2LCC/2	28-	BC-	69
WA5PWW/5	32-	C-	64
W1BB/1	27-	C-	54
WA6OQZ/6	4-	C-	8

2B

K6YNB/6 + KØUJD	1164-	AB-	16,168
K4HUJ/4 + WB2OVV	1441-	B-	13,369
K1LPL/3 + K1JYN	2394-	D-	7182
WA2DEI/2 + WB2ISS	552-	AB-	5981
WB2SIH/2 + WA2BCT	906-	C-	5936
K9LAE/9 + W9KFR	569-	BC-	4447
WA2IZC/2 + WA2MYI	186-	ABC-	3807
W9AE/9 + WA9SUU	540-	C-	3640
WA1KSY/1 + WA1LQX	423-	AC-	3638
WA3HYY/3 + K3TLX	494-	C-	3564
WB2UIH/2 + WB2RGD	549-	C-	3294
K3PCS/8 + K3OWN	489-	CD-	3283
K6VRS/6 + K6YLQ	458-	C-	3148
WB8EIC/8 + WN8EQK	270-	B-	2830
W5ZNN/5 + WB5AIR	358-	C-	2748
WA3HJR/3 + WA3FXE	374-	C-	2644
WB6UFT/6 + WB6QQF	275-	AC-	2314
WA4HQW/4 + W7GHM	140-	AB-	2295
WA8ZCY/8 + WA8ZPD	249-	BC-	2259
W5IWM/5 + K5YRK	246-	BC-	2086
WB4LJA/4 + WA3IJR	331-	C-	1986
W8FKW/8 + WB8BYG	248-	AC-	1894
WA6EBL/6 + WA6TNW	166-	B-	1894
WA1CTQ/1 + K1YRP	235-	BC-	1722
WB8BKA/8 + WN8DFB	170-	C-	1420
W6PVE/KL7 + K6CTG	112-	AC-	1392
WA5VQE/5 + WN5YRU	163-	C-	1378
WA7JKK/7 + WA7JOV	58-	BC-	1376
WB2WII/2 + WB2ZCC	108-	AC-	1060
WB4IWX/4 + W4PKR	98-	C-	988
WB4LDO/4 + WB4LDP	61-	BC-	838
WA2ICU/2 + WB2LQP	186-	ABC-	795
WA8YHN/8 + K8RLS	213-	BC-	692
WA6IBU/6 + WN6GHO	208-	C-	596
WB6ZSL/6 + WB6CZJ	148-	B-	444
W9GWF/9 (2 oprs.)	40-	BC-	302
WB4NFQ/4 (2 oprs.)	59-	C-	118

CLASS C

W4OZF/4 + WB4ENR	1048-	C-	9832
K7NHV/8 + WA3GBU	531-	BC-	6693
W3HTF/3	348-	C-	3332
WAØBJY/Ø (2 oprs.)	311-	C-	2999
W1JY/6	275-	C-	2675
WA6HGH/6	300-	ABC-	2459
K2DTQ/2 + WA2CPQ	167-	AB-	2099
W6UHP/6	154-	AC-	2063
K6HJJ/6	168-	BC-	1957
WA6IQK/6	148-	ABC-	1903
WB6DFO/6	137-	AC-	1842
WØKUF/6	104-	AB-	1831
WB6KZN/6	87-	AB-	1714

Class-C Call-Area Leaders

(Bold Face=Over-all class leaders)

1 Transmitter

K1FSI/1
K2DIQ/2
W3HTF/3
W4OZF/4
WA5QKR/5
W1JY/6
K8MNG/7
K7NHV/8
WA9LHG/9
WAØBJY/Ø
VE2BEJ/2

K1FSI/1	167-	C-	1703
WA6UNL/6	125-	C-	1525
WA9LHG/9	124-	C-	1516
W6JON/6	98-	C-	1482
WA9BVL/9	97-	C-	1473
W6NFH/6	105-	C-	1345
W2TMU/2	75-	B-	1213
K4OCI/4	90-	C-	1210
W6LLP/6	84-	BC-	1188
WB6IAW/6	70-	AC-	1120
WA2ZBV/2	50-	A-	1100
WA2FSD/2	63-	B-	1051
W7UZH/KG6	61-	C-	949
WA6GGC/6 (2 oprs.)	166-	D-	947
K2YGM/2	163-	D-	934
K8MNG/7	73-	C-	887
K6RIJ/6	33-	B-	846
K3PER/3	70-	C-	830
K6AJA/6	23-	C-	807
WB6ACH/6	16-	C-	744
WA9CHY/9	35-	C-	715
K5MVZ/6	4-	A	682
W6FRE/6	4-	A-	682
W3BBD/3	75-	C-	675
W6TEE/6	4-	A-	672
VE2BEJ/2	52-	C-	668
WB6LCM/6	51-	D-	659
WB6PHQ/6	8-	C-	645
WA6IWQ/6	51-	D-	630
WA6OYF/6	24-	C-	616
WA1GYZ/1 (2 oprs.)	22-	A	596
K9SFQ/9	21-	C-	589
WA9BJR/9	20-	C-	580
W4YOK/4	42-	C-	578
WA6AEL/6	19-	C-	571
K6ICS/7 + K6ICQ	18-	C-	542
K6BPT/6	14-	C-	526
WA6THI/6	8-	ABC-	499
WA9ZOF/9	48-	C-	488
W4DRP/4	31-	C-	479
WA6IVI/6	8-	C-	472
W6KME/6	3-	A-	454
WB2EXB/2	14-	A-	452
W2LEX/2	20-	C-	380
W2MB/2	20-	C-	380
W2FWV/2	13-	B-	376
WA5QKR/5	25-	C-	350
K6IWU/6 (4 oprs.)	16-	C-	344
W9BZU/9	11-	C-	299
W2TQP/2	8-	AC-	281
K8JPE/2	6-	BC-	259
W9ACU/9	42-	C-	252
K2CQM/2	3-	C-	227
WB6JWT/8	2-	B-	227
VE7AZG/7	4-	B-	94
VE7SAN/7	3-	B-	41

CLASS D

K4OCE	235-	AB-	4358
WB2IQF	469-	B-	4221
WA8RQB (4 oprs.)	532-	BC-	4091
WA9TKH + WA9NPM	428-	C-	3852
K2IOJ + WB4IUM	529-	C-	3374
K7VCA (6 oprs.)	462-	C-	2972
KH6UL (5 oprs.)	463-	CD-	1718
W6BVN	245-	C-	1470
KG4CS	665-	C-	1330
WB4EQQ/Ø (3 oprs.)	654-	C-	1308
W3FA	192-	C-	1152
KØEOD	60-	A-	1080
K5YPS/4	537-	C-	1074
WØPAN (2 oprs.)	525-	C-	1050
KØGXR (2 oprs.)	972-	D-	972
WA2DHT	469-	C-	938
WB4OSS	858-	D-	858
WA6NUP (7 oprs.)	405-	C-	810
K6KVC	270-	BC-	806
WB6HZZ (3 oprs.)	276-	BC-	763
WN6OMK	59-	B-	731
W2EHU + W2BHP	330-	C-	660
WØJF/Ø (3 oprs.)	33-	AC-	646
WB2OEW	208-	B-	624
WA6DPQ	276-	BC-	616
WA3KZN	200-	C-	600
K4CAX	216-	ABC-	559
WA7JSR	263-	C-	526
K3BBM	184-	BC-	524
WN1MNX	52-	C-	512
WA4ZUI	163-	B-	489
WA7MEO + WA7KVC	240-	C-	480
WA5YCG (2 oprs.)	224-	C-	448
WB8AYC	222-	C-	444
K2HBA/KH6	211-	C-	422
WN4PTM	5-	C-	410
WAØYJW	136-	B-	408
W1ETU	400-	D-	400
WAØYMS	198-	BC-	396
K4DVR/2	193-	C-	386
WAØVPN	193-	C-	386

Class-D Call-Area Leaders

(Bold Face=Over-all class leaders)

1 Transmitter

WN1MNX
WB2IQF
W3FA
K4OCE
K5BBM
KH6UL
K7VCA
WA8RQB
WA9TKH
WB4EQQ/ø
VE7BLO

2 Transmitters

WA1IQC/1
WB2MUK
WA3IQK
W4YKY
WA4ARV/5
WN6PCO
WA9YDR

3 Transmitters

W1BCG
W2ZQ
W4PAY
K8EEN/8
VE7UBC

4 Transmitters

W1AEC
WB2ELW
W8ZHO

6 Transmitters

WA3NAN

7 Transmitters

W6OTX

WA3LMO	71-	C-	362
WN9DMC	58-	B-	362
WA8TQD	179-	C-	358
WB8CLF	174-	C-	348
W3GN	322-	D-	342
WA2ANU	44-	D-	332
WB2VVA/2 (2 oprs.)	155-	C-	310
WN8GSV + WN8HAA	90-	AB-	299
W4YOX	144-	C-	288
WA6HOM (2 oprs.)	278-	D-	278
WA3NGQ	136-	C-	272
W4LEP	134-	C-	268
WB2WHB	129-	BC-	264
WA7ISQ	243-	BD-	259
WA5BJS/5	128-	C-	256
VE7BLO	124-	C-	248
WA6MIN	72-	CD-	247
W2NEP	61-	A-	244
WN1MJC	19-	C-	238
W2EMV	119-	C-	238
W3FZV	116-	C-	232
WAøZTW/ø	12-	C-	224
WA7FKP	11-	C-	222
WA2LDX	220-	D-	220
WA2CKU	108-	C-	216
W6CLM	36-	C-	216
WN6GLP	7-	C-	214
W8CF (2 oprs.)	105-	C-	210
WøBWJ	35-	C-	210
WA1MCH	68-	B-	204
WB2YIG	100-	BC-	204
WA3BSV	102-	C-	204
WB9DLS	104-	CD-	204
WA9OBP	100-	C-	200
WøUV	199-	D-	199
KøRFP/6	60-	B-	180
WA4BPF/4	87-	C-	174
W3QEI/3	79-	C-	158
WB2TUT	39-	A-	156
W5RBB	155-	D-	155
WN2IDD	25-	C-	150
W2CWD/4	144-	D-	144
WB6YZC	71-	C-	142
WB6KOR	70-	C-	140
WB8ASH	69-	C-	138
WN8EDE	46-	B-	138
WN5ZKO	45-	B-	135
WN6TMQ	62-	C-	124
WB2JNW	60-	C-	120
VE3BKO/W1 + VE3FCH	57-	C-	114
WA5IYX/5	56-	C-	112
WB4OGW	111-	D-	111
WA3HJJ (2 oprs.)	54-	C-	108
K9UQN	96-	CD-	107
WB4QKQ	52-	C-	104
W1WMH	51-	C-	102
K4UEE/6	51-	C-	102
W7CWA	98-	D-	98
WA8YBV	48-	C-	96
W6RQZ	46-	C-	92
WAøZLU	30-	B-	90
WB4KFF (2 oprs.)	44-	C-	88
WA3MWQ	43-	C-	86
K4NQ	41-	C-	82
WN6MIE	36-	BC-	81
WB4IUX	40-	C-	80
W1FFR	39-	C-	78
WA3JRV	37-	C-	74
KL7EWA	34-	C-	68
W3NHX	33-	C-	66
K6KDE	65-	D-	65
K2EQB	63-	D-	63
WA3KFT	31-	C-	62
K4LQ	59-	D-	59
WA8YZC	29-	C-	58
W9KKB	29-	C-	58
WN6AZK	16-	B-	48
WN7NOP	23-	C-	46
WN2LYN	21-	C-	42
W4KFC	40-	D-	40
WN6MBO	12-	B-	36
WA6CBQ	11-	B-	33
WN6OJP	14-	C-	28
WA2JIM	13-	B-	26
W1DQK	24-	D-	24
WA8JXM	11-	C-	22
WN6GHI (2 oprs.)	9-	BC-	20
W7PSS	19-	D-	19
WN1KJT	8-	C-	16
WA9YFL	7-	C-	14
2D			
W4YKY (24 oprs.)	447-	C-	3282
W4DU (6 oprs.)	442-	C-	3052
WA4ARV/5 (5 oprs.)	1161-	C-	2322
K4PQL + WB4GTS	1055-	BCD-	2046
WA3IQK (4 oprs.)	679-	BC-	1762
WA1IQC/1 (4 oprs.)	261-	C-	722
W1HPM (4 oprs.)	250-	BC-	588
WB2MUK (4 oprs.)	194-	C-	388
W3DGB (multi-op.)	192-	AC-	386
WN6PCO (3 oprs.)	51-	BC-	340
WA9YDR (5 oprs.)	130-	AC-	276
WA9YXX (3 oprs.)	36-	C-	72
3D			
VE7UBC	594-	BC-	4272
W2ZQ (6 opts.)	270-	BCD-	2242
W1BCG (6 oprs.)	79-	BC-	1101
WA1IQC (6 oprs.)	351-	C-	732
K8EEN/8 (7 oprs.)	39-	C-	278
W4PAY (5 oprs.)	134-	CD-	262
4D			
WB2ELW (27 oprs.)	903-	C-	6218
W8ZHO (12 oprs.)	245-	C-	2270
W1AEC (6 oprs.)	573-	CD-	752
6D			
WA3NAN (18 oprs.)	783-	ACD-	6135
7D			
W6OTX (11 oprs.)	172-	BD-	2332

Strays

Amateur radio is justifiably proud of its many members who have made important technical contributions to the radio art. Dr. Percy L. Spencer, W1GBE, who recently joined the ever-growing list of Silent Keys, was an outstanding member of this group. Old timers are not likely to forget the Raytheon BH gas rectifier, the RK-18 transmitting triode, and the RK-20 pentode, all developed under his guidance at Raytheon, which he joined soon after its beginning in the 1920s. Less known to hams, perhaps, was his work just before and during World War II in microwave radar. He devised methods of manufacturing magnetrons which eliminated costly and slow precision machine work, making possible a manyfold increase in the production rate; for this he won the Navy's Distinguished Service Medal, the Navy's highest civilian award. The Naval Ordinance Award was given him for his work on tubes for proximity fuses. His many inventions included a wide range of electronic devices of great practical value.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity HRH

CONDUCTED BY GEORGE HART,* W1NJM

KEEPING IT SIMPLE

A basic rule for all operating procedures and rules has always been "keep it simple." To the extent that it is or becomes complicated, to that extent it is ignored or misused. In contests, the rules become more and more complicated as ways around them are sought and found by the contestants. In public service operating the procedure rules can be as complicated or as simple as we wish to make them, but complications enter the picture as the situation reaches a certain degree of gravity. The tendency is to amend the rules to allow for this, and to some extent this is done, but always reluctantly and with much foot-dragging – because we want to keep it simple.

The example in point is precedences. For a long time, your League dragged its feet about adopting a standard set of precedences, because despite the fact that they were admittedly needed, how to set up precedences without entering into vast complications was a naggingly controversial problem. The celebrated Florida Plan had nine precedences and three emergency conditions, and was said to work well. But *nine* precedences? Your reporter came up with a system of seven precedences and indication of originating agency, but these went over like the proverbial you-know-what. Finally it was determined to reduce the precedences to their simplest: Emergency at one extreme, Routine at the other and the rest all in between, labeled Priority.

But it turned out to be not *quite* that simple. Priority messages were defined as those which had anything to do with an emergency situation, including "health and welfare" inquiries coming from outside the disaster zone. Experience soon showed that this was no good, that messages from inside the disaster zone coming out should be handled prior to those from outside going in, as a general rule. So we labeled the latter as Priority No. 2 (P2) to show that they were indeed disaster messages but of a lower precedence than straight Priority.

Nobody has been too happy with this arrangement, but it stood until a meeting of the Eastern Area Staff of NTS, some time ago, brought up the matter. P2, it said in effect, is a sort of cupola on the precedence structure, an irregularity, a wart on the face of progress. It doesn't "belong" with Emergency, P and R. Still, some sort of designation for ingoing H & W traffic is needed. The Staff came up with Q as a fourth precedence, to come between P and R. It was mentioned (in small print) in Dec. '69 *QST*, page 70, Item (5). There has been little if any comment. This can mean either that there is little interest or no objection.

In a recent rewrite of the booklet *Operating an Amateur Radio Station*, under the heading of precedences, we sneaked in a mention of Q as a fourth precedence, as an alternative to P2. So all you operators who originate traffic going into a disaster area inquiring as to the health or welfare of an individual may give such traffic the designation of Q instead of P2, from now on. Eventually, we'll drop P2 altogether.

It should be easy to remember. The order of precedence is alphabetical: Emergency first (don't *ever* abbreviate this to E), then Priority (P), inQuiry (Q) and Routine (R). This helps keep it simple. The originating station has responsibility for assigning precedences; handling stations don't change the precedence once the message is on the air. If you disagree with the precedence, handle the message first, argue about it afterward.

Emergency Gravity

Often the most interesting part of an emergency situation is the gravity of the emergency itself, rather than the job the amateurs did in supplying emergency communication. To

* Communications Manager, ARRL.

WØPGX, center, of La Junta, Colo., was recently commended along with other members of the Colorado Amateur Radio Weather Net, for handling 3000 messages for the Weather Bureau over the past ten years. KØZSQ, at left, and WØFDP, founder of the net, look on.

many ARPSCers and others who are "programed" to offer such service, the actual communicating is, after all, practically routine. They are merely "doing their thing." What they remember and talk about most is the destruction and havoc wrought by the high raging water, by the fierce winds, by the extent of the fire, the number of people killed and injured or left homeless.

Some time ago we attended a talk given by an amateur leader and organizer whose group performed some most commendable feats of communicating via repeaters during a hurricane. Practically all he talked about was the extent of destruction, and his illustrations concentrated on this aspect. Was the audience (100% amateurs) disappointed? Not in the slightest; they were enthralled. Oh, we're not saying that he didn't even mention the communicating, or that the audience wasn't interested in that part of the presentation, but the surprising part was that he emphasized the destruction and the audience loved it.

Reports on emergency operation we receive here at headquarters are often along the same lines. In the case of a big emergency, such as a hurricane, earthquake, snowstorm, we often get newspaper supplements containing articles glamorizing the gravity of the situation caused and pictures galore of the damage caused to the suffering population but hardly a word about what the amateurs did to supply communications until wire and power lines could be restored. The newspaper articles and pictures are most interesting and help sketch in the background of the situation, a valuable assist in writing the article, but for the most part could be summed up by a single sentence such as: "A vicious hurricane packing 100-mph winds swept across Louisiana's bayou country on Aug. 17, causing death to hundreds and destruction in the millions." After that, our story would want to concentrate on what the amateurs did. The public press carries full details on all the rest. As for pictures, we are always short of these. Purely for publicity purposes, it is always a good idea to throw your camera into the sack along with all your other emergency gear when you go out on an assignment. We know it's easy to forget, or if you remember it's easy to forget to take pictures in all the excitement. But we need them for *QST*, and often the public press will use them as well.

As for the gravity of the emergency situation, don't let this overshadow the importance of what you are doing as an amateur. To the public and agencies served, communication by whatever method is a means to an end. To us amateurs, emergency communication by amateur radio is the end – the culmination of all our preparedness efforts and a major justification for our occupation of a billion-dollar piece of the radio spectrum.

The SET

The 1970 Simulated Emergency Test will be held on Jan. 30-31, 1971. This may be an odd way to put it, but it happens that in 1967 the SET was changed from October to January, so actually we are nominally a year ahead. The alternative would be to consider that we had no SET in 1967 and give the appearance of having skipped a year, although all we skipped was four months.

Anyway, the *next* SET will be Jan. 30-31, 1971. You AREC and NTS people should all make sure you make no plans for that weekend, and let no one make such plans for you. You will almost surely be called upon for some extra operating.

As for planning, there really isn't much any more, except at leadership level. Your EC or NTS manager may be dreaming up all sorts of weird simulations for you on that weekend, but chances are you'll know little about it until the time arrives. All they ask is that you be ready – ready to make this the biggest and best public demonstration and test of our emergency communicating facilities in our history. – *WINM*

Traffic Talk

There have been some pretty "weird" origination data on messages coming through lately, especially those originating at fairs. Lots of country fairs in August and September, and this year the traffic load seemed exceptionally heavy. We traffickers love *it* – most of us, anyway. Some of the more casual or part-time (e.g., once-a-weekers) element felt themselves overworked and imposed upon, but for the most part the traffic was handled with efficiency and dispatch once it got into the proper channels.

The place of origin on any amateur message is just what the name implies – the place (city and state only) at which the message first originated. This is usually, but *not necessarily*, the location of the station of origin. It is *never* the name of some fair or event or anything else other than a city and state.

Let's assume that you are just closing up your fair station and you have a hookful of traffic to get rid of. Instead of handling it from the rather inefficient, noisy setup at the fair, you decide to take it home (in the next town) and originate it from your own station. The station of origin is *your* station, not the fair station, but the *place* of origin is the fair location, not your location. This sometimes makes it rough on amateurs without call books who want to send service messages to the originating station, but the place at which a message originates is not always the location of the station that originates it. Traffic-handling amateurs should have or have access to a call book as one of their trade tools.

Sometimes a fair sponsor will ask (maybe even demand) that the heading of each message contain the name of the fair, and we have seen a lot of traffic come through with something like "Podunk State Fair" as the place of origin. This is strictly incorrect, and any handling station would be within his rights to remove it and substitute the location of the fair (e.g., Podunk, Ky.) in its place. This comes under the heading of correcting the form of the message, which any handling station has a right to do. Of course, if you don't know the location of the fair, you're probably stuck with that origin. A service message to the originator would be indicated.

New subject: Several people have suggested that the League's message form should have spaced lines on it so that putting a word on each line would make "checking" almost automatic. The idea has been sort of kicked around informally among traffic handlers and has received varied reaction. Among the "regulars" it has been humphed at. It's easy enough to copy five words to a line when you are copying by pencil, without having spaced lines. Copying by typewriter, it's just as easy to copy ten words to a line (leaving two spaces after the fifth word and counting to five again). Since the forms

Public Service Honor Roll August, 1970

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total in the nine categories below. Use CD-190 or submit equivalent information through your SCM. See page 75, Nov. 1969 *QST* for details. Please note maximums in each category.

Category	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	
Max. Pts.	*10*	*5*	*16*	*12*	*12*	*20*	*3*		*5*	*Totals*
W4OGG	10	5	16	12	12			28		83
W6BNX	10		16		12	20		3	5	66
KØLVB	10	5	16	12	12	6			5	66
WA7KIU	*10*	*5*	*16*	*12*	*12*	*1*			*5*	*61*
WB4LAL	10	5	16	12	12				5	60
WB8BBG	10	5	16	12	12				5	60
WAØOEJ	10	5	16	12		11			5	59
W7OCX	10	5	12	12	12				5	56
WB4LAO	10	5	16	12	12					55
WB4OMG	10	5	16	12	12					55
WB4PVA	10	5	16	12	12					55
WAØVAS		5		12	12	20	3	3		55
WØLCX	10	5	16	12	3		3		5	54
WB4JMH	10	5	16	9	12					52
WB4KDI	*10*	*5*	*16*	*9*	*12*					*52*
WB2FEH	10	5	16	3	12				5	51
W3MPX	10	5	16		12		3		5	51
W8IMI	10	5	16	3	12				5	51
WA3AFI	10	4	16	3	12				5	50
WA1HOL	10	5	16	6	12					49
WA2BCT	10	5	12	8	9				5	49
WA5VJW	10	5	16		12	6				49
WA1GCE	10	5	16		12				5	48
W2MTA	10	5	16		12				5	48
WA3FMI	10	5	16	12		5				48
W6BGF	10	5	16		12				5	48
W6MNY	10	5	16		12				5	48
W7AXT	10	2	16		12		3		5	48
K7NHL	10	5	16		12				5	48
WA8ETX	*10*	*5*	*4*	*12*	*12*				*5*	*48*
W9GGW	10	5	16		12			5		48
W9HRY	10	5	16		12				5	48
WA9WMT	10	5	16		12				5	48
WA1LLB	10	5	8	12	12					47
W4HFU	10	4	16	12					5	47
WA1LNF	10	3	16		12				5	46
WB8CWD	10	5	16		12		3			47
KØMRI	10	3	16		12				5	46
WA1JYY	10	5	16		12	1				44
W1DVW	10		16		12				5	43
W1EFW	*10*		*16*		*12*				*5*	*43*
WA1HSN	10		16		12				5	43
K1SSH	10		16		12				5	43
W2FR	10		16		12				5	43
WA2ICU	10	5	16		12					43
W2RUF	10		16		12				5	43
W3EML	10		16		12				5	43
W3LOS	10		16		12				5	43
W3NEM	10		16		12				5	43
WB4FDT	10	5	16		12					43
WB4HJW	10	5	16		12					43
W4ZJY	10	5	16		12					43
W7PI	10	5	16		12					43
WB8ALU	10	5	16		12					43
WA9ZKX	10		16		12				5	43
WØBV	10	5	16		12					43
WAØTZK	*10*	*5*	*16*		*12*					*43*
WAØUTT	10	5	16	12						43
WA8UPI	6	5		12	12	2			5	42
8R1Y[W4	*10*	*4*	*16*		*12*					*42*
W1BVR	10	3	16		12					41
W3TN	10		16	12				3		41
W6INH	10		16		12	2				40
WA1JVV	10	5		12	12					39
WA2DRH	10	5	16	8						39
K8BHH	10	5		12	12					39
VE4FQ	10		12		12				5	39
K1EIR	*10*		*16*		*12*					*38*
WA1GFH	10		16		12					38
WA2BEX	10		16		12					38
W2QC	10		16		12					38
K3HKK	10		16		12					38
WA3LPU	10		16		12					38
K3OIO	10		16		12					38
W4SHJ		5	16		12				5	38
WA6FOO	10		16		12					38
W6YBV	10		16		12					38
W7GHT	10		16		12					38
WA8YUB	*10*		*16*		*12*					*38*
WA9VZM	10		16		12					38
WØHI	10		16		12					38
WAØHTN	10		16		12					38
K2KIR	*10*		*16*		*9*				5	*37*
WA3FPM	10	1	12	6	3				5	37
WA6CEI		5		12		30				37
W7BQ	10		16		6				5	37
WB2DRG	10	5	12	9						36
K3MVO	10	2	12		12					36
WAØHKM	10	5	4	12					5	36
WB8DHY	10	5	8	3	9					35
W9MVV	*10*		*16*		*9*					*35*
K1SXF		5		12	12				5	34
WB2VJB	2	5		12	6	4			5	34
K4KNP	*10*		*12*		*12*					*34*
WA1JMO	4	5		12	12					33
W3EZT	10	1	16			1			5	33
WA6LFA	5		16		12					33
K1EIC	2	5		12	12		1			32
K2KTK	10		16		6					32
WA3CKA	10	2	8		12					32
W6DEF	10		16	6						32
W6LJP				12		20				*32*
W7IWJ	10	5		12		5				32
W7UU	6	5				20		1		32
WA2JIM	10	5	16							31
W6FJT		5	6			20				31
WA6MCK		5		12		14				31
K7UYW	10	5			12	4				31

Category Key.(1) Checking into cw nets; (2) Checking into phone/RTTY nets; (3) NCS cw nets; (4) NCS phone nets; (5) Performing liaison; (6) Legal phone patches; (7) Making BPL; (8) Handling emergency traffic; (9) Serving as net manager.

are used a great deal for delivery purposes, it would look a little silly, even a little juvenile, to have spaced lines on the message blank.

However, we concede that such blanks may *have usefulness in accepting traffic at fair stations*, where as often as not those taking the messages know as little about traffic as those writing them. If you limit the messages to 20 words each (you should!), you simply instruct the originating person to put one word in each space and use not more than four lines.

How about it, traffic men? Shall we put spaced lines on the official ARRL radiogram blank? It would cost little if any more (the League makes no money on sale of these blanks). Of course we could make available radiogram blanks with spaced lines in addition to our present blanks, but this *would involve additional expense and is less desirable for* that reason. – *W1NJM.*

National Traffic System. Through a report from PAN Manager W6BNX, we learn that NCS WA6DEI has been having some trouble. It seems Paul had just begun calling up the net when he noticed something on the floor between his feet. When he investigated further, the object turned out to be a king snake about three feet long. How was this ticklish situation handled? Well, Paul trapped the beast in a corner of the room and put a waste can over the reptile until QNF, when it was released (outdoors, we hope!). Again this month comments from the managers are few and far between, so we'll fill a little space by listing certificate recipients, this time from the west coast on PAN: K5MAT, W6LCP, K6KOL, WA6DEI, W7s BDU EKB GHT ZB, K7UYM, WA7ISP, WØLRN KØs FDH JSP. From 2RN, WB2RKK and WB2SMD have earned their third annual certifi cates: WB2DDQ his second annual and WB2DZ7 his first.

August reports.

Net	Sessions	Traffic	Rate	Avg. Rep. (%)	
EAN	31	1544	1.096	49.8	96.8
CAN	31	1049	1.030	33.8	100.0
PAN	31	967	.863	31.2	96.7
1RN	62	610	.385	9.8	89.0
2RN	62	367	.552	5.9	99.0
3RN	62	470	.403	7.6	97.8
4RN	56	347	.254	6.2	83.5
RN5	62	586	.340	9.5	88.2
RN6	62	782	.611	12.6	100.0
RN7	62	270	.306	4.3	32.7
8RN	61	473	.356	7.6	94.6
9RN	62	480	.408	7.7	96.4
TEN	62	370	.412	5.9	61.1
ECN	57	195	.203	3.4	78.4
TWN	46	190	.216	4.1	48.1
TCC Eastern	124[1]	678			
TCC Central	93[1]	523			
TCC Pacific	124[1]	745			
Sections[2]	1765	8501		4.2	
Summary	2574	19,147	EAN	10.8	
Record	2987	31,117	1.440	16.4	

[1]TCC functions, not counted as net sessions.

[2]Section and local nets reporting (50): PTTN, EPA, WPA (Pa.); SGN (Me.); NCN (Cal.); QKS (Kans.); QMN (Mich.); CN (N. & S. Car.); VSBN, VN (Va.); NLI,NYS (N.Y.); CPN, CN (Conn.); AENB, AEND, AENM, AENT (Ala.); W. Que. VHF, OQN, GBN (Ont.-Que.); FMTN, VEN (Fla.); HNN, UCN (Colo.); BUN (Utah); BSN (Ore.); MSN, MSPN (Minn.); WIN, WSBN, WSSN, BWN, BFN (Wisc.); OSSB, BN (Ohio); NJN, NJSN, PVTEN (N.J.); OZK (Ark.); ILN (Ill.); GTN, GSN (Ga.); RISPN (R.I.); WSN (Wash.); MDCTN (Md.-D.C.); KTN (Ky.); OLZ (Okla.); TEX (Tex.); WMN (Mass.).

Transcontinental Corps. W3EML reports that W1BJG and WA2CAL have earned TCC Eastern certificates. W6BNX has received his TCC Pacific certificate from W6VNQ.

August reports.

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	87.9	1970	678
Central	93	94.6	1098	523
Pacific	124	95.9	1490	745
Summary	351	92.8	4558	1946

The TCC Roster: Eastern Area (W3EML, Dir.) W1s BJG KIT NJM, K1SSH, WA1s JTM GCE, W2s FR GKZ QC, K2s KIR KTK, WA2s CAL UWA, WB2RKK, W3EML, K3MVD, W4s NLC SQQ UQ, K4KNP, WB4NNO, W8s PMJ RYP, K8KMQ, WA8s YVR ZGC. Central Area (WØLCX, Dir.) – W4OGG, K4AT, W5MI, W9s CXY VAY, WA9VZM, WB9DPU, WØs HI INH LCX UCE ZHN, KØAEM, WAØs DOU IAW WEZ. Pacific Area (W6VNQ, Dir.) – W5RE, W6s BGF BNX IPW MLF VZT, K6s DYX ECB, WA6s BRG LFY ROF, W7s DZX EM KZ, KØJSP.

This month NTS had an overall effectiveness percentage of 82.4 percent.

Public Service Diary

On August 7 at 0130 GMT, K1EIC of Shelton, Conn., called WA1HSN of New Haven by telephone to ask about the best possible routing for an emergency message that had just been received from W3BRC. The message, destined for Galé Lake, Ontario, informed a daughter of her mother's serious illness. WA1HSN realized that the Eastern Canada Net was meeting at that time so arrangements were made for meeting on 75 meters to pass the traffic. Some difficulty arose in making contact, but finally, with the aid of WA1IQJ, the traffic was passed to WA1HSN.

After checking in to ECN, WA1HSN sent the traffic to VE3DV who gave the message to Ontario Provincial Police to make the delivery. – *WA1HSN, RM Conn.*

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VO1CA and VO1CW monitored a call from VE3FGC/MM, aboard the Canadian Coast Guard ship *Sir Humphrey Gilbert*, on Aug. 11, asking for a St. John's, Newfoundland, station to obtain information on an automobile accident in which a crew member's family had been involved. After much effort VO1CW was able to get information on the serious accident. To pass any additional news, a listening watch, manned by VO1s CA CW and EL, was set up for the next two days. Finally the crewman was to be sent home. Evacuation was arranged via amateur radio through VE3FGC/MM and VO1CA. – *VO1CA.*

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A gale with hurricane force winds struck portions of Ontario about 1230 GMT on August 20 with the heaviest damage being done in the Lively-Copper Cliff-Sudbury area. There was complete loss of power and telephone service at Lively and Copper Cliff and partial outages at Sudbury.

VE3DOY proceeded immediately to Lively and operated his mobile station until he was called away to help operate commercial equipment. At 2300 VE3BLZ mobiled to Lively and parked near the municipal buildings where he had access to official information. VE3s AC ESM and COO had begun operating from Sudbury in the meantime and were relaying traffic to and from the Lively area. Traffic was very heavy and it was decided by VE3DNS and VE3BLZ that a portable station should be set up to better handle the load. By this time VE3BLZ's gas supply was running low, so he shut down at 0300 and returned to his home QTH where final arrangements were made with VE3DNS and VE3COO for the portable station to be set up the next morning.

A 2.5 kilowatt generator was located and the portable station was set up at about 1100 the following morning on the municipal playground in Lively. Relief operators in the persons of VE3s ESJ FWI GHO and US arrived later during the day. Operation continued until 0430 on the morning of Aug. 22 when VE3BLZ/3 was closed for the night. Operation was resumed at 1315 and continued until 1900 when telephone service had been restored. About eighty amateurs participated during nearly three days of operation and 900 pieces of traffic were passed. – *VE3CJ.*

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On Sept. 6, the San Bernardino (Calif.) City RACES was on standby and was prepared to furnish any communications necessary for the running of the Cal 500 automobile races being held at the Ontario Speedway. More urgent need for communications developed during the race, however, when a fast moving forest fire broke out in Waterman Canyon north of the city. It was soon learned that telephone lines to the numerous communities above the fire had been burned out. These communities were in potential danger and evacuation was a possibility.

The attention of RACES was immediately focused on the newly arisen need and the RACES station at the Red Cross building was put on the air by WB6FRQ. Using two meters contact was established with WB6EIG in Running Springs, one of the communities above the fire line. WB6EIG still had telephone service with most of the other hot spots so communication was restored. A few moments later WB6OFJ appeared on frequency from Crestline, another community in the

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for August Traffic

Call ..... Orig.	Recd.	Rel.	Del.	Total
W3CUL 503	1391	1159	161	3214
W3VR 246	647	601	29	1523
W7BA 8	620	574	40	1242
WA9WNH 17	479	431	0	927
WA5GPO 1	426	426	0	853
KØZSQ 0	390	3	390	783
WAØVAS 107	258	10	248	623
WAØVKL 76	252	241	7	576
W6VNQ 16	286	245	2	549
WB9BJR 137	203	170	33	543
WØLCX 28	293	206	14	541
K9TEY 15	255	220	34	524

BPL for 100 or more originations-plus-deliveries

K1BCS 371	W1FUF 118	W3MPX 108
WA4MKH 260	W6WLV 117	WA6BYZ 106
K8ONA 186	WA3EMI 111	WB9BXX 106
W4OYI 140	W8QCU 110	W3IN 102
W8RDSV 139	W2OF 108	WA3AJQ 101
WB8CWD 128		W6DEE 101

More-Than-One Operator Station

E3HKK 106

BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listings: WA2EPI, WAØVYV.

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.

threatened area, and provided an additional traffic outlet.

The RACES continued to operate throughout the day until early evening when the fire was partially under control and it was determined further evacuations would be unnecessary. Ten other area amateurs participated. - *WB6FTE.*

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At 1535 GMT of April 19, the electrical power went off at the home of WØGB, EC of Clay County, Minn. Investigating, he found both of the power company high lines crossing his property were down due to large accumulations of ice on the wires.

Using emergency power, the Clay Co. AREA Net was called and contact was made with KØLWK, KØJHL and WØGFE, who tried to notify the power company of the outage but found that telephone lines were also out of order. Additional stations continued to check in asking for or giving information on outages and road conditions. At 1800 the net was closed but many amateurs remained on frequency.

At 2310 the Clay Co. Sheriff requested assistance in handling messages to the power company. After making contact with WØUTT, a circuit was established to handle the traffic. — *WØGB, EC Clay Co., Minn.*

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On May 10, amateurs of the various ARPSC branches in all five boroughs of New York City participated in supplying all radio communications for the Salute to Israel Parade. The parade, with 75,000 marchers and 500,000 spectators, followed Fifth Avenue from Fifty-fourth to Eighty-sixth Streets in Manhattan. Twenty-two amateurs used six-meter am and fm and two-meter fm to provide a supplementary communications channel for New York Police during the six hours of the parade. — *WB2FXN, EC Kings Co., N.Y., Six meters.*

On May 24, nine Wayne Co. (Mich.) amateurs furnished communications for the Ecorse Memorial Parade, under the direction of EC W8BEZ. This was the second time amateurs had helped with communications for the parade using two-meter fm. — *W8BEZ, EC Wayne Co., Mich.*

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The Rocky Mountain Radio League provided communications for another Memorial Day Parade, this one in Denver, Colo. The RMRL portable repeater was placed atop a downtown hotel and provided good coverage along the parade route for seven hand held units and one mobile. Ten amateurs participated. — *WBØAWG, VHF PAM Colo.*

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Seventeen amateurs from the Kingsport, Tenn., area, manned a roadside rest area for motorists near that city on the Memorial Day weekend, May 29-31. Details were not supplied, but 75 and 40 meters were used to pass 24 pieces of traffic. — *WB4MPJ.*

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On June 6 the Rocky Mountain Radio League was asked to help in the search for a lost boy in Gilpin County, Colo., 7 miles north of Blackhawk. KØAUZ was the first to respond. He set up a command post at the point where searching had begun. An hour later other amateurs from Denver began arriving. However, searchers found the boy a short time later and the operation was secured. Operation was mainly on two-meter fm through the Squaw Mountain repeater WØWYX. — *WBØAWG, VHF PAM Colo.*

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The Los Angeles City RACES exercise, simulating major earthquake with resulting floods, fires and looting, was held June 16. K6ROC, the L.A. City Amateur Radio Organization, was used as control and WB6OON was ten meter net control. W6TCH was in charge of the overall operation.

The LA Police Department mobile communications center was activated with its twenty base stations, including provision for AREC/RACES. Twenty amateur units passed 100 pieces of test traffic in the exercise which lasted just over two hours. — *W6TXJ.*

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Forty-three SEC reports were received for the month of July, representing 14,924 AREC members. This is five more reports than July of last year and is just shy of 500 more members. Sections reporting: Alta, Ariz, Ark, Colo, Conn, EFla, EMass, EPa, Ind, Iowa, Kans, Ky, LA, Mar, MDC, Mich, Minn, Mont, Nebr, Nev, NMex, NLI, NNJ, NTex, Ohio, Okla, Ont, Org, Oreg, Que, SDgo, SF, Sask, SDak, STex, Tenn, Utah, Va, Wash, WVa, WFla, WMass, WPa.

Independent Net Reports

Net.	Sessions	Check-ins	Traffic
Hit & Bounce, ...	31	301	434
Mike Farad E & T.	26	303	202
Eastern U.S., ...	29	154	61
North East Traffic.	31	393	277
7290, ...	57	1972	1753
North American 20 Meter SSB.	26	439	413
ECTTN, ...	19	195	61

Ham vs. CATV: A Light in the Darkness

BY STEVE BURRIS,* WB6OLI

FOR THOSE hams who have known the sheer, unadulterated misery of living in an area employing CATV (Community Antenna Television) systems, the following will be of no surprise; indeed, it may even provide inspiration to many of you oppressed chaps. But to the thousands more who have only to put up with TVI of the common variety, I hope this story will evoke your sympathy and appreciation for that rare breed of ham who conquers this Goliath. This is the story of one such David . . .

Len Capsen was the sole resident ham of the desert community of Los Infiernos, Nevada. The town was populated by a varied conglomeration, including Indians, wetbacks, hippies, Edsel dealers, etc. Len himself was a never-say-die AMer; but that's off the point. Fact was when folks discovered Len's antenna was intended for purposes other than a monument to the sun god, they were without doubt puzzled as to its real use. But because bad news travels quickly anywhere, Los Infiernos' grapevine made WCARS look like a bunch of Channel 9 CBers in its relaying of the devastating news: Mr. Capsen was the culprit burning their TVs with that awful "beep-beeping." The source of this information is still unkown; however, its final effect is now history.

Without a doubt, Len's six-element Yagi pointed to him as the guilty party more effectively than Charlie Chan ever could have. Townspeople phoned him day and night; and, although Len did not understand Spanish nor hippie jargon, the gist of their remarks could have been deciphered by any child who had known the taste of soap. Removing the phone alleviated this small difficulty, but as Len soon found out this was a temporary measure at best. Some smart lad informed the patrons of the town's local bar that sticking pins through poor Len's coax would remedy the situation pronto.

As you may have guessed, Len awoke the next morning only to find the women's sewing circle busily doing their Voodoo best to stick every pin they owned into the mysterious black snake leading to the metal contraption above. Len was furious, but his temper subsided. He bought a Matchbox and quickly installed some open-line feeder. The present threat to his home and security resolved, Len set about once again to working JAs — unaware of impending doom.

Len was once again 57 in Japan and 59 plus 20dB on Channel 8. Even W6AM would have had to go some before beating Len's signal on Channel 2. It came as no surprise to Len when he peered out the window and saw the villagers marching towards his home under the light of the full moon.

*1031 Castlegate Lane, Santa Ana, CA 92705.

The villagers chanted mysterious hymns, and many of them brandished torches amid the kerosene lanterns and 29-cent flashlights. Len fancied himself a Boris Karloff in one of those old flicks, and only wished he had a Frankenstein to release upon them. His old Knight-Kit Novice rig was a Frankenstein of sorts, but Len figured correctly that its cathode keying would have little effect on the bunch of landline users approaching. Nope, he had to come up with something else. Either he could admit defeat and turn in his call letters, or fight back. By golly, Len wasn't to sit still and watch all that expensive S-line fall waste for naught. If he had to go, Los Infiernos would have to go as well! Like the Biblical tale of Sodom and Gomorah, Los Infiernos would soon feel the wrath of its superior being. Len Capsen would flee now, he would watch the burning of his house later; but in the final analysis he would have the last laugh.

The following day all that remained of the ash and rubble that once was Len's home was its concrete foundation. Villagers fully expected Len to rebuild on the site, but instead were puzzled when all that was erected were four gigantic audio amplifiers. Len withdrew his life savings and spent them on the final part of his plot: publicity. In every magazine and on every media throughout the country came the ominous announcement: "Beautiful people take note: Woodstock II at Los Infiernos, Nevada, August 9-12. Free admission, free food, free love. Be part of a beautiful happening. Len Capsen Enterprises."

On August 13 Len stood amidst the rubble, Ripple, and generally nauseous mess that once was Los Infiernos. Not counting the few unintimidated jackrabbits, Len was Los Infiernos' sole citizen. Len could transmit at will, with only himself to worry about. Unquestionably, this was the happiest day of Len's entire life. His was the realization of the ham's eternal dream, the unique euphoria of transmitting without worry of TVI. Len's joy was short-lived: four electric guitars on four ten-thousand watt amps get pretty loud.

Send your cards and condolences to Len Capsen, Nevada School for the Deaf, in its new location at Los Infiernos.

Happenings of the Month

Election Results

Restrictions on 40 Meters

Extra Code Retained; Output Measure Denied

Executive Committee Minutes

LEAGUE ELECTION RESULTS. . .

In current elections for director and vice director of eight ARRL divisions, three directors and one vice director return to office without balloting, as the only candidates for the posts.

Harry J. Dannals, W2TUK – who has had a tie vote and a 33-vote plurality in his three previous election contests – this time was the only nominee for director in the Hudson Division. The Northwestern Division director, **Robert B. Thurston, W7PGY**, picked up his fourth term without contest, after a three-way race two years ago.

In the Roanoke Division, director candidate Tom Harrell, K4TSJ and vice director candidate William A. Holland, WA4EUL, each expressed pleasure at having been nominated, but withdrew in favor of incumbent director **Victor C. Clark, W4KFC** and vice director **L. Phil Wicker, W4ACY**, who thus get third terms without balloting.

. . . AND BALLOTING

The remaining twelve posts have more than one candidate, so ballots have been sent to Full Members (of record on September 20) in each of the seven divisions involved.

In the *Central Division*, director Philip E. Haller, W9HPG faces Ronald C. Williams, W9JVF; Kenneth A. Ebneter, K9GSC opposes vice director Edmond A. Metzger, W9PRN. Daniel A. Ostroy, WB2TUL, challenges Stan Zak, K2SJO for vice director from the *Hudson Division*. Quite a battle looms in the *New England Division*: incumbent Robert York Chapman, W1QV; Daniel A. Mac Donald, W1PEX; and William M. Maguire, W1IF, running for director and George C. Campbell, WA1DVE; Roger E. Corey, W1AX; Walter S. Rogers, W1DFS; John C. Sullivan, W1HHR; and Robert E. Thompson, W1TWG struggling for vice director – a sixth candidate, Gary L. Foskett, W1ECH, withdrew.

On the opposite coast, *Northwestern Division* vice director David O. Bennett, W7QLE, and Dale T. Justice, K7WWR/WA7KTV are on the ballot. The *Rocky Mountain Division* is in a unique position, with neither the incumbent director nor vice director running for reelection. The choices are, for director, Charles M. Cotterell, WØSIN and John H. Sampson, Jr., W7OCX; for vice, Allen C. Auten, WØECN, Wayne M. Moore, W7CQL and William E. Wageman, WØBUR/K5MAT – thus involving all four states of the division.

In the *Southwestern Division*, Fred Johnson Elser, W6FB, challenges director John R. Griggs, W6KW, while Frank Ellsworth Bingham, III, WA6DRQ; incumbent Arnold Dahlman, W6UFI; and Gary A. Stilwell, W6NJU, battle for the vice director slot. A return match occurs in the *West Gulf Division*, with director Roy L. Albright, W5EYB, again facing Ray K. Bryan, W5IQ. Vice director candidates are J. R. Pronto Poston, W5AJ and V. Leon Vice, W5VCE/W5OBC.

The ballots were mailed during the second week in October and to be valid must reach headquarters beforenoon, EST, November 20. Any Full Member of the divisions listed above who has not yet received the election papers should write immediately to League hq.

CONGRESSIONAL REMARKS

At the suggestion of WA1GFJ, Congressman Emilio Q. Daddario on September 14, 1970 called the attention of the House to amateur radio with these remarks, reprinted here from the *Congressional Record:*

HON. EMILIO Q. DADDARIO

Of Connecticut

IN THE HOUSE OF REPRESENTATIVES

Monday, September 14, 1970

Mr. Daddario. Mr. Speaker, I rise today to call the attention of the House to the valuable services performed by amateur radio operators – "hams" as they are frequently called. Operating their own private radio stations, hams render emergency assistance in providing communications during disasters such as Hurricane Celia. We have all read accounts of such activities and are well aware of the invaluable help these volunteers provide. What is not so well known is the continuing assistance hams provide in alleviating a most human problem – the loneliness and suffering that comes from the separation and lack of communications between our servicemen and their families. Those of us who daily see our wives, children, and close friends forget that there are hundreds of thousands of young people whose contact with their families is limited to letters and occasional photographs. Like the concerned public servants they are, hams have stepped forward to lend their aid and provide radio communications facilities so that servicemen abroad can talk to their loved ones at home. Using "phone patch" equipment coupled directly to their own radio receivers and transmitters, hams call friends and parents of servicemen on the telephones and let them talk to their absent soldier in Vietnam who use military radio facilities over there. Acting as the vital link, the ham provides a much needed human contact between individuals separated by the war.

An excellent article detailing these phone patch activities recently appeared in Parade magazine. I take this opportunity to insert the article in the

Congressional Record and commend it to the attention of all Members and other readers.

Other members may wish to contact their Representatives, particularly when amateurs have been in the news for some outstanding emergency work, for similar mention.

GETTYSBURG EXAMS DISCONTINUED

Apparently as an economy measure, the Federal Communications Commission has discontinued amateur operator examinations at the Gettysburg processing office, effective September 4, 1970.

FOOTNOTES ON FORTY

Amateurs in some U.S. possessions in the Pacific have lost the top end of 40 meters and the rest of us have been reminded of shared use in that band by a recent FCC action.

At the World Administrative Radio Conference held in Geneva, in 1959, the forty-meter amateur band was further split up; amateurs in Europe, Africa, Asia and most of Oceania (actually, in ITU Regions 1 and 3) retained 7000-7100 kHz as an exclusive amateur band, but 7100-7300 kHz was assigned in those regions to international broadcasting ("propaganda" stations like Radio Moscow, BBC and Voice of America). Only in ITU Region 2, the Western Hemisphere extended out to Hawaii, did the whole band remain assigned to amateurs.

To avoid conflict, the assemblage adopted regulation 117, specifying that where a band of frequencies is allocated to different services, the basic principle is equality of right to operate. The conference also adopted Resolution 10, specifically to deal with the 7000-7300 kHz allocation.

FCC has now changed Section 97.61 to prohibit its licensees located in Region 3 from using 7100-7300 kHz; the islands involved are: Baker, Canton, Enderbury, Guam, Howland, Jarvis, Palmyra, American Samoa and Wake. FCC has also added Resolution 10 to our amateur rules as an appendix. At the same time, FCC tidied up its slow-scan allocations by deleting remarks which only applied between November 22, 1968 and November 22, 1969. Resolution 10 and the amended portion of Section 97.61 appear below:

Resolution No. 10

Relating to the Use of the Bands 7000 to 7100 kc/s and 7100 to 7300 kc/s by the Amateur Service and the Broadcasting Service.

The Administrative Radio Conference, Geneva, 1959,

Considering

(a) that the sharing of frequency bands by amateur, fixed and broadcasting services is undesirable and should be avoided;

(b) that it is desirable to have world-wide exclusive allocations for these services in Band 7;

(c) that the band 7000 to 7100 kc/s is allocated on a world-wide basis exclusively to the amateur service;

(d) that the band 7100 to 7300 kc/s is allocated in Regions 1 and 3 to the broadcasting service and in Region 2 to the amateur service;

resolves

that the broadcasting service should be prohibited from the band 7000 to 7100 kc/s and that broadcasting stations operating on frequencies in this band should cease such operation;

and noting

the provisions of No. 117 of the Radio Regulations;

further resolves

that inter-Regional amateur contacts should be only in the band 7000 to 7100 kc/s and that the administrations should make every effort to ensure that the broadcasting service in the band 7100 to 7300 kc/s, in Regions 1 and 3, does not cause interference to the amateur service in Region 2; such being consistent with the provisions of No. 117 of the Radio Regulations.

Section 97.61 * * *

Frequency band	*Emissions*	*Limitations see para. (b)*
kc/s		
3800-3900	A3, F3	
3800-4000	A3, F3	4
7000-7300	A1	3,4
7000-7200	F1	3,4
7200-7250	A3, F3	3,4
7200-7300	A3, F3	3,4
14000-14350	A1	
14000-14200	F1	
14200-14275	A3, F3	
14200-14350	A3, F3	
Mc/s		
Mc/s		
21.00-21.45	A1	
21.00-21.25	F1	
21.25-21.45	A3, F3	

(b) * * *

(3) Where, in adjacent Regions or sub-Regions, a band of frequencies is allocated to different services of the same category, the basic principle is

KAOK Cablevision, Lake Charles, Louisiana, presented a 2 1/2 hour show on ham radio August 7, featuring local amateurs and finishing with "Ham's Wide World." Some of the participants were photographed: seated, W5SKW, producer/moderator; Ray Carroll, host of "Night Beat". Standing, from left: WA5LPW; W5BSR; W5BWZ; W5CCD; K5DXY; WA5LBT; W5TVH. Also helping but not in pix: WA5EWL; K5BQT; W5CEZ; K5HAH. *(Photo by WA5VMO)*

the equality of right to operate. Accordingly, the stations of each service in one Region or sub-Region must operate so as not to cause harmful interference to services in the other Regions or sub-Regions (No. 117, the Radio Regulations, Geneva, 1959).

(4) 3900-4000 kc/c and 7100-7300 kc/s are not available in the following U. S. possessions: Baker, Canton, Enderbury, Guam, Howland, Jarvis, Palmyra, American Samoa, and Wake Islands.

COMMISSION DENIES TWO PETITIONS

FCC on September 16 released an order denying RM-1522, a petition by Anthony R. Gargano, W2EHB, which would have eliminated the 20 wpm code requirement for Extra Class licensees. Quoting from the order:

The question of whether the Amateur Extra Class license would require a superior code skill as well as competency in technical matters, was considered when this class was originally adopted and again in the Docket 15928 proceeding (FCC 67-978, 9FCC 2d814, 1967). The basic premise was that there should be a top class of license as evidence of this all around superiority and that there should be some practical reward for having attained it. The reward of some small exclusive segments of the amateur bands for both telegraphy and telephony modes is designed to attract those who may prefer one mode of operation over the other to show a greater versatility in the art of amateur communications. The Commission is not pursuaded by the petitioner that this concept is not still a worthwhile means of encouragement of the improvement of the Amateur Radio Service.

On July 24, the Commission denied RM-1512, a petition by Ralph M. Hartwell, II, W5JGV, which would have required measurement of power output instead of input on amateur frequencies above 400 MHz. In part, FCC said:

On December 6, 1968, the Commission released an Order (FCC 68-1165) which denied a proposal similar to that of the petitioners. In denying the proposal the Commission stated: "that the practical limitations of measuring output power militate against that method of power measurement in the Amateur Service. The average amateur is not equipped with a radio frequency watt meter or other equipment for determining power output, whereas the use of metering circuits for transmitter adjustments, which can also be used to determine power input, are common." Petitioner has not made a showing to substantiate his statement that the present power limits tend to restrict the advancement of the art. Moreover, we are not convinced that the temperature differential method for measuring output power, described by the petitioner, is within the capability of the average amateur.

WØ QSL BUREAU SPLITS

The Des Moines Radio Amateur Association has resigned as QSL Bureau for W-K-WA-WBØ calls, but the subbureau managers as individuals will now carry on the bureau functions. Envelopes and cards already sent to Des Moines have been forwarded to the new addresses, and there should be no break in normal service. The set-up:

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

WAØ – Lloyd Harvey, WØQGI, P. O. Box 7, Attica, Iowa 50024 USA

KØ, WBØ, WNØ – Dr. Philip D. Rowley, KØZFL, Route 1, Box 455, Alamosa, Colorado 81101 USA

Also, minor changes in two other Bureau mailing addresses.

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

VE8 – George T. Kondo, VE8RX, c/o Ministry of Transport, Norman Wells, N.W.T., Canada

EXECUTIVE COMMITTEE MINUTES

No. 331 *September 28, 1970*

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Headquarters office of the League in Newington, Connecticut, at 9:25 a.m. September 28, 1970. Present: President Robert W. Denniston, WØDX, *in the chair*; First Vice President Charles G. Compton, WØBUO; Directors Victor C. Clark, W4KFC; Harry J. Dannals, W2TUK; Noel B. Eaton, VE3CJ; Robert B. Thurston, W7PGY; and General Manager John Huntoon, W1RW. General Counsel Robert M. Booth, Jr., W3PS; Treasurer David H. Houghton; and Directors John R. Griggs, W6KW, and H. Dale Strieter, W4DQS, were also present.

On motion of Mr. Eaton, affilation was unanimously GRANTED to the following societies: The Amateur Radio Club of El Cajon, El Cajon, Calif.; Cape Fear Amateur Radio Society, Fayetteville, N.C., Cathedral Amateur Radio Association, Duluth, Minn.; Conejo Valley Amateur Radio Club, Inc., Thousand Oaks, Calif.; Empire Radio Club, Lakewood, Colo.; Fair Ave. School QSO Chasers, N. Hollywood, Calif.; Grossmont High School Amateur Radio Club, La Mesa, Calif.; The IBM Radio Club of Boca Raton, University Park, Fla.; Johns Hompkins Amateur Radio Club, Baltimore, Md.; JPL Amateur Radio Club, Pasadena, Calif.; Lera Amateur Radio Club, Pearl River, N.Y.; Mich-A-Con Amateur Radio Club, Iron Mountain, Mich.; The Milford Amateur Radio Club, Highland, Mich.; Murray State University Amateur Radio Club, Murray, Ky; Springfield Gardens High School Amateur Radio Club, Springfield Gardens, N.Y.; Tewksbury Memorial High School Amateur Radio Club, Tewkshury, Mass.; Tri-County Radio Association, Alliance, Ohio; Trumbull Amateur Radio Club, Trumbull, Conn.; University of Arizona Amateur Radio Club, Tucson, Ariz.; Vanderbilt Amateur Radio Club, Nashville, Tenn.; Wayne Amateur Radio Club, Wayne, N.J.; W6IN Society, San Fernando, Calif.

On motion of Mr. Dannals, unanimously VOTED to confer Life Membership upon the following: Dave Ablowich, Jr., W5SY; Sherman V. Allen, Jr., WA1IHN; John R. Beck, K4LJV; Ernest R. Benham, WØDXC; R. W. Berkemeyer, K6IIO; William A. Bode, WA6BWB; James F. Bogner, Jr., WAØKYM; Norman Lee Borchers, W8BIJ Anthony Bortko, WA9PFI; W. Ernest Bosselman, W1DO; Kenneth M. Branscome, K5OJM; Richard G. Brooks, WA8EZI; David C. Bunting, WA1JRA; Peter C. Card, W1WDD; William E. Clausen, W8IMI; K. Diane Courtney, WB4INM; Robert O. Craig, WAØPXT; Newton M. Davis, Jr., WAØPQB; Harold D. DeVoe, KL7MF; Richard Bruce Doughty, W6BDU; Victor A. DuBois, K4SHB; Edward J. Evans, W5LK; Hal W. Everett, II, WA1IUL; John R. Falker, W8SRK; Herbert S. Gates, Jr., WA4SND; Richard P. Gaul, K2GMY/WB6ZEP; Arthur E. Goddard, WØMOQ; Christopher Grant, WØLRW; William S. Grenfell,

W4GF; Kenneth D. Grimm, K5KBH; James A. Hackney, III, K4AJR; Robert Winfield Hart, W1RH; G. Scott Henninger, K8HBN; Charles F. Hill, W9VPU; Donald F. Holaday, WØDR; Martin Michael Horvat, WN7KIZ; John D. Imhof, WB2JJN; Robert A. Johnston, K4DMG; Robert Kreutzer, W8GYR; Craig Larson, WAØROY; Horace D. Lasher, WB4CRZ; Charles R. Littlewood, W4RUH; Ramon L. Ruiz Lopez, KP4EB; Munroe W. MacDonald, W3WKN; Tim Mauldin, WA5LTM; James D. Mazgy, W2UGL; Robert A. McClard, WA6OWH; George Vernon McClintock, Jr., K4BTY; Charles P. McConnell, W6DPD; Robert E. McCullough, K3DAK; Andrew McGowan, Jr., WA5EBE; David G. Mello, W3FOR; J. Adrien Michaud, VE2DEA; George N. Muscat, VE3GNM; Robert F. Nelson, Jr., K2QPN; Henry D. Olson, W6GXN; Robert G. Parks, K6AEC; John Phillips, VE3CRP; Robert E. Phillips, W5VZO; Eddy E. Pollock, W6KHS; Merrill A. Posner, WA1KZA; John H. Possehl, W3KV/W3DBF; Alwin H. Rector, WØLKF; Joseph Reymann, Jr., WA4FAG/K2CAM; Eugene P. Rhodes, WB4JCV; Philip Alvin Rider, K9QED; Frank W. Robins, K6KUM; Brock W. Roblin, W6RNL; Alfred C. Rousseau, W1FJJ; Thomas S. Rousseau, K7PIT; David R. Russell, WN6FBY; Fred M. Ruzick, WA8GQQ; Jimmy Scott, W3FVR; Rudolph Patrick Severns, WA5QJW; John S. Shami, WB2ISL; Richard S. Shepard, WA5ZSO; Alfred G. Smith, WA2TAQ; Don Snortland, WAØQHL; Joseph Sanford Stoutenburgh, WAØWDX; Murray Strober, WB2VKO; George A. Teufel, W2CUO; Gregory W. Teufel, WA7BPA; Arlie M. Thomason, W7DAN; Douglas E. Thompson, K8OTJ; David William George Thorne, VE8ZZ; Victor A. Trueblood, WB6HYW; Terry L. Van Benschoten, WA2ZSG; Owen L. Wait, WA6AUS; David Waters, VE2DK; Richard L. Wilder, W2ZCZ; Jack D. Wilk, K2KDQ; Sidney S. Williams, W7GVX; Charles R. Wilson, K1GVA; Van A. Wimmer, Sr., WA4BIX

The Committee next proceeded to examine nominations in the director elections, with careful attention to the application of the eligibility rules concerning membership and freedom from commercial radio connections. The Committee made findings and ordered actions as detailed below, all by unanimous action.

Central Division

For Director: Philip E. Haller, W9HPG, and Ronald C. Williams, W9JVE, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director: Kenneth A. Ebneter, K9GSC, and Edmond A. Metzger, W9PRN, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

Hudson Division

For Director: Harry J. Dannals, W2FUK, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Director from the Hudson Division for the 1971-1972 term without membership balloting.

For Vice Director: Daniel A. Ostroy, WB2TUL, and Stan Zak, K2SJO, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

New England Division

For Director: Robert York Chapman, W1QV; Daniel A. MacDonald, W1PEX; and William M. Maguire, W1IF, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director: Gary L. Foskett, W1ECH, was found lawfully nominated; but the Committee was in receipt of a communication from Mr. Foskett withdrawing his name as a candidate. George C. Campbell, WA1DVE; Roger F. Corey, W1AX; Walter S. Rogers, W1DFS; John C. Sullivan, W1HHR; and Robert E. Thompson, W1TWG, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

Northwestern Division

For Director: Robert B. Thurston, W7PGY, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Director from the Northwestern Division for the 1971-1972 term without membership balloting.

For Vice Director: David O. Bennett, W7QLE, and Dale T. Justice, K7WWR/WA7KTV, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

Roanoke Division

For Director: Tom Harrell, K4TSJ, was found lawfully nominated; but the Committee was in receipt of a communication from Mr. Harrell withdrawing his name as a candidate. Victor C. Clark, W4KFC, was found lawfully nominated and eligible; he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Director from the Roanoke Division for the 1971-1972 term without membership balloting.

For Vice Director: William A. Holland, WA4EUL, was found lawfully nominated; but the Committee was in receipt of a communication from Mr. Holland withdrawing his name as a candidate. L. Phil Wicker, W4ACY, was found lawfully nominated and eligible; he was thereupon declared,

The February *QST* Cover Plaque Award was won by Al Schwaneke, WØGS for his article, "Equipment Modification for the Blind." Presenting the trophy to WØGS is Midwest Director Sumner Foster, WØGQ (at right).

pursuant to the By-Laws, to be duly reelected as Vice Director from the Roanoke Division for the 1971-1972 term without membership balloting.

Rocky Mountain Division

For Director: Charles M. Cotterell, WØSIN, and John H. Sampson, Jr., W7OCX, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director: Allen C. Auten, WØECN; Wayne M. Moore, W7CQL, and William E. Wageman, WØBUR/K5MAT, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

Southwestern Division

For Director: Fred J. Elser, W6FB, and John R. Griggs, W6KW, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director: Frank E. Bingham, III, WA6DRQ; Arnold Dahlman, W6UEI, and Gary A. Stilwell, W6NJU, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

West Gulf Division

For Director: Roy L. Albright, W5EYB, and Ray K. Bryan, W5IQ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director: J. R. Poston, W5AJ, and Leon Vice, W5VCE, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

On motion of Mr. Clark, unanimously VOTED that Messrs. Harry J. Dannals, Noel B. Eaton and Robert B. Thurston, with Charles G. Compton and David H. Houghton as alternates, are appointed a Committee of Tellers to count the ballots in the current elections.

At this point the Committee discussed at considerable length the matter of restrictive rules interpretations recently issued by the Federal Communications Commission – concerning amateur activities in the public service area in general, and message-handling in particular – and requested the President to take appropriate action to protect the interests of the amateur radio service.

The Committee was in recess for luncheon from 12:30 to 12:45 p.m.

On motion of Mr. Thurston, unanimously VOTED to affirm earlier mail action in approving the holding of a Rocky Mountain Division Convention in Colorado Springs, Colo., on June 19-20, 1971.

After discussion of the worldwide beacon project sponsored by the German amateur society and the Region I IARU organization, on motion of Mr. Eaton, unanimously VOTED to support the establishment of an appropriate beacon station installation in the northern part of this hemisphere by providing both equipment and initial installation expenses.

On motion of Mr. Eaton, unanimously VOTED that Charlotte A. Clark is authorized to sign documents in connection with the League's several savings accounts, vice Jane G. Mastronarde, resigned.

There being no further business, the Committee adjourned, at 3:30 p.m.

(During the course of its meeting the Committee discussed, without formal action, the trend of club growth, location for the 1971 Board meeting, monetary contributions to the League, expense reimbursement of officers, postage expense for mailing official bulletins to affiliated clubs, license fees, safety measures at W1AW, and recent correspondence from The Radio Society of Ontario.)

Respectfully submitted:
JOHN HUNTOON, W1RW
Secretary

LETTER FROM CANADA

VE amateurs generally, but also U.S. hams concerned about recent discussions of the position of the League in Canada, will be interested in the following letter from the Radio Society of Ontario addressed to ARRL Director Noel B. Eaton, VE3CJ:

The Board of Directors of the Radio Society of Ontario, Inc., has resolved that the Society should express its regret to you and to the President of The American Radio Relay League, Inc., that a conflict of opinion between the Canadian Amateur Radio Federation and the League was given prominent publicity in Volume 5, Issue 3, of The Ontario Amateur, the Official Journal of the Society.

As President of the Society I am pleased to convey this message to you and to take the opportunity to correct any impression that may have been created that the Society has adopted a position with respect to the issue. The Directors wish to make it known to you that, despite the fact that the Radio Society of Ontario, Inc., is a member of the Canadian Amateur Radio Federation, the Society reserves judgment concerning the course adopted in the name of the Federation.

It has been, and remains the policy of the Radio Society of Ontario, Inc., to represent and serve the needs of Ontario amateurs and to do so in a spirit of co-operation and unity. As a participant in the Canadian Amateur Radio Federation it is the aim of the Society to encourage a similar atmosphere on a national scale with due recognition of the interests of all concerned. To the extent that the recent issue of The Ontario Amateur may have indicated renunciation of these objectives it is a matter of regret to me and to my fellow Directors.

I trust that this letter will make the position of the Society abundantly clear and that you and The American Radio Relay League, Inc., will accept it as an admission that the Society erred in publicizing in its Journal a controversial issue in which the Society is not directly involved.

Arthur C. Blick, VE3AHU
President

[A note from the Editor: By way of explanation, this letter refers to a proposal by the Canadian Amateur Radio Federation to establish an independent but affiliated Canadian amateur organization by means of a merger of CARF with the ARRL Canadian Division. Although the League is acutely conscious of its stewardship role in behalf of all amateurs, and therefore sympathetic in principle to the desire of some Canadian amateurs for their own organization, there were several problems in this particular proposal which caused the ARRL to turn it down. We are especially appreciative, therefore, of the gracious statement by the President of the Radio Society of Ontario who is also CARF President.] QST

I.A.R.U. News

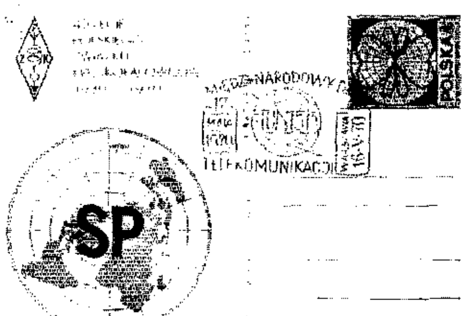
INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

JA LICENSES

New rules for club stations have been put into effect by the Japanese Ministry of Communications. These stations will have call sign suffixes beginning with "Y" and "X". The majority of the members of such clubs must be Japanese nationals. But, since the minimum membership is not specified, it has been pointed out that an American and two Japanese can qualify under the law for a club license. Thus the way appears open for foreigners to get on the air.

There is no reciprocal operating agreement currently existing between the United States and Japan, although negotiations toward such are in progress. Thus, the new club station arrangement for alien operators provides the first opportunity for non-Japanese nationals to operate. There has been for some time an availability of operating privileges to U.S. military personnel operating from military bases with the KA prefix. But, these stations are of a quasi-military nature and, in fact, Japanese nationals are forbidden to communicate with the KA stations. *(Tnx to KH6IJ for info.)*

United Nations Twenty Fifth Anniversary, San Francisco, California, June 26 [illegible]



POLISH SOCIETY CELEBRATES 40TH YEAR

This year the *Polski Zwiazek Krotkofalowcow* is observing its 40th anniversary. The society, founded in 1930, now has a total membership of 6000 which includes 2864 licensed amateurs. To commemorate this occasion the Polish Ministry of Telecommunications has issued a special post card. The sample shown here is also stamped with the postmark for the International Telecommunication Union's "World Telecommunication Day."

NOTES

The Austrian IARU society, *Osterreichischer Versuchssenderverband* is sponsoring a 160-meter cw international contest, November 14, from 1900 to 2400 GMT. The objective is to work as many cw stations as possible. Each contact counts for one point – each OE call area counts as a multiplier of 2. Logs containing date, GMT, station worked, RST, and three-digit contact number go to: *OVSV Landesverband Oberosterreich, Erwin Braunschmid, Eisenwerkstrasse 22, A-4020 Linz, Austria.*

On the occasion of the twenty-fifth anniversary of the United Nations, station W6UNO was operated through the joint efforts of Joseph L. Alioto, Mayor of San Francisco, and the San Francisco Disabled Amateur Radio Operators' Club. During its one-day existence on June 26, the station made over 350 contacts from its mobile van site. *(Info via W6VCN.)*

THE RADIO CLUB OF PERU AND ITS NATIONAL EMERGENCY NET AT THE SERVICE OF THE COMMUNITY

The radio amateurs of Peru demonstrated a brilliant efficiency by participating in the humanitarian task developed by the National Emergency Net during the earthquake which occurred in the central part of the country on the 31st of May of this year. The city of Yungay, the city of Huaraz (capital of the department of Hancash) disappeared as well as many other cities on the coast and innumerable small towns in the zone, with a loss of more than 50,000 lives and leaving more than 200,000 people without homes.

A few minutes after the earthquake was felt in Lima, about 500 kilometers south of the affected area, and as soon as the electric power was restored, many amateurs got on the air, calling to the principal cities of the country and trying to

locate the possible area hit by the phenomenon. No answer was received in two hours from zones 2 and 3, so those zones were suspected of being the affected ones.

Two hours later, OA4A, Net Control Station of the National Emergency Net, received a dramatic call from OA3T, in Huaraz operated by a North American priest, asking for help and giving a report about the catastrophe and its magnitude. He said that the city was severely damaged (65% destroyed), and explained also that his transmission was possible because the convent from which he was operating was located outside the city in an open area having an emergency power plant.

A little later another station located in the port of Chimbote, which was 40% destroyed, joined the net, and from then on both stations remained in permanent contact with OA4A NCS located in the Hq building of the Peruvian Radio Club.

The net operated for 27 days, and all the emergency traffic was channeled to the Presidential Palace, to the Red Cross and to the different Government Agencies to which OA4A was connected by a teletype net using telephone lines.

In the operation of the National Emergency Net there were participating more than 100 amateurs in Lima and in the rest of the country. Several operators were XYLs and YLs. During the first 12 days the station OA4A operated 24 hours a day, the next 8 days it operated 12 hours and then until the close of the Net only 8 hours per day. There were a total of 240 hours of operation, relaying in that period more than 1000 official messages.

In order to provide communications to those cities and small towns isolated by the earthquake, the Radio Club Peruano sent 16 mobile stations collected from the members and other affiliated clubs. These stations were operated by their owners, who came to the zone of disaster from places as far away as 1200 kilometers.

The mobile stations were assigned to those places where no other means of communications were available; they sent the most impressive reports giving to the Government the real situation.

Since OA4A was dedicated exclusively to the official emergency traffic, and it was not possible for it to handle the traffic requested, with understandable anguish, by numerous people who had relatives in the area of disaster, the Club established a special service, parallel to the Emergency Net, which worked on two different frequencies, 7050 and 7150, while OA4A was on 7100/Kc. Besides this special service, as so many calls were received from other countries wanting to know details of the disaster, another parallel service was established working on 14,245 kc.

Few times in the history of amateur radio has the work done by the Radio Club Peruano, its affiliated clubs and the amateurs in general been so justly appreciated in its real value, having received the public acknowledgement of the Peruvian Government in a special message of the President of the nation addressed to the country. Informative articles of praise appeared in the principal newspaper of the country and the club received the congratulations of the U.S. Ambassador Mr. Taylor Belcher, who in the name of the U.S. Government donated to the Radio Club Peruano five transceivers to be used as base or mobile station. The donation was received by the President of the Club Col. Fernando Cardoza, OA4UY, in a ceremony which was held in the Assemblies Room of the Club. There were present Mr. Fernando Berckemeyer, Peruvian Ambassador in USA, Mr. Carlos Romero, OA4PS, Director of Telecommunications, who represented the Minister of Transport and Communications, Mr. Ricardo Leon Velarde, Mayor of San Isidro (County where the Club is located), Mr. Gustavo Reusens OA4AV, Secretary of the Interamerican Amateur Radio Union – IARU Region II, and about 100 members of the Club.

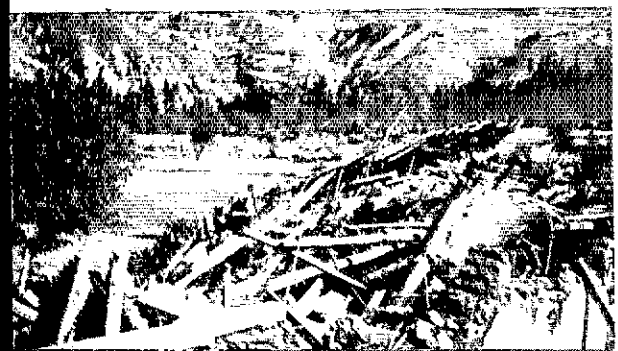
At this occasion the Mayor of San Isidro also honored the Radio Club Peruano, presenting a very nice diploma in recognition of the very good work accomplished during the emergency and along its almost 40 years of life, serving the community.

Once more has been demonstrated the importance of amateur radio and the necessity to be always ready with reliable equipment and well-trained operators. This type of service is one of the several ways that make us justify our presence in the bands, and good reason for the governments to support and stimulate our activity. *Radio Club of Peru.*

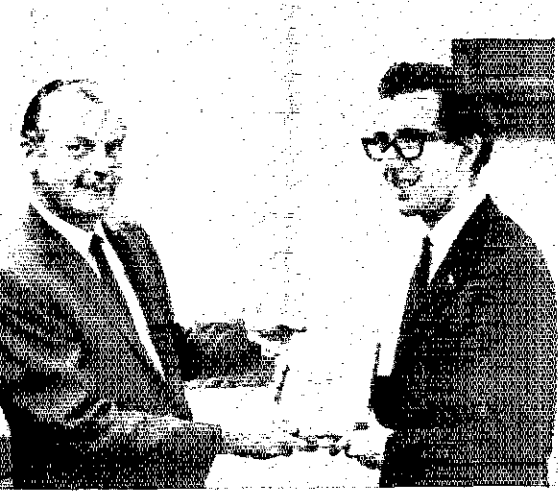
* * *

Besides the extensive operation detailed in the preceding report, there were a number of smaller operations by individuals and groups. One of these, as an example, was organized by the American Alpine Club. Adams Carter, editor of the *American Alpine Journal*, led a team of 27 doctors,

In the area from Huaraz to Huari, hundreds of homes looked like this after the quake of May 31, 1970.



In Huaraz, a refugee camp after the quake. Thousands of homeless families moved into makeshift tents like these.



Here are a couple of recent headquarters visitors. Left, *Wireless Institute of Australia* president VK3KI receives a *Handbook* from *ARRL*/IARU president WØDX. Right, ON4VY, International Affairs Officer of the *Union Belge des Amateurs Emetteurs* (Belgium) is shown with *ARRL*/IARU secretary, W1LVQ.

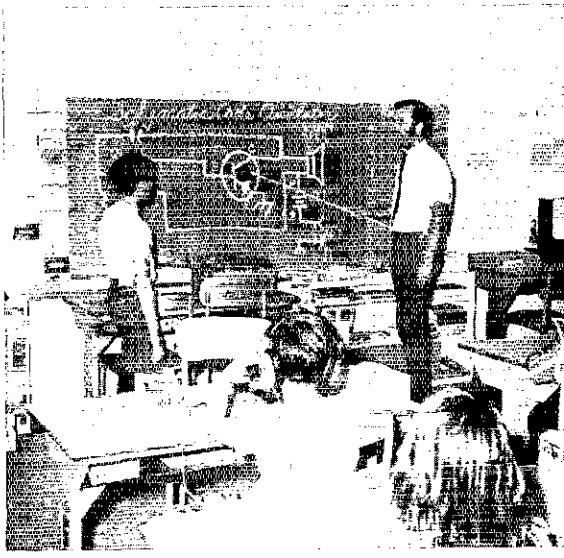
registered nurses, and mountaineers into the area around Huari at an elevation of about 10,500 feet, arriving on the scene about two weeks after the quake. Even so, it was the first relief mission to reach the area, and was able to furnish considerable assistance, including medical, material, and morale. Local communications for the group was provided by *ARRL* Assistant General Manager Baldwin, W1IKE, who brought along a KWM-2 and a generator (antennas were donated by W1BOY and W1AZG). Most communications were on 7 MHz, establishing contact with an airstrip at Anta and with the *Radio Club of Peru* at Lima. Thus, W1IKE is able to verify from first-hand knowledge what has been stated in the other reports – that amateur radio operators played an important role in this huge disaster.

A future issue will carry an additional report of amateur involvement in the Peruvian disaster. QST

Strays

W2JE reminds QCWA members of the following net schedules: Weds. 9:00 P.M. on 7095 kHz cw with W2JBL as NCS (W9CV, alternate); Sun. 7:00 P.M. on 21,447 kHz with W2SF NCS (W2AIM, alternate east) and W6IL NCS (W6EB, alternate west).

"Paint your" what?! *(Shot by K7VOR near Natick, Mass.)*



During a summer Science Enrichment Program of the Los Angeles City Schools, WA6BJA conducted an amateur radio course for fifth and sixth graders. In addition to the study of code and theory, each student constructed a code practice oscillator. As a result of the program, 28 ten- and eleven-year-old boys and girls are looking forward to receiving their new WN6 calls. *(W6LHQ photo)*

Correspondence From Members-

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

LET'S TALK TRANSISTORS

● I am enclosing $1 to cover the cost of one copy of "Let's Talk Transistors," a series published in *QST* and authored by Robert Stoffels. The series was excellent and I would like to have the copy for my library and for my students' use. . . . *Harry M. Hawkins, W2CKG, State University College, Oswego, NY*

● Glad to see the League is still on the ball and offering reprints of the transistor series. I am enclosing my check of $5 for five copies to pass out to some of my younger ham friends to help them advance their technology. *Ley Murray, W8BKA, Lathrup Village, MI*

● *QST* is to be commended for featuring such a fine writer — *W8YIQ*. With a tube background, transistors have given me problems in understanding; Stoffels work really helped — *WB4KZN*. Look forward to adding this outstanding series in booklet form to my library — *WA5YFL*. Hope you run more of the same — *W3CZS*. Stoffels did a particularly fine job and made it easily understandable — *W2KPI*. I work with solid state for a living and welcome the availability of technical literature of this nature — *W3LCF*. Best technical series that has been included in *QST* in quite some time — *W9KRU*. This series makes the transition to solid state easier — *WN2KJF*. Happy to know that "Let's Talk Transistors" is available in reprint for $1. Stoffels did fine job and is to be commended — *WA9RLU*. Greatly impressed with the excellence of the series — may WB9ESH enjoy fifty years of ham radio as I have — *W6HH*.

COUNTERMEASURES

● On page 63 of Sept. '70 *QST* Congratulates: . . . Howard O. Lorenzen, W3BLC, selected as a Fellow in the IEEE for leadership and contributions to "countermeasures technology."

Well, Countermeasures technology — huh? Perhaps this is one (or more) of the following: 1. Preventing TVI 2. Preventing hug bounce 3. Preventing short circuits (fuses, etc.) 4. Family planning 5. Preventing hippie riots 6. Warding off incoming ICBMs — or what? — *John O. Parker, K6CQC, San Mateo, CA*

OPERATING PRACTICES

● Why doesn't the FCC adopt a few new questions to add to their present amateur examinations, especially to the Novice test, regarding both simple and complex operating practices?

When I was a Novice, I always appreciated calls from the General Class. Recently I decided to pass the favor on to the present crop. So, up I went. Listen. Listen. "CQ CQ CQ" . . . five minutes later. "CQ CQ CQ de WN8XXX WN8XXX K K K K K"

Who? I almost fell asleep from listening to the fifty or sixty CQs, so I didn't notice the call. Well, believe it or not, this guy got an answer! A WN2 called him. And do you know what? The WN8 didn't hear him, because he had already started calling CQ again!

Take some of the info from Chapter 24 in the '70 *Handbook*, put it in question form, and add that to the exams.

All this doesn't apply just to Novices, either. This afternoon, I worked an Advanced Class licensee who had a chirp that was so bad, his signal shifted in and out of the passband of my receiver every time he keyed. I called him in answer to his CQ.

When I informed the fellow of his FB chirp, he sent, "check ur rcvr — I can't hve chirp — i'm using new xmtr — wks fb — 73 es GA."

I checked my receiver, all right. I couldn't believe my ears! — *Steven D. Katz, WB2WIK, Springfield, NJ*

FRAGILE AND WEAK

● How about that! Amateur radio is finally facing the crisis that has wrenched every other segment of society.

Our rebels are gumming up the airwaves with left-wing revolutionary garbage, and the extremists of the right are fighting back with name-calling, jamming, and all the techniques they accuse the other side of using.

The vast "silent majority" of breadboard-builders, grid-dippers, and insular technicians, far more interested in the accomplishment of communication than in what they are communicating, are mad over something besides incentive licensing, QRM, TVI, and license fees. Whoopee! There's something to talk about besides RST, QTH, and 73.

Did we really think we would escape forever? Did we honestly believe that it could all stay like the 1920 style cartoons in *QST*? Most of us kind of hoped it would, but we knew, down deep in the gut, that it couldn't, and wouldn't.

I've been a ham for fifteen years, Novice to General to Extra. Like most, I like it the way it is, but I can't say that's the way it should be for everybody. If the activists want to talk, and are willing to keep it clean and legal, let 'em do it. Certainly, their "traffic" is no more irrelevant than most of it the rest of us handle.

Amateur radio has a beautiful set of lofty ideals, and a fine tradition of public service and technical accomplishment. I can hardly believe that it is so fragile and weak that it can't survive a few who want to twist the traditions a bit.

Unlike some who have written, I don't intend to quit because of it. We're big enough to understand, if not agree — aren't we? — *Joel Rose, W8GOE, Akron, OH*

BUILDS HANDBOOK GEAR

● I have just finished building the "Selectoject" from the plans and write-up in the *Handbook*. It works well, to my satisfaction. The only alteration from the plans I made was to use Motorola transistors, HEP-254 instead of the RCA SK-3004.

The Handbook has brought me pleasure in both reading about advanced IC component equipment and building projects that provide much enjoyment both in construction and operation. – *Fred M. Sherman, Bronx, NY*

FREE SPEECH?

● I don't quite understand a letter in your correspondence column in the September issue.

Gerry Cohen, WA1CYT, filed RM-1631 to support free speech on amateur radio bands – and yet he would deny a GI the right to get a message through to his family on the MARS system.

This is free speech? The joker has to be kidding! – *Everett W. Hosking, WA6HXT, Long Beach, CA*

REVERSE INCENTIVE?

● I am one of those members who enjoy his membership; and appreciate your efforts to keep amateur radio at its best. You may not think it important, but it seems to me the government contradicts "incentive" with its MARS programs. This is one of the reasons I dropped out . . . basic licensed persons operating all bands. . . encouraged with government goods. . . I don't know; perhaps you do? – *Chester W. Plank, WA4YRU, St. Petersburg, FL*

OVERSEAS PARTS

● Amateurs building equipment featured in international magazine such as *QST* often experience difficulty in obtaining essential components. The average non-American amateur is interested in knowing where small quantities of radio components can be purchased in the U.S.A., preferably without having to run to fifty dollar minimum orders. The average incomes of non-American amateurs are less than American ones.

I suggest that a simple reference list is inserted into *QST* once a year showing those firms who are interested in receiving small mail orders for components from overseas amateurs.

Should any American amateur wish to obtain components from England, I would be pleased to help them by referring them to a suitable Company provided that the necessary IRCs are sent to me together with details of the items required. – *Ingemar Lundegard, G3GJW, Orpington, Kent, UK*

PROVOCATIVE PROPOSAL!

● Since ARRL was one of the main forces for incentive licensing I propose it get behind a drive to ban full-carrier amplitude modulation on all bands from 80 through 15 meters except for mobile operation.

It is folly (and a real joke) to have incentive licensing and permit carriers to occupy space several times wider than necessary. Tis also foolish to say only general and conditional licensees are responsible because more a-m stations are below 3900 than above. To say it would impose a hardship on some may be true but then again so did incentive licensing on local nets on 75.

Carrier suppression on the order of 45 db or so is advertised by the Heath Company and this could be the "guide line" as the minimum requirement satisfactory to all concerned.

To say it will phase itself out eventually is absurd and beside the point. Some die-hards, somewhere, would still be using spark if it was legal! – *Walter O. Carr, W3LDD, Havre de Grace, MD*

HIGHER LICENSE FEES

● I have been reading June *QST* here at the Saigon USO, expecially your Opposition and Counterproposal in Docket 18802, the proposal for increases in license fees. I agree completely with each and every point! *Bob Dahlquist, WB6KGF, FPO San Francisco, CA*

[EDITOR'S NOTE: Thanks, Bob! As everybody knows by now, we (and the whole communications industry) lost the first round. But we're still trying – our Petition for Reconsideration appears in "Happenings" page 84 of the October issue.]

● As a member in good standing in the silent majority of ham radio, I don't usually write letters to the editor. However, I am somewhat incensed at all the hams who automatically oppose any change in the FCC rules such as incentive licensing or increased fees. Incentive licensing is now an old issue; it's here, it works, and I would not have gone for a higher license otherwise. But people who oppose the fee changes need to think a little logically for once. Many of these people seldom complain about paying $3-$5 per year for hunting and fishing licenses (myself included), but squawk at the idea of paying just under $2.00 per year for a hobby that has no closed seasons, does not destroy the environment, and causes little accidental damage to property or persons. The major objection seems to be that rates will go up 125%. Granted, that is a giant step, but it only brings the fee up to where people would normally expect any licensing fee to be. As W3DZA stated in his June letter, "15 cents (per month) is little to pay for the privilege of operating. . . . Millions . . . in other countries would pay any amount. . ." Heavens to H.P. Maxim, friends, you pay more than 15 cents every time you fire up the afterburner! Let's be grateful for our hobby and our privilege, and quit being picky and greedy every time a 30 year-old tradition is changed.

Although I am not opposed to the idea of the rate increase, there are a couple of changes which should be made. First, I am glad that no increase is proposed, to my knowledge, for the Novice ticket. Any fee for that license would be unacceptable. In addition, fees should not be charged for failed tests, only for awarded licenses. Lastly, a discount should be given to the applicant for any exam given by mail, say 25-35% or so. It seems that these proposals would have a very good chance of clearing the FCC, and I would like to hear from others if they have suggestions for the improvement of my proposals. Call weekday afternoons on MIDCARS. – *Steve Margison, WA9DRE, Downers Grove, IL*

PERSONAL HAM HISTORY

● In going through the files of the Michigan State University Amateur Radio Club (W8SH), we have found a wealth of QSLs, both DX and stateside, from the 1920s and 30s. But two-thirds of these treasures are unreadable due to the disappearance of the ink used to fill them out.

Please, be careful to get all the information on your cards (how many QSLs in your file are missing the date, time, frequency, etc.?) and use a permanent type of ink. Your QSL may be a keepsake someday. – *Al Francisco, K7NHV/8, East Lansing, MI*

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Feedback

In September *QST's* "Correspondence" we had the wrong call under the letter, "Worked All Planets" – Randy Buckspan is WN5ZBK.

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

YL Harmonics

IN THE thirty-one years of YLRL one of the most popular facets of this world-wide organization that is devoted to women radio operators has been the club's official bulletin, *YL Harmonics*. It made its appearance under the guidance of Enid Atwell, W9NBX, (now W6UXF) who sparked so much of that organization when the first plans for YLRL got under way. Originally called *YL News*, this first single news sheet asked the gals for suggestions for a name. The following month, December 1939, the present name came into being.

Harmonics is written by and about the YLRL primarily, but is of interest to all women operators. Since the beginning it has contained introduction of new members, results of elections, announcements of YLRL sponsored activities as they came into being. It lists officers, custodians of certificates, and the rules, and then the results, of the contests. It has told of changes in the constitution and recorded the growth of the membership from the 12 YLs who were the nucleus of the club to today's almost 1000 members. Would you believe that in the first year an OM managed to crash this "For Women Operators Only" club? *Harmonics* duly reported the removal of the call from the membership list since the only YL thing about him was his desire to "join the ladies."

The editors have worked hard over the years, and their efforts are the published evidence of the even harder work of the District Chairmen, for the DCs are the "reporters" of this magazine. Their reports of the YL activity within the 13 YLRL Districts, and the one from the International Correspondent, are incorporated into its most popular feature – "Chatter," or what the members are doing. This news of individual activity isn't just radio. it is a picture of YL-dom, for YLRL represents a large cross-section of what has been termed "the distaff side of Amateur Radio." Here, as nowhere else, is the YL able to keep in touch with the women she knows only by voice or fist in the nets. It is here she learns of the trials of a contest chairman, or the sweat and tears going into the Mid-west YL, or the quadrennial international YLRL conventions. And she in turn sends in her own news of everything from a new rig, or advancing class of license, to the arrival of guests from some far away DX country.

Harmonics has grown steadily from a single mimeographed sheet in November 1939, to a mature publication that last year was the recipient of 8 awards in 12 categories from the Amateur Radio News Service. In all, *Harmonics* received three first place awards, two second, and three third place. All six issues for the year 1969 were awarded second place in the "Over All" category under the editorship of Maxine Hanberry, WA6AOE, during that year.

No one can look at the 1969 record of *Harmonics* and say with Topsy that it "jest growed," any more than one can say it about YLRL itself. The work and dedication of the many editors: W9NBX, who gave it its beginning, W9DBD, and the gals like W8TAY and W5JFW, who worked so hard to keep it going in the war years when there was no radio. The editors of the post war years: W5IKC, W2RUF, W9FXM, W3CUL, W1SCS, W1RTB, W3UUG, W9SJR, W3RXV, W9STR, K6ENK, K6EXQ, K1EKO, K1GSF, WA6LWE, WA6AOE, and the present editors, the Gulf Area YL Amateur Radio Club,

*YL Editor, *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001.

1970 Mid-West YL convention, Flint Michigan.

with K5BJU heading the group, to bring it up to the excellent rating it has received.

To these YLs and the DCs who gave them the news, and the membership who supplied it, "YL News and Views" offers congratulations and best wishes for continued success in the coming years.

YLRL Election Results

The YLRL officers for the year 1971 will be:

President	Janice Fontana, WB2JCE
Vice president	Mae Hipp, K7QGO
Secretary	Betty Marsh, KL7HJW
Receiving Treas.	Jackie Van de Kamp, W6YKU
Disbursing Treas.	Jan O'Brien, K6HHD

District Chairmen: 1st District, – Florence Grant, WA1GQZ; 2nd District, – Christine Haycock, WB2YBA; 3rd District, – Bertha Kenas, W3TNP; 4th District, – Carrie Lynch, WA4BVD; 5th District, – Audrey Beyer, K5PFF; 6th District, – Myrtle Cunningham, WA6ISY; 7th District, – Beth Newlin, WA7FFG; 8th District, – Marion Bees, W8UAP; 9th District, – Margaret Bailey, WA9HLW; 10th District, – Elsie Kness, WAØRZF; KH6 District, – Ardella Johnson, KH6TI; KL7 District, – Lyla Inman, KL7CSR; VE District, – Bubbles Timlick, VE4ST

Plan Ahead

The Trillium Weekend is NOW! See the October *QST*, "YL News and Views" for dates and rules.

January 7-10, 1971, SAROC. Plans are afoot for a very special YL program at the annual SAROC convention at the Flamingo Hotel in Las Vegas.

YL-OM comes up in February and March 1971.

And it isn't too early to start thinking about the 1971 Midwest YL Convention in Cleveland, Ohio. A very special annual affair. Dates will be May 14, 15, 16, 1971.

Certificate of Merit to WB2YBA

Among those receiving Certificates of Merit from the Medical Amateur Radio Council at the 1970 annual meeting was Christine E. Haycock, M.D., WB2YBA.

Dr. Haycock's certificate reads as follows: "On 21, 22, August, 1969, WB2YBA in contact with W7HST/8RI, in Georgetown, Guyana, concerning a young man injured in a motorcycle accident, gave suggestions to aid the diagnosis of the case. The procedure she recommended was done and the diagnosis confirmed. The patient was treated and recovered."

Chix-on-Six Certificate.

Dr. Haycock is assistant Professor of Surgery at N.J. College of medicine, and specializes in trauma.

Chris, who also holds the call VK2ADZ, is a life member of ARRL, YLRL, MARCO Net, NYC-YLRL and ISSB. The OM is not licensed.

Meet the Club – Chix-on-Six.

Eleven years ago W8OIS, W8VLF, K8MZT, and W8WRH were the starters who accelerated into 10 charter members, and an active membership of 26 by the end of that year, and called themselves the Chix-on-Six.

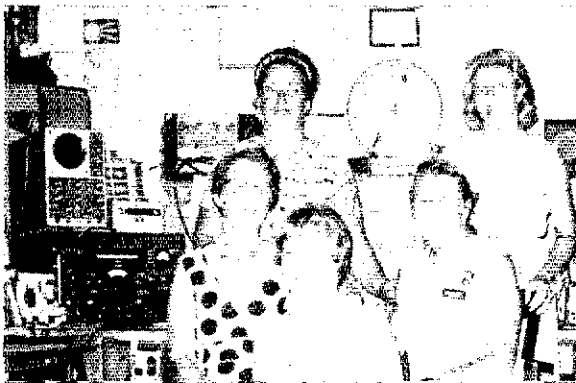
From 1959 to 1962 the Chix-on-Six were active in helping with the ARRL-sponsored Cleveland Amateur Radio Convention. In 1963-64 they were working to get ready for the YLRL Convention sponsored by the Buckeye Belles in Columbus, Ohio. Since the membership of the Buckeye Belles and the Chix-on-Six are almost identical, the Cleveland gals decided to retain individual Statewide Belle membership, but only have Chix-on-Six meetings and net. Most of the YLs enjoy membership in both groups.

The Chix have four business meetings, installation banquet, a Christmas party, and a summer picnic regularly every year.

While the net operates on six meters, on 51.3 MHz. at 2100 EST each Wednesday, the membership is made up of every class of amateur radio license and even prospective radio operators who are attending classes and working for their first licenses are members. The Chix-on-Six have

WB2YBA receiving Certificate of Merit from K1EEG, president of MARCO.

Chix-on-Six officers. Left to right Front row: WA8IJW, Dot, 1971 Midwest YL Convention Treasurer; WA6DXY, Martha, Secretary; WA8EBS, President. Standing: K8MVY, Pat, Treasurer, W8WRJ, Carol, Vice-president. *(WA8EBS photo)*



Who says "no homebrew?" Robin Erlich, WN6OHX, built her own 75-watt rig, including the layout and drilling. She was supervised by her very proud dad, K6RJ. *(K6RJ photo.)*

their own form of Incentive Licensing based on mutual encouragement. They are on six because of preference, not requirement.

Public service projects are encouraged by the gals, who have provided communications during tornadoes, floods, and other disasters. They participate in traffic handling, in the Thunderhead and Eyebank, as well as the form of service that appeals to each of the individual members.

Chix-on-Six and the Buckeye Belles are jointly sponsoring the 1971 Mid-West YL Convention at the Airport Ramada Inn, in Cleveland, Ohio, in May 1971.

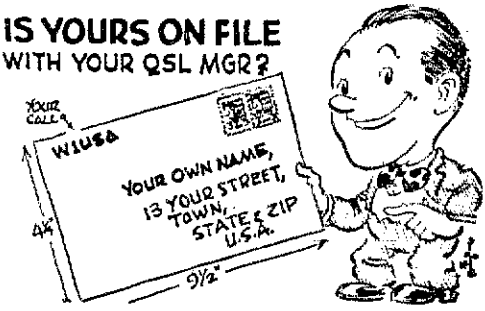
The net certificate was designed by K8JOH, Ann Panzner, and is available to amateurs in Ohio by submitting evidence of having worked 10 members of the club. Four contacts are all that are required for amateurs living outside the state. Custodian is Marge Blose, K8ZEV.

WA8EBS, Eila Russell

Woman scorned or woman ignored causes a reaction, and Eila did not in the least appreciate being shuffled off with "the other wives" at a radio club meeting. Nor did she like sitting in the car when the OM, W8BU, visited another ham. Once as she waited she saw a copy of the code in a book and Eila found that she hadn't forgotten what she had learned as a Girl Scout years ago. That night she wrote it out, asked the OM "Is this right?" and that tore it. She learned the theory and received the call, WA8EBS, with the Advanced class license following just last year.

Eila really enjoys DX and holds the WAC with DXCC looming on the horizon, but as are so many of us, she is all wrapped up in traffic handling where she finds the run-of-the-mill type of message handling as interesting as emergency work.

A member of Chix-on-Six, Buckeye Belles, ARRL, Buckeye Rag Chewers and YLRL she is also in the middle of a ham family, for seven of her family are licensed. She is a legal secretary in her husband's law office. Add to all that the fact that she is co-chairman for the YL Mid-West Convention next May, Eila simply hasn't time to be bored. QST



A.R.R.L. 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 4¼ by 9½ 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[1] – Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.

W2,K2,WA2,WB2,WN2 – North Jersey DX Assn., PO Box 505, Ridgewood, New Jersey 07451.

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

W4,K4 – H. L. Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.

WA4, WB4, WN4[1] – J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL, 32901.

W5,K5,WA5,WN5 – Kenneth F. Isbell, W5QMJ, 306 Kesterfield Blvd., Enid, Oklahoma 73701.

W6,K6,WA6,WB6,WN6[1] – No. California DX Club, Box 11, Los Altos, California 94022.

W7,K7,WA7,WN7 – Willamette Valley DX Club, Inc., PO Box 555, Portland, Oregon 97207.

W8,K8,WA8,WN8[1] – Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, Ohio, 43215.

W9,K9,WA9,WN9 – Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60126.

WØ[1] – Reggie Hoare, WØOYP, P.O. Box 115, Mitchellville, Iowa 50169.

WAØ[1] – Lloyd Harvey, WØQGI, P.O. Box 7, Attica, Iowa 50024.

KØ, WBØ, WNØ[1] – Dr. Philip D. Rowley, KØZFL, Route 1 Box 455, Alamosa, Colorado, 81101.

KP4 – Alicia Rodriguez, KP4CL, PO Box 1061, San Juan, P.R. 00902.

KZ5 – Gloria M. Spears, KZ5GS, Box 407, Balboa, Canal Zone.

KH6,WH6 – John H. Oka, KH6DQ, PO Box 101, Aiea, Oahu, Hawaii 96701.

KL7,WL7 – Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

VE1 – L.J. Fader, VE1FQ, PO Box 663, Halifax, N.S.

VE2 – John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.

VE3 – K.H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.

VE4 – O.E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5 – A. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.

VE6 – Karel Tettelaar, VE6AAV, Sub. Po 55, N. Edmonton, Alberta.

VE7 – H.R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

VE8 – George T. Kondo, c/o Ministry of Transport, Norman Wells, N.W.T.

VO1 – Ernest Ash, VO1AA, PO Box 6, St. John's Newfoundland.

VO2 – Goose Bay Amateur Radio Club, PO Box 252, Goose Bay, Labrador.

SWL – Leroy Watte, 39 Hannum St., Ballston Spa, New York 12020.

[1]These bureaus prefer 6x8 inch or #50 manila envelopes.

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

Note: Stations operating portable should continue to receive their QSL cards at the bureau in their home call area; i.e., WA1QRX/VE8 gets his cards through the W1 Bureau.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

You'll likely be missed
If you don't make our list.
– *M. C. O'Pyle*

Directed (QND) netting is taken for granted in traffic work but it's a different story among DX hounds. Dating back to days of spark the hunting and capture of rare DX has been considered by most amateurs to be an individualistic sort of thing, each man for himself, one against the world, etc. The QNF (free, undirected) pile-up nets so detested by traffic men are the sport's very essence to *laissez faire* DXers. "DX without dogfights? Are you kidding?"

Heretofore there was adequate DX room for both QND and QNF schools. Those who don't mind waiting in line for an NCS-directed shot at Tibet could do so, and lone wolves could do their traditional off-frequency pile-up thing downband over something equally rare. But now, mainly due to widening DX competition and accelerating overseas distribution of zero-beat transceive equipments, the scale appears to be tipping steadily toward QND DX. A shrinking number of split-frequency goodies is available to W/K loners who consider controlled DX netting an unethical abomination.

Resulting friction on DX bands is frequently frightful to behold. Can anything "be done" about this imbalance? Well, what could have been done about the revolutionary VFO-vs. crystal DXing trend that caused such a furor in the late '30s? VFOs came back to stay, zero-beating, swishing and all. A generally accepted code of conduct gradually emerged to help us live with it.

Retrospectively we see that old revolution as merely evolution, a process continuous in DX operating techniques as elsewhere. Paths of progress are often bumpy and winding; maybe we'll live long enough to see remoting VFOs and extra receivers catch up overseas to swing the pendulum back toward QNF. Forty- and 75-meter voice DXing, a cross-band kind of thing, may help spread things out during the coming sunspot minimum. Plenty of WNF in contest work, too.

Meanwhile, as usual, it's all up to the operators at the DX end. If *they* encourage or tolerate QND operation – as they apparently often must for W/K contacts with simplex transceivers – then so be it. Childishly deliberate QRM by either faction assuredly is not remedial. Why make 20 sound like 11?

* * *

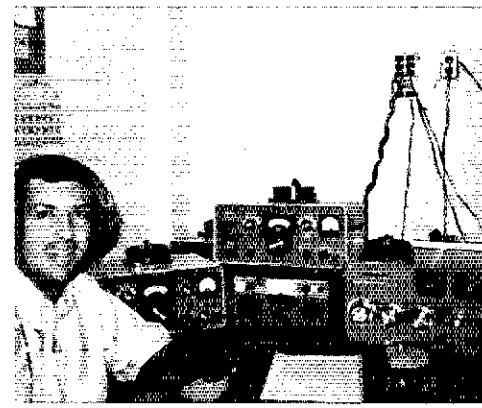
What:

Still plenty of paint left over for Tom's big fence. Let's pass the DX brush around some more . . . No "donations"for our KA1B Marcus DXpedition will be solicited, expected or accepted. – *KA9RC (WA4FLR)*. . . . July 30, 1952, is the beginning date for our many awards. – *JARL (Japan)*. . . . VU2IEZ's first receiver refused to work. – *WA7MUY*. . . . KA2AA will make skeds with Novices on 15. – *WN4QDR*. . . . From Mano I enjoy many fine contacts with W/Ks. – *EL9C*. . . . I've had good luck on the long path into Africa on 20. – *WA0ZZT*. . . . We Melanje CR6s wish to make our beautiful town known all over the world. – *CR6MQ*. . . . I may soon operate from FZ 5U7 5TS TT8, etc. – *6W8DG*. . . . Thanks to those who waited so patiently and courteously for my QSOs from KX6BJ. – *W1BRJ*. . . . I correspond in Portuguese with ex-CR8AJ. – *W9TKV*. . . . Thanks for your cooperation with AX9KY Cocos publicity. – *VK2SG*. . . . Cruised the Caribbean for five months with the Marines aboard *USS Guadalcanal*. – *WA2ZEZ*. . . . KH6BSA was a two-day special. – *KH6BZF*. . . . K2BPP apparently replaces KITWK as KC4USM QSL manager. – *K8NG*. . . . A dipole and 800 watts get plenty of good DX in the 40-meter General band. – *K1OME*. . . . Sending out 1600 QSLs for my operations at various DX QTHs. – *W5NW*. . . . Been in contact with 4X4DK twice weekly for thirteen years. – *VE3MR*. . . . Due Stateside after QRT September 4th. – *HS3DR*. . . . GC5OU's license expired years ago although he's still in the *Callbook*. – *WA5YQV*. . . . I have some nominations for *non*QSLers of the Month. – *K4HPR*. . . . Very much interested in QSL managing procedures. – *WB2MUK*. . . . Got WAS No. 20,916. – *WB2ZHM*. . . . Since it is up to us readers to keep ourselves informed I guess it's time I helped. – *VE3GHL*. . . . No one can dispute the fine service rendered by those tireless individuals who act as QSL managers. – *K4HNA*. . . . Chiburban Radio

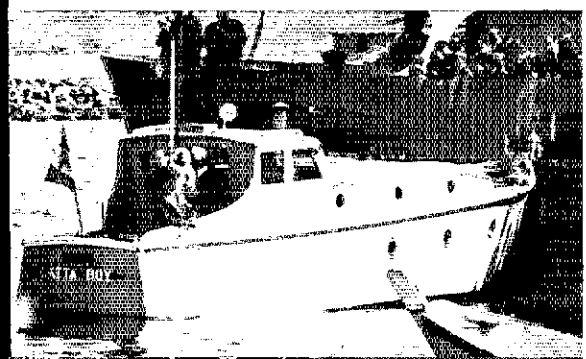
ET3USA's unorthodox skywire plantation supplies ample Ethiopian DXCC credits from 3.5 through 28 MHz. That water tower is a high and handy anchor for the near ends of lower-frequency long-wires. Shack and personnel of ET3USA are pictured in September's "How's". *(Photo via WA1KQM)*

*7862-B West Lawrence Ave., Chicago, Ill. 60656.

Mobileers plan to hold the 1971 160-Meter Reunion in July. – *W9UCW*. . . . All cw here and still going strong with 40 watts. – *WB9BUV*. . . . We're overdue for more *QST* treatment of the Beverage receiving antenna as applied to 160. – *W2BP*. . . . Twenty-eight members were present at our second International DX Association meeting. – *WA5REU*. . . . With things a little more settled down I'll try to report more regularly. – *K7DVK*. . . . Please enroll me as a DXHPDS member. – *D. Frank*. . . . Becoming editor of Greater Lansing DX Group's bulletin started me reporting to "How's" again. – *WA8VBY*. . . . With costs increasing we are paring the W9-DXCC mailing list. – *W9ZRX*. . . . VP2AK apparently can make use of U.S. s.a.s.e. – *W1ETU*. . . . Winnipeg DX Club members believe that friendship amongst amateurs of the world. – *CF4AE*. . . . Wyoming was the last holdout for EG7FD's WAS. – *WB8ABN*. . . . When conditions stablize 9Q5RD and I will be glad to arrange skeds for anyone needing the Congo. – *W9AES*. . . . 4X4AE's three-element beam is atop a four-floor apartment house. – *K2HYB*. . . . Africa would make me WAC. – *W2VP*. . . . Wondered how to go about QSLing ZY1 and ZZ5. – *W5RWC*. . . . Haven't run across any of those BYs yet. – *WN2JQL*. . . . Previously signed KG1AQ, KL7AGM and KR6LJ. – *W5QJZ*. . . . Please show all necessary QSO information on one side of your QSLs. – *W2GHK of DXotM*. . . . Rules for our 1971 Roumania Contest will be modified to allow larger participation. – *YO2AFB*. . . . Worked W5NW while he was operating *YBØAAI*. *W3ICQ*. . . . I'm reporting in behalf of North Carolina DX Association. – *WB4KZG*. . . . Your June opener fits my sentiments exactly. – *WB6BBO*. . . . 9U5RH took a five-month trip to various parts of Burundi. – *ON5TO*. . . . Busy with KJ6BZ and KJ6CF traffic nightly on 14,290 kHz around 0330 GMT. – *WA6ENF*. . . . Shall be G2MI/VP9 into November. – *G2MI*. . . . Trying to work a Novice WAS on 15. – *DL5GJ*. . . . Worked Jeeves & Co. when I was a WN2. – *WA2JIM*. . . . Five QSOs and five new countries in a row! – *W9OW*. . . . I'm skeptical but that didn't stop me from mailing my QSL to BY1C. – *W4JUK*. . . . Our QSL managers are doing a fine job for DX and DXers. – *WA5UHR*. . . . Running skeds with ZE1CX for four years. – *W4NJF*. . . . I do my own QSLing in reply to cards via RSGB. – *CR6GO*. . . . UA9OH has been bitten by the vhf bug. – *W1YYM*. . . . Searched and searched for dope on that HO1 prefix. – *WB4LEM*. . . . Poor fen is drying up so I'll try four elements on 20. – *WA9ZCP*. . . . My sixteenth year as a ham was my first with a beam. – *W3JZJ/5*. . . . JA1HNO is building an exciter from the '63 ARRL *Handbook*. – *WA8MUW*. . . . Passed the Advanced in April. – *WA9UEK*. . . . Cosmonaut Gagarin is pictured on UAØKQU's QSL. – *K4IFV*. . . . Will soon add more calls to my growing collection. – *DL4VA-FØUG-WA4WME*. . . . Never realized there were so many pirates until I started digging for 5B-DXCC. – *W3TV*. . . . Hope I've set the record straight on TY6ATE. – *W4KIL*. . . . We lost every generator we had with us on that February Cocos try. – *W9IGW*. . . . Because the *Callbook* must necessarily stick to official information I find your "unofficial" QTH data a valuable complement. – *K9YRA*. . . . Changes in Bermuda contest rules make the event available to more amateurs. – *VP9BY*. . . . Tried a TR4 and vertical as ZF1ME. – *W8QQW*. . . . DXCC No. 2149 as W8MQR and now No. 10,531 from Florida. – *W4PGW*. . . . This year's Venezuela Contest commemorated our 159th anniversary of independence. – *RCV*. . . . My first DXpeditions two years back as KIOTA/LX and ZB2BE encouraged me to try again. – *KIOTA*. . . . If current logs are on hand I answer QSLs for AP2KS and VK9BM the same day received. – *K6TWT*. . . . You occasionally give DX net info but perhaps not enough. – *K6SE*. . . . As an amateur since June of '66 I'd like to join ARRL and help support its work for all hams. – *FL8HM*. . . . Business trips limit QSOs with son HS1ACW (WA1HCX). – *W1HZ*. . . . No reports to "How's" lately but I'm still with you. – *W7VRO*. . . . Congratulations to ARRL for FB service to amateurs all over the world. – *YV4UA*. . . . My HL9VX tour extended through March. – *WA4MSU*. . . . I formerly signed K3LZC. – *W2EGV/4X*. . . . My newest kick is mobile cw work. – *W9WHF*. . . . ILIAPR caused a big pile-up on April 1st. – *W1FTX*. . . . I am presenting *QST* regularly to my club station. LU4EV. – *LU3EDO*. . . . Mail goes through Sikkim from India to Tibet once a week. – *AC3PT*. . . . Needed six more logs for the ARRL Test. – *K8ODH*. . . . One of my duties as QSL manager is to keep a current listing of hams at Wake. – *KW6GH (W7ZST)*. . . . Twenty-six



TJ1AW is a welcomed Five-Band DX Century Club target on 80 through 10 meters. Charlie, who signs K4PHY back in Tennessee, expects to radiate from Cameroon for a couple of years as embassy duties permit. *(Photo via K4ZCP)*



FP8AP, barely visible behind and to the right of his son-in-law and grandchild, is captain, engineer, wireless op, cook and deckhand of this jolly dreadnaught. Gus has logged 145 voyages between St. Pierre and Newfoundland in the past four years. *(Photo via W4BRB)*

4X4WN has a familiar signal from the middle east bearing. David's businesslike Kefar-Saba installation is often audible near 21,350 kHz at 1600 GMT or so. *(Photo via W4BRB)*

W9-K9-WA9s have owed me QSLs since 1967-'68. – *UY5AD*. . . . Finally got 80-meter permission here to help with 5B-DXCCs. – *TF2WLW (WA0GQI)*. . . . Quite an active DX scene lately. *WB2HEO*. . . . HR2HHP may come to New Orleans this fall. – *WA9RAT/5*. . . . Would like to see more rare stuff in the contests. – *W9CRQ*. . . . Fine operating by YA2HWI/1 – *WB9ACR*. . . . Here's my first correspondence to "How's" – *WA8TNJ*. . . . Some OSLers of the Month for you plus a few long-overdues. – *K4BBK*. . . . I can trade unaffixed U.S. stamps for Canal Zone postage. – *KZ5KN*. . . . YA contacts after 1965 count toward our Camel Drivers Radio Club ARA award. – *YA5RG*. . . . Visited W1AW with WB2DLJ and had fun in the pile-ups. – *WA2FDG*. . . . Sent info on upcoming Stateside QSO parties to friend ZS5SY. *K9EUZ*. . . . I used a Viceroy and HQ-180 with a triband quad at Tema. – *ex-9G1GL*. . . . Jinny, ex-9N1RA, obtained her Masters and teaching credentials at the University of Boston. *K6OE*. . . . Considerable number of W/K QSOs from Tarawa. – *VR1O* (G3NRA). . . . VK6CB was K9QIZ back in Chicago. – *WA9GGI*. . . . I'll let you know if my Monaco plans work out. – *DL4WJ (W4UVV)*. . . . QSOs after January 1, 1970, count for DARC's Munich Olympic Diploma. – *DJ8ZU*. . . . My '69 railroad-mobile work in Labrador as VE2BYJ/m/VO2 ran off a Diesel ac power unit. – *F1FFY*. . . . I'll keep you informed of my next move, probably to Africa. – *GD5APJ (F5QQ)*. . . . GB3FON was easily located by its 60-foot beam tower at the Festival of Nottingham. – *G3VVU*. . . . We hope to bring along more operators on future DXpeditions to Anguilla. – *VP2EX (WB4MKU)*. . . . Expect to continue VP2AAP operation til '71. – *WJ1BS*. . . . The 200-country results of DL6UH/m should be an inspiration to all mobile operators. – *WA4OQO*. . . . Relay my 73 to Jeeves. – *W5LEF*. . . . Many Stateside hams seem confused by our HT prefix. – *YN1MG*. . . . Eleven UA4s hope to sign U4 calls. – *W9MXP*. . . . Would computerized DX horoscopes guard against Murphy's law? *WA1DJC*. . . . After nine trips to the top of my 100-foot tower I got the prop-pitch motor and gear box working again. – *W1IKE*. . . . Here are a few tidbits in exchange for some ZF1 info. – *K6SSN*. . . . I'm a forty-year ARRL member. – *W5AMK*. . . . Got QSLd by a 9VØ I unfortunately never worked. – *WØKMH*. . . . Too many QSL managers hold my s.a.s.e. – *W6JYY*. . . . Asia is rough for my T4X and vertical. – *K4OLQ*. . . . Back at it after a year's absence. – *HR2GK*. . . . ECARS No. 665 here. – *K4AKE*. . . . As former VP5CS I know that operating procedures advocated by ARRL can produce positive results under marginal conditions. *K1BTD*. . . . I do my own QSLing from Nimitz Hill. – *KG6ASP*. . . . Obnoxious jamming transmissions clutter up 20 phone. – *VE3IG*. . . . VK3AYT really pours in on 20 ssb via short and long paths. – *W3LE*. . . . The late VS6FS-9J2NW started his ham radio as ZL3GI in 1947. – *VS6AD*. . . . G3XNG told me about the ten-day GB3BS special in Bedfordshire. – *W4BJ*. . . . Chief Scout Sir Charles MacLean Bart attended GB3BS events. – *G3FWA*. . . . Attempted to help 5B-DXCCers on 80 from GC3UMU. – *G3UML*. . . . Getting on 40 and 75 soon to assist with 5B-DXCC. – *DL5DY*. . . . Well, my receiver still works okay, anyway. – *W2ADP*. . . . I've not written to you in years but now I have plenty of time for that elusive DX. – *W9WCE*. . . . 4JØFR was tough to figure. – *WA9EWZ*. . . . October '69 *QST* had two pictures of YK1AA, February '70 had two of 9N1RA. – *WA3ITR/6*. . . . Was an 80-meter DX fan as CT2AT. – *K7UWT*. . . . OK1HAF's 20-watter is often workable on 80 cw. – *K1IFJ*. . . . Now have two-thirteenths of DXCC. – *WA1JXD*. . . . Forty and ten cw sure were FB last season. – *WA3MGA*. . . . I was first licensed as SM5XH in '37. – *WB2LLG*. . . . Sorry but rig complications caused me to miss another deadline. – *WB4LIL*. . . . Add a propagation forecast and drop "What." – *WA1AAV*. . . . How about more "soapbox" as a "How's" feature? – *K2KIR*. . . . I keep listening a lot on 20. – *W9GX*. . . . Maybe these addresses will be helpful to those who look forward to their *QST* as I do. – *K6KII*. . . . 8P6CC says he's not interested in awards. – *W4OPM*. . . . Feeling a little better now after heart troubles. – *SU1IM*. . . . Sure interested in any tip on how to get those DX QSLs. – *W8YBP*. . . . How about a list of stations who never QSL? – *WA3HMM*. . . . I'm another who needs help in rounding up loose QSL ends. – *W3BYY*. . . . An EL2 card would confirm a QRP-portable WAC from Cape Cod. – *W2LX*. . . . Desperately seeking a few more Honor Roll QSLs. *W6KG*. . . . After years of college I'm back on the air for good. *WA2FHJ*. . . . DXing on 80 and 40 cw would be just about impossible without my Extra. – *WA2BCT*. . . . W4NDW is my most recent of many calls. – *HS1ABO*. . . . A beam and tower rest on my lawn awaiting an antenna-raising ceremony. – *EI2CB*. . . . A ZS4 signs "peace through amateur radio" which sounds good to me. – *W9VNG*. . . . ZD1WB was my first RTTY DX. – *KØJHG*. . . . Aloha to the DX gang from beautiful downtown Pearl Harbor. – *KH6SP*. . . . It appears that GW stations are relatively rare. P *G3WET*. . . . With no specific plans HP9FC/mm could come on from rare spots at any time. – *VE1ACU*. . . . I use an SBE-34 and vertical on 15 and 20 at my winter home on Bonaire. – *PJ9BB (W2VIA)*. . . . As a twenty-year contributor I still run hot and cold on DX. – *WØCSZ*. . . . I was F8PZ for many years. – *VE1KG*. . . . Manage to see a copy of *QST* only now and then. – *AX9AC*. . . . Thirty-three years between QSOs with ZL2BI, now ZL3ND. – *K4OI*. . . . Please emphasize OARC's new address. – *KR6KQ*. . . . Contadora island, location for our HP8C DXpedition, is 34 miles southwest of Panama city. – *HP1AC*. . . . Enjoyed an Indian dinner at VU2ST. – *WB2WUQ*. . . . Swan island is a big iguana-filled jungle. – *W4VPD*. . . . OD5LX was my second Lebanon contact. – *WN7OLT*. . . . We

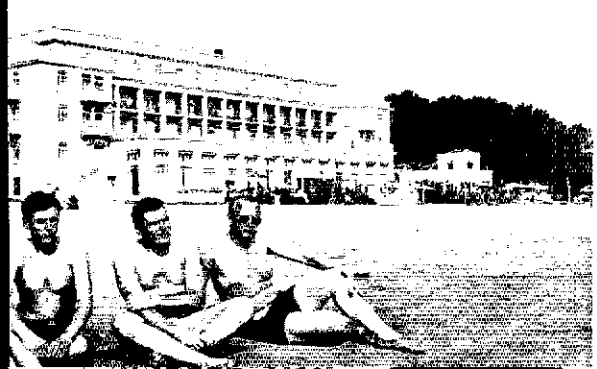
cliff-dwellers are finding it increasingly difficult to erect any sort of antenna systems. – *WA@UUK*. . . . Whoa – better save a little space for some of that QTH data mentioned profusely in the preceding.

Where:

I'll be happy to QSL my QSOs from HS1EL and OD5EL. – *W5OG*. . . To keep the record straight I'm QSL manager for 4X4DK, not 4X4DR. *VE3MR*. . . G8KB manages TA3OZ's European QSLs and I handle the others for contacts since May 28, 1970. – *W8UMR*. . . I'm now W7TE and still QSL manager for TA2EM. – ex-*W@DAK*. . . QSL via W2MMC for K2IXP's September QSOs from AC3PT. – *DXNS*. . . Perusal of the *Callbook* reveals that many countries do not have QSL bureaus, some bureaus handle cards only for members, and several areas such as TF and VP2 have more than one bureau route to deal with. – *KA2BD, FEARL*. . . I've become 4Z4AI's QSL manager as of January 1, 1970. – *WA2KWP*. . . XW8DK QSLing is 100 percent with priority given to cards accompanied by self-addressed stamped envelopes or s.a.e. plus International Reply Coupons. – *WA6NFC* . . . No mail from EL2AY in the past year so I can no longer manage Dave's QSLs. – *WB2BCI*. . . K2MGF tells me that W2AIW now does FB8WW QSLing. Charlie has logs only to January 4, 1970, but will try to get others. *WIYYM*. . . No mention of radio in addressing VQ9HJB's mail, please. – *DXNS*. . . K6KQN handles 3V8AB QSLing only for QSOs of August, 1968. – *WCDXB*. . . ST2SA ran through a stock of 700 cards and will resume QSLing on receipt of more blanks. – *LIDXA* . . . I can confirm 5A3TX QSOs made between October, 1964, and July of '66. – *W3HNK*. . . VP7IG's QSOs from 9M2VI can be QSLd via VE7BWG. – *WCDXB*. . . About fifteen percent of all QSLs received for ZMs 1AA[/k 1BN/a 3PO/c and AX@LD had incorrect information on them. *ZL2AFZ via WA5UHR* . . . OK1ADM has appointed me his QSL manager as of August 1, 1970, but note that my address is wrong in *Callbooks* prior to this year – *WA5GFS*. . . Those confusing Russian club-station prefixes go UK2A-UC2, UK2B-UP2, UK2C-UC2, UK2F-UA2, UK2G-UQ2, UK2L-UC2, UK2I-UC2, UK20-UC2, UK2P-UP2, UK2Q-UQ2, UK2R-UR2, UK2S-UC2, UK2T-UR2, UK2W-UC2, UK50-UO5, other UK5-UB5, UK6C-UD6, UK6D-UD6, UK6F-UF6, UK6G-UG6, UK6K-UD6, UK6O-UF6, UK6Q-UF6, UK6V-UF6, other UK6-UA6, UK8H-UH8, UK8J-UJ8, UK8M-UM8, UK8R-UJ8 and other UK8-UI8. – *WIYYM, WA2JNB*. . . M1s B, D and I are the only resident San Marino amateurs. – *I'ERON*. . . QSLs outstanding for my QSOs from OAs7I and 4KF may be claimed through my Holland address. – *PA@XE*. . . SM5FAC is still HC8RS QSL manager but, due to poor postal service, YV1YC will collect Rolf's logs and mail them to Sweden. *DXNS*. . . Like father like son; WP9MI, whose dad G2MI is RSGB's QSL manager, assists VP9AK with Radio Society of Bermuda QSL chores. – *W1NU*. . . Any VP5CS QSL inquiries should be directed to ZD8CS until next January, then to my home address. – *K1RTD*. . . No ZF1 call at this writing but cards for November Grand Cayman work by W8TJQ and myself should go to my QTH. – *WA8VRB*. . . October QSOs from HH9DL by W6s GC EJJ and WLH should be QSLd to my address. – *W6WLH*. . . Returns on QSLs here now average from 16 to 21 percent compared to 98 percent when I made DXCC over ten years ago. – *W9UTQ*. . . The Salvador bureau informs me there was fraudulent YS3ET operation in'68. – *VE7BAF*. . . CE@AE, DK3OI, EA8FO, G3JXE, GW3AX, HC7DC, HK3AXY, KX6DR, SV@WO, VO1HO, XE2SSV and SM1AAT/k, plus QSL aides Ws 2CTN 4SPX, WAs 3HUP 5UCT, VE3s ACD EUU and ZL2AFZ are speedworthy "QSLers of the Month." – *Ws 2ABL 3HNK 4IUK 5BZK, WA5UHR, WB4JYB, WN9DOF*. . . We volunteer to serve as QSL managers for busy ops at the DX end. – *WB9CDC, WN2LYN*. . . Caution: The following specifications are presented with admonishment that each is necessarily neither "official," complete nor accurate. . .

BY4SQ, P.O. Box 241, Peking, China
C21GB, MQ1 GVT, Nauru Island
CM3LM, 39 av. 7410, Box 6, San Antonio de los Banos, Havana, Cuba
CR4BS, P. O. Box 101, Praia, Cape Verde Islands
DL7NS/OH@ (via DL7MQ)
FL8BH, P. O. Box 30, Djibouti, French Somaliland
FL8PJ, J. Pierrat, 54 Bd. de Gaulle, Djibouti, French Somaliland
FR7AG, P. O. Box 819, St. Denis, Reunion Island
HM5AP, Byong-joo Cho, 1 ka, 91, Young Sun Dong, Yongdo-ku, Pusan, Korea
HS4ADS, Box 17, APO, San Francisco, Calif., 96386 (or to WB6RYN)

When DXpeditioning you make the best of what comes along. OHs 5SE 2BH and 2BW (left to right) worked several hundred W/Ks from this Albanian seaside hotel during their ZA breakthrough in July. Accommodations weren't so sophisticated for W4VPD and K5QHS on their July venture to Swan Island. The lads managed a couple of kiloQSOs despite continual rain, a solid mosquito barrage, 110-degree heat and failing gear. Okay, men – how about Clipperton? *(Photos via WA6AUD, West Coast DX Bulletin, and W4VPD)*



DU1ZAF likes 20-meter work around noon GMT. Alex is one of the more active among Manila's DX gang. *(Photo via W5EL)*

IL1s GAI JT LCK (via IT1GAI)
IP1s GAI JT LCK (via IT1GAI)
IT1XAI/il (via I1IJ)
JD1ABH, Keuchi Wakitt, Chichi Jima Weather Stn., Ogasawara via Tokyo, Japan
JY2, P.O. Box 2101, Amman, Jordan
KG6SV, J. Leekley, P. O. Box 212, Capitol Hill, Saipan, Marianas, 96950
LZ1MH, Box 70, Haskovo, Bulgaria
PAØXE, E. Kaleveld, Heinsiuslaan 8, Rotterdam 12, Netherlands
TA1s MT/2 TT/2 (via DJ9ZB)
TA2EM, via E. Farley, W7TE, 1418 Federal way, Salt Lake City, Utah, 84102
TU2CW, P.O. Box 1297, Abidjan, I.C.R.
U4L (via CRC attn. UA4LM)
VP1s JF SJ (via WB6IXC)
VQ9HJB, H. Best, P. O. Box 2950, Luanda, Angola
VR4BC, B. Chaterly, Box 332, Honiara, Guadalcanal, Solomons
VR5DX, P. O. Box 28142, Sacramento, Calif., 95828
WA1DJG/SP6 (to WA1DJG)
YB3AAI, P. O. Box 7, Surabaja, Java, Indonesia
YB3s AF AS, Box 59, Surabaja, Java, Indonesia
ZK2AF, W. Christman, c/o Dept. of Education, Niue Island
3B7DA, A. Mootoo, Weather Bureau, Mauritius
4J1CR (via CRC attn. UA3CR)
9Q5s BW ID (via K4UOW)

AC3PT (see text)
C31B1 (to F9IE)
C31DE (to EI6AU)
C31DG (to G3CDK)
CN8BG (via W3HNK)
CR7GJ (via W3HNK)
EL2AY (see text)
F6RAC (via REF)
FØPJ (to DK3LR)
FØVB/FC (to DL8UW)
FØVC/FC (to DJ5DU)
FØYL (to G3RJB)
FØYT (to LX1BW)
FB8WW (see text)
FC1FX (to F2FX)
FL8HM (via W9FN)
FO8DG (via KH6BZF)
FO0TC (to W9CTY)
FY7AC (via WB9BPG)
GC2YS (via RSGB)
GC3UJE (to G3UJE)
GC5ASS (to WB6CAB)
HBØAMY (to HB9AMY)
HC8RS (see text)
HH9DL (see textP
ex-HS1EL (to W5OG)
JX2HK (to LA2HKØ
KF4GSC (via W4DQD)
KFØNEB (via WØYOY)
KG4DZ (via WB9BPG)
MP4BHV (to WA4OWG)
OA3Y (via SMØFO)
OD5CS (via W3HNK)
ex-OD5EL (to W5OG)
OK1ADM (via WA5GFS)
TA3OZ (see text)
TJ1AX (via LA6XJ)
TJ1AZ (via K4ASI)
TR8JM (via DK2NU)
TY7ATF (via K3RLY)
VK2BRH (to W9CTY)
VU2REG (via VE7BWG)
W6LWA/XV5 (to W6LWA)
WF7ARW (via W7DK)
YJ8WP (to WB4LWX)
ZF1ML (to K9QEZ)
ZL1BKR (to W9CTY)
4N2MT (via YU2NEG)
4X4DK (via VE3MR)
4X4DR (see text)
4Z4AI (via WA2KWP)
5J4DF (to HK4DF)
5W1AJ (to KS6DH)
7Q7AA (via W2CTN)
9J2PV (via RSZ)
9Q5WV (to ON5WV)
9V1QE (via VE7BWG)

Credit for this assortment goes to Ws 1BV 1SWX 1YYM 2ABL 2KXK 3HNK 4DQD 5QKZ 6GSV 9AZP 9DY 9LNQ, K6s QPG SE, WAs 2BLE 7OWA, WB9s BUV CJS, KH6BZF, VE3s CDP/W9MR, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore rd., Norwich, Nor. 72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4FRO), International Short Wave League *Monitor* (A. Miller, 62 Warward ln., Selly Oak, Birmingham 20, England), Japan DX Radio Club *Bulletin* (JA3UI), Long Island DX Association *DX Bulletin* (W2GKZ), Neward News Radio Club *Bulletin* (J. Heien, 3822 Marshall ct., Bellwood, Ill., 60104), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025), Southern California DX Club *Bulletin* (WA6GLD), URA's *On the Air* (ONs 4AH 5VA), VERON's *DXpress* (PAØs FX LOU TO VDV WWP), West Coast *DX Bulletin* (WA6AUD) and 3 KM *DX Bulletin* (JA1s KSO VIO). Anything in *your* log to help the boys along?

* * *

Which:

We haven't looked in on our Novice DX comers since February. With another wild and wonderful 15-meter season to hand here's what "How's" correspondents WNs 2JNA 2JQL 2KEA 4OFO 4OJD 6KGQ 7OCL 7OLT 9CDR ØVJF and ØYMC have been busying themselves with lately: CE2s DK/mm RM, CM2ZU, CO2FC, CR6s GO KW, CTs 1 XO 2AC, two dozen DJ-DK-DLs, EAs 1EH 3QW 6BH, EL9BS, Fs 5BK 5CO 6AGM 6AMD 6AQM 9TE, a dozen Gs, GD3YDB, HAs 3MB 3MJ 8KCP, HB9s AGH AKM AMZ, HC1TH, HIs 7RC 8LB, HKs 3AXY 5BQW 5BWK 6AWX, HS1ABC, I1s AMO FTU YDX, IRØs JX PEP, JAs 1LHR 1KRU 8FJR, KGs 4AN 6AAY 6ASB, KL7s EEJ GQD, KP4BBN, KR6NG, KZ5s JVN KBN LX MC PNN SIN, LA2TA' LG5LG, LUs 4FBM 9FAN, OE2LEL, OD5EJ, OHs 1KF 2SR 5UQ 5YU 6NH, OKs 1APV 1KTL 2BCH 2BIX, ONs 4US 5EH 5KD, OZ1TD, PAØs LRK WF, PYs 1CZR 1DAQ/2 1JA 1NEW 2BJH 5ASN, fourteen SMs, SPs 2AEO 2AJP 6AKZ 8AQN, UAs 1MA 3ET 9PP, UKs 2BBB 3MAA, UO5PK, UV3GWG, VK7SM, VP9GK, WAs 1KPJ/8P6 3KOO/KP4, WH6HBS, WL7GQQ, WN3MJA/WP4, WP4s DHD DHW, WS6DI, WV4GG, XEs 1CCR 2BBO, YO8GL, YUs 1AG 1BPQ 5CYZ, YVs 3NQ 5BPJ 5CBG, ZLs (and ZMs) 1TB 2CY 3JC 3JO, 3A2HA and 4Z4GG. Over half a DXCC in this little collection so don't be surprised to see two-year Novice tickets produce biz for W1CW & Co. before 21 MHz succumbs to the sunspot shortage. QST

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* KØCER

Auroral E

THE TITLE may be an improper designation, but even the experts have not agreed upon a name for the clear T9-type signals sometimes present on 50 MHz during the breakup of an aurora. At times the signals are propagated over distances exceeding 2000 miles at latitudes generally 40 degrees north or higher. At the recent Central States Vhf Conference, Mel Wilson, W2BOC, who must certainly be considered an expert in the propagation field, discussed the phenomenon and said the propagation could be considered "auroral associated *E*-layer propagation." Whatever the mechanism, the vhf amateur can do much to properly identify it. This information is much needed in professional circles.

This type of propagation has been responsible for many exciting but unexplained contacts at 50 MHz, the July reception at VE2AIO of the Icelandic TF3VHF 70-MHz beacon, and the logging in Iceland of VE2AIO's 50-MHz signal. Similar paths have been spanned between the Pacific Northwest and New England; and between VE8BY and Alaskan stations, working into considerable areas of the contiguous United States. There have also been reports of Florida-to-California contacts using apparently the same propagation mode.

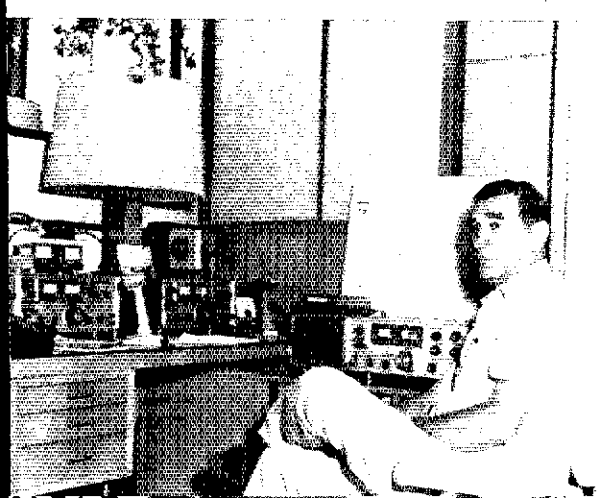
We know little of the mode's mechanics except that it is likely to occur along paths following the contours the Earth's magnetic dip angle immediately to two hours or so after the breakup of a strong aurora. Skip distances may be anywhere from 600 to over 3000 miles. The signals are clear with little or no trace of characteristic auroral modulation. Frequencies propagated include at least 40 to 70 MHz, and at times the signals are quite strong, exhibiting little attenuation. The skip distance involved may be explained by the puddling or dumping of charged particles at a height of the *F* layer. The shorter distances suggest a skip zone typical of single-hop F_2; the longer distances may be explained by signals being trapped in the *E* layer or passed from one puddle to another without requiring a return to earth. Sometimes both long and short-distance signals are heard simultaneously. All data available to date indicate the paths to be true ionospheric skip.

Mr. Wilson says careful observations as to exact time of the occurrence in GMT and in relation to the auroral breakup, beam headings, and the frequencies propagated are needed. The observer should record not only the spectrum covered, but also whether the signals appear first at a higher frequency and proceed down the spectrum, or from the bottom up.

Transatlantic path studies may be aided by the BBC's channel 1 television on 41.5 MHz, French TV on 41.25, the Icelandic 70,270-MHz beacon, TF3VHF, and the Shetland Island beacon GB3GM, on 70.305 MHz. As we have reported before in this column, VE2AIO is exploring a Canada-to-United Kingdom, 50-to-70-MHz contact possibility. Several New England 2-meter operators are testing for a possible 144-MHz contact across the Atlantic. We don't know for sure if this propagation reaches 144 MHz. KL7FLC and VE8BY work indicates that it does not. The limiting factor may be the early-morning hour in the United Kingdom when the phenomenon occurs, or that such a contact has only been recently attempted and there has not been two favorably-located stations operating at the proper time. This is conjecture, but the thought of a United States-to-Europe contact on 2 meters not using moonbounce is worth exploring. VE2AIO's results lend encouragement that Geoff may soon be successful in the 50-to-70-MHz range.

This current solar cycle 20 has been unusual; very little like cycle 19, but somewhat similar to cycle 18 which produced excellent auroras in 1950 and 1951. The number and intensity of the auroras this past summer, especially the July 24-26 and

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



Bill Boykin, HL9WI/W6HTH, Seoul, Korea, keeps us informed on Far East 50 MHz activity. Bill's equipment is mostly Japanese. In addition to six meters, he is also active on the hf DX bands.

August 16 sessions, have caused vhf oldtimers to speak optimistically of auroral conditions likely in the next 18 to 24 months.

This could be fortunate timing for amateur radio. We need a new discovery to make the scientific circles again sit up and take note - and to prove our value as amateurs. Why not build a converter and beam for the British 4-meter band? And you 2-meter operators in the east, why not look towards Europe during the next auroral session? There just *might* be some choice DX for the trying.

OVS and Operating News

50 MHz news typically begins to decrease in the fall as *E* openings diminish. Lower-latitude DXers are hoping for one more opening to South America or the Pacific before the present solar cycle falls to a point below that capable of supporting 50-MHz *F2*. Now that strong *E* signals have disappeared for another six months, except for the minor December season and an occasional opening, the scatter operators will do the greatest share of the DXing. During the September contest there was little or no *E* activity and the importance of scatter for large contest multipliers became obvious. W8CCI and K8BBN had the *big* signals into the midwest. I wouldn't be surprised to learn that W8CCI worked 30 or more sections with his consistent scatter signal.

August *E* reports were received from several stations including WB2SIZ, N.J., who reported success on single-hop with 10 watts and 4 elements. WA6JRA reported a "moderate" opening to the Seattle area and that a KH6 answered a CQ at 0600 GMT, August 28. WA5IYX/5, San Antonio, says August exhibited the expected sharp decrease in the number and duration of *E* openings, from the May-to-July levels. Pat noted no multihop *E* during August, the first year since 1964 he has not recorded multihop in August. Pat noted some *E* during early September and the *F2* muf to South America approaching 50 MHz. WA5IYX says his observations over the past 7 years indicate a smoothed peak of cycle 20 during December, 1969 and that he expects some *F*-layer activity yet this fall.

Aurora the evening of August 16 allowed many buzz contacts throughout the United States and Canada. The aurora was heard as far south as W4GDS, near Miami, and ended with auroral *E* signals being propagated nearly across the continent. Among the best DX work was VE2AIO's contact with W7FN, Washington, and W7VDZ, Wyoming, working into the Boston area. VE2AIO says he heard a KL7 weakly but couldn't copy the suffix.

On August 9, TF3EA in Iceland heard VE2AIO at 2319 and 2338 GMT. VE2AIO heard fragmentary signals from TF3EA on 70 MHz.

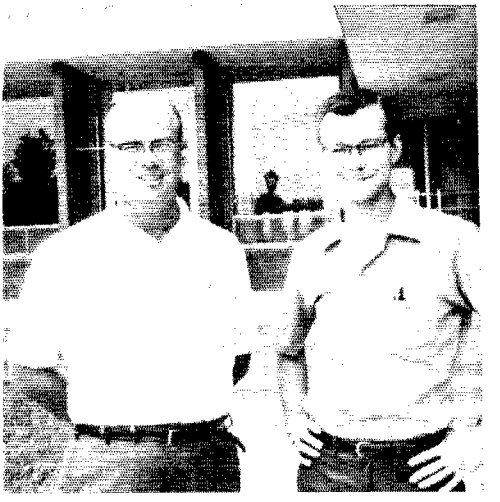
In the Far East, HL9WT, Korea, says the best 50-MHz opening he has heard from Seoul happened August 12 between 0300 and 2200 GMT. Bill, who signs W6HTH stateside, says the band was alive with S9 signals from Japan. He worked two log pages of JAs with 25 watts. Bill hears HM stations (Korean nationals) occasionally on fm with one- and two-watt military portables.

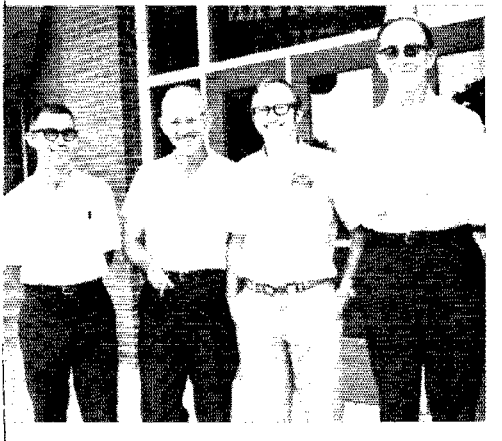
ZK1AA's Cook Island beacon was heard on August 26 between 2053 and 2112 GMT by K4RNG in Miami. This was the first time ZK1AA has been heard in Miami since spring 1969.

2-METER STANDING

K1ABR	35	8	1478	W5HFV	37	10	1285
W1AZK	34	8	1412	K5WXZ	36	10	1450
K1HTV	34	8	1310	W5AJG	33	9	1360
K1WHT	31	8	1300	W5UKO	32	9	1290
K1UGQ	30	8	1370	W5LO	29	7	1325
K1WHS	29	8	1300	K5PTK	18	6	1330
W1VTU	29	8	1296				
K1BKK	28	7	1275	W6GDO	18	5	1326
W1JSM	25	7	1100	W6WSQ	16	4	1390
W1HDQ	24	7	1040	K6HAA	13	4	1380
K1RJH	22	7	1450	K6JYO	13	4	1240
K1MTJ	20	7	1225	K6HMS	11	4	1258
W1MX	18	6	850				
K1JIX	18	6	800	W7JRG	27	6	1320
				K7NII	25	5	1290
W2NLY	37	8	1300	K7ICW	18	4	1278
W2CXY	37	8	1360	K7VTM	10	6	950
W2ORI	37	8	1320	W8PT	41	9	1260
W2AZL	36	8	1380	K8AXU	38	8	1275
W2BLV	36	8	1150	K2ZAT/8	36	9	1310
K2RTH	34	8	1215	W8IDU	36	8	1150
WA2FGK	33	8	1340	W8YIO	36	8	1100
W2CUX	33	8	1334	W8IDT	35	8	1150
WB2WIK	32	8	1080	K8DEO	32	8	960
WA2CJK	31	8	1160	W8NOH	31	8	1165
W2CRS	30	8	1270	W8TIU	24	8	1000
K2CBH	27	8	1200	K8ZES	22	8	675
WB2SIH	25	6	1000				
K2DNR	24	7	1200	K9SGO	42	9	1300
WA2FMB	23	8	1335	WA9DOI	41	9	1303
W2CNS	23	8	1150	W9AAG	41	9	1200
K2BWR	23	7	1350	K9AAJ	41	9	1200
W2DWJ	23	6	860	K9UIF	41	9	1150
WB2YQU	22	6	850	W9YYF	38	9	1050
WA2PMW	21	6	1000	W9BRN	36	9	1260
WB2EXR	21	6	915	W9PBP	34	8	820
K2YCO	21	7	750				
				WØBUB	45	10	1380
W3RUF	36	8	1100	WØNXF	45	10	1369
W3KWH	35	8	1335	KØMQS	44	9	1276
W3BHG	32	8	1260	WØLER	42	9	1440
W3GKP	32	8	1108	WØDQY	41	9	1300
K3CFA	25	8	1200	WØLFE	40	9	1100
W3BDP	25	8	1100	WØFYF	35	9	1380
W3UB	23	8	1310	WØENC	35	9	1360
W3TFA	21	8	1342	WØLMS	33	9	1320
K3CFY	21	7	950	KØCER	33	9	1276
K3OBU	21	7	930	WØLCN	31	9	1100
W3ZD	20	7	850	WAØCHK	30	8	
WA3GPL	19	6	625	WØDRL	27	9	1295
K4GL	39	9	1270	VE1AUC	7	2	500
W4HJQ	39	9	1150	VE2DFO	28	7	1340
W4WNH	38	9	1350	VE2HW	11	5	800
W4HHK	38	9	1280	VE3BQN	36	8	1250
K4FJQ	37	8	1125	VE3ASO	33	8	1290
K4IXC	36	8	1403	VE3FZC	33	8	1283
W4CKB	35	8	1440	VE3AIB	29	8	1340
K4QIF	35	8	1225	VE3CWT	27	7	1072
W4VHH	35	8	1100	VE2FVW	25	8	1100
W4FJ	34	8	1150	VE7BQH	9	3	1248
W4AWS	29	8	1350				
				VK3ATN	3	3	10417
W5UGO	43	10	1398	ZL1AZR	2	2	11055
W5RCI	42	9	1289	SM7BAE	1	1	11055

The figures after each call refer to states, call areas and mileage of best DX. Revised November, 1970.





These pictures were taken at the Central States VHF Conference held in Oklahoma during August. Pictured left to right beginning with the top row are W1FJH/4 and K9UIF, both 2-meter meteor scatter DXers; K8DEO and K8REG, 432 leaders; W4FJ and 2300 MHz moonbouncer W4HHK; W6KJD (K6QEH) and K6JYO, California six meter DXers; K9HMB and W2AXU, big signals on 6; and WØLER, new president of the CSVHFS, W5HFV, W5WAX and North Dakota's 50 MHz popular, WØGNS. Next year's Central States conference will be held August 20-22 in Sioux Falls, S.D.

144 MHz DX news this month is highlighted by the August Perseids. There is no apparent consensus on this year's shower. Comment runs from poor to average to excellent. The results appear mostly to depend upon previous experience and whether the particular operator was active during the early-morning August 12 peak. Here are the reports from around the country by call area:

K1ABR (R.I.): K8RFG, WA9DOT, KØMQS, KØCER, WAØCHK
W1JSM (N.H.): K4EJQ, W9SUV, WØRLI, KØMQS
W3BHG (Del.): W5ORH
K4GL (S.C.): WA5NOB, K7VTM
W5UKQ (La.): K1HTV
K7ICW (Nev.): KØMQS, WØNEN
K2ZAT/8 (Ohio): K1HTV, WA1JTK, K5AGI, W5GVE, W5LO, W5ORH, K7VTM, W7JRG, WØEYE, WØWYZ, VE2DFO
WA9DOT (Wis.): K1ABR, WA1JTK, WA3DRC, W1FJH/4, K5AGI, W5RAG
W9AAG (Ill.): K1BKK, W1YTW
WAØCHK (Mo.): K1ABR, K1AGB, K1HTV, W1YTW, K2VHS/1, K3ARN, K3CFY, W1FJH/4
WØEYE (Colo.): K2ZAT/8, W9BRN
WØLCN (Minn.): K3ARN, W5RAG, K7VTM
WØLER (Minn.): K1HTV, WA2CJK, WA2DIR, K5AGI, WA5NOB, W8AEC, VE2DFO
VE3BQN (Ont.): K5AGI, W5RCI
VE3CWT (Ont.): W4LSQ, WØENC

Other contacts were reported in last month's column. You'll note a number of changes in the states worked boxes, mostly as a result of the Perseids. The shower produced two new call area leaders, K1ABR and K4GL. K4GL says, "those wonderful, wonderful Perseids meteors." Jack also holds top honors in the 8th call area as W8PT. K7ICW and WØNEN recorded apparently the first Nevada-to-Missouri 2-meter contact. At age 61, W9AAG says he still has the same old get-up-and-go even though he has been at it since 1928. Dallas added 2 new states during the Perseids on his first ms effort since 1965. Wa9DOT came back strong during the Perseids after an April heart attack. W2AZL and W2CUX, both New Jersey, ran schedules with W7JRG, Montana, over a 1700-mile path receiving enough to identify Ken. WA2UDT also identified W7JRG while monitoring the schedules. A number of contacts were made also on random CQs during the shower's peak. Liason on 75 meters proved successful in arranging hasty schedules.

Aurora the night of August 16 was described by some as the best in 5 years. Here are some of the results. K1ABR, R.I., heard or worked 19 states including a contact with WAØCHK, Mo. Dick heard K8AXU on 220. W1JSM, N.H., worked K4GOF, Ky., for state number 25 plus many 2s, 3s and K4YYJ, N.C. W7JRG, Montana, worked KØCER, WØEMS, WØEYE, WØLZO and WØNXF. K2ZAT/8, Ohio, worked 19 stations in 8 call areas adding K4YYJ, N.C., WØDRL, Kans., and KØCFR, S.D. for new ones bringing Kelly to 36 worked. In Illinois, W9JGV worked 19 stations in 14 states and Ontario. Jerry worked east to K1ABR and west to KØ CER for excellent coverage.

Reliable WØLER, Minn., says the aurora was the best visual display he has seen in nearly 15 years. The radio display wasn't bad for John either. He worked 10 states and VE3CWT. VE3CWT reports hearing 19 states in Toronto and says contacts with K4GOF and WØLER brought him to 27 states worked.

Tropo was fair beginning the third week of August. On the 20th, WA8TYF/5, Arkansas worked 8s, 9s and Øs giving a new state to several. WØEMS, Nebr., worked into Michigan on the 26th. KØMQS, Iowa, says the tropo was so strong that night he logged 15 uhf TV stations throughout the midwest with no antenna on his TV set! The opening repeated on the 27th as KØCER worked WA8PIE and KØMQS worked K4GOF for two of the longer hauls reported. September 1 was also excellent in the midwest. WØEMS worked K8REG and W8KAY and heard W8BKI in West Virginia. On September 6th, the band opened on tropo from the Texas Panhandle to Illinois.

One of the finest tropos in several years began forming between the midwest and the east coast September 16. That night W9YYF, ILL., worked 40 stations on the coast including W1RJH, Conn., and W1JSM, N.H. Conditions on the 17th were above normal, but the big show began the evening of the 18th. Before the sunset, 500-mile signals were common in the midwest and three hours later 800 miles was workable. KØMQS and WØBFB, both Iowa, worked K4PCL/4 in western Virginia and WØEMS and KØCER contacted W8BKI, West Virginia. The opening continued through the night and as the sun came up the 19th long-haul signals peaked. KØCER heard W1FJH/4, Virginia, in contact with WAØCHK, Mo., and although WAØCHK told the Virginia station someone was trying to break, neither stood by. The South Dakota-to-Virginia path is 1000 miles.

The opening covered an area bounded by Oklahoma, Colorado, South Dakota and Minnesota east to Maryland and Virginia. WØEYE, Colorado, worked KØMQS over a rare tropo path from the Rockies. The tropo was also excellent on 432 with Minnesota to at least Indiana contacts being made. Because the opening came at column deadline time, reports are incomplete and next month we'll take a closer look.

On the moonbounce scene, VE7BQH continues schedules with K6MYC, SM7BAE and ZL1AZR. In South Carolina, K4GL is preparing for EME activity.

Headquarters Note: Between tropo during the September VHF Party and during the following week, there was no lack of vhf and uhf DX in the Northeast in September. Here's a sample, from K1HTV: 9/16-17 — 145-MHz ssb: K8MXY, WA8FJI, W9HTF, WA8LKD, W9GMJ, K9TZZ, WA8RQJ. Then Rich went to 432, and worked W8YIO, W9WCD, W9ZIH and W8HVX. W9WCD is reported to have heard K2UYH on 1296 MHz! Back to 144 at 0330, K1HTV worked W9YYF, WA9DOT, W9QXP, W8LCY, W3CA, WA8IPG, K8WKZ, K8AKN, and W9VWI.

K1RJH called to report phenomenal 2-meter signals from all over the 8th and 9th call areas the same night. Both Rich and Carl noticed that this opening seemed to favor the W1s. The western stations were reporting much stronger signals from Connecticut and Massachusetts than from the 2s and 3s farther south. Even the weather maps on local TV stations the night of Sept. 16 indicated that something rare was developing. That afternoon temperatures in the 90s were recorded around Philadelphia, and along an east-west boundary below the Great Lakes. In New England at this time we were in the most unlikely-looking sort of weather: continuous drizzle and temperatures in the low 50s. But we were sitting almost under a very sharply-defined airmass boundary that extended nearly 1000 miles to the west! — *W1HDQ*

220-MHz meteor scatter was explored on the West Coast during the August Perseids. W6WSQ ran schedules with W7CNK, Tacoma, and on August 12th made contact on several bursts of up to 9 seconds duration. On the 15th a 30-second burst was noted, but no contact made. The contact with W7CNK gave W6WSQ his 6th state on 220. WØEYE, Colorado, had meteor contacts with W7CNK on August 10 and 12. WØEYE heard bursts from WB6NMT/6 but a high noise level on the California end probably prevented a contact. WØEYE now has 10 states worked on 220.

WBNMT/6 ran extensive meteor tests with W7CNK during late July and into mid August. The meteor rates peaked noticeably between July 28 and August 12. Radio rates to 80 per hour were observed the week preceeding August 11th. The two stations made contact on the 12th.

WB6TJO reported WA6GYD had started a 220 newsletter in the San Francisco area — and then a few days later I received three copies of the newsletter on a single day! In it, WA6GYD says everyone is using horizontal polarization and he lists more than 20 active stations. Transmitter power ranges from 4 watts to a kilowatt. Specific operating times and frequencies should be available from WA6GYD or WB6TJO. The newsletter is interesting and should give 220 a boost throughout California.

432-MHz tropo began for the fall season in the midwest the evening of August 27. WØLER, Minn., worked North Dakota's KØAWU with signals above normal levels. The next evening WØLER worked VE4MA in Winnipeg over a 420-mile path. VE4MA runs 300 watts and a 52-element Yagi array at 45 feet and will accept schedules. Also on the 28th, WØLER and WØLCN worked K9UIF, Ind., giving new states to each station. WØLER worked several Illinois stations and heard 4-watt Chicago stations in Minneapolis. September 1, WØLER worked two Chicago area stations, KØAWU and WØIT, South Dakota, on still another opening the morning of September 5th John again worked KØAWU, VE4MA, and Illinois stations, and heard WØEYE in Colorado. John had fallen asleep on the livingroom couch the night before, with the television set on, and was awakened by a Chicago TV station signing on the air! KØAWU also worked W9WCD giving the Illinois station 20 states on 432.

During the August Perseids, W4FJ, Virginia, and WØDRL, Kansas, came very close to making the first ever 432 meteor scatter contact. This was on the morning of August 12, after a several-hour marathon. Calls were exchanged and W4FJ heard two bursts from WØDRL, one 5 seconds long and the other 20 seconds with complete calls and signal report. W4FJ says weariness probably prevented them from completing the contact. They have been attempting this contact for a year. Their schedules are continuing.

W4FJ and WØLER also scheduled during the Perseids. W4FJ got complete calls from John, but WØLER heard only pings from the Virginia station. W6WSQ scheduled WØEYE with negative results. WØEYE also scheduled W5RCI, Miss., and heard nothing, but W5RCI heard one short burst. WØLER is confident that the first 432 m.s. contact is not far off.

The August 27th tropo produced a fine 1296-MHz contact between K4EJQ, Tenn., and W9IIY, Indianapolis, over a 320-mile path. WA9HUV, near Chicago copied K4EJQ peaking nearly 20 dB over the noise but no contact was made. The K4EJQ W9IIY contact is one of the longest on record between home stations on 1296.

220- and 420-MHz STANDING

220 MHz				WA2EUS	9	4	260
				K2RIW	9	3	
W1HDQ	13	5	450	K2OVS	8	4	260
K1JIX	12	4	600	W2SEU	6	4	220
W1AZK	10	3	375				
K1BFA	10	3	225	K3IUV	16	5	720
				W3RUE	14	7	585
K2CBA	19	7	2650	W3UJC	9	4	400
W2DWJ	15	5	740				
K2DNR	13	5	600	W4FJ	20	7	995
W2SEU	12	5	325	K4QIF	19	7	1065
K2RTH	12	4	600	K4EJQ	19	7	800
W2CRS	12	4	600	W4HJZ	15	5	560
				K4SUM	15	5	462
W3UJC	14	5	460	W4VHH	12	4	750
W3RUE	10	5	480	K4GL	10	3	585
K3IUV	10	4	310	K4NTD	9	2	835
K4GL	4	2	485				
K4IXC	3	2	1090	W5RCI	19	6	880
				W5ORH	12	4	700
W5RCI	10	5	910	W5AJG	7	3	1010
W5AJG	3	2	1050	W5UKQ	6	2	590
W5LO	2	2	660	W5GVE	3	1	365
W6WSQ	6	4	1142	W6DQJ	4	2	360
WB6NMT	3	3	2650				
				K7ICW	4	2	225
K7ICW	4	2	250	W7JRG	2	2	420
K7JRG	2	2	959				
				K8REG	20	7	700
W8PT	11	6	660	K8DEO	20	7	675
				W8YIO	19	7	650
WØEYE	10	4	950	W8HVX	16	8	660
				W8CVA	13	7	625
VE3AIB	7	4	450	W8MNT	13	7	600
				W8RQI	10	6	425
420 MHz				W8CVQ	10	6	400
				WA8VHG	8	6	625
K1HTV	17	5	610	W8EWF	7	4	450
W1AJR	16	5	680				
K3EAV/1	14	6	700	W9WCD	20	7	825
K1BFA	13	5	710	WA9HUV	17	7	780
WA1JTK	11	4	715	W9AAG	15	5	800
K1JIX	11	4	460	WA9NKT	12	6	560
W1QVF	10	5	400	W9IIY	12	6	550
W1HDQ	10	3	250	K9AAJ	12	5	425
				K9CNN	12	5	
K2ACQ	23	8	925				
K2CBA	20	8	2670	WØDRL	18	6	1185
WA2EMB	18	6	720	WØLER	10	4	709
K2UYH	17	6	840	WØLCN	10	4	700
W2BLV	17	6	732	WØEYE	7	2	703
W2CLL	17	6	693				
W2DWJ	16	4	570	VE2HW	4	3	750
K2CEH	14	7		VE3DKW	12	7	940
W2CNS	14	6	525	VE3AIB	9	5	600
WA2EGK	13	5	425	VE3EZC	7	5	510
K2CYO	10	6	675				
K2ARO	10	5	580	VE4MA	2	1	420

Feedback

W2CQH tells us that he is being deluged with inquiries about the width of the strip lines in the uhf directional couplers described by him and W2IMU, in September, 1970, *QST*. The dimension in fig. 2, page 27 was omitted. It is 0.17 inch, for all conductors.

Operating News

GEORGE HART, W1NJM
Communications Manager

ELLEN WHITE, W1YYM,
Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, W1ZJE
DXCC: ROBERT L. WHITE, W1CW
Contests: ALBERT M. NOONE, WA1KQM
Training Aids: GERALD PINARD
Public Service: WILLIAM O. REICHERT, WA9HHH

Affiliated Club Requirements. We are having quite a bit of correspondence, these days, on this subject. Yes, it's the same old story; requirements that for years have seemed adequate and reasonable suddenly now seem to be too tough and discriminate against someone. We discuss this subject here because many people concerned with these requirements are not now members of affiliated clubs. They are just League members who may belong to a non-affiliated club, or perhaps amateurs who are interested in forming clubs and may subsequently seek information on affiliation requirements.

Basically, the requirement is simple. At least 51% of the voting members must be ARRL members, and at least 51% of *all* members must be licensed amateurs. The rest is routine procedure, involving completing a questionnaire about your club, filling out a "Resolution of Affiliation" form, a membership list and forwarding a copy of your constitution. The papers go "upstairs" for a membership check, then go to your director for his preliminary approval, and finally to the Executive Committee at its next regular meeting for a final okay. The whole thing can take a month or more, but once you have hurdled the membership check and gotten the director's okay, you pretty much have it made.

What does affiliation buy? Well, considering it doesn't cost you anything, quite a lot. First crack at ARRL Training Aids, for one. Preferred treatment for headquarters staff and directors visits. Eligibility for club participation in the ARRL DX, Sweepstakes and VHF-SS contests. Fifty cents in the club treasury for every payment of ARRL membership dues through the club. Less tangible, but not less important, identifying your club with an already-large group already in support of the amateur's only national organization.

But perhaps even more important, and apropos of this discussion is the *political* significance of the affiliated club. To a large extent, directors rely on affiliated clubs to help reflect the views of amateurs in their divisions. Some directors have an appointed representative in each affiliated club to represent that club's views. Others have been instrumental in forming club federations for this same purpose, among others. And we all know that an organized group of individuals is capable of exerting a far greater amount of political pressure than the same number of separate individuals. There is no question but that our affiliated clubs have much to do with formation of the policies of the League.

And therein lies the crux of the discussion.

Two or three years ago the membership requirement for affiliation was lowered from 51% to one member in the case of secondary school amateur radio clubs. Last year this was extended to include college and university clubs. Quite a few clubs have been affiliated under this provision, and their numbers are increasing. But no matter how much you relax the requirements, there are still going to be those on the borderline who will complain that they are too stiff.

Why the relaxation? Obviously, to get into the ARRL sphere more of those young people who are just getting their feet wet in amateur radio but, being in school or college, are hard pressed for money with which to pay their dues. If they cannot be members, at least they can belong to an ARRL-affiliated club, the next best thing.

But if this is true (and it's pretty rational thinking, you'll have to admit), then it is also true

OPERATING EVENTS

(Dates in GMT)

November

4-5	YL/AP, p. 102 Sep.
5	W6OWP Qualifying Run
7	EMT, OOs only
7-8	Del. QSO Party, p. 110 Oct.
	N.C. QSO Party, p. 144 Oct.
14	Austria 160-M. Contest, IARU News
14-15	SS phone, p. 58 Oct.
18	W1AW Qualifying Run
21-22	SS cw, p. 58 Oct.

December

2	W6OWP Qualifying Run
5-6	Indiana QSO Party, Sta. Act.
10	W1AW Qualifying Run
12-13	160 Meter Contest, p. 92 Oct.
17	W1AW Morning Qualifying Run
31	Hand-Key Nite

January

7	W6OWP Qualifying Run
9-10	VHF SS
13	W1AW Qualifying Run
16-17	CD, cw
23-24	CD, phone
30-31	SET

Feb.-Mar.

6-7	DX Competition, phone
20-21	DX Competition, cw

that becoming an amateur licensee is even more expensive (now) – not to mention more difficult – than belonging to the League. So why not relax the requirement for percentage of licensed amateurs from 51% to one member, in like manner? That argument runs like this: You want to train people *to become amateurs and join the League, but you* cast out those organizations set up for this purpose by requiring a high percentage of them to be licensed amateurs *already*. What sense does that make?

DX CENTURY CLUB AWARDS

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings.

August 1 - 31, 1970

New Members

W4SYL	273	W9EEQ	150	VE3BQB	117	W3DTZ	107	K4LBJ	102	WA8PRR	101
VS6DR	260	DL7PH	150	PY4UK	112	W4MIA	107	KØVVL	102	4X4SO	101
W4BA	235	*JA8BXC*	125	VE3EJM	111	DJ1XI	106	EA8CE	102	W2KPZ	100
ZF1CY	205	K2QBT	123	1F2WLS	109	DJ3OZ	106	DJ6MZ	101	W2SEG	100
SM7DBD	197	W1DDX	121	W6JZU	109	G3BZG	105	DJ9ER	101	WB6ZSU	100
PY2YC	164	*VE3GJH*	120	DL2FB	108	*K4EKJ*	104	*DK2RP*	101	*W9KWU*	100
WA5RXT	159	K7QEG	118	PAØINA	108	K4CQJ	102	SM6BZE	101	WA9VIY	100
K8BGZ	156	K6OVJ	117	VS6AF	107	K4DFI	102	W5NCB	101	4X4MH	100
W4SYL	248	K4UVH	130	K5GPI	118	VE3BQN	107	WB4IDN	105	EL2BD	100
JA2HNP	166	WB2PCF	128	VE3GIH	115	W5FLB	107	DK3FZ	102	K4GHR	100
EP2DX	160	DL7PH	124	WA5YKU	114	K8VIR	106	TU2CS	101	W3ZR	100
K3EUR	158	*KP4COB*	119	*I1BOH*	109	*K9GFL*	106	*WA9ROU*	101	*WA8PWZ*	100
WB6NRK	154	K2QHT	118	W8VPW	108	WB4KRT	106	WAØQIT	101	WA8ZCO	100
W8ZCQ	154									W9LMH	100

Endorsements

In the endorsement listings shown, totals from 120 through the 249 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

ZS6YQ	320	WØCAW	280	OH2BAD	250	I1CTL	200	WA1JHQ	180	W2SE	140
JA3UI	315	WØCPM	280	W6MUM	250	I1ZO	200	W3IRE	180	W3YSH	140
K4HNA	315	*DL3GH*	270	*WB6UDC*	250	*JA1HHM*	200	*W4CZS*	180	*W5LUJ*	140
KØUKN	315	SM5EC	270	W7LZF	250	JA2HNP	200	W4TXE	180	W8EXP	140
W4CKB	315	SP6AAT	270	YV5AK	250	K6BTT	200	WB6NRK	180	W8YMB	140
K4YYL	310	W1PYM	270	*OH2QQ*	240	*W2GFP*	200	*WA8TTJ*	180	W9EPZ	140
K6RN	310	W1UUK	270	VE2DCY	240	W2HL	200	WA9LUD	180	W9POC	140
JA1BN	310	WB2JAE	270	W4HHN	240	W3ARK	200	WØLBZ	180	WAØTVC	140
W8YGR	310	W5DL	270	W4ORT	240	W3IRF	200	5H3LV	180	HB9ALE	120
DL7BK	300	W5LRY	270	W7QON	240	WA3IUV	200	I1SZI	160	K6JB	120
K6AO	300	W6DOD	270	DL9TI	220	W4DUQ	200	K3JYZ	160	K6OVJ	120
OH4NS	300	W7MVC	270	K2AAC	220	W4QT	200	K5LJW	160	K8CCV	120
WA6VYW	300	W8ELE	270	K2SHD	220	W8JJA	200	VO2GD	160	VE7HQ	120
W9ZTD	300	WØCY	270	K4EP	220	W8ZNO	200	WA2CFF	160	VP5AA	120
DJ5DA	290	K2LGJ	260	K4DRO	220	WA9NHQ	200	W4LF	160	W1AM	120
K4HXF	290	K4HPR	260	K6NM	220	ZL2VN	200	WA8QLY	160	WA2VDA	120
OH2BW	290	OH3NY	260	K6QW	220	G5PQ	180	W9VRV	160	W4LKX	120
OK1MP	290	W1AA	260	K7RLS	220	K2KGB	180	YV1ISF	160	WB4JLG	120
W9AG	290	W1FOA	260	OE3SIW	220	K2OLG	180	K4NTS	140	WB4LXF	120
DL8NU	280	W4FPW	260	SP3AIJ	220	K5LJW	180	K4UEF/6	140	W6BWM	120
K9AWK	280	WA6GEE	260	WA1ABW	220	K9GBL	180	K9JNC	140	WA6GOR	120
OF1HGW	280	W9IGW	260	WB4CGY	220	K9KKU	180	KØZXE	140	WB6WHM	120
OH2BR	280	W9UX	260	WA8EDC	220	OH5CA	180	TA3BIP	140	WB6ZUC	120
W4RJL	280	K4XFB	250	DJ5BW	200	PY2GE	180	W2FLW	140	WAØKTA	120
		K9YXA	250	DL5MI	200	VL3DGX	180	W2NYU	140		
KØUKN	310	W5OBS	270	6Y5DW	240	K6PIH	200	5H3LV	180	WA1KYW	140
JA3UJ	300	W9ZTD	270	K8GKU	220	W2EV	200	K2KGB	160	WB2BDH	140
K6EC	300	HK3WO	260	K4BKE	220	WA2CGD	200	K4EFX	160	WA3IUV	140
W3AEV	300	W1AA	260	K6RN	220	WØVYS	200	OH3NY	160	WA3LVX	140
W3JK	300	WB2VAE	260	VE2DCY	220	DL3OM	180	VE3DGX	160	W7LLR	140
HR1KAS	290	W4RJL	260	W1DQ	220	I1CTL	180	W3NM	160	W7QON	140
K4YYL	290	*JA1BN*	250	W2ESC	220	K2OLG	180	*W4QT*	160	W9UX	140
I1KN	280	OE3SAA	250	W4BA	220	KP4BBK	180	W6DOD	160	YV4PA	140
I1ZV	280	VS6DR	250	WB4CGY	220	PY2GE	180	WB6GKK	160	VP5AA	120
JI1GAI	280	DJ5DA	240	WA4GUZ	220	WA1JHQ	180	W8JJA	160	W2TOK	120
WØCPM	280	DL8NU	240	WA6RIA	220	W4CZS	180	6Y5AH	160	WA2BHJ	120
CR6DU	270	G5AFA	240	W7EKM	220	W4RKN	180	K8BGZ	140	W3NB	120
K1LHT	270	OH2BAD	240	W7MVI	220	W4TXE	180	KØTOV	140	W4LKX	120
KH6BB	270	OH2BR	240	WA7DRP	220	W4WSJ	180	KØWWX	140	WB4APP	120
OK1MP	270	W2MS	240	YV4QQ	220	W6HUR	180	PY1IZ	140	WB6WHM	120
SM5EC	270	WB6UDC	240	DJ2MM	200	W6ISI	180	TI2WKP	140	WB6DVY	120
W1EXD	270	W8STD	240	DL3OH	200	W8ZNO	180	VE1ARN	140	WA9JLV	120
W4TUC	270	W8YGR	240	K6BTT	200	VE3BUI	180	W1HFP	140	ZL2VN	120

Pretty good argument for lowering the licensed amateur requirement for affiliation, eh? OK, just to balance things up, here's an argument against it. We have already pointed out that affiliated clubs exert a strong political influence on ARRL policies. Do we want part of this influence to come from clubs that are not only controlled by non-ARRL members but by non-licensees as well? Hasn't the relaxation of requirements already gone too far?

All in all, a pretty good subject for a formal debate. We'd like to see a college or university amateur radio club affiliated through the one-member rule take on a regular ARRL-affiliated club on the question: Should the ARRL affiliation requirements be further relaxed to permit affiliation of high school and college amateur radio clubs having only one licensed amateur? Let your director act as judge.

The Time Jumble. No doubt we are going to have confusion regarding what time it is as long as man insists on connecting, although in a general way, the hands of his clock to the position of the sun in the sky. Some years back the Board of Directors ordered all references to times in *QST* and other League publications to be in GMT. In complying with this, a number of difficulties were encountered and much confusion ensued. Added to the confusion was the fact that there is no "daylight saving GMT." That is, if you are stating time in GMT you can't just say that you use the same time by your clock when the nation advances its clock an hour to kid itself that it is doing everything at the same time as before. GMT says you are doing it an hour earlier, and no nonsense about it. Thus, you do things by the same time on your local clocks, but an hour earlier by GMT.

It's bad enough that we have standard time zones (seven of 'em in the U.S. alone), without moving all of them one zone east every October and moving them all back one zone west every April. We amateurs don't deal in local communications and should be aloof from all of this. The airlines and the broadcast networks have to show their schedules in local time because they deal exclusively with the general public. We don't. In amateur-to-amateur work and talk we should talk GMT. In other words, we amateurs should be bi-lingual in time so that we can immediately state the time in either local time or GMT, depending on whom we are talking to – and we should be aware of the date and day that go with the time expressed. There is no "trick" to it. All that it requires is practice. Electric clocks are relatively inexpensive, why not two of them in your shack, one on local time and one on GMT? Then do some practicing, somewhat along the following lines and in this chronological order:

(1) Practice instant conversion of AM-PM times of the 24-hour version. That is, when your clock says it's two o'clock, read it as 0200 or 1400.

(2) Practice converting from your local time to GMT, and vice versa. When you hear, read or see a local time, mentally convert it first to 24-hour time (if necessary), then to GMT; do the same in reverse when the occasion arises. Make sure you change the day/date if needed!

(3) Stop thinking in terms of morning, afternoon and evening when you go GMT. For example, 2100 EST is not 0200 "the next morning" by GMT, it's just 0200 the *following day*. In the EST zone, 0200 just happens to fall in the evening; elsewhere it might be "afternoon" or "morning." The position of the sun in the sky has no effect on GMT.

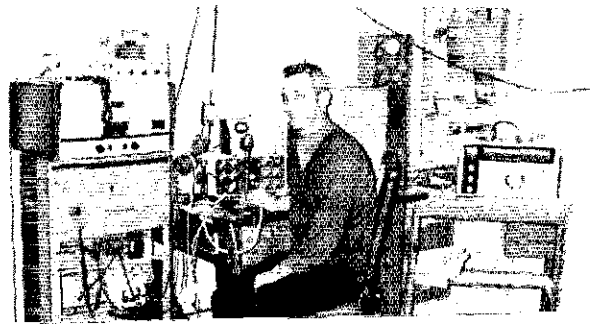
No one can really learn a foreign language if he has to translate it to his native language before he can understand. You're not going to master GMT, either, if you have to translate it to local time. You have to train yourself to *think* GMT, until you are as at home with it as with your local clock time.

WIAW Afternoon Bulletins. A new feature to the growing WIAW program is afternoon bulletins. Afternoons, that is, if you happen to live in the U.S. or Canada proper. This will commence (or already has) on Oct. 25, the date we go from "daylight saving" back to "standard" time, on Tuesdays and Thursdays only at 2130 GMT for cw and 2230 GMT for RTTY. There will be no following phone bulletins, since the phone bulletins in the evenings aren't very widely used. The bulletins will be sent at the standard speed of 18 wpm, an excellent practice speed for the amateur struggling between the 13 wpm general class and the 20 wpm extra class. This is a trial procedure, so *let us know* if you are using it. If widespread use is indicated, it can be increased to five days per week; if not, it can be discontinued.

Straight Key Nite. You may remember that some time ago someone suggested a "straight key night" when everyone got out his old, dusty

Meet Your SCM

Quebec SCM Joe Unsworth, VE2ALE, has been licensed since August of 1959. He is currently an electrical foreman for the Canadian Pacific Rail Company, after serving in the Royal Canadian Army for 17 years. VE2ALE is active in the Montreal Amateur Radio Club, the Western Quebec VHF/UHF Amateur Radio Club and RAQI. This SCM is active on all bands, with a particular interest in VHF/UHF. He has been active in FD, CD Parties and VHF contests. In addition to being SCM, VE2ALE is serving as the Section Emergency Coordinator.



WIAW FALL-WINTER SCHEDULE
(Oct. 25, 1970—April 25, 1971)

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EST, Saturday 7 P.M.-1:00 A.M. EST and Sunday 3 P.M.-11:00 P.M. EST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your *original* operator's license with you. The station will be closed Nov. 26, Dec. 25, 1970; Jan. 1, Feb. 15, Apr. 9, 1971.

*GMT**	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	.....	.....	.....	RTTY OBS[3,7]	.....	.....
0030	←	CODE PRACTICE DAILY[1]			10-13-15 wpm		→
0100	.....	←			CW OBS[4]		→
0120-0130[4]	.....	.....	3.700[6]	7.020	3.520	7.150[6]	7.020
0130	.....	.....	3.700[6]	7.080	3.555	7.150[6]	7.080
0200	←			PHONE OBS[2]			→
0205-0230[4]	.....	.....	3.820	50.120	146.600	1.820	3.820
0230	←	CODE PRACTICE DAILY[1] (35-15 wpm TThSat), (5-25 wpm MWFSn)					→
0330-0400[4]	.....	.....	3.555	.....	1.805	.....	3.555
0400	RTTY OBS[3]	.....	←		RTTY OBS[3]		→
0410-0430[4]	.....	.....	3.625	14.095	7.095	14.095	3.625
0430	PHONE OBS[2]	.....	←		PHONE OBS[2]		→
0435-0500[4]	.....	.....	7.220	3.280	7.220	3.820	7.220
0500	CW OBS[4]	.....	←		CW OBS[4]		→
0520-0530[4]	.....	.....	3.700[6]	7.020	3.945	7.150[6]	3.520
0530-0600	.....	.....	3.700[6]	7.080	3.945	7.150[6]	3.555
1400	.....	← CODE PRACTICE[1] (5-25 wpm MWF), (35-15 wpm TTh)					.....
1800-1900	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900-2000	.....	14.280	7.255	14.280	7.255	14.280	.....
2000-2100	.....	14.280	21/28[5]	14.095	21/28[5]	7.080	.....
2130-2230	.....	14.100	CW OBS[4]	14.100	CW OBS[4]	14.100	.....
2230-2330	.....	7.255	RTTY OBS[3]	21.1[6]	RTTY OBS[3]	7.255	.....

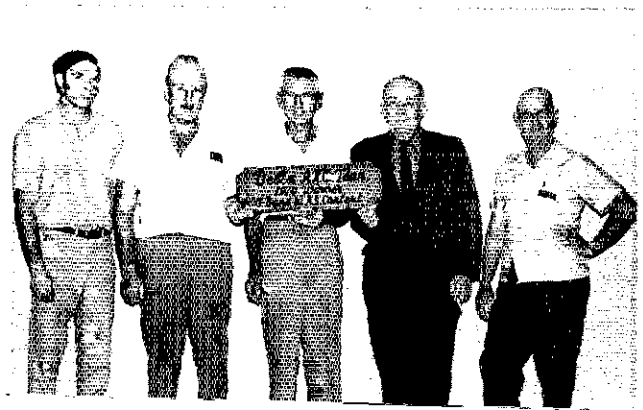
[1] CW OBS (bulletins, 18 wpm) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.6 MHz.
[2] Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.
[3] RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 29.095 MHz.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] *Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.*
[6] WIAW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
[7] Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
Maintenance Staff; W1s QIS WPR. *Times-days in GMT. Operating frequencies are approximate.

telegraph key and spent an evening pumping away as of yore. There was no widespread acclaim for the idea, but we keep getting requests to know when this is going to come off. Well, it's coming off on New Year's Eve, 1970-1971, when the youngsters who never even saw a straight key will be out whooping it up and the old timers who cut their teeth on the gadgets will be staying at home where they belong. Of course there will be novices, too, and some ex-novices who learned on a straight key and never got out of the habit. We don't mean to make it a strictly old-timer's night. Nevertheless, many OTs who haven't touched a key of any kind for years will no doubt be in there pumping away.

Rules will be in the December issue, but they will be very simple. The idea is just to get on with your straight key and make as many contacts with other straight key operators as possible during the specified period. Rag chewing is strictly permissible. No sideswipers or "cootie" keys, please – and of course no bugs (if you have no straight key, nobody will know the difference if you use only the "dash" side of your bug) or electronic monstrosities. Don't be a wise guy and think you can get away with using an electronic key or a bug at slow speed; the old timers can spot them in a second. We expect one of the rules will be that each operator submitting a list of stations worked nominate one or more candidates for the title of "Mr. Straight Key." It promises to be an interesting evening – and it may have a desirable side effect of keeping some people at home who would otherwise be out carousing. See you on SKN (that's "Straight Key Night," dad!). – *WINJM*

ARRL QUALIFYING RUNS

Any person can apply for an ARRL code proficiency award. Neither League membership nor an amateur license is required. Send copies of al



Early this year, at the start of the ARRL 5-Ban*WAS Award, the Delta Radio Club (affiliated i*1962) challenged the Oak Ridge Radio Operator Club (affiliated in 1946) to a 5-Band WAS contes The top 5 scores in each club were totalled an Delta won out with 818 to the Oak Ridge 661 *(Note, however, that old contest pro K4LPW c* the Oak Ridge group was the only participant t work the maximum number of 250!) Here's th winning Delta crew (l-r) with their 5-band total WA4FDR 207, WA4TFI 203, W4OGG 17 W4CME 135, WB4FVZ 95. That W4OGG su seems to be in the middle of everything interestir *going on!*

qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualified at one of the six speeds transmitted (10-35 wpm) you will receive a certificate. If your initial qualification is for a speed below 35 wpm, you may try later for endorsement stickers. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP (W6ZRJ, alternate) for the coming 3-month period. W1AW will simultaneously transmit a qualifying run on 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.6 MHz at 0230 GMT Nov. 18. In converting, 0230 GMT Nov. 18 becomes 2130 EST Nov. 17. W6OWP (W6ZRJ, alternate) will transmit a qualifying run on 3590 and 7129 kHz, at 0500 GMT Nov. 5. In converting, 0500 GMT Nov. 5 becomes 2100 PST Nov. 4.

W1AW CODE PRACTICE

W1AW transmits daily code practice according to the following schedule showing speeds, local times/days and GMT times/days. For practice purposes, the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries a checking reference.

10-13-15	7:30 P.M. EST daily 4:30 P.M. PST	0030 daily
5-7½-10 13-20-25	9:30 P.M. EST SnTThS 6:30 P.M. PST	0230 MWFSn
5-7½-10 13-20-25	9:00 A.M. EST MWF 6:00 A.M. PST	1400 MWF
35-30-25-20-15	9:30 P.M. EST MWF 6:30 P.M. PST	0230 TThS
35-30-25-20-15	9:00 A.M. EST TTh 6:00 A.M. PST	1400 TTh

The 0230 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending in step with W1AW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and September *QST* practice xtext to be sent in the 0230 GMT practice on the following dates.

Nov. 13:	It Seems to Us, p. 9
Nov. 17:	Short Antennas, p. 15
Nov. 23:	A Two-Band Vertical, p. 20
Dec. 3:	UHF Couplers, p. 26

The subject of practice text for the following sessions is *Understanding Amateur Radio* First Edition.

Dec. 7:	Greater I.F. Selectivity, p. 142
Dec. 9:	Multiband Converter, p. 142

Strays

Feedback

Due to a clerical error, WA1JYY was mistakenly listed in the "Silent Keys" column in October.

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The photos of early amateur stations on page 87 of the September issue are reversed. The one on the *left* is W4YM.

—•••—

Use your Zip code when writing ARRL. Use ours, too. It's 06111.

Silent Keys

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

W1AKN, Edward I. Hartel, Sandwich, MA
W1BHM, Charles B. Weed, Hamden, CT
W1CNO, Charles N. DeRose, Northampton, MA
W1EUE, Frank W. Horn, Centerville, MA
WA1EXL, Carlton R. Stevens, Thomaston, CT
WA1FXS, Adelbert D. Littlehale, Groton, CT
W1HR, Sherlon T. Baldwin, Milford, CT
W1IET, Alan C. Wilson, Arlington, MA
W1KPM, Henry D. Lloyd, Jr., Barrington, RI
W1RWC, Verrin Millet, Brockton, MA
W1WRZ, Oliver R. Hamlin, Weeks Mills, ME
WA2BOZ, Herbert K. Mai, Rego Park, NY
WA2CLK, Walter H. Brunn, Oradell, NJ
K2GVB, A. Wood Johnson, Asbury Park, NJ
W2IBL, Stanley P. Bush, Elmont, L.I., NY
K2IYK, Warren F. Olson, Amityville, NY
K2KBI, Charles Taylor, N. Syracuse, NY
WA2NQR, Thomas E. McLaughlin, Nassau, NY
W2REW, Joseph A. Werner, Merchantville, NJ
W3AEE, Charles A. Milson, Whitball, PA
W3BMS, George F. Hall, New Hope, PA
WA3DWF, Melvin F. Kesner, Accident, MD
W3MJB, Kit H. Carlos, Plymouth Meeting, PA *
K3NDY, Robert W. Prutzman, West Chester, PA
W3OKU, Frank J. Bernhart, Oakdale, PA
W4ANT, C. M. W. "Chris" Englebert, Montgomery, AL
K4BN, ex-W4FCF, Milton N. McCoy, Memphis, TN
K4DRJ, ex-W1DXO, Robert F. Abbott, Deltona, FL
W4EV, Edward Johnson, Appomattox, VA
ex-W4GQU, D. F. "Pop" Moore, Greensboro, NC
W4IHC, Julius I. Carlton,* Glouchester Points, VA
W4LAY, Conrad A. Wimbish, Greensboro, NC
K4LGP, Leslie M. Burton, Virginia Beach, VA
W4LHQ, Willima H. Riheldaffer, Birmingham, AL
K4QCT, Robert S. Conklin, Coral Gables, FL
K4RA, Robert Adams, Boca Raton, FL
W4TRE, William S. Compton, Atlanta, GA
W4VXD, Lewis B. Gilmer, Onemo, VA
WA4WTA, Luther F. Rogers, Rose Hill, NC
WA4ZIN, James M. Taylor, Lewisburg, TN
W5ASQ, Norman B. Drake, Ponca City, Ok
W5MQ, Eugene C. Hannan, Metairie, LA 70005
K5PEO, Col. Karl L. Springer, USAF, Ret., La Porte, TX
W5QYO, Otis C. Finch, Garland, TX
W6ATI, Stephen M. Newmark, Los Angeles, CA
WA6KZB, Robert A. Jakobsen, Los Angeles, CA
WA6QGF, O. Vick Vikjord, Ceres, CA
W6REA, Carroll L. McQueen, Auberry, CA
W6RU, Carl A. Rambow, Pasadena, CA
WA6ZRW, Harley J. Holcomb, Los Angeles, CA
WN7KTL, Harry Phillips, Pinetop, AZ
W8BWR, Herrick Thompson, Columbus, OH
WA8CQB, Claude H. Parke, Drayton Plains, MI
WN8GBV, John T. North, Columbus, OH
WN8GOO, Norman L. Mau, Sr., Dayton, OH
W8INQ, Amos J. Hawkins, Dayton, OH
W8QXE, Harold Holmes, Chardon, OH
K8TUL, John W. Reilley, Lansing, MI
K8YUT, Marion M. Cook, Tipp City, OH
WA8ZAI, Lawrence L. Zinsmeister, Vassar, MI
W9CIA, William P. Fligel, St. Germain, WI
WA9KAY, Charles W. Vann, Cicero, IL
W9LWQ, Thomas H. Standish, Evanston, IL
WA9QQZ, Joseph Meyer, Oshkosh, WI
WA9SDI, Fidele Marineau, Marinette, WI
W9VQT, Ralph L. Updike, Blue Mounds, WI
W9WOO, Archie J. Foley, Spring Valley, IL
W@FIO, Joseph J. Moran, Kansas City, MO
W@LPE, Leroy A. Landom, Bismarck, ND
WA@TBR, Clarence Seidel, Cathay, ND
VE7BJL, Fred Rice, Surrey, BC
OZ7X, Olaf Rasmussen, Kerteminde, Denmark
ZS1BV, K. F. Scott, Capetown, Cp, Rep. of South Africa
ZS6XQ, Louis Nel, Mafeking, Cp, Rep. of South Africa
*Life Member, ARRL

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, John L. Penrod, K3NYG – SEC/PAM: W3DKX. RM: W3EJB. Renewals: WA3HWC as OVS, W3EFB as RM, WA3DUM as ORS, W3RDZ as OO, W3BHG worked W5ORH *for state No. 32 on 2 meters. W3BDP was busy working schedules* during the Perseid showers. The First State ARC won the John Thompson Memorial Field Day trophy, with the Brandywine ARC taking second place. WN3OYA has worked 26 states to date. K3VWP got the Swan 260 and K3NVV the TV set at the Delaware Hamfest. *We welcome WA3HFL to Delaware. WA3KZQ has 102* countries worked. Those wishing to try their hand at a slow cw traffic net, try the MDDS on 3643 kHz daily at 0145 GMT. WA3DYG wants check-ins for the 6-meter net. Monthly reports are welcome. Check page 6 of *QST* for address. Traffic: (Aug.) WA3KZQ 21, WA3HFL 2, WN3OYA 1. (July) W3TRC 13.

EASTERN PENNSYLVANIA – SCM, George S. Van Dyke, Jr., W3HK – SEC: W3ICC. RMs: W3EML, K3MVO, W3MPX, WA3AFI. PAMs: WA3GLI, K3PSO. VHF PAM: W3FGQ. OO reports were received from W3KEK, K3EMA, K3RDT, K3WEU; OBS reports from K3EMA, WA3AFI, WA3FMI, WA3JZB; OVS reports from W3CL, WA3MCK, WA3FMI, WA3JWL, WA3HVR, WA3NZA, *WA3JZB. Those making the BPL: W3CUL, W3VR, W3MPX,* WA3FMI, PSHR: W3EML, K3OIO, W3MPX, WA3CKA, WA3FMI, *WA3FPM, K3MVO.*

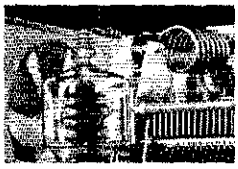
Net	*kHz*	*Operates*	*QNI*	*QTC*	*RM/PAM*
EPA	3610	6:45 P.M. Dy	294	321	W3MPX
PITN	3610	6:00 P.M. Dy	221	200	WA3AFI
PFN	3960	5:30 P.M. M-F	433	312	K3PSO
WWN	28800	10:15 P.M. Dy	9	0	WA3FPM

Penn Wireless and West Jersey Radio Amateurs repeater committees, chaired by W3ICC and K2QIJ, are joining forces for a repeater in this area. It will be on 146.91 MHz. WA3NZA is going all out for fm on 2 meters. New Novice WN3PDN has worked 13 states already. W3CUL had some cutting done; it also cut into her schedules! W3EML reports reports the back-to-school time makes net rosters *fluid for a while. W3MPX seems to be doing as well as anyone on 6* meters using his 80-meter dipole! WA3JSU will probably be checking in from school in Conn. Fall *EPA Newsletter* is out and we are looking for someone to handle a fall dinner meeting. Any takers? WA3CKA is ONI EPA with 5-watt transistor rig. WA3IYC passed the Extra Class exam. WA3JWL is leaving EPA and going to Md. WA3HVR got four new Novices started at camp this summer. W3JSX is vacationing in Puerto Rico. W3RC says DX is good on 6 these days. WA3ILF is on 6 ssb with 12 watts PEP! WA3MM runs the BEARS Net on 50.76 MHz Mon. at 8:30 P.M. and is looking for *check-ins. New licensees are K3NGD and WA3MBN. WA3MBU is* now General Class. W3OR is working on his antennas. W3KV is now *W4CX. W3EGQ and WA3IGY are busy with Navy MARs. W3RC* says his homebrewing days are about finished! Traffic: (Aug.) W3CUL 3214, W3VR 1523, W3EML 493, W3MPX 400, WA3EXW 278, K3NSN 218, WA3LAK 217, WA3AFI 168, K3MVO 154, WA3FMI 145, WA3LMO 144, WA3ATQ 138, K3BHU 104, K3PIE 96, WA3JSU 80, WA3LVC 63, WA3JZB 62, WA3CKA 60, K3OIO 57, WA3FPM 50, W3NNL 47, WA3IYC 42, W3HNK 22, K3PSO 22, W3VAP 17, W3HK 16, K3HKW 13, WA3EEC 11, W3VA 11, WA4TMY 11, K3KTH 9, WA3JWL 8, WA3HVR 6, W3ISX 5, *W3ADE 4, W3BNR 4, W3OY 4. WA3BJQ 2, W3CL 2, WA3IAZ 2,* WA3UIV 2, K3EMA 1, W3EU 1, K3FOB 1, W3ID 1, W3KEK 1, *K3VAX 1,* W3YPF 1. (July) *K3BHU 179, WA3JZB 29.*

MARYLAND-DISTRICT OF COLUMBIA – SCM, John Munholland, K3LED – SEC: W3LQY. PSHR (Aug.): W3TN, *W3EZT. BPL: W3TN. New appointment: W3QCW as ORS. W3ZNW* says the MDDS seems to be going great as the late session for ML W3EQV had a ball all summer "eveballing" old friends and new all the hamfests. WA3NHG jumped from Novice to Advanced Cl in one giant leap. W3EWP reports that K8GQV/3 in Annapoli now Extra Class. K4CGY and WA4JJF briefed the Aug. meeting the Foundation for Amateur Radio on problems associated w incentive licensing and distributed copies of a petition, RM-16 filed with the FCC July 22. W3FA, longtime iron-man NCS MDD, started a 4-fri. holiday from NCSing Aug. 28. W3 *continues his dedicated pursuit of Intruder Watch activities. K3N*C renewed many friendships at the Winchester and Delaw Hamfests. WA3NUH/K1TKS has transferred his traffic activity fr Conn. to Md. W3FZV, ex-W4TFX/3, is running a 14XB/R4B rig indoor antennas. W3ECP reports WA3CZZ is a freshman at Carne Tech. and WA3AJR has matriculated at Maryland U. Medi School. WA3MJF has his SB-102 on the air. WA3MLI, new Gene Class, operates portable 8 from Ohio U. and is looking for his M. friends on 40 and 80 meters (cw and phone). W3QCW, former *of MDD, will be a candidate for SCM of MDC. Don't miss the* Hamfest at Gaithersburg Fairgrounds Nov. 1 or the Jerm Hambanquet at the American Legion Hall in Arbutus Nov. *Traffic:* W3TN 215, WA3LFU 96, W3EUS 83, W3EZT 59, W3 53, K3LED 45, WA3MJF 27, W3EQV 22, K3GZK 22, W3ECP WA3LKJ 16, W2ZNW 15, WA3IHW 14, WA3NUH 12, W3FZV WA3GXN 9, K3GPN 8, K3QDC 8, K3NCM 2, W3EWP 1, WA3N 1.

SOUTHERN NEW JERSEY – SCM, Charles L. Travers, W2Y – SEC: W2LVW. RM: WA2BLV. The NJ QSO Party wa tremendous success. WB2APZ scored 24K for Cape May and the submitted by a former NJ resident and section member, W2ZV presently located at 1909 Moon N.E., Albuquerque, New M WB2VPR announces the following totals for Aug. for the NJ S Net: 26 sections, 79 stations 44 QTC, 33 QSP for Net M WB2FEH. WB2VPR also reports results on the NJN Late WA2BLV Net Mgr. as follows: 31 sections, 216 stations, 224 Q *126 QSP. W2QRS continues to scan the airwaves and finds very* instances of bad practice. WB2VEJ is commended for outstanding traffic report. It is a pleasure to see so many of stations sending in regular reports with station activities. WB2H reports the purchase of an HW-100. WB2JSS submitted his re card in spite of a busy summer. A new ORS appointee is WB2D K8JLF made his final report before moving to I-Land where he *become a member of the Harvard University Faculty.* WB2I expects to locate at a new QTH, shortly, possibly 6-Land. Tra *(Aug.) WB2VFJ 111, K2RXB 28, W2YPZ 16, W2CKF 13, W2IL* WA2KIP 10, W2IQ 6, W2ORS 4, W2PU 4, WB2DVB 2, WB2SI WB2APX 2, WB2HMU 1. (July) WB2WHB 3.

WESTERN NEW YORK – SCM, Richard M. Pitzeruse, K2K – Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2RUF. Leade appointees and section nets appear in July *QST*. Please note SCM's new address: 407 Woodland Rd., Syracuse, N.Y. 13 WB2QGK has a complete S/Line in his office. NYS cleared messages in Sept. with a total of 790 check-ins. WA2PZD/WB2 *has gone back to RJ1 but before he went he turned in an OO r* that looked something like the Manhattan phone directory. K. is leaving for PY2-Land and Sao Paulo. *K2KZJ has retire* Florida. W2PVI reports the number of call letter plates a following picnics: Gassers 26, NYSPTEN 30, NYS 40, W2RQF over as mgr. of the NYPON CW Net as WA2CAL makes for Co WB2SMD likewise heads for Clarkson. W2CTP has a new Signa on the air and hopes to soon add an Alpha Seventy Linear. welcomes contributions of material for the ECARS *Monitor*, *be edits. The Glens Falls Area AREC Net still operates Mon. at* local time on 51.0 MHz. WB2RPL and WB2ACI assisted WB *when he discovered a fire in a camping vehicle along Interstat* WA2PCK is a new Tech. WA2PAU has moved back to Sa Springs. The NYPON gang held its picnic at Delta Lake Parl Rome. W2RUT claims he's "gettin' chicken" because he won the nets in lightning storms any more. The Chautauqua C RACES guys now have positive identification cards complete color photos and fingerprints. WB2VVZ is going to C WA2JCB is ex-WL7GKB. K2BUI is active as CEØAE on Island. A new Novice in Elmira is WN2PKE. Ex-WN2LMD *WA2PHZ. RARA Hamfest master-mind WA2KND is now w*



Here's the exciting new Heath SB-220 2 kW Linear Amplifier. Running maximum legal power on amateur bands between 80 and 10 meters, this compact powerhouse features two rugged EIMAC 3-500Z zero bias triodes in proven grounded grid circuitry. Note the modern desktop styling and the heavy duty components. And note the use of the reliable 3-500Zs. Heath chose EIMAC because these dependable tubes are ideal for heavy-duty operation, around the clock, around the world. And the two tubes have a total plate dissipation rating of 1000 watts.

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in Syracuse and commuting home week ends. Support your local ARRL affiliated radio club. PSHR: W2s FR, RUF, MTA, QC, K2s KIR, KTK, WA2s BFX, ICU, BPL: W2OE. Traffic: W2OE 388, WA2ICU 288, W2FR 221, K2KQC 206, W2MTA 151, W2FEB 113, W2RUF 103, W2HYM 65, W2RQF/2 57, K2KTK 51, WB2VND 49, WB2NNA 46, W2MSM 43, WA2BEX 41, K2KIR 37, WB2LQP 33, K2OFV 26, K2UIR 26, K2DNN 18, W2AFB 17, K2IMI 17, WA2ILE 15, WB2JZN 15, W2RUT 13, WB2HLV 12, W2PZL 10, WB2VBK 10, W2PVI 8, W2CFP 6, K2AYQ 5, WB2YEE 3, WA2ANE 3.

WESTERN PENNSYLVANIA – SCM, Robert F. Gawryla, W3NEM – SEC: W3KPJ. PAMs: K3ZNP, W3WFR. RMs: W3LOS, W3KUN, WA3AKH. WPA CW Traffic Net meets daily on 3585 kHz at 2400Z; WPPN daily at 0300Z on 3955 kHz ssb; KSSN on 3585 kHz at 2330Z. These nets are members of the National Traffic System (NTS). The following nets meet for the convenience of the locals but others are welcomed: Breezeshooters 9:00 P.M. Mon., Westmoreland and Allegheny County AREC Net, Wed. 8:00 P.M., both meeting on 29.0 MHz. Allegheny County AREC Net meet at 0100 GMT Tue. on 6 meters. The Foothills Radio Club Novice Net (FRC) meet on the 40-meter Novice band daily. New advances in license classes are W3LTH, W3KVS, W3VFN to Extra, W3GJY and WA3KFX to Advanced, WN3MAU to General. W3UHN is making a fabulous comeback in the traffic circles. Tony made 23 QNI into WPA out of a possible 31 and for shift work that isnt bad. K3HKK, the Nittany ARC, reports a very fine week of traffic-handling at the yearly Grange Fair, with K3HKK finally earning the BPL Medallion. WA3NAZ also reports a fine week of activity at the Green County Fair. The Radio Association of Erie is again sponsoring code and theory classes. The newly-formed Presque Isle Radio Club also is sponsoring code and theory classes. Erie hams have a direct line to the Vatican via HV3SJ. WPA traffic totals for Aug. showed 31 sessions, 370 stations,QNI and 200 messages. Traffic: K3HKK 192, WA3IPU 173, K3ZNP 166, W3NEM 165, W3ATQ 115, WA3NAZ 107, W3LOS 101, W3KUN 96, K3HCT 36, K3SMB 31, W3UHN 25, K3HID 22, W3YA 12, W3UT 9. Total 1255.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – SEC: W9RYU. RM: WA9ZUE. PAMs: WA9CCP and WA9PFI (vhf). Cook County EC: W9HPG.

Net	*Freq.*	*Times(Z)/Days*	*Tfc.*
IEN	3940	1400 Su	4
ILN	3760	2330 Dy	143
NCPN	3915	1300/1800 M-Sa	102
Ill PON	3915	1430/2245 M-F	696
Ill PON	145.5	0200 MWF	2
Ill PON	50.28	0200 M	4

W9HRY reports that the Ninth Region Net traffic count was 372. W9NWK is now W7HUB and W9NWI is now W7HTZ. Their QTH is 13817 Tan Tara Drive, Sun City, Ariz. 85351. The DXCC gang held its Annual Get-together and Banquet at the Marriott Inn in Chicago and many an eyeball QSO was held. WA9ZWY has a new 10- and 15-meter quad to bring in the rare ones. W9DYP, WA9WJS, W9KWA and W9EN are also installing new quads. WA9GQK and fiancee were married recently. WB9BXXs new QTH is 309 North Church St., Roanoke, Ill. 61561. WB9DPU has a new 80-meter center-fed at 60 feet. Decatur has a 2-meter repeater transmitting on 146.90 MHz and receiving on 146.340. WA9TEC did the hard work on the project. Quite a few from 9-Land were seen at the National Convention in Boston. The Peoria Hamfest was also held the same week end with usual overflowing crowd. W9LMH and WA9VIY received their DXCC certificates. W4UHI and WB4OGQ will be operating portable at 774 Easy St., Glendale Heights, Ill. while awaiting their 9 calls. WA9HGH was killed in a motorcycle accident. Our sympathy to his family and friends. Phillip E. Redman's new call is WB9EKC. WA9ZBP has a new SB-101. New appointees include WB9BXX as ORS and WB9EKC as OVS. WA9WNH and WB9BXX are BPL certificate recipients. Traffic: (Aug.) WA9WNH 927, WB9BXX 273, WA9ZUE 117, WB9DPU 100, W9NXG 99, W9HOT 95, W9JXV 57, W9DOQ 55, W9YH 53, WA9ZPL 40, WA9RTB 39, W9FLF 38, W9FHJ 21, WA9NZF 17, WA9SFB 17, W9PRN 16, WA9BRQ 14, WA9LDC 14, W9HJM 10, K9RAS 8, K9HSK 3. (July) W9JXV 64.

INDIANA QSO PARTY

This contest, sponsored by the Indiana University Purdue University of Indianapolis will take place from 1900 GMT Dec. 5 to 0600 GMT Dec. 6 and from 1600-2400 GMT Dec. 6. It is open to all amateurs. Stations may be worked on different modes and different bands. The exchange will be QSO number, report and state, province or country. Indiana stations give number, report and county. Indiana stations may work other Indiana stations. Suggested frequencies: cw, 3535 7035 14035 21035 28035; phone, 3955 7265 14295 21395 28600 50400 kHz. Scoring system: Score one point for each contact and multiply by the number of states, provinces or countries. Out-of-state station use the number of different Indiana counties worked for the multiplier. Awards: Certificates will go to the first place winner in each state, province or country and first place in each Indiana county. A special award will be given to the highest scoring stations in and out of state. The mailing deadline is Dec. 31, 1970. Send your log to Contest Chairman T.J. Thamann, WA9MXG, 5013 Nowland Ave., Indianapolis, Ind. 46201. For results, please include an addressed stamped envelope.

INDIANA – SCM, William C. Johnson, W9BUQ – SEC: W9FC. RMs: W9FC, W9HRY, WA9WMT, WA9ZKX. PAMs: K9CRS, WA9OHX, W9PMT (vhf).

Net	*Freq.*	*Time(Z)/Days*	*Tfc.*	*Mgr.*
IFN	3910	1330 Dy 2300 M-F	150	WA9OHX
ISN	3910	0000 Dy 2130 M-S 2300 S-S	280	K9CRS
QIN	3656	0100 Dy 0300 Dy	222	WA9WMT
IFN	3740	0100 Dy	49	WA9ZKX
PON	3910	1245 Su	88	WA9UMH
PON VHF	50.7	0200 M-Su	25	WA9TJS
Hoosier VHF			19	W9PMT

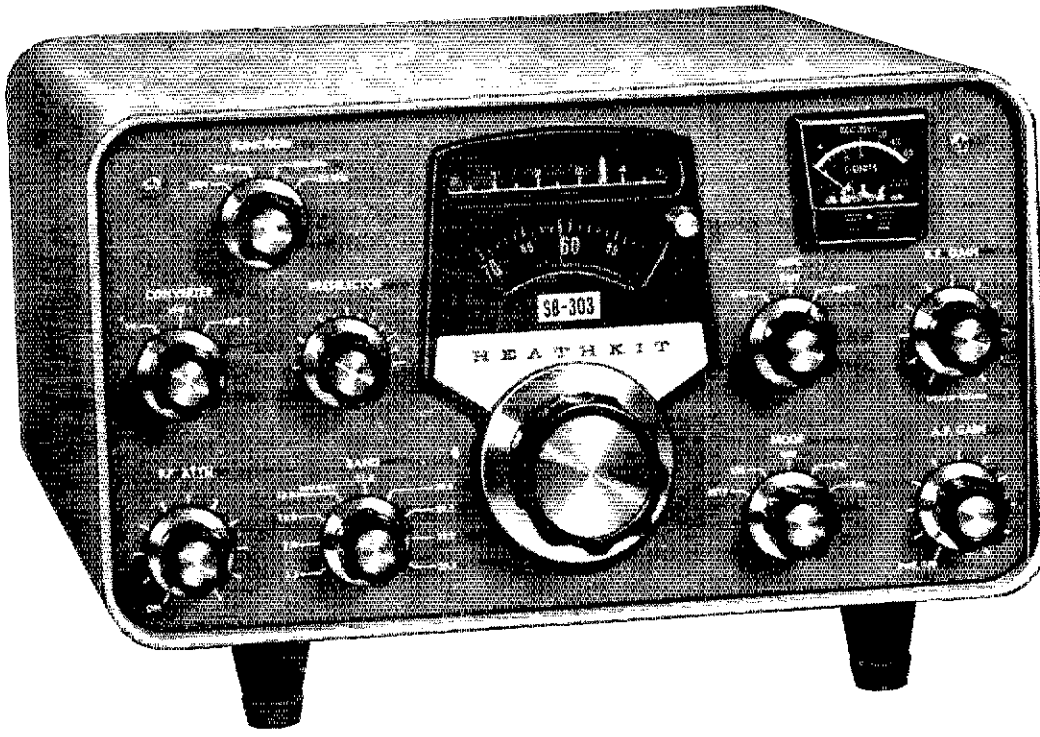
EC for Floyd County: WA9IDG. Appointment: W9GX as OO. K3UWZ, from New Windsor, Md., has moved to N. Manchester and has the new call W9LVX. WA9EAU is a member of the Ft. Wayne Repeater Assn. W9HWR is building a new rig. WA9PQM soon will have a new tower. W9BUQ has painted his tower. WA9AVV, of Fort Wayne, handled traffic from Peru during the recent disaster. W9BDG is moving to Fla. Aug. traffic was down because of vacations. Don't forget to read page 72 of Sept. *QST* about the PSHR new point system. WA9VBG spent most of his vacation in bed. There has been some interference on the Ind. Net at 0000Z and 2300Z such as blowing in the mike and a 60-cycle note that made communication impossible. This station never gave its call and went off after the net was over. All Indiana phone nets operate on 3910 kHz; Red Cross has its mobile van in operation. QIN Honor Roll: W9HS 26, W9BDP 25, K9VHY 23, WA9VZM 21, W9JBQ 17, WB9ANT 17, WA9MXG 16, WA9WMT 16, W9QLW 15, WA9ZKX 15. *Amateur radio exists because of the service it renders.* Traffic: WA9VZM 292, WA9ZKX 256, W9EWH 247, WA9OHX 152, WA9WMT 134, W9HRY 113, K9CBY111 W9JBQ 105, W9GGW 70, K9YBM 62, K9RWQ 44, K9CRS 35, W9BUQ 27, K9VHY 26, WA9WJA 26, WA9GJZ 25, WA9VBG 23, W9MVV 21, WA9TJS 21, W9PMT 18, K9RPZ 17, K9ILK 14, W9LG 13, W9YYX 12, W9ICU 10, K9JQY 10, W9LWI 10, W9UEM 9, K9QVT 8, WA9CHY 7, K9KTB 7, WA9BHG 6, W9DZC 6, W9FC 3.

WISCONSIN – SCM, S.M. Pokorny, W9NRP – SEC: W9NGT. PAMs: WA9EZT, WA9IZK, WA9OAY, WA9QKP, WA9QNI. RMs: W9HQT, K9KSA. Late net reports for July: WIN, QNI 195, QTC 68; SW6RN, QNI 136, QTC 2.

Net	*Freq. Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
WSSN	3662 0030 TTS	42	8	K9KSA
WIN	3662 0115 Dy	270	71	W9HQT
WRN	3620 0130 Su (RTTY)			K9GSC
SW2RN	145.35 0230 Dy	238	14	WA9IZK
SW6RN	50.4 0300 M-S	208	2	WA9EZT
BWN	3985 1245 M-S	336	178	WA9OAY
BEN	3985 1800 Dy	717	80	WA9QKP
Wi-Pon	3925 1801 M-F	374	90	W9EMC
WSBN	3985 2300 Dy	1224	178	WA9QNI

W9VCM has asked to be relieved as Wi-Pon Mgr. and W9EMC has been selected as new Mgr. Welcome to WB9DLL, ex-KG6AQI. Sure would like to get addresses of radio club officers, as well as information on when you will be holding your club picnic in '71. If we have this information at a central point we might be able to eliminate some of the doubling and tripling of hamfest or picnic dates. The Wisconsin Hamfest/Picnic sponsored by the WNA will be held Sun., July 11, 1971, so mark that date on your calendar. Would appreciate news of club activities for this column. Traffic: (Aug.) WB9BJR 543, W9CXY 236, W9ESJ 140, K9CPM 135, WA9QNI 72, K9JPS 58, WA9ZTY 57, W9NRP 48, W9HQT 40, WB9ABF 38, K9FHI 38, K9KSA 36, W9AOW 33, W9KRO 31, K9TBY 31, WA9OAY 25, WA9YEC 21, W9IND 19, W9RTP 17, WA9PKM 8, W9DXV 7, WA4ICF/9 6, WB9BAH 5, W9ONI 4. (July) W9CXY 171, K9CPM 161, W9HQT 44, W9DXV 16, W9OMT 10.

Introducing the New Heathkit® SB-303



the "303"... the new standard of performance in receivers

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The New Heathkit SB-303... another hot performer in the world-famous SB-Series. The "300" and "301" were the choice of thousands because of their obvious performance superiority and value... and the new "303" delivers even more of both.

Advanced Design. A dual-gate MOSFET front end provides greater dynamic range and large signal handling capabilities with low distortion... new RF attenuator allows adjustment of receiver sensitivity to copy weak signals without danger of overloading on strong ones. An all solid-state circuit employing the latest in techniques and devices gives instant warmup, 100 Hz stability in 10 minutes and superior tracking. The exclusive Heath solid-state LMO with 1 kHz dial readout is factory assembled and aligned to assure peak performance and provide the smooth, linear tuning that's become a hallmark of all SB-Series gear.

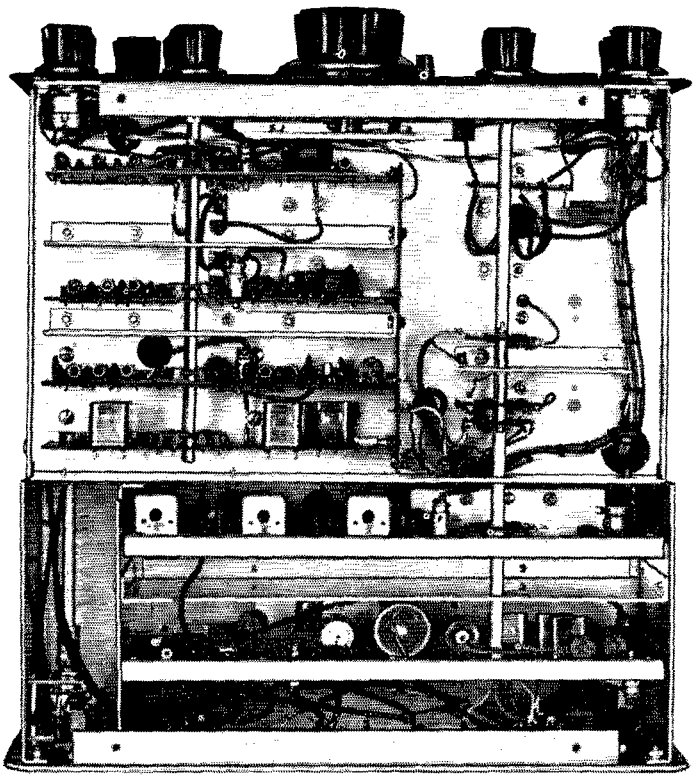
Compare The Performance Features. The new SB-303 offers all the features required for today's operations... and they're built-in, not added on later as costly options. The "303" giv complete SSB/CW transceive compatability with the famo "400" or "401". Three position AGC gives the versatil needed for different conditions: Slow limits the amount background noise present between words and syllables 5/9 copy... Fast position allows scanning large portions the band without the AGC interruption that slow AGC wo cause under this condition. To spot the new subband allo tions quickly and simply, just turn the crystal calibrator to 25 kHz position. Work the high bands? The "303" has ante & power connections already installed for up to two VHF c verters, and front panel switching eliminates cable chang Spare sockets on the rear panel allow the "303" to be u with a wide range of famous Heath Station Accessories.

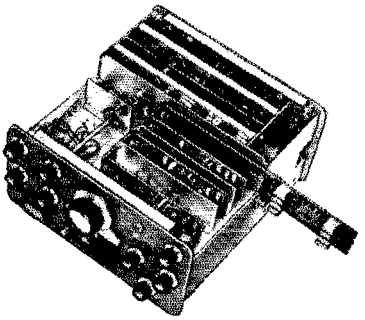
Compare the Specs. Most any receiver will do the job w the bands are hot...but you need good specs when the ba start to go — and the "303" delivers. Sensitivity: less tha quarter of a microvolt for 10 dB S+N/N. Selectivity: 2.1 with the standard SSB crystal filter, and low cost optio filters for CW & AM can be selected from the front pa Image Rejection: 60 dB or more. IF Rejection: 50 dB or be Spurious Response... Dial Accuracy... AGC Characteris ...check *all* the specs. You'll see the SB-303 delivers r for a lot less than others.

New Construction Techniques mean faster assembly, chance for error. Wiring harnesses and nine plug-in ci boards combine to practically eliminate point-to-point w ...and the special extender boards (see photo opposite) able you to bring any board out of the compact chass check voltage and resistance readings without probing tight spaces. And, of course, the famous Heath manual gu you a step at a time, with clear, concise instructions and fold-out pictorials.

Check Out The New "303"... send for a free spec shee see how other receivers stack up for performance, val price. Then order your new "303"... another FB piece of — from the Hams at Heath, of course.

Solid-State Amateur Receiver... $319.95*





Inside The New "303". When the Hams at Heath design gear, it not only looks good ... it's easy to work on should you ever have to. Because of the compact design, we've innovated a special technique to make service and adjustment easy — extender boards. These special boards allow you to bring any board out away from the chassis ... and patchcables supplied mean you can make checks and adjustments while the "303" is operating. Note the liberal use of shielding between circuit boards that contributes to greater stability and more rugged mechanical design.

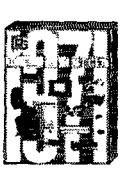
Kit SB-303, 19 lbs. **$319.95***

SBA-301-1, optional 3.75 kHz AM crystal filter, 1 lb. ..**$20.95***

SBA-301-2, optional 400 Hz CW crystal filter, 1 lb. ...**$21.95***

SB-303 SPECIFICATIONS: Frequency Range (MHz): 3.5 to 4.0, 7.0 to 7.3, 14.0 to 14.5, 15.0 to 15.3, 21.0 to 21.5, 28.0 to 30. **Intermediate Frequency** (IF): 3.395 MHz. **Frequency Stability:** Less than 100 Hz drift per hour after 10 minutes warmup under normal ambient conditions. Less than 100 Hz drift for ±10% line voltage variation. **Frequency Selection:** Built-in Linear Master Oscillator. **Modes Of Operation:** SSB — Single sideband (suppressed carrier, with selectable upper or lower sideband). CW — Keyed continuous wave. AM — Amplitude modulated continuous wave. RTTY — Radio teletype (frequency-shift keyed continuous wave). **Sensitivity:** Less than 0.25 uV for 10 dB S+N/N for SSB operation. **Overall gain:** Less than 1.5 uV input for 0.5 audio output (single tone SSB). **AGC characteristics:** Blocking — Greater than 3.0 V CW/SSB/RTTY. Dynamic Range — Greater than 150 db CW/SSB. R.F. Attenuator: Variable 0-40 dB nominal.

Selectivity: SSB — 2.1 kHz @ 6 dB down, 5.0 kHz maximum at 60 dB down (crystal filter supplied). CW — 400 Hz at 6 dB down, 2.0 kHz maximum at 60 dB down (crystal filter available as an accessory). AM — 3.75 kHz at 6 dB down, 10 kHz maximum at 60 dB down (crystal filter available as an accessory). RTTY — 2.1 kHz at 6 dB down, 5.0 kHz maximum at 60 dB down (uses SSB crystal filter). **Image rejection:** 60 dB or better. **If Rejection:** 3.395 — greater than 55 dB, 8.595 — greater than 50 dB. **Spurious Response:** All below 1 uV equivalent signal input. **Temperature Range:** 10°C ambient. **Dial Accuracy:** Electrical — Within 400 Hz after calibration at nearest 100 kHz or 25 kHz point. Visual — Within 200 Hz. **Calibration:** Every 100 kHz or 25 kHz. **Dial Backlash:** No more than 50 Hz. **Antenna Input Impedance:** 50 ohm nominal unbalanced. **Audio Response:** SSB — 350 to 2450 Hz nominal at 6 dB. CW (with accessory filter) — 800 to 1200 Hz nominal at 6 dB. AM (with accessory filter) — 200 to 3500 Hz nominal at 6 dB. RTTY — 1840 to 3940 Hz nominal at 6 dB. **Audio Output Impedance:** Matching Speaker — 8 ohm. Matching Headphones — Low impedance. **Audio Output Power:** 4 watts at less than 10% distortion. **Muting:** Open external ground at Mute socket. **Power Requirements:** 105 to 125 or 210 to 250 VAC, 40 watts maximum. **Front Panel Controls:** Main tuning dial; function switch; mode switch; band switch; AGC switch; converter switch; AF gain/power on-off; RF gain/speaker disable; preselector; noise blanker/off-on-threshold. **Circuit Board Controls:** IF/Audio — Bias adjust; meter zero; meter full scale. Power Supply/BFO — + 15 V adjust; 100 kHz adjust. RTTY — Wide Shift; narrow shift; CW shift. **Connections:** Rear Panel — Phones; HF antenna; VHF antenna #1, VHF antenna #2; mute; antivox; speaker; HFO out; LMO out; VFO out; CW shift; four spare sockets; 3-wire line cord socket; accessory socket: VHF Converter, + 15 VDC @ 25 mA, switched. RTTY Keyboard. **Cabinet Dimensions:** 12¼" W x 6⅝" H x 13" D. **Overall Dimensions** (with knobs & feet installed): 12¼" W x 7⅛" H x 14" D. **Net Weight:** 15¾ lbs. **Note:** specifications measured with 120 VAC line voltage at 25°C.



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DAKOTA DIVISION

MINNESOTA — Acting SCM, Bob Schucting, WØBE — SE WAØMZW. RMs: WAØURW, WAØIAW, WØAAU. PAMs: WAØDW WAØHRM, WAØMMV, WAØOEJ. Net schedules in last months QS and summer net activity has been excellent. WØRQJ hosted t MSN Picnic, which was honored by the attendance of Direct WØPAN and ARRL Vice-Pres. WØBUO, in addition to a number RMs, PAMs and other officials. Interest in emergency activit remains high, although we have been very lucky this summer. AR appointments are available from your EC, SEC or SCM. We a invite applications for new appointments of all types and hope t inevitable fall pick-up of activity will bring out new interest. WØZS was given the award as Minnesota Amateur of the Year at the S Cloud Hamfest. Ned also has been appointed Asst. Director for t Dakota Division. This will be about the last chance our weath allows for antenna work, so get set for the fall and winter operati activities! Traffic: WAØVAS 623, WAØTOT 280, WØBUO 19 WAØIAW 150, WAØWEZ 145, WØZHN 111, KØCSE 109, WAØYM 88, KØZXE 41, WAØHRM 32, KØMVL 32, KØORK 28, WØBF KØZRD 24, WAØIFC 23, WAØJPR 22, WAØRKV 22, WAØTFY WAØVTZ 19, WAØNQH 17, WAØRKF 17, WAØVHX 16, WØAA 15, KØICG 14, WAØYAH 12, WØPAN 10, WØU^X 10, KØLT WØEOO 7, WNØASX 6, WØKLG 4, WØYC 4, WNØAOE 3, WØ 2, KØZBI 2, WAØMNE 1, WAØSZJ 1, WNØYVT 1.

NORTH DAKOTA — SCM, Harold L. Sheets, WØDM — SE WAØAYL. OBS: KØSPH. PAM: WØCAO. RM: WØRSR. OO: WØH It is with deep regret that we report the passing of WAØTBR, w joined the Silent Keys the latter part of Aug. Work has been start to activate the UND Student Center Radio Club station, WBØBCZ. 1I6DX beam has been mounted and several dipoles but the tello are waiting for the operating room to be finished. WAØWBU i freshman at UND. WAØIVH visited WØDM and advises he planning to get on 75 meters soon. He reports a fine trip to Norw this summer where he was a guest of the Norwegian Governme WNØBPB got on the air with an HW-16 operating 40 mete *KØAWU, WØLIR/Ø, KØOSL and K5DFD/Ø are on 146.94 fm a* doing OK. WØCGS is on 6 and 2 meters also. If there are any mo *please report activity. WAØVMA helped WBØBHJ to install t* tuning unit for the blind on the TR-3 which he received fro *KØBIH. KØBIH has joined Silent Keys recently. The Fargo Ra* Club started fall activities in Sept.

Net	*kHz*	*CDT/Days*	*Sess.*	*QNI*	*QT*
Goose River	1990	0900 Su	8	58	
NDPON	3996.5	0900 S-Su 1830 S	15	240	
NDRACES	3996.5	1830 M-F	16	347	
NDN CW	3640	2100 M-F	5	8	

Traffic: KØSPH 31, WAØRSR 14. WØDM 6, WØCDO 4.

SOUTH DAKOTA — SCM, Ed Gray, WAØCPX — The number AREC members in the section stands at 115, with 83 full and limited members. WAØYAK is our newest EC. Your SCM enjoy visiting a large number of amateurs in the section this summer any clubs would like me to come to any meetings please let know. If you have any ideas that you would like to express ple drop me a line about them. I would like to thank the following sending me activity reports: *WØIPF, WØSMV, WAØLYO, WAØR* WØHOI, WAØLUZ and the net managers. I am sorry to report t *WAØRIQ had a fire which destroyed part of his gear. WØLX is* new pres. of the Sioux Falls Radio Club. All the nets show *increase in activity.*

DELTA DIVISION

ARKANSAS — Acting SCM, Jimmie N. Lowrey, WA5VW SEC: W5PBZ. RM: WA5TLS. PAM: WA5KJT. WN5BID has wor 53 countries after being on the air four months. WA5SOG is new EC for Crawford County. WA5BDP, W5RXU and WA5KJT now on 2-meter fm. WA5PGZ has a new linear running a pa 813s. Congratulations to WA5RNG on passing the Advanced exam. WA5GPO once again made the BPL. WA5VDH has worked 240 countries with his SB-100. WA5FLL plans to chang QTH but will remain in Little Rock. W5PBZ plans to begin the net soon. WA5ELFN/Ø is now WBØCIW. Net reports for June:

Net	*Time(Z)/Day*	*Freq.*	*Tfc.*	*QNI*	*Mins.*	
OZK	0000 Dy	3790	69	157	611	WA5
RN	2330 Dy	3995	45	625	475	WA5
PON	2130 M-F	3925	79	293	600	W5
APN	*1100 M-F*	*3937*	*3*	*312*	*1266*	W5
DX INFO	2345 Mon	3860				WA5

Traffic: WA5GPO 853, WA5TLS 68, WA5VWH 43.

LOUISIANA — SCM, J. Allen Swanson, Jr., W5PM — W5OB. RM: K5ANS. VHF PAMs: WA5DXA, W5UQR. New off

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of the Westside ARC are WA5PWX, pres.; WA5TPS, vice-pres.; W5OB, secy.; W5MQ, treas.; W5OUD Act. mgr. WA5IFW and WA5MMD passed the Extra Class exam at the Beaumont Convention. WA5PAA is back from school in North Dakota. WN5ZNV would like to work all Louisiana parishes on the Novice bands. W5KKZ has joined AREC. New officers of the Greater New Orleans ARC are WA5WPV, vice-pres.; WN5AHG, secy.; W5GZJ, station trustee; W5JYK, program chairman. We regret to report that W5MQ passed away Aug. 24. The Central Louisiana ARC Hamfest '70 was a big success. WA5TYJ is now on ssb. WN5ZZN is inactive because of work. WN5ZZA needs Alaska for WAS. WA5DXA reports a new vhf club in New Orleans. K5ANS has been ORL teaching and studies. WA5VQE is new net mgr. for LAN. WN5YRU passed the General Class exam. WN5BPI is installing a matchbox and trying for DX. WA5NYY is now on ssb. W5EA wants cooler weather. W5SKW reports regularly for AREC in Southwest Louisiana. The Old Croney Net meets on 3905 every morning with W5BMM, WA5CAU, W5CEW, W5GMO, W5BV, W5OB, W5VUH/M, WA5SIK, W5DHF and others. W5EKF is the new EC for Algiers and the Westside area. W5NGA is a new EC for St. Tammany Parish. Traffic: (Aug.) WA5VQE 262, W5MI 128, W5EA 8. (July) W5MI 105.

MISSISSIPPI – SCM, Clifton C. Comfort, WA5KEY – Asst. SCM and PAM: Walker J. Coffey, W5NCB. SEC: WA5JWD/WB5AHF. PAM GCSBN: W5JHS. WA5UYW, MSBN Mgr. is back from vacation. New NCSs for MSBN are WA5TMC, WA5TWI, WA5OBQ, WA5SUE, WA5SIM and WA5MPQ. Tippa Co. Fair station was WA5TMC/5 with K5KIR, K5YPV, K5DGL, WA5EMJ assisting with operations. WA5EIN apologizes for the low traffic count of 55. W5NCB now has DXCC and WAS certificates. New Novices in Biloxi and Gulfport are WN5BVO and WN5BVP, the XYLs of WA5SUE and W5PDG. Also new are WN5CEQ, Pascagoula, and WN5CGT, West Point. New Generals are WB5ABR and WB5CKK. K5ZEM is the proud owner of a Seeing Eye dog. W5MGR has his 25-year button from ARRL; he is back on the air with a new ssb rig. Check into the MTTN Slow-Speed ew net.

Nets	*Freq.*	*CDT/Days*	*Mgr.*
MTTN	3605	1845 Dy	W5SBM
GCSBN	3925	1830	W5JHS
MSBN	3990	1915 Dy	WA5UYW
Shrimp	146.94	2000 Dy	WA5KYR

Traffic: (Aug.) W5SBM 274, WA5EIN 55, WA5TMC 37, W5EDT 35, W5WZ 32, W5NCB 20, WA5UYW 16, W5BW 15, WA5KEY 15, WB5BUE 5, W5PDG 4. (July) W5SBM 117.

TENNESSEE – SCM, Harry A. Phillips, K4RCT – SEC: WB4ANX, RM: K4AMC. PAMs: W4PFP, K4MQL, WA4EWW.

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TSSB	3980	2330 Tu-Su	26	1310	47	K4MQ
TPN	3980	1145 M-Sa 1300 Su	31	1294	38	W4PF
ETPN	3980	1040 M-F	21	508	18	WA4EWW
TPON	3980	2330 M	5	157	19	K4RTA
TN	3635	0000 Dy	31	101	39	K4AMC
ETVHF	148.2		8	43		WB4IOE
RTVHF	50.4		12	124	5	WB4IOE
TeMSN	50.115	0015 Th	3	19		K4LQ
ETTMN	26.8	0130 W&F				K4LTA
MTTMN		0100 Tu&Th	9	60		WA4GLS

The Tri-City meetings of Bristol, Kingsport and Johnson City have met with much success and will soon become known as the Quad-City meeting as Greenville joins them. The MARA (Memphis) sponsored a ham school again this year. K4IQO reports that hon "Mayday" calls have been heard on 6 meters. WB4GSS is now operating from WA4UCE at Tenn. Tech. Traffic: W4ZJY 208, W4OGG 165, W4SQE 71, WA4UAZ 29, W4WBK 28, K4AMC 25, W4PFP 24, K4SJV 18, WB4ANX 14, WA4YNF/4 13, K4LQO 1 WB4GSS 8, WB4MPJ 8, W4TYV 8, WA4GLS 4, WB4DYJ WA4ZBC 3, W4SGI 2.

GREAT LAKES DIVISION

KENTUCKY – SCM, George S. Wilson, W4OYI – SEC: K4YZU Appointments: WB4AXO as PAM, WB4KER, WB4NQZ as ORS. Endorsed: W4CSN, WA4RZS as ECs, WB4EOY, W4UK, W4BTA WA4VUE as ORSs, K4TRT as OPS and PAM, W4BAZ as ORS an OBS. BPLs: W4OYI (medallion winner), WA4MKH.

Net	*QNI*	*QTC*	*Net*	*QNI*	*QT*
KRN	311*	26	KNTN	48	
MKPN	511*	152*	KYN	333	3
KTN	872*	47	KCATN	60	

W4BTA is chmn. of Red Cross Communications in Louisville, W now have 61 active hams holding appointments as follows: ORS 2 OPS 22, EC 18, OVS 7, PAM 5, OO and OBS 4 each, SEC and RM

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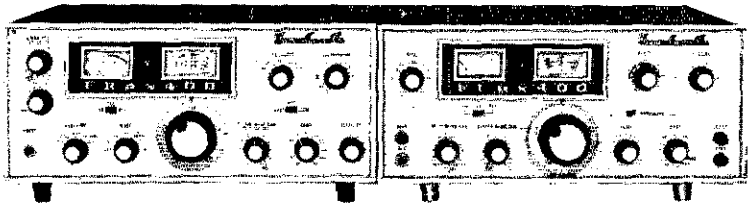

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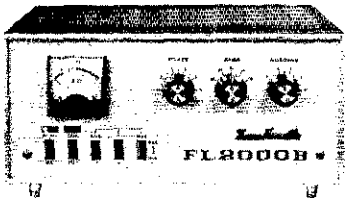

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each. Things to remember in the last two years: K4HY, WB4BKG, W4MWX and WA4GMA as Silent Keys; upsurge of college radio clubs, vastly improved *AREC* and higher *SET* standings; W4UX winning cover plaque award with his Touchcoder II; CAP/CD exercises; Owensboro Regatta coverage; Louisville Kenvention and other hamfests; hams at Perryville trek; classic booth presentation by Kentuckiana RC at Louisville Hobby Show; fast alerting on East Kentucky floods; formation of a Novice, net. Traffic: (Aug.) WA4MKH 390, WB4LIL 301, WB4KPE 271, W4OYI 182, W4BAZ 137, WB4NOZ 137, WB4KER 91, WA4AGH 72, WA4VZZ 69, WB4AUN 67, K4MAN 67, WA4FAF 52, WB4EOR 44, K4TRT 43, K4VDO 43, WN4PSP 32, WA4MXD 31, WA4GHQ 26, WB4ILF 26, WA4WSW 25, WA4DYL 24, WA4WWT 24, WB4HQW 20, K4UMN 19, WB4EQY 16, W4NBZ 14, K4UNW 14, WA4MEX 12, W4RQW 12, WA4UIH 11, W4UK 11, W4BTA 5, WB4LFZ 4, WB4GCV 3, WB4HTN 3. (July) WB4HQW 42, WB4KER 3. Total traffic 2343, reports 43.

MICHIGAN – Acting SCM, Ivory J. Olinghouse, W8ZBT – SEC: W8MPD. RMs: WA8PIM, W8RTN, W8WVL, K8KMQ, WB8DTT. PAMs: W8VXM, WA8TAN, K4PVC. VHF PAMs: W8CVQ, K8AEM.

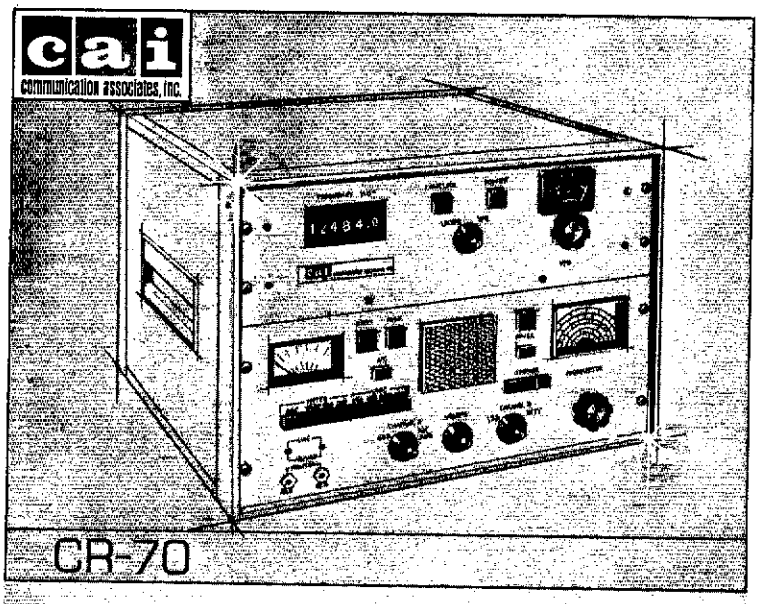
Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2300 Dy	623	312	61	WA8PIM
UPEN	*3920*	*2230 Dy*	*503*	*34*	*29*	*K8MJK*
BR/MEN	3930	2230 S-F	893	88	26	WA8TAN
GLFTN	3932	0230 Dy	758	116	31	K8PVC
WSSB	3935	0000 Dy	812	88	31	W8VXM
PON-Ph.	*3953*	*2400 Dy*	*656*	*413*	*31*	*K8LNB*

Silent Keys: K8LNB, W8ZM, K8KUK. W8CQU is home from the hospital and back on the air. W8EZL has a new tower. WA8GTG has a new Galaxy 500. K8MIU is home recuperating after surgery. WA8WBP is DXing with a Ten-Tec. K8LJS is building a new HW-12A. W8AZI has a new Swantenna. What a mobile signal! W8SSZ has a new HW-12A. W8LA says he is a green horn at MCing the QCWA Sun. morning net. W8QWN cut weeds along his neighbor's electric fence to stop QRN. K8NKB is now a postmar and promises prompt delivery of *QST* and QSLs. W8FGB/R was operated six days at the U.P. State Fair by W8FGB, WA8KEF W8KBH, K8INZ, K8QHA, W8KBZ and WB8PUW. Officers o GLFTN should have been K8PVC and W9KBI as mgr. and asst. mgr (first mistake I ever made) K8AEM, K8JIC and WA8ULG traced non-amateur signals on the 144-MHz band to police frequency scanners. W8OKW vacationed at Robert H. Treman State Park N.Y., and K2JVB furnished communication during a cloudburst to the Park Commission July 3 and 4 with mobile units and walki talkies. Traffic: K8LNE 382, K8ZJU 334, WA8PIM 240, WA8ENV 197, K8KMQ 109, WA8LXY 96, W8NOH 78, W8JYA 74, WB8BYE 67, W8DCN 61, WA8PII 57, WB8DTT 56, W8ZBT 51, WA8ONZ 49, W8MO 45, K8MEG 42, W8FZ 39, W8IUC 34, K8JED 32 K8PVC 28, W8TBP 22, W8IZ 20, WA8WZF 20, W8PX 19 WB8AUK 18, WB8BJP 16, WB8ANR 15, K8OOI 14, W8FGB 12 WB8AUN 9, W8MPD 7, W8AGQ 6, WA8PDN 4, K8AEM 2.

OHIO – SCM, Richard A. Egbert, W8FTU – SEC: W8OUC RM: W8IMI. PAM: K8UBK. VHF PAM: WA8ADU. Aug. section ne reports:

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time(Z)*	*Mgr*
OSSBN	2243	1136	62	3972.5	1530 & 2345	K8UB
BN	735	604	62	3580	0000 & 0300	W8IM
6 MtrN	503	74	62	50.61 50.16	0000Z 0200Z	WA8AD
OSN	138	86	28	3580	2325Z	WA8WAE

Note the change of GMT times listed to accommodate the switch t standard time. WA8WAK is now mgr. of the Ohio Slow Ne replacing WA8VNU, to whom we owe a debt of gratitude for h dedication and service to the OSN in the past. WA8WAK invites a those who have an interest in cw traffic-handling to check into OSI BPL certificates were earned by W8OCU, K8ONA, WB8CWD ar WB8DSV. Sept. *QST* announced some changes in PSHR. Tho submitting totals for listing in *QST* should check. WA8TY operated portable on 2 meters from Clay Co., Ark., and provid contacts for three Ohio stations. WA8VBK announces resumptic of the Retirees Net (Cleveland area) on 50.55 MHz at 1030 loc Mon. and Thurs. K8WHX is now located in Miami Shores, F *Congratulations to new Extra Class W8OHO and new Advanc* Class WB8HQO, WB8CPY and WA8YIG. WA8MCR tells us th W8JLO recently passed his General, Advanced and Extra Cl exams on the same day, Stark Co. Asst. EC WA8ETX advises th the Stark Co. AREC Net (50.4 MHz) meets daily at 7:00 P.M. loc Silent Keys: WA8UTH, W8INQ, K8PQZ and W8JDV. Northwe Ohio EC K8LFI spent a motoring vacation in Europe. Central Ol AREC provided communications for the Muscular Dystrop



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Telethon. Northeast Ohio EC W8GRG has developed a communi tions for the Muscular Dystrophy Telethon. Northeast Ohio EC W GRG has developed a "Communications team" plan for his area o jurisdiction. Pat will be happy to send a copy on request. Th seems to be some misunderstanding about our Ohio Secti Emergency Plan. We invite anyone interested to ask W8OUU or for a copy. W8LT was appointed OBS; WB8CKI and WA8HGH new ORSs. Columbus ARA, now handling QSL Bureau chor advises that it will have a table set up at most of the hamfests a other gatherings where SASE can be put on file with the Bureau. you know who the EC in your area is? Don't you think you should Drop me a card or ARL Seven. Trucomah Area EC W8OE set up AREC advertising campaign at the Trumbull Co. Expo. He "sol memberships to eleven hams in his own area of jurisdiction, a nine others including the W. Pa. and W.N.Y. sections. Traffic: (Au W8RYP 450, WA8CXY 400, W8QCU 318, K8ONA 283, W8AVS 244, W8QZK 211, WB8CWD 207, W8IMI 203, WB8DSV 19 WA8ETX 175, WA8WAK 166, WB8CKI 158, WA8DWL 15 WB8AKW 150, W8PMJ 147, WA8YUB 135, WB8DHY 128, K8BE 122, WA8TYF 121, WA8SED 119, WA8QFK 115, WA8RUO 1 WA8FQW 99, WB8AYC 93, W8LAG 92, WB8CLF 88, W8UDG W8JD 85, K8UBK 74, W8LT 58, WA8MCR 55, WA8ZTV WA8UPI 52, W8MOK 51, WA8FCQ 50, WA8NOQ 41, W8OE *WA8MHO 38, K8BYR 34, WA8VKF 34, WB8AJC 33, W8ETU* WA8ADU 31, WA8GRR 28, W8ERD 26, W8GQD 26, WA8SXI K8LFI 21, W8UX 20, W8FGD 19, WA8AJZ 17, W8GOE *K8ONV 16, WA8YHN 16, WA8ZJF 16, W8OIW 14, K8PBE* WA8WDU 14, W8AJW 11, W8OUU 10, WA8ZGC 10, W8ARW K8DHJ 7, WA8FSX 7, W8NAL 7, WA8TKM 7, K8BPX 6, W8J 6, W8LZE 6, WA8SHP 6, WB8CEH 5, WB8DNZ 5, W8MGC *WB8AKU 4, K8CKY 2, WB8CQC 2, K8QYR 2,* WA8STX WB8BZX 1, WB8FWX 1, W8WEG 1. (July) W8LZE 5.

HUDSON DIVISION

EASTERN NEW YORK – SCM, Graham G. Berry, K2SJN SEC: W2KGC. RM: WA2VYS. PAM: WB2VJB. VHF PA WB2YQU. Section Nets: NYS, nightly 3675 at 2300Z; ESS, nigh 3590 at 2300Z; NYSPT&EN, nightly 3925 at 2300Z. On the cl circuit: New Rochelle Communications Club held a transmitter hu in mid-Aug., won by WA2IDF, and provided communications the 12th year in a row for the City Swim Carnival with W2DPV a *K2EBX in charge. The Colonie Central HS Albany reports new cl* officers: WA2GSB, pres.; WN2JBW, vice-pres.; WB2FJA, sec treas.; WB2FGS, ops. mgr., who is just back from one year as *exchange student in New Zealand. New season for the Westches* ARA has K2CA, pres.; WB2MOJ, vice-pres.; W2KFB, sec WA2WDH, treas.; WB2MOI, W2RP, W2CFU and WB2ZMK, *They plan a Christmas Dinner for Dec. 10.* The Communicati Club of New Rochelle Dinner is scheduled for Nov. 28. Look for Colonie HS Operations Day No. 3 on a Feb. date to coi Remember to put the SCM on club bulletin mailing lists plea Individual station notes: I regret to report W2KKE as a Silent K He was a founding member of WARA, senior club in ENY. Visit to ARRL Hq. Aug. 23 included WA2DFI, WA2FIQ, WA2F WB2ISS and WB2JIC. W2GWY is checking in after a 15-y absence from the bands, mostly cw but with ssb plans for winter. WA2NJR is now Advanced Class. WA2VYS was busy skipper of *Osprey* during the summer months. WA2MTG is a r General call in Rhinebeck. WA2QEG and K2SJN went to Gre France and Ireland during Aug. WN2MYK made a Field Day film WARA activities, sound tracked by WB2DLJ. Net no NYSPT&EN and NYS both held Annual Picnics Aug. 8. Bela congrats to K2AVP on recent marriage. WA2VEG went to Te and Hawaii on vacation. WA2RAU is in Canada. *W2ANV is off* sick list. *Register your station with AREC through County EC W2KGC.* Remember to renew appointments via RM, PAM or V *PAM for the coming season. Traffic: WA2VLS 158, WB2VJB* WA2HHO 54, WA2FBI 40, WA2CRW 31, WA2MGT 31, WB2 25, WA3IYS/2 25, K2SJN 16, WB2FWK 14, W2CZ 7.

NEW YORK CITY AND LONG ISLAND – SCM, Fred Brunjes, K2DGI – SEC: K2OVN. RM: K2UAT. HF P/ WA2UWA. VHF PAM: *WB2RQF.* The following Nets are m AREC Nets. Join one!

Bronx	28.64 MHz	50.35 MHz	146.17 M
Brooklyn	28.64 MHz	50.40 MHz	145.26 M
Nassau	28.72 MHz		145.32 M
Queens	29.50 MHz	50.20 MHz	145.62 M
Richmond			147.12 M
Suffolk	29.56 MHz	53.51 MHz	146.82 F
Huntington	28.73 MHz		145.50 M
Brookhaven	28.73 MHz	50.46 MHz	145.50 M
New York	28.50 MHz	50.48 MHz	

Note: Nets usually open 2000 Mon. Hope you all enjoyed

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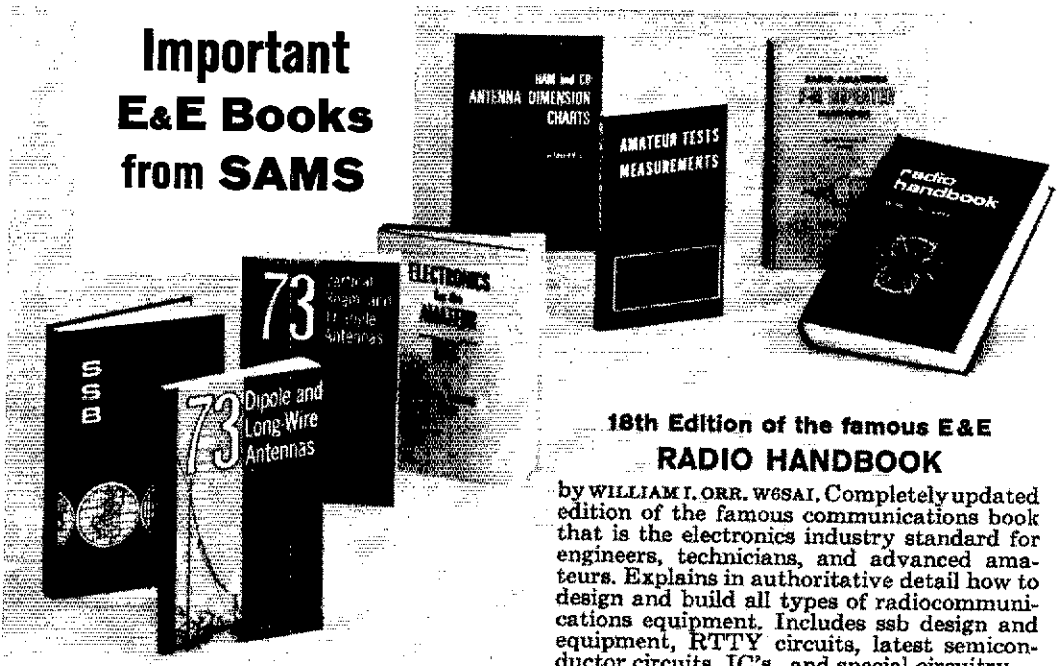

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Hudson Division Convention. By all indications, it was about the best one yet. I enjoyed meeting the many members of the section and hope your questions were answered to your satisfaction. If not, please drop me a line so I may try to clear up any areas of doubt. Congratulations to WA2CIS on making the PSHR (Aug.)! Well! WB2WFJ now signing WB2WFJ/2 from Stony Brook, State U. on Long Island, expects to be passing on traffic from there. Ol' W2GKZ really enjoyed himself this summer: did some traveling through Canada and northern U.S. with a rig tucked under his arm. WB2HWI *and WA2HSQ are looking for candidates for opening an NLI* operation on *top band* (160 meters for the new-comers). WA2BRF has declared war on the boys in W4-Land; says he finally found the big antenna to do the job and has it all lined up and ready to fire away. WB2WOI will be QRT for the winter, but hopes to have *WIVU* gassed up and going by the spring. Many thanks to WB2TUL for sitting in for K2UAT these past months and holding down the fort. It's efforts like these and others in the section that give the respect and dependability to all of our section nets and deservedly so. My thanks to all of you who participate. WB2STQ had a real hot time in the shack! He advises that if a fire is in a closed room, don't open a door, open a window instead to get the heat out not let it in! *New officers for W2AFF are WA2NLU, pres.; WB2UQP, vice-pres.;* WA8SNI/2, secy.; WB6NIK/2, treas.; WA2UVK, tech. dir. Looks like W2LGK has found some neutral ground for his ham radio activities; he tapes the XYLs favorite soap operas while she's out bowling! By golly! WA2DNO reports passing his Extra Class exam and is awaiting a new high-priced call. WB2DLJ reports he is off and running again after a long lay-off. How about you! What's happening?How about letting me and the others around what you are doing?I know things are going on, so drop me a line. Traffic: WB2LGA 131, WA2CIS 110, WB2WFJ 89, K2AAS 44, W2GKZ 42, W2EC 13, W2DBQ 9, W2PF 8, WB2HWI 7, W2AML 6, WA2LJS 5, WA2BRF 3, W2EW 2, WB2WOI 2, WA2QJU 1.

NORTHERN NEW JERSEY – SCM, Louis J. Amoroso, W2ZZ – SEC: K2KDQ. RM: WA2TAF. PAMs: W2PEV, K2KDQ, K2SGX and WA2TBS.

Net	*kHz*	*PM/Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695	7:00 Dy	31	416	180	WA2BLV
NJN	3695	10:00 Dy	31	216	126	WA2BLV
NJSN	3740	8:00 Dy	26	79	33	WB2FEH
NJPON	*3930*	*6:00 Su*	*4*	79	19	*WA2TBS*
NJEPTN	3950	6:00 M-Sa	31	666	222	W2PEV
NJAN	50425	8:00 M-F	21	143	21	K2SGX
PVETN	145710	7:30 Dy	31	118	92	K2KDQ
ECTN	145800	8:30 M-Sa	29	97	41	WA2TBS
	146700	8:30 Su				

New appointments: K2SGX as PAM for 6-meter net operations; WA2DMF, WA2ERZ and WA2UOO as ORSs; WA2DBD as OVS; K2OQJ and WB2FEH as OPSs; WA2BAN and WB2TUL as ORSs. *New club officers for K2OQJ are WA2FVH, pres.;* WN2JLE, secy-treas.; WB2JYY, novice prep. WN2OXI is a new ham in Teaneck. W2HFZ passed the Extra Class exam. W3CVW scored 5376 points in the recent VP9 Contest. WA2EUX won first place for New Jersey in the recent NY QSO Party. Our own NJ QSO Party *had a good turnout with all counties represented.* The East Brunswick ARC handled over 200 pieces of traffic at the Middlesex County Fair. WN2KYB has a tribander under construction. WB2CDI is on with a DX-60. WB2LTW went to W6-Land for his vacation. K2ZFI went to VE3-Land for his. The K2DEL group reported a very successful hamfest. WA2DIG has 325 confirmed. W2PEV has a new tribander. WA2PKY has an Advanced Class ticket. WA2UDT is attending Newark State College. W2CU has added a TR-3 to his shack. WA2DRH has a new MN-4 tuner. WA2CRF and WA2DIG added a new sb-220s to their lineups. The K2DEL group is now using SB-200 on low bands. WN2MXY has a new 311-B keyer. WN2ORZ is using a DX-60 and dipole. W2FEA reports successful *40-meter QRP work with his new Ten-Tec transceiver.* WA2UOO worked portable on his camping trip to Vermont and New Hampshire. We wish the following college-bound members lots of success: WA2DMF and WA2BAN to NCE; WB2SKD and WB2EZI to U. of SC and WN2OEP to Rutgers. Good luck to all in the SS. Traffic: *(Aug.), WB2TUL 369, WB2RKK 341, WB2CDI 298* WB2VPR 278, WA2BAN 231, WB2DDQ 137, WA2DMF 119 K2KDQ 118, WA2JIM 92, K2DEL 73, WB2FEH 68, WA2KHQ 59 W2PEV 55, WA2EPI 52, WA2EUX 45, WA2TBS 45, W2CVW 40 WB2BCT 39, WN2MXY 35, WA2DRH 32, WB2YPO 31, K2SGX 26 WA2CCF 25, K2EQP 22, W2ZZ 21, K2OQJ 14, WB2BXK 11 K2DOT 11, W2EWZ 10, WA2FVH 8, WB2LTW 8, WB2BKC 6 *W2TFM 6, WA2AKM 3, K2EFN 3, WA2UOO 3, K2ZFI 3. (July)* WB2YPO 30, WA2BCT 19, K2DOT 16, W2CVW 10, WN2KYB 8 W2TFM 4.

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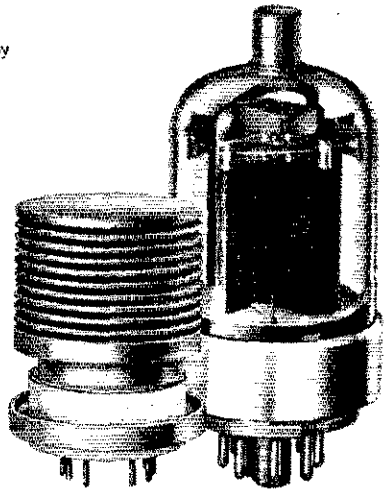


RCA

MIDWEST DIVISION

IOWA — SCM, Al Culbert, KØYVU — SEC: KØLVB. New calls: WNØCKC, Rudd, and WNØCGG, Goldfield. The 75-Meter Picnic at Marshalltown Aug. 16 was a real success with WAØDYV getting the *SBE-34. WØPAN, a former Iowan and now Dakota Division* Director, was a surprise guest at Marshalltown. WØNFL has been holding early morning skeds into the South Pacific on 75-phone; he gets plenty of SWL reports but very few QSOs. KØJGI has been on a QRP kick lately with a 100-mw transistor job. With those cold winds starting to blow, and some long winter evenings ahead, why not plan to check into the Iowa CW Net (TLCN) at 6:30 local any *night of the week. If you think speed is a problem, try Sun. evening,* as this is the slow-speed night with KØLVB as NCS. Don't know procedures? Copy along for a few nights and you will get the hang of it. WNØDAN has moved to South Dakota.

Net	*GMT*	*MHz*	*QNI*	*QTC*
Iowa 75	1730	3.970	1430	202
Iowa 75	2300	3.970	1166	38
TLCN (cw)	2330	3.560	161	100
PON (cw)	2330	3.697	28	5
PON (fone)	2330	3.915	79	6

Traffic: WAØVKI 576, WØLCX 541, WAØVZH 69, KØAZJ 44, *WAØZID 39, KØJGI 31, WØJPJ 26, WAØVDP 16, WAØAUX 15,* WØBW 8, WØMOQ 7, WØKB 6, WAØQZL 6.

KANSAS — SCM, Robert M. Summers, KØBXF — SEC: KØLPE. *PAM: KØJMF. RM: KØMRI. VHF PAMs:* WAØCCW, WAØTRO. WAØHOZ is taking part in the Intruder Watch Program. I attended the Boot Hill ARC Hamfest Aug. 17. Several public service projects were discussed. WØPB and WAØOZP have been operating a 2-meter *fm auto-print teletype circuit for the past few weeks.* KØLPE reports the AREC membership moving up to 417 now. Several ECs reportedthis month but only one Zone Net reported. Honors go to Zone 1 again. Because of my vacation the following did not make the last report: KPON: (July) QNI 1179, QTC 239. Individual station traffic count: WBØBFI 62, WNØAJU 20, WAØUTT 14, KØGZP 5. PSHR: WAØUTT and WBØBFI. PSHR for Aug.: WAØUTT, WAØTZK, WØHI, KØMRI. See *Nov. QST* 1969, participate and report. Net reports for Aug.: KSBN, QNI 908, QTC 72, Mgr. KØJMF; KPN, QNI 204, QTC 19, Mgr. KØJMF; KPON, QNI 1308, QTC 328, Mgr. WØLXA; QKS, QNI 409, QTC 187; QKN, QNI 102, QTC 37; Ks Wx Net, *QNI 528, QTC 28.* Traffic: WAØLBB 261, WØHI 186, WØINH 154, KØMRI 97, WAØTZK 92, WAØLLC 90, KØJMF 59, WØMA 55, KØBXF 51, WØNEE 38, WAØSRQ 32, WBØBFI 28, WØGCJ 27, KØLPE 25, WAØUTT 24, WAØZYW 23, WØCHJ 18, WØBGX 17, WØFDJ 11, WØLYC 11, WAØOWH 11, WAØOZP 11, WAØSEV 11, WAØSWC 10, WAØSXR 10, WNØWXY 8, WØPB 6.

MISSOURI — SCM, Robert J. Peavler, WØBV — SEC: WØENW. New appointments: KØLCB as OVS, WAØYST as OBS. Appointments: WAØKUH as OBS, WAØTAA as PAM.

Net	*Freq.*	*Time(Z)Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
HBN	7280	1800		579	44	KØLPE
MoPON	3933	2300 M-Sa	26		33	WAØTAA
MoSSB	3963	2400 M-Sa	26	1031	61	WØRTO
MON	3585	*0100 Dy*	28	141	68	*KØAEM*
PHD	50.45	0130 T	5	131		oWAØKUH

The times above are net times after return to standard time. Correction: WNØBBD, not WNØBVD, is in Jefferson City. Ex-KØZGR, after several years as W4BPH in the Washington area, is back in Jefferson City as WØNKY; his son is W1FRF, ex-KØQMY and ex-W4DZE. KØETV is QSL. Mgr. for his cousin ZD8H-ZD8HAL, ex-9Y4KK, ex-W8HAL, and at present WØJYM. Congratulations to: KØRPH, who became the father of a girl; to WAØPSG and WAØYCN, who passed Advanced Class; and to new Novices WNØBDL, WNØBSQ, and WNØCDO. WNØBDL started in radio with the first BC station in Joplin, was WW I Navy operator and is now in amateur radio. *WØHH,* a retired merchant marine operator, is active on MON. New officers of the St. Louis University ARC are WAØAHL, pres.; WB4HPO, vice-pres.; WA8ZMP, secy. WNØTFI, treas. Traffic: KØONK 1655, KØAEM 233, WAØUPA 80, WAØHTN 79, WØBV 58, WØOUD 25, WØGBJ 16, WAØKUH 15, WAØVRI 9, WAØTAA 6, WØBVL 3.

NEBRASKA — SCM, V.A. Cashon, KØOAL — Asst. SCM: Velm Sayer, WAØGHZ. SEC: KØODF. New Novices WNØCEZ, WNØCLA, WNØCGV and WNØCKD are working on their stations. WAØIBB' new QTH is Grand Island. WAØFGV's new call in Rushville i WBØCAU. *KØWPF, Box Butte County EC, reports 2-Meter ARE* Net QNI 24, QTC 1. KØOAL won first place in the 1970 Nebr. QS Party using all cw. West Nebr. Tech. ARC's new officers ar WNØYUL, pres.; WAØWHY, vice-pres.; WAØNKC, secy.-trea Hastings ARC Hamfest disclosed 33 amateurs and total attendanc

of 86. The Tri-City ARC Picnic at Bridgeport had 14 amateurs and total attendance of 33. New appointments: WØYFR and KØHNT as OBSs; WØINR as OPS and ORS. Renewed appointments: WAØJKN, WØLOD, WAØOHO, WAØFIQ, WØEHJ and WØYFR as ECs; KØYRL, WAØHWR as ORSs; WAØIXD, WAØPSN, WAØPIF and KØJTW as OPSs. Aug. Net reports:

Net	Freq.	GMT/Days	QNI	QTC	Mgr.
NSN I	3982	0030 Dy	941	50	WAØLOY
NEB	3590	0300 Dy	147	31	WAØHWR
EBSN	3982	1130 1st M	5	0	WAØSOP
NMN	3982	1230 Dy	940	34	WAØJUF
WNN	3950	1300 M-Sa	525	10	WØNIK
AREC	3982	1330 Su	199	0	WØLRZ
CHN	3980	1730 Dy	837	91	WAØGHZ
NSN II	3982	2330 Dy	774	50	WAØLOY

Traffic: WØLOD 170, KØUWK 165, WAØZUR 40, KØKJP 35, WØBFV 32, WAØJIH 30, WAØCBJ 27, WAØQEK 27, KØJFN 22, WAØGHZ 21, WAØIBB 20, WØYFR 17, WAØHWR 13, WAØBOK 12, KØFJT 12, WØTQD 12, WØDMY 11, KØSFA 11, WAØSOP 11, WAØYGI 11, WØNNL 10, WAØPIF 10, WAØQEI 9, KØFRU 8, WAØOQX 7, WAØTTM 7, KØHNT 6, KØODF 6, WAØSCP 6, WØWKP 6, WAØDXY 5, WAØPCC 5, WAØ EEI 4, WØNIK 4, WAØQLE 4, WAØRPB 4, WAØGAT 3, WØAGK 2, WØATU 2, WØDJO 2, WAØDJO 2, WØHOP 2, KØOAL 2, WAØTTX 2, WAØVIT 2, WBØAEA 1, WAØJKN 1.

NEW ENGLAND DIVISION

CONNECTICUT – SCM, John J. McNassor, W1GVT – SEC: W1HHR. RM: WA1HSN. PAM: K1YGS. VHF PAM: K1SXF.

Net	Freq.	Time/Days	Sess.	QNI	QTC
CN	3640	1845 Dy	31	305	587
CPN	3965	1800 M-S 1000 Su	31	468	228
VHF 2	145.98	2200 M-S	21	63	10
VHF 6	50.6	2100 M-S	21	96	2

High QNI: CN – WA1JZC and WA1HSN, CPN – K1EIC, W1HHR, WA1JVV and K1YGS. SEC W1HHR held an ARRL section leadership meeting, first of a series, to promote activity in emergency communications. Active AREC members are wanted. The Annual Message from Director W1QV is a continuation (since 1965) of bi-monthly letters to affiliated clubs. These, plus club and hamfest visits, indicate sincere interest to help solve our problems. *Meriden ARA's new officers are W1FYG, pres.*; W1WEE, vice-pres.; W1OWD, treas.; W1WHR, secy. The Hamden ARA plans a visit to ARRL. Tri-City ARC is going strong and has a new bulletin. The best contest operators in the world attended Murphy's Marauders Annual Picnic Aug. 30! The New Haven Repeater Assn., Ltd., held its first Annual Picnic Sept. 20. The Conn. *Wireless Annual Picnic* was at W1FTX's QTH. With deep regret we include WA1FXS/NNØHQT as a Silent Key. Bert was active on CPN and Navy MARS. W1EJI has 40-meter TCC sked. W1CUH is back on CN. W1OA is /4 for the winter. Congratulations to: W1FUF Aug. BPL; WN1NMZ new Novice; WA1LYT new Tech.; WA1LLB Conn. first place in Mass. AR week; K1VTM Connecticut's most active OO! Please enter the ARRL 160-Meter Contest Dec. 12. Activity is required to insure holding our top band – don't lose it! Traffic: W1EJI 333, WA1JVV 219, W1EEW 210, K1EIR 205, W1FUF 127, WA1HSN 127, WA1HOL 110, K1EIC 109, W1OA 109, WA1LLB 103, WA1GFH 99, WA1JYP 97, W1GVT 51, K1YGS 47, W1BDI 34, W1AW 30, WA1JQC 27, K1SXF 19, W1MPW 18, W1QV 17, W1CTI 14, W1CUH 13, WA1JGA 13, WA1KRG 13, W1YBH 13, W1HHR 10, WA1JMO 10, W1BNB 6, W1YBI 6.

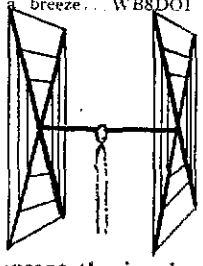
EASTERN MASSACHUSETTS – SCM, Frank L. Baker, Jr., W1ALP – W1AOG, our SEC, received reports from W1LE, K1DZG, WA1DXI. In six months WA1MKP has worked 20 states on 2 and 6 *with antennas in the attic. WN1LSO belongs to the Masconome*r HSRC in Boxford. New YLs are WN1s NJT, NJS, NIS. W1EHT has retired and moved to Hancock, N.H. W1CTR is retiring to Me W1HA says when he retires he is going to move to Mexico. W1BIO i going to retire. WN1LXE has his General and FTDX-560. W1BNS does a lot of traveling but gets on 80 ssb and cw week *ends. Th*e Barnyard Net had 26 sessions, 498 QNIs, 7 traffic. W3ROQ/1 has beam for 6. The T9 Radio Club met at WA1IZF's QTH. K1ISH an W1ZGC have HA-460s. W1EUE is a Silent Key. The New Englan Emergency Phone Net had 5 sessions, 7 traffic, reports W1AOG W1NF says 68 years ago he got his first receiver going, a Coheren W1KP has moved to Amherst, N.H. WA1MSG is a new Tech. t Hingham. W1ZXG is back from vacation in Europe. K1WYF is no in Memphis, Tenn. W1IAS has retired. W1BW is working on 15 DX K2LLA still is working in Braintree. The 6-Meter Crossband Net ha 8 sessions, 13 QNIs. K1OKE on the Cape all summer. WA1ETA DXing. WA1CQI is on 6 and 2. W1YZG/W4MSI has the Advance

AHA! YOU THOUGHT GOTHAM

made ordinary, everyday, run-of-the-mill antennas. No, no, no. We make winners through superior materials and design. WA1JFG won the New England Round-Up championship with our 3-element 15-meter beam by a margin of 5,982 points! In QST since '53.

QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AB, DM4SEE, FL8SR, F6AUM, HK7YB in few hours. Instructions a breeze... WB8DOI



CUBICAL QUAD ANTENNAS— these two element beams have a full wavelength driven element and a reflector(the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' × 1¼" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' × 1" OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

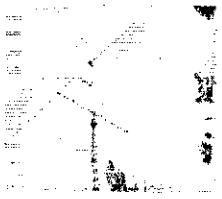
Now check these startling prices — note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD	$37.00
10-15 CUBICAL QUAD	32.00
15-20 CUBICAL QUAD	34.00
TWENTY METER CUBICAL QUAD	27.00
FIFTEEN METER CUBICAL QUAD	26.00
TEN METER CUBICAL QUAD	25.00

(all use single coax feedline)

BEAMS

"Just a note to let you know that as a Novice, your 3-El. 15 Beam got me R1 Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20	$21	4 El 10	$20
3 El 20	27*	7 El 10	34*
4 El 20	34*	4 El 6	20
2 El 15	17	8 El 6	30*
3 El 15	21	12 El 2	27*
4 El 15	27*	*20-ft. boom	
5 El 15	30*		

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2-FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2-KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

***FLASH!* Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1-LC, PY5ASN,FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!**

V40 vertical for 40, 20, 15, 10, 6 meters $14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters ... $18.95

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect. *DEALERS WRITE!*

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

Class license. WB9BVI/1 is on Martha's Vineyard. WA1IFF worked W4-8-and 9-Land on 6. As an OBS, K1BJZ keeps the MARS members up to date. WN1NLX, who has a DX 60-B, is the son of the late W1ZST. The Capeway Radio Club now has the call W1ZST. W1AAC/WB4LZD has gone back to Florida. W1IFT is a Silent key. He was the sone of W1OXX. WA1BYM, our Westport EC, says AREC is coming along well. WN1NH has an HW-16-18 AVG vertical. K1CLM is feeling better after a heart attack. W1AOG is in the hospital. WA1FNM is a member of the Guardian Net. WA1MHJ passed the Advanced Class exam. A letter from K4NS says he keeps a weekly sked with W1BZI. The Massasoit ARA held a meeting. K1DYA is /VE for awhile. K1UIW has a new QTH in East Bridgewater. WA1KPS and WA1FIQ had a unt QSO from Waltham to N.H. on 449.050. The Capeway RC met at W1ZXG's QTH. *WN1KSS has WAS. K1MAK passed the Advanced Class and has a* Mosley TA-33. WA1MIJ is a new OBS. Appointments endorsed: WIs YYI, IU, LE, WA1s IRY, DXI as EC's; W1s MX, SMO as ORSs; W1s MX, PEX, DOM, WA1s FNM as OPSs; W1MX as OVS; K1BJZ as OBS; W1TZ as OO and OBS. WA1JHQ is a new OPS. The OOTC had a luncheon at the Motor Hotel, Hawthorne, Salem with 30 present. K1ZYW is now on RTTY. FM2MN had 21 sessions, 120 QNIs, 128 trraffic. WN1NMU is new in Milton. Another Silent Key is Dr. Percy Spencer, ex-W1GBE. Traffic: (Aug.) WA1EYY 404, W1OJM/1 381, WA1EAD 244, K1ZYW 179, WA1KFJ 130, WA1IFF 71, W1IWG 71, WA1KZE 68, W1EMG 60, W1CTR 51, W1ABC 51, W1UX 31, WA1IJL 30, K1PRB 28, WA1BYM 26, K1ESG 13, W1BDF 8, WN1NH 8, K1CLM 4, W1LE 4, WN1NCW 3, WA1FNM 2, WA1MHJ 1, (July) W1EMG 75, K1LCQ 42, WA1JYY 22.

MAINE – SCM, Peter E. Sterling, K1TFV – SEC: K1LCF. PAM: WA1FCM. RM: W1BJG. W1PSK is chief engineer for WCBB-TV. K1QYO is deputy for communications in Maine Wing Civil Air Patrol. W1EZR and W1MFJ are going up for their Extra Class licenses. Sea Gull Net certificates have been issued to W1EZR, K1LDM and WA1JCN. We regret the passing of W1OTR. He will be sadly missed on the air. New hams in Maine are WN1NKU, WN1NMC, WN1NMM and WN1NGJ. WA1FQW has received his Advanced Class license. Anyone wishing to get in on the 2-meter repeater, please get in touch with K1QIG for further information. Sea Gull Net meets on 3940 Mon. through Sat. at 1700. Pine Tree Net meets at 1900 on 3596 Mon. through Sun. K1BAX is back from *JA-Land and is active from his summer camp at Steep Falls.* Traffic: WA1FCM 236, WA1JCN 14, K1TFV 2.

NEW HAMPSHIRE – SCM, Donald Morgan, K1QES – SEC: W1LUD. PAM: K1APQ. RM: K1BCS. The welcome mat is out to *WA1NHP (G), WA1s NJE, NKO, NKN (T) and WN1s NHF, NIE,* NHX, NJH, NJI. K1AC has been endorsed as ORS. W1UBG now has a Drake 2-NT and 2-C and is very active. WA1JTM is back from Arkansas and is puttting up another beam in prepatation for winter. WA1GCE has taken over as net Mgr. of the VTNH Net. One OO report was received this month from W1EEF. The VTNH Net Mgr. reports that NCSs are needed badly. The VTNHN reports 31 sessions, 188 check-ins and 250 traffic. The GSPN reports 741 check-ins and 62 traffic. The NHAREC reports 103 check-ins and 37 traffic. Traffic: K1BCS 404, WA1GCE 312, WA1JTM 305, W1UBG 110, K1QES 25.

RHODE ISLAND – SCM, John F. Johnson, K1AAV – SEC: W1YNE. RM: W1BTV. PAM: W1TXL. VHF PAM: K1TPK. RISPN report: 31 sessions, 404 QNI, 55 traffic. K1QFD is installing a 40-ft. tower and a tri-bander beam. W1YNE invites all interested in AREC to contact him. He also is working on an SR-401 and has installed a flat-top antenna for 80 and 40 meters. WA1IQH is leaving W1-Land to make his home in W4-Land. His new call will be WB4RBX. *WA1IQH has been active on the 1RN and the cw nets and will be* missed by the RI hams. W1HIK is another RI ham who will move to W-Land; missed by the RI hams. W1HIK is another RI ham who will move to W-Land; his new call will be K4EVZ. He has joined the Gulf Coast Amateur Radio Club of New Port Richey, Fla. In RI he *was active in the Providence Radio Club and on 6 meters. Howard* Wishes to say 73 to all his RI hams. W1KMV, the University of R.I. Radio Club, would like any former members who have equipment to return it to the U.R.I. Electrical Eng. Lab. at Kelley Hall, Kingston R.I. Traffic: (Aug.) W1TXL 30, K1QFD 24, WA1IJC 22, WA1JST 10, WA1CXF 5, K1VYC 1, W1YNE 1, (July) W1TXL 68.

VERMONT – SCM, E. Reginald Murray, K1MPN –

Net	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
Gr. Mt.	3932	2130 M-S	328	48	W1LLZ
Vt. Fone	3955	1300 Su	85	9	W1KKM
MNV	3685	2230 M-F	188	250	K1BCS

60% less cavity!

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GENERAL ELECTRIC

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Carrier	3945	1300 M-S	318	10	W1BLC
VTPO	3909	2200 Su	53	43	K1BQB
VTSB	3909	2130 M-S	390	49	WA1HSG

All nets will follow the shift to Standard Time. Welcome to new Novices WN1NDN (Clarendon); WN1LEC (Bennington); WN1NGW, WN1NGX, WN1NGY, WN1NGZ, WN1NHA, WN1NHB (all of Chester), WN1NIF and WN1NKY (Springfield), WN1NLW (Burlington). The VTSB Net elected WA1HSG, net mgr.; WA1LJR, asst. mgr.; WA1GKS, secy.-treas. A new 2-meter fm repeater is planned for Mt. Ascutney. Traffic: (Aug.) K1BQB 67, W1FRT 22, K1MPN 6. (July) W1FRT 60.

WESTERN MASSACHUSETTS – SCM, Percy C. Noble, W1BVR – SEC: WA1DNB. CW RM: W1DVW. WA1DNB reports that a total of 19 stations took part in the Sun. morning AREC sessions. Because of heavy cd work W1QFB has resigned as Hampshire County EC and has been replaced by W1CSF. W1DVW reports that WMN had 176 QNIs and handled 159 messages. Top five in attendance were W1DVW and W1BVR (tied with 28 QNIs), WA1LNF 23, K1SSH and W1ZPB. W1ZPB is also a new OBS. The *Berkshire Eagle* had a nice write-up of WA1IGQ's radio shack and activities. W1LS has moved to Cape Cod. W1QWJ spent Aug. in Maine operating with auxiliary power. WA1IZS now has a beam for higher frequencies. W1HRC tried out the Ultimate Transmatch (July *QST*) and found it excellent. WA1LNF is in charge of the new Worcester County AREC Net (1300Z Sun. 3947 kHz.tz). From VARC: Three VARC members were on a 15-minute show on TV Channel 22. WA1LES is a regular on the IMRA Mission Net on 20. WA1FKE is leaving for a new post in Milton. New member: WA1FAE. From CMARA: New members are K1LZH and W1YPK. WA1GTM has a new linear for 6. The club picnic was held Aug. 30. K1VNT is at Worcester Industrial Tech. Inst. for two years. W1JLA is at Northeastern. K1WNN will be fraternizing with the elite at Clark U. From MARC: Installation of officers and banquet was held in Sept. WA1GCY has a new Gotham Triband quad. W1GUI has a top-loaded 23-ft.-high 40-meter vertical. WA1MWF has a Heath HW-17 on 2 with an eleven-element beam. W1LTY is in the Mount Elam Nursing Home. Traffic: K1SSH 170, W1BVR 135, W1DVW 83, WA1LNF 60, W1KK 31, WA1LPJ 25, WA1IZS 21, W1STR 13, WA1LGU 5, W1HRC 3.

NORTHWESTERN DIVISION

IDAHO – SCM, Donald A. Crisp, W7ZNN – SEC: WA7EWV. The FARM Net meets on 3935 kHz at 0200 GMT daily, the Idaho RACES Net week days on 3991 kHz at 1515 GMT. The WIMU Hamfest was held at Mack's Inn, Idaho. The hamfest was sponsored by the Utah Council of Radio Clubs. Montana amateurs will sponsor the hamfest next year. WN7OHJ and WN7PDV are new amateurs in Coeur d'Alene. W7GHT is moving to Lewiston. The Boise Club held picnics in July and Aug. instead of regular meetings. W7DWE's car broke down while mobiling along the highway. A quick call to the FARM Net brought help. FARM Net report: 31 sessions, 1005 check-ins, 96 traffic handled. Traffic: K7KBX 231, W7GHT 69, W7YON 42, WA7BDD 28, W7ZNN 6, K7CSL 3, W7FIS 3, W7IY 2.

MONTANA – SCM, Joseph A. D'Arcy, W7TYN – SEC: W7RZY. W7TYN and W7RZY attended the Director's meeting in Seattle Aug. 22. All of the SCMs and SECs attended this Northwestern Division meeting. Among topics discussed were phone nets and the NTS, the IRAU and commercial CB-ham transceivers. Vice-Director W7LQE attended the WIMU Hamfest. There has been some interest in an fmers hamfest. If you would be interested in such an activity, write W7RZY or W7TYN. This will be my last report as SCM. W7RZY took over the position of SCM as of Sept. 9 and is well into the job. I wish to thank everyone who made the job of SCM so enjoyable as well as educational. 73. Traffic: WA7JQS 70, K7EGJ 17, W7LBK 17.

OREGON – SCM, Dale T. Justice, K7WWR – SEC: W7HLF. RM: K7GGQ. PAM: K7RQZ. Section nets: BSN (3908 kHz 0130/2000Z Dy), AREC (3908 kHz 0300Z Dy), sessions 31, check-ins 613, maximum number of counties 15, traffic 36, contacts 76, OSN (3585 kHz 0245Z Tu-Th), sessions 20, check-ins 137, traffic 49. The Rogue Valley ARC held an Annual Picnic during Aug. with 17 hams and their families attending. The SAUDSN had a get-together at WA7AUA's home. The annual meeting of Northwestern Division officials was attended by your SCM and SEC. W7NGW passed the Extra Class exam. Traffic: (Aug.) WA7ICX 243, W7BDU 174, K7RQZ 166, WA7IFS 156, K7QFG 74, K7NTS 69, WA7KIU 67, WA7MIF 35, WA7JAW 26, K7WWR 24, W7LT 20, K7YQM 19, WA7KRH 15, W7BNS 10, W7MLJ 9, K7QUF 9, K7KPT 7. (July) WA7KRH 15.

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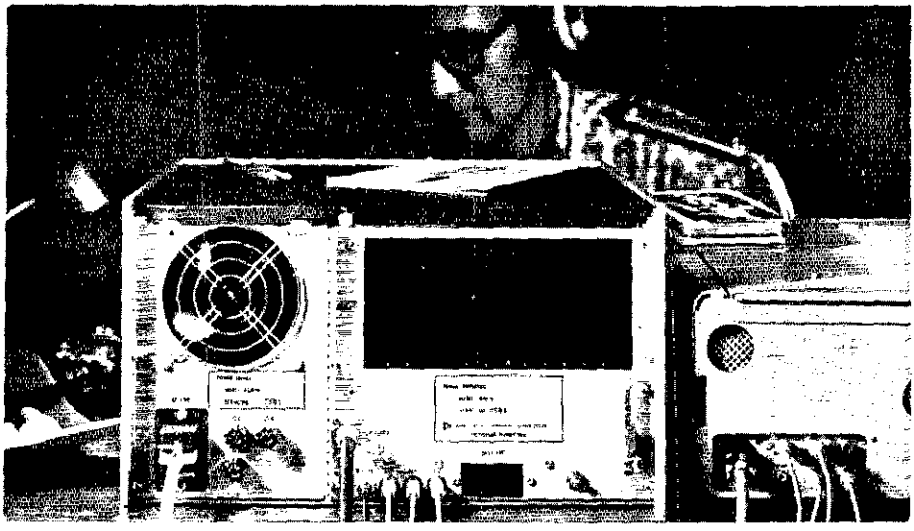

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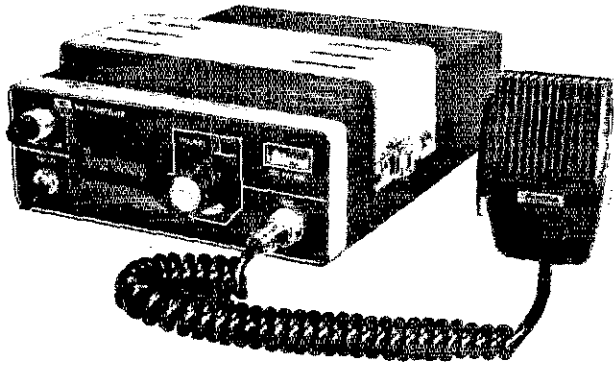

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Includes transceiver, two channels supplied, mobile mount, microphone, coax cable and antenna.

SPECIFICATIONS

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Frequency Coverage	144-148 MHz
Number of Channels	12 Channels, 2 supplied Channel 1 Receive 146.94 MHz Transmit 146.34 MHz Channel 2 Simplex 146.94 MHz
Modulation	Frequency Modulation
Transmitter Control	Push-to-Talk
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Power Source	AC: 117 Volts Factory Wired 220/240 Volts 50-60 Hz DC: 13.5 Volts ±10%.
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Weight	8¼ lbs.
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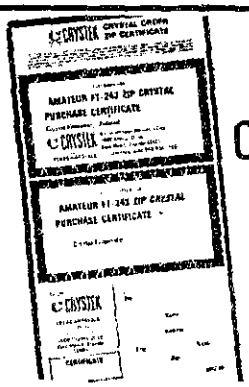

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WASHINGTON – SCM, Harry W. Lewis, W7IWJ – Among recent stations to register with AREC are WN7OEV, VE7AZT/7, WA7LOL, WN7NKQ, WN7OIP, WA7LMO and WA7LUJ. W7IFU, ye old county hunter, has confirmed over 500 counties and wishes it known that a county is not a country as previously reported. The Tech Net is in operation for the Winter at 1500 on 3970 kHz. WA7MJO is Mgr. of NSN meeting nightly on 3780 kHz. K7CTP, K7OXL and K7OVF are new directors of NSN. WN7LTQ, formerly of Aberdeen, is at a new QTH in Olympia. The 75-Meter AREC Net is active Sun. mornings at 10 AM on 3930 kHz with either SEC W7UWT or his asst., K7WTG, as net control. Six AREC nets are now active in the Puget Sound area. Traffic: W7BA 1242, W7PI 370, WA7HKR 227, W7BO 61, WA7DZL 52, W7IFY 40, W7APS 34, W7BUN 28, WA7DXI 28, W7IWJ 25, K7WTG 17, K7LRD 15, W7ZHZ 10, W7AIB 9, W7IEU 9, K7OKC 6, W7AIB 4.

PACIFIC DIVISION

EAST BAY – SCM, Paul J. Parker, WB6DHH – RM: WA6DIL. If you are interested in an appointment get in touch with me or WA6DHL. I invite all news that relates to station activity. The SEC spot is still unspoken for and is open to the person who would like to take it over. W6TTS reports that he has been able to maintain a regular phone patch with the Galapagos Isl. WN6DRU is finding that starting a 4-H net can be a lot of fun; if interested please get in touch with him. W6IPW reports that his 20-meter TCC skeds are starting to be rough copy and he is planning to go to 40 soon. W6AR has been hard at work after his DXCC and only has two cards to go before he makes it. W6AKB had an FB four-month vacation and had many an eye-ball with a fish. Please check your appointments certificates to see if they have expired. If so, drop them in the mail and I will take care of them for you. At this time there still is no really active AREC in this section. Don't you think it might be a good idea to have some form of Emergency Corps available in case of an emergency where we as hams might be able to help?I hink about it and let me know. Did you know that there was a Worked All Calif. Counties award?Well, there is and one was just issued to W6ERE. If you would like more information on it, get in touch with W6ELW. Traffic: (Aug.) W6IPW 317, WB6VLW 31, W6AR 8. (July) WB6UMT 6.

HAWAII – SCM, Lee R. Wical, KH6BZF – SEC: KH6GQW. RM: KH6AD. PAM: KH6GJN. QSL Mgr.: KH6DQ. ECs: KH6s GPQ, LP, BAS, GRV, K1HNO/KH6, K2HBA/KH6, KC6EJ, W7UZH/KG6. RACES Nets coordinate with Henry Gamache, Radio Officer. Our QSL Mgr. reports the following have QSL cards at the KH6 Bureau: KH6s AIK, ABH, AH, DED, EKO, EYP, EDX/KM6, FIF/KS6, FGA/KG6, FHH, FRI, FRO/4, FOJ/KL7, GEL/4, GBI/4, GFH/KL7, HBZ, RR/4, W1UDX, W1BOB, K1NPN, K1OBK, K1RLR, K1ZJT, K2HQI, K2KZI, K3ZCI, K4CRU, K4RSD, W4PBN, W4EAB, W4GFB, W4IFW, W4IGP, W4LRC, WA4IKU, W4VCA, W5BJZ, W5EAS, W5FLO, K5FOO, K5TSC, W6OSA, W6WBY, K6CLG, K6LDD, K6RWJ, WA6MLW, WB6IGY, WB6ONN, WB6ZFV, W7FNF, W7BQI, W7JCI, W7UJ, K7GOK, K7AFB, K7RLA, K7VAY, K7YGB, W8CFL, WB8AJW, K8AVC, K8ZST, W9GBH, W9FCX, WB9AWD, K9HLL, K9THP, K9POT, K9VEA, WØABV, WØBLV, WØFCL, WØDAD, WØEKJ, WØOBW and KØRQO. Please get your "rare" QSLs from KH6DQ and send your updated address. An SASE is required. The DX gang has had Manahiki, Niue and Tuamotu Islands on almost at the same time. KH6HHI was H08DG and the others were ZK1MA and ZK2AF. KH6LG returned from JA-Land. KH6GQW landed a summer job with a "rent-a-cop" agency. WH6HIF is a new Novice. His brother KH6GRG returned from U.S. Coast Guard boot camp and will attend ET school. K4RSD/KH6 has worked 191 countries. New DOs are WØDAD/KH6 and K2HBA/KH6. W7RSZ/KH6 flies for PAA as a co-pilot. KX6EJ is again W1BRJ. VE1ASJ hopes to be Hawaii-bound soon.

NEVADA – SCM, Leonard M. Norman, W7PBV – SEC: J.L. "Mike" Blum, WA7BEU, 560 Cherry St., Boulder City. The Reno gang did it again! The Sierra Hamfest at Genoa was the best yet, even if W6BDU, the MC, and W6ZRJ, our Director, did get lost in the fog when they tried to fly in. K7NKF has completed all the courses offered by Army MARS. K7QGO is vice-pres. of the YLRL and is planning a meeting at the 1971 SAROC convention. W7TVF will schedule anyone needing a Nevada QSO. WA7BEU has the 28 MTTY going FB. WCARS-7255 *Sentinel* is an FB publication, with a new face, too. K7ZOK and WA7DSP report activity on 6 meters. The Las Vegas Radio Club repeater, K7UGF, is working FB on 146/94. W7VYC is also an expert on newspaper routes; give him a call if you miss your paper. W7RBV is in the hospital. K7TDQ is out of the hospital and doing fine. Send your traffic and activity reports before the first of the month.

SACRAMENTO VALLEY – SCM, John F. Minke, III, W6KYA – The month of Aug. was a slow one with the exception of the annual Sierra Hamfest, this year held at Genoa. Ham classes are now being conducted 7 to 10 P.M. Mon. at McClellan AFB and 6:30 to 9:30 P.M. at Highlands High School in North Highlands. Those of you who are interested, contact W6OMK, phone 442-2847. Sacramento Valley was 15th in its class for AREC and 59th overall. Last year's figures were 12th and 49th. Traffic-wise SV was 53rd and last year was 54th. I sure hope the activity will pick up in our section. Maybe the Nov. SS will stir up some. Traffic: W6LNZ 73, WB2TTW/6 8, WA6OWH 4.

SAN FRANCISCO – SCM, Kenneth S. McTaggart, K6SRM – WA6LLX has received his Advanced Class ticket and credits the code practice via W6OIF with helping him over the 13 wpm hurdle. WB6EZN has been handling NCS duties on NCN/2 and also is RN6 liaison. W6WLV credits W6OER, WA6BYZ and W6DEF with a great deal of help in clearing QSL Bureau traffic. WB6JOP and W6PZE were kept busy with traffic for a recent fiesta in Petaluma. W6PZE was awarded a Certificate of Merit for his seven-year service as EC at a recent meeting of PARK. WA6BYZ also was awarded a Certificate of Merit by SCM K6SRM for his straight BPL for 1969. W6ULB has equipped his new shack with Drake gear and a Mosley tri-band quad. WB6IZZ has erected a 54-ft. tower. WA6JUV looks forward to a vhf contest free of competition from W6BIP, who is always coming up tops in SS, CD and DX Contests. W6BIP reports good luck with his Swan 400 working out of Yosemite Valley on a recent vacation. Clubs please note: Send two or three months advance notice of your activities, speakers, etc., so I can spread the word via this column. *K6UGS reports that his new SB-102 is doing a good job and passed* all smoke tests OK. WB6LGU has his General. Traffic: (Aug.) WA6BYZ 297, W6WLV 163, WB6JOP 111, W6KVQ 110, W6OER 79, WB6EZN 63, W6BWV 36, WA6AUD 25, W6PZE 9, (July) W6WLV 125.

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6JPU – EC's for San Joaquin Valley are *WB6TFU*, Fresno Co., *WB6RZI*, Tuolumne Co. and W6ASV, Tulare County. EC's are needed for Stanislaus, Kern, Kings, Madera, Mariposa, Merced and San Joaquin Counties. WB6GUB/6 was heard working short skip on 6 meter ssb. *W6DPD is on 2-meter mobile. WB6VOG is on 2 meters. WB6OWI* has an eleven-element beam on 2. WA6ZOH is on 6-meter ssb. *WB6UYG and W6POW worked ZF1AA on 6-meter ssb.* New officers of the Tulare Co. Amateur Radio Club are WA6AGS, pres.; W6DEA, vice-pres.; *W6MUV*, sec.; *W6LLR, act. chmn. W6RRN* has worked 50 states on 6 meters. WB6UBT is attending Davis U. WA6NMT is in *Lodi and awaiting his W6 call. WB6OQF is mobile on 2 meters.* WA6CPP has a Swan 220 mobiling. WA6CPP made over 3000 *contacts while vacationing.* WB6JXQ is QSL Mgr. for VR2LK. W6SM is active on cw, keeping a sked with W6DIY while *vacationing in Oregon. WB6VSV* is the editor of *Skip.* K6ZMW has a Gonset GSB-6. WB6VSV and WB6ZBX assisted with communications in the Powder Puff Derby. WB6TGW is now in Taft. K6VEF has been very active teaching code and theory and reports at least nine passed the Novice tests, among them WN6CJZ, WN6CBT, WN6CFN, WN6CHR and WN6CKA. Traffic: WA6CPP 10.

SANTA CLARA VALLEY – SCM, Albert E. Caetano, W6VZT – Acting SEC: W6NVO. RM: WA6LLA. K2EIU/6 has received a W6 station call of *WA6UKG*. *W6MMG has been working a new* tri-bander getting ready for the winter DX. Director Gmelin took a *vacation down at Disneyland with his family and all had a good* time. Recently I've noticed a lot more activity on RTTY and hope that some day we can get a good RTTY liaison into and out of the traffic nets. Many of the traffic people now have RTTY gear and could use it for traffic work. RTTY would be especially good for specific traffic skeds. Maybe some of you guys ought to consider it. I'm ready. Traffic for the month of July picked up again and by the time you fellows read this we will be in full swing again. Remember, don't send traffic to the receiver faster than he is sending to you. W6BPT reports that MARS traffic coming from RN6 is picking up. W6ZRJ is sending Bulletins on RTTY every Wed. at 0330Z on 3615 *kHz. This is a good chance for you RTTYers to copy some plain* language (English) at tape speed to check your machines. Traffic: W6RSY 466, W6NW 319, W6HVB 265, W6YBV 191, W6DEF 142, WA6LFA 132, K2EIU/6 93, K6DYX 75, W6VZT 66, W6AUC 55, *W6BPT* 42, *W6RFI* 16, *W6ZRJ* 6.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Calvin M. Dempsey, WA4UQC – SEC: W4EVN. PAM: W4AJT. VHF PAM: W4HJZ. RM: W4WX2, WB4KPD, WA4DLF and K9ZCH/4 worked VE1PS on 146.94 fm. The Shelby Hamfest was real fine as usual. K9ZCH/4 was mobile and reported an accident to WA4DLF on 2-meter fm. The Highwa

Patrol was called. K9ZCH/4 is real busy with a Novice class of 1 people. WA4KWC is experimenting with 2 meters. WB4RYK is new ham in Asheville and is on 2 meters. WA4UQC has put up *2½meter quad. K4SKI had an operation but has now recovered an* is back on the air. We were sorry to hear of the death of WA4SPL XYL.

Net	*Freq.*	*Time(Z)/Days*	*QTC*	*Mgr*
NC SSB	3938	2330 Dy	2	WB4AD
CHEN	3923	2330 Dy	60	WA4UQ
CN(E)	3573	2245 Dy	40	WB4GH
CN(E)July	3573	2245 Dy	30	WB4GH
CN(E)July	3573	0200 Dy	38	WB4MI
CN(E)	3573	0200 Dy	50	W4WX

Traffic: W4FVN 190, W4WXZ 94, K4MC 28, WB4BGL 3 WB4JMG 26, K4VBG 17, WB4MTG 16, WB4HGT 12, WA4VN 11, WA4UQC 9, *WB4HGS 5*, WB4NZB 3.

SOUTH CAROLINA – SCM, Mrs. Elizabeth Y. Miller, WA4EF *SEC: WA4ECJ. Asst. SEC: W4WQM. PAM: WA4GAW.* RA WB4DXX. New ECs: K4NGU, K4WJU, WB4MCI and WA4HNA f Barnwell, Laurens, Spartanburg and Williamsburg Counties respectively. Anderson County has 3 new Extras: WA4YA W4PST, WB4AMR – and 2 new Advanced: WB4NJH, WA4OT WB4NNY is back home after a European trip. K4HDX has giv en experimental planes in favor of boat building. WB4LMS de-hugge *his intermittent. W4SH home-brewed an antenna coupler.* WN4P has a new QTH and potential antenna farm. K4UFU failed to dra back fast enough when feeding his pet alligators. Switch to safet Keep your hands out of the power supply. SCSSBN traffic: 14 Nets: SCPN: 3930 kHz Dy Noon; Su 0830 and 1530 EDT. C 3573 kHz Dy 2245Z and 0200Z. SCSSBN: 3915 kHz Dy 19 *EDT. SC AREC Forum 3925 kHz Tue-Wed 2000 EDT. Sou* Carolina stations can usually be found on 3915 or 3930 kH Traffic: W4JSD 41, WB4QBZ 27, K4OCU 26, W4WQM 2 WA4LFP 23, WB4OVQ 16, W4ELW 2, K4CSZ 23.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A. Martin, W4THV. SEC: WA4PBG. Asst. SEC: WB4CVY. PAM W4OKN, WA4YXK. RMs: WA4LUL, K4MLC, W4SHJ. W4OGW st is in the hospital. W4TE has been in and out of the hospital. T Hamfest in Winchester, as well as the VSBN Picnic at W4OUKs, a the NVRC cookout at W4TE/K4LMB's were FB recently. VSB Picnic at W4OUKs, and the NVRC cookout at W4TE/K4LMB's we FB. WN4RNT recently operated portable in Tenn., working southern states except Tenn. WB4DRB and WA4IJF are active on W4YZC moved to Fairfax and is mobile. WA4HOW made Ext *Class and is going to college in Fairfax. W4WBC is chasing ac hu* WB4EAE is chasing DX. WB4PYA went off to college with a 5-wa transceiver. Director W4KFC attended all Virginia get togethe Effective July 31, SEVWA is 100% ARRL. W4SOO was appoint as OPS/ORS. W4OUK as OPS, WB4DRC as OBS. Net certificat went to *WB4DRB, WB4IJS* and W4KAO. WB4LOV hopes to fi high swr antenna. K4AWV moved to Annandale from Californ W4ZM is sulking over DX conditions after a Cape Cod vacatic W4JUJ joined in the Ohio, Md.-D.C., and S.C. Parties. WB4FDT s Welcome Wagons to WB4KIT, K4SNS, WB4RMQ, WB4J. WB4HON and WB4PYA. W4GCE took a well-earned three-we vacation. The VARC picnic was a great success. W4DUQ a *WA4OPW talked to King Hussein, W4FPR is in a new QTH wit* new harmonic. WB4DKL is back from KG4-Land. K4LEF converting to ssb and is now program director for WKWS in Ro Mount. WA4HHP is working on a new solid state transmit between classes at V.P.I.

Net	*Freq.*	*Local t*
VSBN	3935	1
VSN	3680	1
VN	3680	1
VFN	3947	1
VSBN	3935	1

Come join us! Traffic: (Aug.) WB4NNO 445, WB4CVY 157, W 97, *K4KNP 88, WB4PYA 87, WB4FDT 83, K4POL 76, K4FSS* WA4PBG 44, W4UQ 44, WA4IJF 42, K4GR 40, W4OKN WB4DRB 34, WB4KSG 30, W4SHJ 24, K4JM 22, K4TSJ WB4KBJ 20, WA4WOG 16, WB4KIT 15, W4ZM 15, W4SQQ WA4HOW 10, W4KFC 10, WA4NJG 9, W4ZYT 9, K4AW *W4MK 7, WN4PWP 7, W4THV 7, W4KAO 6, WA4HHP 4, W4O* WN4RNT 3, W4KX 2, K4LMB 2, W4YZC 2, W4DM 1, WB4EA WA3YS/4 8. (July) W4OKN 31.

WEST VIRGINIA – SCM, Donald B. Morris, W8JM – S WA8NDY. RM: WB8BBG. PAMs: W8DUW, W8IYD, K8C Phone Net Mgr.: WA8LFW. CW Net meets at 7 P.M. on 3570, Pl Net at 6 P.M. on 3995 and RACES Training Net on 3996.5 Su 8 and 1 P.M. WA8LFW received his WACWV certificate. Acti the Bridgeport tornado: WA8NDY, WA8WCK, K8BCF, K8I

W8AEN, K8CHW, W8WVM, W8HZA, WA8KFR flew his ra controlled model airplane 34.9 miles. K8UFF and Raleigh Cou amateurs operated a booth at the Sportsman Festival in Oak *WB4GCK is consistently faithful to the West Va. Phone* WB8BBG is back in PSHR again with 60 points. CW Net, sessions, 92 stations, 36 messages. Phone Net, 31 sessions, stations, 97 messages. WB8CYB is a new ORS. Repeater operation. St. Albans, Huntington, Wheeling. QCWA held its meeting in Charleston. W8NTV is recovering from a serious illr Traffic: WA8POS 157, WB8BBG 126, W8HZA 83, WA8NDY *WA8LTW 17, W8JM 12,* WB8CYB 10, *W8DOV 8,* W8SQC WA8ATC 6, K8QEW 5, W8KWL 4, WB8IBG 3, WA8OXC WA8ROB 3, WA8THX 3, WA8ZNH 3, W8UKX 2, W8LQI W8WEJ 2, K8ZDY 2, W8AEN 1, WB8AQE 1, K8CFT 1, K8FM WB4GCK/8 1, W8GWR 1, W8LBT 1, WB8NVQ 1, WA8QMI WB8ETD 1, WA8SLG 1, WA8TWR 1, W8VOI 1, WA8WCF WA8YWO 1.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Charles M. Cotterell, WØSIN – The P Peak Radio Amateur Association's picnic was well attended, as the Colorado Code Net at KØECR's place in Idaho Springs. WØL and WØLRW are presenting a talk on traffic and emergency wor various clubs. Good work. The Silver State Net kicks off on 19 kHz at 0230 GMT Oct. 25. WØLRW is PAM and NCS. WØYCD, for Dist. 18, is now cd director for Prowers County. WØPGX is Extra Class. Correction on Aug. issue traffic report: WØWYZ sho be WØWYX. KØUYF and WØVLS received the Weather Burea award for sending in 3000 wx messages. WAØYED is new EC district 2, WAØSUD for district 6. WBØAWG, VHF PAM, rep *that the 34-94. WØWYX FM repeater group was active in a paral* lost person hunt, was the subject of a three-minute news broad on K1Z-TV; and has officially associated with the Alpine Re Team. CCN, QNI 136, QTC 94, time 545 mins. Hi-Noon, QNI 1 QTC 130, time 1253, Traffic: KØZSO 783, WØWYX 272, KØ 118, WØLG 83, WAØMNL 80, KØECR 67, WØPGX 62, WAØL 39, WØYCD 33, KØMNQ 31, WØLRW 10, KØIGA 9, WØKTF WØSIN 2, WØUAT 2.

NEW MEXICO – SCM, James R. Prine, W5NUJ – Welcom *WØBHN5 who has moved to Silver City and is active on 15 me* W5QNQ has acquired a Heath Twoer to supplement his hf activ A special word of appreciation goes to W5QNY for his OO effo The summer lightning storms have caused several brief outage W5PDO 2-meter fm repeater. The big event for Sept. was the *Mexico Hamvention, Sept. 18-20, in Albuquerque.*

Net	*GMT*	*kHz*	*QNI*	*Q*
Road Runner	*0000*	*3940*	*471*	
New Mexico Net	0130	3750	8	

Traffic: K5DAB 87, W5RL 49, W5PDY 48, WA5UJY 47, W5E 31, W5NON 27, W5NUJ 22, W5MYM 20, WA5MIY 16, WA5 10, K5ISJ 8, WA5OHI 8, WA5BLL 6.

UTAH – SCM, Thomas H. Miller, W7QWH – SEC: W7W RM: W7OCX. KL7FPM will be operating from his Utah QTH w attending Westminster College in Salt Lake City. WN7OXZ joined the YLRL. WA7MEL is still chasing DX and hopes to ha beam up for the fall and winter season. W7OCX has turned 56-point score for this month's Public Service Honor Roll. He not missed a month since PSHR started last Nov. W7UKC graduated from the Capitol Radio Engineering Institute. K7 and WA7HCQ are now regular NCSs on BUN. More NCSs needed during week days. Those interested should contact the or W7OCX, BUN manager. K7CLO built a 1-Watt transmitter fo *meters and has worked three states but says it is a little hard* work them. WA7NHA is now heard regularly on the Beehive BUN reports QNI 645, QTC 37, average time 13.94 min sessions 31. W7EM is now using an old HT-18 Hy-tower as a su for a TA-33 tri-bander and is enjoying improved DX capabil Traffic: W7EM 102, W7OCX 49, WA7NHA 14, K7CLO 2.

WYOMING – SCM, Wayne M. Moore, W7COL – SEC: K7I RM: K7KSA. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7I W7SDA, WA7BHA. Nets: Pony Express, Sun. at 0800 on 3920 *daily at 1830 on 3608; Jackalope, Mon. through Sat. at 12:* 7260; Wx Net, Mon. through Sat. at 0630 on 3920; PO Net, Mon. through Fri. on 3950. A new ham in Casper is W7 formerly W5KKK. WA7AMS has a new transceiver and is pu out a very good signal from Seminole Dam. WA7HDB now tri-band beam on a nice tower. W7VII has been transferr Louisiana. WN7MGA is back on the air from Green River. W *is out of the hospital and feeling very perky after a very s* operation. There is now a 2-meter repeater on Casper Mou thanks to WA7DNZ and the group. The Casper Club has s

code and theory classes again. If you know anyone interested, send them around. Traffic: W7TZK 59, K7VWA 30, K7SLM 24, K7TAQ 24, W7SDA 22, W7VJI 14, K7AHO 8.

SOUTHEASTERN DIVISION

ALABAMA – SCM, Donald W. Bonner, W4WLG – RM: W4HFU. The BARC is now the proud owner of the 1969 Field Day Trophy. Congratulations. The RACES 2-meter fm repeater is now in operation in Mobile using 147.27 MHz in and 145.65 MHz out, 250 watts. This is an open repeater. WA4WME will be in Liechtenstein Oct. 22, 23 on 20-meters from 2100Z and again Oct. 24, 25 on all frequencies with the call HBØXKW. New Advanced Class licensees are WB4NRJ, K4LYY, WB4ORK and WB4NRJ. WN4SBZ is a new Novice from Selma. Several from the section attended the Georgia ARRL State Convention in Augusta Aug. 19. WB4LAL is the new Net Mgr. of AENT. Traffic: WB4JMH 147, WB4EKJ 136, W4HFU 85, WB4LAL 75, WB4LAO 61, K4AOZ 54, WB4KSL 41, WB4NLK 38, K4WOP 34, WB4OVR 22, W4WLG 15, WA4AZC 13, K4HJM 13, WB4PQL 12, WB4MLV 10, K4UMD 10, W4DGH 8, WB4LNM 7, WN4ORK 3, K4BSK 2, WN4PSP 2.

EASTERN FLORIDA – SCM, John F. Porter, W4KGJ – Asst. SCM: Albert Hamel, K4SJH. SEC: W4IYT. Asst. SEC: W4SMK. RMs: W4ILE, K4EHY. PAM 75: W4OGX. PAM 40: W4SDR. Traffic totals were up a little this month. We are looking forward to a big increase this winter. Columbia Amateur Radio Society has obtained a 10-kw auxiliary generator for emergency use. WA4OHO is back at Ga. Tech, and he will be checking in on OFN from the club station while there. K4FMA is still up high with his OO reports, 150 total. W4FFF is breaking in a new electronic key on OFN. W4BNE, working through the Red Cross, handled Tampa area traffic to and from the Corpus Christi hurricane area. Local handling via 147.240 MHz. W4SDR is operating his project, "Upgrade" for those in the Daytona Beach area seeking their Extra Class. The new Broward County CD repeater now is in operation on 146.58 input and 146.85 output. WB4HJW and WB4OMG made the PSHR. Can you top this: A Fla. ancestry of over four centuries dating from the founding of St. Augustine in 1565. This is the claim of W4BM, Safety Harbor, Fla. Dewey is 100% QNI on the Gator Net beginning in July. Don't let that steady gait with a hand key fool you, he is an FB operator. WA4SCK is new secy-treas. The Vero Beach ARC Gulf Stream Society now has an fm repeater operating with two input frequencies, 146.280 and 145.500. Output is 146.880. TARC pres. K4YHG has a full club sked for the coming winter season. TARC VHF Net meets Tue. at 8 P.M. on 51.450. The Fla. Sideband Assn. celebrated its tenth anniversary in Sept. According to the Callbook, Florida has about 100 new Novices. Let's give a listen on the Novice bands for these lands and girls. Keep those traffic reports coming. Traffic: (Aug.) WB4AIW 313, WB4OMG 190, WB4HJW 172, WB4ABY 118, W4SDR 110, 8R1Y/W4 106, W4JSK 104, W4KRC 73, W4FHW 72, WB4MIQ 72, W4NGR 68, WB4GHD 63, K4DAX 62, K4EHY 62, WB4FJY 61, WB4HNL 59, WB4PWD 55, W4BNE 54, W4DVO 51, W4KGJ 45, WB4HKP 42, K4HS 42, K4IEX 35, W4FFF 31, W4YPX 29, W4ZAK 25, W4OGX 24, K4LPS 22, K4JWM 21, WA4CIQ 18, W4FP 17, W4IYT 16, W4GDK 14, WA4IJH 13, WB4KPK 12, W4TJM 11, W4IK 10, WB4JRV 9, W4IAD 8, WA4OHO 7, W4IA 6, K4BLM 5, WA4EYE 4, K4EBE 3, W4ZIR 2. (July) W4KRC 34, WA4IJH 26, K4IEX 20.

GEORGIA – SCM, A.J. Garrison, WA4WQU – Asst. SCM: John T. Laney, III, K4BAI. SEC: W4YDN. RM: K4BAI.

Net	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Net Mgr.*
GSN	3595	2300/0200 Dy	544	149	K4BAI
GTN	3718	2200 Dy	111	45	WB4IKO
GSSB	3975	0000 Dy			

A good time was had by all who attended the Georgia State ARRL Convention/Augusta Hamfest in Augusta Sept. 19-20. K4TXK/6, formerly of Georgia, is active in some of the California nets and is looking forward to returning to Georgia in a year or two. W4DQD reports that the Georgia Southern College Club will operate with a special station call, KF4GSC, from the Ogeechee Fair in Statesboro Oct. 10-20. QSL via W4DQD. As of the end of Aug., W4RNL had checked into 171 of the last 184 sessions of GSN. W4LRR is building a pair of 4-400s for 6 meters. Because of a change of business, W4YDN has resigned as SEC. WA4VWV, of Dunwoody, assumed the duties of SEC Oct. 1. Traffic: WA4RAV 128, WA4WQU 87, W4NSO 65, K4BAI 62, W4AMB 58, W4CZN 33, W4RNL 32, W4DDY 5, W4FDN 4, WA4LLI 4.

WEST INDIES – SCM, Jose Medina-Hernandez, KP4CO – The Puerto Rico ARS held a very FB hamfest at La Esperanza Hacienda with an attendance of 162. Official announcement was made of an

award to honor the memory of Juan Alberto Wirshing, ex-KP4BI, to be given to the most distinguished KP4 operators of the year by the PRARS. The Radio Club de Puerto Rico held a hamfest at Palo Viejo Distillery in Camuy. Officers are KP4TI, pres.; KP4COM, vice-pres.; KP4BBI, secy.; KP4TL, treas.; KP4BSH, KP4DFH, KP4DV and KP4IZ, dir. KP4SV is the happy father of new General Class Tito, KP4BBN activated civil defense KP4AXR with S/Line. Congratulations to KP4CL, who won the YL-OM World-Wide YLRL Contest and the Lebanon award for the Lebanon Contest, also to KP4BBU, KP4AUK and KP4DJE, who were 1st, 2nd and 3rd in the VHF Radio Club de P.R. Field Day. KP4AST is working with *Catalytic, Inc., and will get a five-element 20-meter beam with a* 86-ft. boom 150 feet up and 2 meter activity. KP4DKP, KP4DJI, KP4BAP and KP4DI won honorable mention in the VHF Field Day. *Traffic:* KP4WT 227.

WESTERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKH – SEC: W4IKB, PAM: W4MQO. RM: K4VFY, RM RTTY: WB4WEB, Pensacola: W4ETF was host for FFARA annual fish fry and swim party. A new code class is starting with K4FKV and W4ETF as *instructors.* K4SVX is *teaching night classes at PJC.* The W4UC repeater is back on with a much-improved receiver. Milton: WB4JRP has an FB signal on 2-meter fm. Crestview: WN4RXM received his *ticket.* WA4YCO *is leaving for the Phillipines.* Fort Walton/Eglin: The EARS had a tour of the FPS-85 space track radar at Eglin. WA2BDA, WA4LBM, W4ROM and WB9DBD will be missed on 2-meter fm. W4ROM is back at sea. Defuniak Springs: W5MEH/4 has just moved here. Panama City: WB4IXK and the PCARC are well along with plans for a 3-meter fm repeater. WB4QLU has his General and is active on WFPN. Sneads: The WFPN Picnic was held at Three-Rivers State Park, Tallahassee: K4GRD was nominated for the A-1 Operator Club. Monticello: W4WSY now works for a local BC station. WB4PAV is the only ham in Lafayette County. Traffic: (Aug.) 8R1Y/W4 106. WB4DVM 10, WB4NHH 7, W4RKH 5, WA4SSB 2, (July) 8R1Y/W4 60.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Gary M. Hamman, W7CAF – PAM: W7UXZ, SEC: K7GPZ. RM: K7NHL. The Labor Day weekend found many amateurs providing communications from flooded areas to Phoenix. The Phoenix Chapter of the American Red Cross utilized the 2-meter repeater facilities of WA7CEM, with K7GHS and W7QNO coordinating the communications and the following participating: WA7CRB, W7CWI, WA7DSW, W7EKV, K7ESA, WA7FVR, WA7GNE, WA7GPX, W7IJP, K7IWB, WA7KEY, WA7KRV, W7KWB, WA7NQA, K7OLD, K7PRS and W7UXZ. A shelter was set up in Scottsdale for flood evacuees and K7DAW, at the Red Cross, was active from 2130 Sat. to 1600 Su. The Payson and Tonto Creek area was hardest hit by the flash flood with eighteen fatalities so far. WA7OBS, in Payson, handled 55 messages and several phone patches over the week end on 75 meters. Some of the stations handling his traffic were WA7KOE, W7KWL, W7NUC, WA7NXI, W7PG, W7PLX, W7WFY, K7WIF and W7CAF. Among license upgradings is K7HOF to Advanced Class. It is noted with *regret the passing of two amateurs once very active in Arizona* W7KYM and W7YBZ. Congratulations to K7UYW and K7NHL on making the PSHR. Traffic: (Aug.) K7NHL 234, W7PG 68, K7UYW *30, WA7GAE 23, W7JMQ 12, K7NTG 10, WA7JCK 8, K7OUY 6,* WA7NXI 4, W7OQS 3, WA7DTT 2, WA7HUH 2, W7LLO 2, W7OUE 2, (July) W7PG 67, K7RDH 22, WA7JCK 12, W7CAF 7, *W7UXZ 4.*

LOS ANGELES – SCM, Harvey D.D. Hetland, WA6KZI – Asst. SCM: Philip J. Goetz, W6DQX. SEC: WA6QZY. WB6WDS is working on a new vfo and transmatch. WA6FQC notes a surprising amount of 50-MHz fm activity while mobile. K6OMU has a Motorola 140-D working on 29 MHz, both fm and am. WB6ZTI added a phone patch. WN6GLT reports 5 states, 1 country and 5 QSOs for Aug. W6IL advises that the local QCWA now has a museum which may be visited on the last Sat. of the month by calling (213) 870-0216 on the previous Fri. and making reservation. K6YRD, of Collins Radio, spoke to the JPL Radio Club. W6WLH, WB6NEN and W6HCD recently upgraded to Extra Class, while K6GHJ and W6MEO are now Advanced Class. K6UM and WA6KZI spoke before the San Fernando Valley RC on ARRL. W6LYY seeks the loan of a Valiant II instruction book in order to make a *Xerox* copy for CE4LO. WA6GSV is serving as Ramona RC vice-pres. as DXing permits. W6EJI got a tower and rotator for his quad, and W6DQX has a new beam about to go up. WB6RXC is *getting the San Gabriel Valley RC ready for Field Day. WB6PA* has a new antenna tuner. W6FNE is busy providing communications on 50 MHz for motorcycle races. WB6JZL is active on 40-at 20-meter cw. *The Antelope Valley RC began a new set of Novi*

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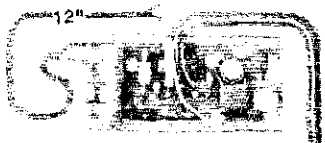

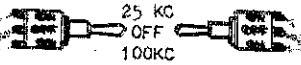

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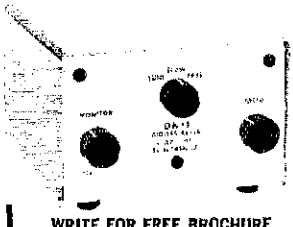

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and W7ONO coordinating the communications and the following

classes, W6NJU is getting the antenna ready for the new season. The Santa Clarita ARC is using 145.98 MHz Mon. at 8 P.M. for a club net and on Tue. it becomes code practice using mew. The Antelope Valley RC is looking for more participants in its Novice net Mon., Wed. and Fri. at 9 P.M. on 7162 kHz. W6FAV advises that the 10-10 Net has plans for a bulletin. WN6FFU reports 12 states toward WAS. SEC WA6OZY now has a club program available to clubs using slides and other aids to demonstrate how AREC functions. K6AFH advises that the Palisades RC repeater is repeating 146.610 MHz to 147.330 MHz evenings and week ends using a6fm. Word has it that the San Fernando Valley RC has a repeater going in the 450-MHz band. New Net Directories are available from ARRL or the L.A. SCM on request. If you haven't mailed your ballot for the Director election remember it must reach ARRL by Nov. 20. I wish to thank the clubs and individuals who made it possible to have a series of open club meetings at which all candidates were invited to speak and to meet the membership. Net report for Aug.:

Net	*Time*	*Freq.*	*QTC*	*Mgr.*	*Month*	
So. N	6:30 P	3600 kHz	191	843	W6LCP	Aug.
So. Cal.	6:30 P	3600 kHz	421	575	W6LCP	July

Traffic: (BPL/PSHR): K6AFH 0/12, W6AM 2/0, WB6BBO 481/0, W6BHG 84/0, K6CDW 67/0, K6CL 40/0, W6DGH 11/0, W6DPV 30/13, W6DQX 4/0, WA6EIM 0/5, W6EJK 0/1, W6ED 22/0, WA6EJJ 5/5, W6FJT 20/31, W7GAQ 32/0, WB6GGL 1/6, WB6GHH 14/18, W6IL 8/28, W6IVC 42/13, W6INH 318/40, WB6JZL 0/2, WB6KGK 24/17, WA6KLA 0/3, W6LPJ 0/32, W6LYY 20/10, WA6MCK 0/14, W6MLE 28/0, W6OI 0/9, WB6PAV 2/5, W6USY 1/0, WB6WDS 3/0, WB6ZTI 15/17, WB6ZVC 79/47.

ORANGE — SCM, Jerry L. VerDuft, W6MNY – Asst. SCM: Richard W. Bierbeck, K6CID. SEC: WB6CQR. RMs: W6LCP, W6BNX. WB6ASR, 18 years old, is a new OVS and WB6YXA is the new Riverside County EC. The 75-Meter AREC Net meets Sun. at 0830 local on 3945 kHz. EC K6CGS has been appointed Asst. Dir. EC WB6WOO says the Orange County 2-meter AREC group proved its capability once again by providing communications for the Santa Ana Tennis Tournament. Participants were WA6UBW, WA6QHH, WA6HTC, WB6WYU, W6DYI, WB6BJH and WB6WOO. WB6ZFC has built a new 80-meter dipole and his signals are the best ever. W6EB was visited by DU1FH. WA6ITT worked two Rhodesian mobile stations, ZL2IF and ZE2JP, via long path on 20 meters. W6CPB is helping to run phone patches to SEA at Autonetics ARC MARS station AFCoYPX, now a member of Air Force Communications System. K6OT has a new XYL as of Sept. 14. K6DLY obtained WAC *operating 20-meter mobile. WB6ASR and WA6BJH went on a* 6-meter DXpedition to Mt. Toro in the San Bernardino National Forest. Their best DX was K6PRO on Catalina Island. RM W6LCP reports for the Southern California Net 31 sessions, 48 stations, QNI 391, QTC 543. SCN needs more stations providing reliable traffic outlets. It meets daily on 3600 kHz at 6:30 P.M. local. The SCM, Asst. SCM and SEC were guest speakers *at the Lee Deforest ARC* meeting Aug. 11 in Hemet. We welcome invitations to speak at any club in the section. Write the SCM, address on page 6. New address of the SEC WB6CQR is Billy C. Hall, Bit O' Home Lodge Space 56, 5002 W. McFadden Ave., Santa Ana 92704. PSHR: W6BNX 66, WA6ROF/W6MNY 48, WA6FOO 38, WA6CEI 37, WB6SEA 27, WB6ZEC 25, WB6ASR 16, W6CPB 5. Traffic: (Aug.) W6LCP 242, WA6FOO 200, WA6ROF/W6MNY 91, WB6ZEC 83, W6BNX 82, W6WRJ 32, WB6AK6GGS 6, WA6CEI 2, W6EB 2, W6GB 2, (July) K6DLY 9, W6AOC 7, WA6IWS 3.

SAN DIEGO — SCM, Richard E. Leffler, WA6COE — Asst. SCM Art Smith, W6FNI. SEC: K6FDA. The 30-ft.-long booth will show the NTS, RACES and AREC preparedness programs Nov. 27, Dec. at the Home Show in the Concourse. Club news: The 2-Meter fr group lists 146.34 and 146.85 for WB6WLV repeater. Th association *now has well over 60 members using the repeate* facilities. SD DX Club Nov. meeting will be at the QTH of W6BS IVARA meets in the Red Cross Bldg., El Centro. (Contact W6DLI for information.) Palomar RC held its annual picnic at Live Oa Park in Aug. The North Shores held its club picnic at Crown Poin in Sept. SOBARS continues to meet at the QTH of WA6DDI Chula Vista. The ARC of El Cajon recently had W6KW, WB6VK and WN6QVH as guest speakers. Station news: We're sorry to repo the following as Silent Keys: VE2BBO/6, WB6LIC (ex-W6LTP) an W6REX. New 50HCX and beam are up for W6SRS. W6RDI is qui ill in El Centro. DeAnza Rescue Unit credited W6JHG and WA6MT with invaluable communications help in a recent Baja search. Mayo Curran gave W6INJ a certificate for ARRL 12 AM Net) for help wit the SLOBB campaign this summer. WA6PTP has a newly redor shack and WA6EXM reports much equipment trading. K6BT

converted CB gear to 10 and ran 3.5-GHz tests across the shack. A happy Thanksgiving to all! Traffic: W6VNQ 549, W6LOI 349, W6BGI 346 (PSHR), K6HAV 87, W6YKF 74, WA6AAI 5, WA6COI 4, W6INI 4, WA6IAM 2, W6TAI 2.

SANTA BARBARA – SCM, Cecil D. Hinson, WA6OKN – SEC: W6JTA, RM: W6UE. W6GFB recently answered a CQ emergency on 40 cw from San Felipe, Mexico, and was requested call Mexicali, Mexico, on the telephone for fire department assistance. The only record he has of a job well done is a large telephone bill. WB6WKC traveled to Colombia, South America, this summer with Amigos de las Americas and operated as WB6WKC/HK8 in Florencia for a month. The Fiesta Parade in Santa Barbara this year was assisted by K6SIF's repeater atop the Balboa Building. A new Novice in the Los Osos area is WN6CXD. WA6DEI is an active member of the Southern California Net (SCN) and has been recommended as net mgr. WB6WKC will be on RTTY soon, thanks to AE-MARS. The Thousand Oaks ARC held its summer Luau at the QTH of W6SUN. Two-meter fm is a renewed interest at WA6OKN since the advent of a new repeater in Thousand Oaks. Traffic: WA6DEI 283, WA6MGG W6ITA 33, WA6MGG 12.

WEST GULF DIVISION

NORTHERN TEXAS – SCM, L.E. Gene Harrison, W5LR – Asst. SCM: Gene Pool, W5NEO. SEC: W5JSM. PAM: W5BOO. RM: W5GQZ. Asst. SEC: Tex/PAM VHF: WA5KHE. We retired Sept. 30 and made the Brownfield Swapfest Oct. 24, 25, plus the Longview meeting of FTex Emergency Net (3970 group) Sept. 13. A sample mailing of the ARPSCTO bulletin was sent members of the NF Tex emergency group for evaluation. SoTex RM W5EZY back in Feb. '70 said A-3 bands to be widened and feasibility studies were ordered per *QST* July '69, p. 78. How's to review to date with present thinking and advise your director. K5MMS, living ARC, reported on "Celia" at the Aug. 28 meeting. K5QYO, of Garland ARC, is a Silent Key. Brownfield hams made 414 contacts during ED. W5CJX wants an OBS appointment. W5IZU and Tyler associates report interest in reforming the East Texas RC, meeting monthly at Kilgore, Tyler, Longview, Henderson, etc. etc. Understand Waco has 160 hams and a new club. W5URD was appointed as Smith County EC. WA5KIV was selected for Medical School in Galveston. WA5KHE is ready for the Stephen F. Austin new school year. WFPAN's proposal for restructuring Communications Department appears be in the right direction per W5EZY, So. Tex RM. However, many COs have different ideas along this line. For example, No.Tex. has an area of 127,000 square miles and terrific administrative problems. My G-2 says the Arlington RC is interested in the '71 convention. The Kilocycle Club of Fort Worth, K5BIQ, says vacations are over and now to business. W5CVW is now W5TI. K5AZX is now pres. of the Brownfield ARC. WA5VJW received an award for the highest cw score in the 5th District YL/OM Contest. Sorry you guys missed the EMT Sept. 12. W5MNY, Gregg County EC, worked in "Celia." W5NEO is busy repairing damage from the Lubbock tornado. SEC W5JSM reports 277 AREC members. WA5VJB is active on 432. W5QPX made 35 OO observations in Aug., W5KYD made 11, W5QWJ none. Your SCM has antenna problems. K5GMI now is on the air. Traffic: WA5VJW 251, W5RID 120, W5HVF 42, WA6KNW/5 30, W5NFO 12, W5PBN 11, W5JSM 7, W5LR 5, W5QGZ 1.

OKLAHOMA – SCM, Cecil C. Cash, W5PML – Asst. SCM: W.L. Smoky Stovel, K5OOV. SEC: WA5ESN. RM: WA5YRO. PAM: W5MEX. The net structure has been changed to some extent. The Sooner Traffic Net No. 2 and the Oklahoma Weather Net have been combined and the starting times split. The net now is known as the Oklahoma Traffic and Weather Net (OTWXN). The Net Mgr. is WA5WHV, of Tipton, and the weather report logging manager is WA5TWM, of Oklahoma City. Glad to have K5WPP out of the hospital and back into the swing of things after a long illness. W5MEX has returned from vacation on the East Coast. W5JJ said batching is not his thing after a three-week siege of it while his wife was visiting in Utah. K5DLE has a new homebrew 50-MHz rig. After many requests we have accepted the resignation of W5QMI as RM. Congratulations to new RM WA5YRO, of Duncan, and new OPS and Net Mgr. WA5WHV and holder of new two-letter call W5TY, ex-W5ERM.

Net	*kHz*	*Local Time*	*Sess.*	*QNI*	*QTC*
OPEN	3915	0800 Su	5	196	6
OPON	3913	1700 M-F	22	260	47
STN 1	3850	1730 M-S	26	257	21
STN 2	3913	1730 M-S	26	452	46
OWXN	3913	1800 M-S	26	400	
OLZ	3682.5	1900 M-S	12		30

Traffic: K5TEY 524, WA5IMO 68, WA5ZOO 31, W5IKL 2 W5CDG 24, W5QMJ 22, WA5UEJ 22, W5PML 15, WA5FSN K5OCX 2, W5JJ 1.

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE6FK — SEC: VE6X PAM APSN: VE6ADS, PAM CPSN: VE6DO, RM: VE6TY, EC VE6SS, VE6AFO, OOs: VE6IM, VE6MJ, VE6TY. Observation the APSN shows continuing activity. Written message traffic is st very light. However phone calls, etc., are handled in abundanc Most VE6 mobiles appear to prefer B.C. The Labor Day week e and its attendant BEBA was a lot of work for many of the Alber amateurs. VE6AWS/6, at Harvie Heights, did EB on the provinc control position. Without his splendid cooperation the scher would have been most difficult. VE6AZU, in Calgary, was ha pressed to get enough volunteers to cover the scheme. Howev most of the old reliables did an excellent job. VE6ALS/mobile, the Banff Lake Louise area, did his usual excellent job. VE6TG a VE6DJ mobiles put on a good show in the Lethbridge area as usu VE6AZU and VE6FK wish to thank everyone throughout t province who helped out. VE6ASK and VE6AHV once again ran excellent exhibit at the Annual Hanna Fair. I understand "Ha Wide World" was well presented and appreciated.

BRITISH COLUMBIA – SCM, H.E. Savage, VE7FB — Dur Aug. we met many visiting amateurs in camp sites and had go QSOs. VE7KY is now recovering at home. VE7RD, Brit Columbia's Provincial Fire Marshal, has retired after more th thirty years service. VE7BIL is in the hospital. The British Columb Emergency Net, 3650 kHz reports summer activity has been goo The Vancouver Club set up a station at Brockton Point for the S Festival week and worked considerable DX. VE7BAF and his X are teaching in Merritt. You may be interested to know that VE AP, AXI, BHR, BMM, VP, YC and YF have just completed 39-week chore, maintaining contact each and every night w VE0MCA in *Porpoise, III*, one of the ships in the recen completed sailing race from Victoria to Maui, Hawaii. The skipp of *Porpoise III* is VE7BKT and the radio operator/cook/navigat was VE7QH. Traffic: (Aug.) VE7AC 26, VE7BLO 15, VE7GG VE7LL 4, (July) VE7LL 27, VE7BLO 15.

MANITOBA – SCM, Keith Witney, VE4EI — VE4CG a VE4HJ are both pleased with their new Tempo I transceivers. VE EI, HI, IH, FC, IA helped marshal the Cresentwood Parade. Winnipeg repeater duplex has arrived and was scheduled for 24-ho operation on Oct. 16. The Winnipeg Centennial Hamfest wa success with several interesting talks and displays. I was particula pleased to see VE4EO's slo-scan equipment on display. VE4KE w the 2-meter hunt and VE4DV won the /5-meter one. VE4HI a myself spent the 2-meter hunt going around and around the repea site. VE4RW has joined VE4EF at West Man Electronics. Traff VE4RO 28, VE4EQ 16, VE4CR 13, VE4QI 6, VE4CN 2, VE4FO VE4JA 10.

MARITIME – SCM, William J. Gillis, VE1NR — Asst. SC Clarence Mitchell, VO1AW, SEC's: VE1HL, VE1ATP and VE1A were recent visitors to Nfld. and PPB. VO1CV is active on 75 surgery. The Nfld. Net is on a fall sked, 3.785 MHz at 7 P VO1JH now is in Halifax, VO1GR is the second white cane in V under the sponsorship of VO1CB. VO1BT passed the Advanc Class exam. ARCON now has a 2-meter repeater operating at No Arm. VO1CU has the DXCC, WA, VE, CA, Capt. Cook and N Zealand awards gracing his shack. VO1AW vacationed in VE3-La VE1AJR is now VE3EXU and VE1AVK is now VE3ELZ. VE1 has new equipment. VE1AUE was reelected pres. of NSARA w VE1MQ, 1st vice-pres. and VE1AKO, secy.-treas. VE1AI completed WAZ and is moving to Ottawa. An informal gathering Fundy National Park saw a good turnout. VE1AUB and VE1IT proud parents of a new Jr. operator. Traffic: VO1CA 70, VE1 56, VE1ARM 46.

ONTARIO – SCM, Holland H. Shepherd, VE3DV — London ARC has organized a steering committee to install a 2-me fm repeater station to serve London and surrounding area. PA and RMs are looking for NCSs. Toronto's West Side Radio C ARRL affiliated, has published an extensive program for 1970 under new officers VE3CIK, pres.; VE3CDM, vice-pres.; VE3A secy.; VE3FGW, treas.; VE3ELA, VE3GFR, act. Other Onta ARCs are invited to take this opportunity to look to the past send me a brief history. OO appointees are reminded of the N FMT. All field appointees should make an extra effort to take in the Nov. Sweepstakes. VE3CRA is interested in obtain pre-WW2 General Radio equipment. Beacon VE8WT, 50.98 MH

now undergoing tests at Ottawa. When completed it is to be installed at Frobisher Bay. Thunder Bay AREC, under EC VE3AYZ, did a fine support job along with PAM VE3BLZ and the Sudbury gang during a storm at Sudbury Aug. 21. VE3CNF again operated at Toronto's CNE. VE3AIA received a certificate for ORS. VE3ACH reports that the Elgin Amateur Radio Society is headed for a big year under the capable hand of VE3GMO. VE3GI, RM ECN, had a new 80-meter dipole strung with the aid of VE3GHO, VE3ARJ and VE3DV. VE3FZX is now heard on the phone nets since he received his Advanced. VE3BUX is back on the bands after an extended trip to Britain. Going back to school has taken some of the top hands from the nets and we need volunteers. Contact the SCM for details of field appointments available. Thanks to those clubs sending in their bulletins. TFMCA is excellent as well as West Side Signal. Traffic: VE3DBG 137, VE3DV 112, VE3ERU 90, VE3DPO 88, VE3GCE 60, VE3EWD 55, VE3GI 44, VE3EHL 39, VE3FXI 36, VE3AWE 10.

QUEBEC – SCM, Joe Unsworth, VE2ALE – VE2BTZ has been appointed as SEC. New calls heard are VE2BWD and VE2BVD. VE2ADE reports the addition of a YL in the family and VE2DFE another jr. operator. VE2AEJ was in VE1-Land for the summer. VE2AOF parti a VE3. Nouvelle repetitrice Quebec VE2ASU. Mini-Congres de Val D'Or a eu beaucoup succes et Le Petit Train de 8 Heures dans 5 annee. NCS VE2AA-Dir. VE2AB sur 3,755,3090 passagers L'An dernier RAQI a fourni communications Table Rondes 80 metres duree des Jeaux du Quebec. Merci a VE2DLD. VE2RM, Inc., another first with solid state control touch tone. VE2LD is NCS of the VE2AQC net. Other new calls are VE2BRQ and VE2NW. VE2JO had WA3EPH, a former VE2, as a visitor. VE2HI is secy. of MARC and NCS. The PL Net is expected on 2-meter fm shortly. VE3GP, VE2RM and VE2AKI trying to locate a person in a Montreal Hotel to deliver traffic checked 16 hotels and were unable to locate. Hi. Traffic: VE2DR 45, VE2OJ 18, VE2AJD 17, VE2ALE 5, VE2APT 2. QST

RULES FOR LIFE MEMBERSHIP

1. Life Membership is granted only by the Executive Committee, upon proper application from a Full (U.S. or Canadian licensed) Member.

2. The Life Membership fee is twenty times the annual dues rate, or currently $130.

3. An applicant may choose an alternative time-payment plan of 8 quarterly instalments, $16.25 each. In such instance he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, the application will be presented to the Executive Committee for approval.

4. Life Memberships are non-transferable and dues payments are non-refundable. In the event an applicant is unable to complete payments on the instalment plan, he will be given a term of membership, at the annual dues rate, commensurate with payments received.

5. Other licensed amateurs in the same family, and at the same address, of a Life Member may retain or obtain Family Membership upon payment of the annual dues of $1, but without receipt of *QST*. The dues of the Family Member may be prepaid for any number of years in advance, but there is no special rate.

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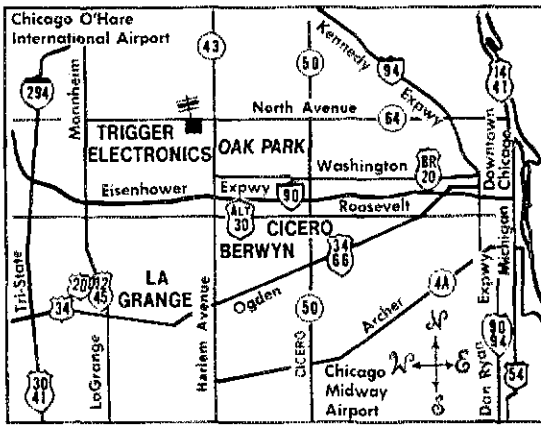

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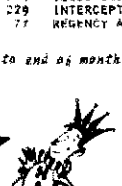

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QCWA Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Write for information, A. J. Gironda, W2JE, Box 394, Mamaroneck, NY 10543.

FREE Sample copy Long Island DX Association Bulletin. Latest DX news. Business size s.a.s.e. to K2AFY, Box 74, Massapequa LI NY 11762.

SAROC, January 7-10, 1971, Flamingo Hotel Convention Center, Las Vegas, Nevada. Sponsored by Southern Nevada ARC, Inc., Box 73, Boulder City, Nevada. Advance registration $14.50 per person accepted until January 4, regular registration at door, includes Flamingo Hotel late show and drinks. Sunday breakfast, cocktail parties, technical seminars and meetings, ARRL, DX, FM, MARS, QCWA, WCARS-7295, WPSS-3952 and WSSBA. Ladies program. Flamingo Hotel SAROC room rate $12 plus room tax, per night, single or double occupancy January 3 thru 12 1971. Mail accomodations request to Flamingo Hotel. Mail advance registration to SAROC.

WANTED: All types of tubes. Top prices paid for Varian and Eimac. Jaro Electronics Corp., 150 Chambers St., New York NY 10007.

WE BUY all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co. Box 516, Hempstead NY 11551.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway NY 10012. Tel. 212-925-7000.

PHONE patch, with 2.5 kc filter, for Telco coupler or direct if not required. No tricky adjustments. Kit $6.95. Wired add $4. Ham Kits, Box 175 Cranford NJ 07016.

WANT early issues of Pioneer Wireless Magazines for W4AA Historical Radio Library. Wayne Nelson, Concord NC 28025.

WANTED. For personal collection. The Radio Amateur's License Manual, Edition 12, ARRL "Map of Member Stations," 1914. W1CUT, 18 Mohawk Drive Unionville, CT 06085.

NOVICES. Need help for General ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, Box 6015, Norfolk VA 23508.

WE'RE trying to complete our collection of callbooks at Hq. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington CT 06111.

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QSLs 3-color glossy 100, $4.50. Rutgers Vari-Typing Service Free samples. Thomas St. Riegel Ridge, Milford, NJ 08848.

QSLs SWLs WPE. Samples 15c in adv. Nicholas & Son Printery, Box 11184 Phoenix AZ 85017.

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160 meter Matchverter resonates any 40 or 80 meter inverted vee/dipole on 160 meters. Handles 250W PEP, $29.95 ppd. Top Band Systems, Dept.4, 5349 Abbeyfield, Long Beach, Calif. 90815.

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QSTs before 1927 and amateur teletype publications wanted. Orville Magoon, 1941 Oakdell Dr., Menlo Park, Calif 94025.

SAVE on all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Rd., Swampscott Mass 01907, 617-589-9700

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NOVICE crystals: 40-15M $1.38, 80M $1.83. Free flyer. Nat Stinnette Electronics, Umatilla FL 32784.

AMATEUR museum buying old radios, books, magazines, catalogs, parts. Selling QSTs and CQs. Erv Rasmussen 164 Lowell, Redwood City CA 94062.

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YAESU Munsen FLDX400 transmitter (not a transceiver). Self-contained ac power supply. New never used. All ham bands. $285. No swaps and no personal checks. FOB. L. K. Laird W9RLW 501 E. Pine, Mt. Prospect IL 60056.

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WANTED R389 R390 R390A receivers. Price must be realistic. Supply information on electrical and physical condition in first letter. Bill Smitherman WA4YFI East Bend NC 27018.

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FOR SALE. Complete kilowatt station. Heath TX1 $90, KX1 $110, HA10 $140, HO10 and HO13 $45 each. Vibroplex $20. Eico keyer $50. Lot price $450. Frank McJannet 11557 Evanston N., Seattle WA 98133.

6N2, Eico 723, Heath P.S. $95; HB 2M XMTR with 2 6360's $25; Parks 2M conv. $30, WA9SPA 5253 S. Luna Chicago, IL 60638.

HOMEBREW cw station power supply, all-band transmitter 80-20, with coils and amplifier, 45-120 w. transmatch, $75.00 Box 191, Shokan, NY 12481, WA2SRO.

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GSB-100 SSB Xmtr All Band $130., 1 KW Lakeshore P-500 Linear $50., Both for $150, W7BX 2025 William Ave. Chehalis, WA 98532.

RCVRS — Collins 75A2 in mint condx $150, SX28-A $30., no speakers, DX100B $60, SR10 SSB Adaptor $40 — together $90. Have manuals, cables, etc will ship, FOB Ogden, UT Earl Sanders, W7MFU, 3105 S. 4300 W, Ogden, UT 84401.

SELL: Mint 75S-3C No. 10095, manual, All 10M Xtals, 500 CPS filter, $500; mint SB-400, Manual, $200; excellent condition QST continuous Sept 1947 to present, CQ continuous Feb 1962 to present, both for $75. Robert Crupi, 12831 Owen, Garden Grove, CA 92641.

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SELL: Knight-Kit VTVM. Needs tube. $15. Paul J. Skinner, W9QXR, Galesburg Research Hosp. Galesburg, IL 61401.

MANUALS — R-390/URR, R-390A/URR, BC-639A, $6.50 each. Hundreds more. S. Consalvo, 4905 Roanne Drive, Washington, DC 20021.

WANTED — Antique receivers and component parts for purpose of restoring. Need all types of antique tubes that are in working condition. Prefer pre-1930 equipment, but will consider later models up to 1935. Items are wanted for personal collection. Please give price with letter. Will swap modern components for your tube or solid-state project if preferred. Write Doug DeMaw, W1CER, c/o ARRL Hq.

NEW Standard SR-C806MA, plus SR-CL25 linear 25 W. output 2 meter solid state FM, all xtals for 12 channels $320. K2BQO-Paul W. Hazzela, 8 Yale Place Armonk, NY 10504 Tel 914-273-8067.

RTTY wanted - Model 14, 19, or FRXD. B.W. Campbell WA8OJR, 3126 Gratiot Ave., Port Huron, MI 48060.

FOR SALE: $300.00 SWAN 350 with opposite sideband adapter dual VFO Adapter model 405 VFO AC power supply and speaker. W1UPF 57 Allen St. Hampden MA 01036.

SELL: TR-4, $419; TR-3, AC-3, $349; DC-4, $75; LA-1 Arrestor $10; Comdel CSP-11, $75; SB-630, $59; Mars swr, $12; Omega-7 antenna noise bridge, $15; EV-674 (List $95), $49; G-104 G-Stand, $19. Wanted: HO-10, R. Nevers, 1591 Nrwch-NL Rd 31, Uncasville, CT 06382 203-848-3452.

ESTATE Sale. Like new collins 75S-1 328-1 30L-1 312B-4 complete, $1000 Firm. No shipping. W4GYO P.O. Box 2841 Atlanta GA 30328. Tel 404-252-3857.

FOR SALE Heathkit SB-200 Linear Amplifier with manual $180, postage excluded. K9PBJ Richard Kuonen, Route 4 Crawfordsville, IN 47933.

WANTED: Collins CC2 & 3 with PM-2 75S3-B/C. Have 75S-3 with 500 cycle CW filter. Swap or sell with cash to difference W6IPB, 2 Val Mar Place, San Carlos, CA 94070 415-591-2089.

SELL: Transceiver - SSB/CW/AM with AC supply and spkr. Eico 753 and 751. $150 FOB W6RAB, 5454 Milligan Dr., San Jose CA 95124.

TRADE: KWM-2, PM-2, 516E-1, and 351D-2 mobile mount, all excellent condition for 75A4 (S/N5700 or higher) with all filters and spinner knob and HT-32B. Both in excellent condition K1OJQ 617-773-0284.

SUCCESSFUL HAMS invest in W6SAI Handbooks for top-ma results! Cubical Quad Handbook - $3.95; Beam Antenn Handbook - $4.95; VHF Handbook — $4.95; Better Shortwav Reception — $3.95; Electronic Construction Practices — $3.9 Sold by leading ham dealers. On orders to publisher, please ad 20cents per book for handling/postage. Radio Publications, In Box 149-P, Wilton, CT 06897.

HW 12A and HP23 $125.00 K1MMC, 298 Lincoln St. N. Easton MA 02356 or Ph. 617-238-6856.

WANTED: Old Engines from Model Airplanes. Will trade tube transistors, transformers etc etc. Frank Schwartz W4KFK, 240 W. End Ave., Nashville, TN 37203.

JOHNSON Invader 200/2000 Cables, Manual, mint $375. Drake R4A w/MS4, Manual , orig. cart, $275. Johnson Phone-patch $18. Dow Ant. coax. Rv. SPDT 110 ac. $10 Package $650. All as new. Ph. 212-597-7425 WB2ZBM Roger Batista. 1219 Taylor Ave. Bronx, NY 10472.

SELL: Hamplon 206A FM mod meter $150, SB200 $185. Motorola T-44 Mobile Units $100. I need Motorola and/or other late model FM test equipment also SB301. Jim Hiatt, 2725 Eastfield Rd, Smyrna, GA 30080.

WANTED HQ-129-X Exc cond Bob Lauren W3BIN 5184 Livingston Terr. SE, Washington, DC 20021.

DON'T guess at operating privileges. 8 1/2 X 14 " wall chart displays FCC frequency allocations and authorized emissions for novice through extra class. 3.5 through 148 MHz. 50 cents. K. Nichols, 7280 Danbury Way, Clearwater, FL 33516.

RETIRING — and Moving, must sell excess transmitters, receivers, power supplies etc. Send for list W2ECO.

CONTACT us for the best deal on new or reconditioned Collins, Tempo-One, Drake, Swan, Galaxy, Hallecrafters, Hammarlund, Hy-Gain, Mosley, Henry linear, towers, antennas, rotators, other equipment. We try to beat any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio Butler, MO 64730.

HAM'S Spanish-English manual $3.00 ppd. Gabriel, K4BZY, 1829 NE 4th Ave., Fort Lauderdale FL33304.

AM Phone 811's KW modulator completely wired as per ARRL Handbook 1962, All Thordason matching transformers with Universal output transformer $75.00, 50 MHz Halo with trans. Brand new $15.00 Finco Beam for 6-2 MHz $8.00 used. Phone 201-759-8829, K2DQT, 61 Cortlandt St., Belleville, NJ 07109.

QST-CQ magazines: - QST: — 1932-1970, $275. CQ: — 1954-1970, $50, No shipping. Stan., W8QKU, 2748 Meade, Detroit MI 48212.

COMPLETE Heath station, DX-60B, modified HR-10B with crystal calibrator and preamplifier, HG-10 VFO Vibroplex bug with CW monitor and power supply for monitor. All for $200. Jim Nance, route 2, Colome, SD 57528.

SB-400, Heathkit transmitter, excellent condx., Best offer over $150.00. Joe Murphy, Box S 896, Stevens Terh., Hoboken, NJ 07030 201-656-5229 WB2QYO.

INVADER 2000 Need space, Steal it for $250. W4SD 683 SW Seventh ST., Boca Raton, FL 33432.

COLLINS 75S-3, 32S-1, 516F-2, $800, V2VDN, 19 Schuler, Waldwick, NJ 07463, Days 201-933-5134.

SALE: SB-200, $185.00 or reasonable offer. W2WHK 210 Utica St, Tonawanda, NY 14150.

SELL: HW-16, like new, xtals 3707, 7153, 7158, 21.105, 21.150, $85, R. Keimling, WN8GCR, Route 3, Galion, OH 44833.

DRAKE 2NT, 2C, 2CS speaker, Key Crystals. Perfect. $300 Gary Hargrove M.D. WA6OZH 6402 Park Ave. Garden Grove, CA 92641.

FOR SALE: F/W Ranger II transmitter and NC300 Receiver. Both for $275.00. K9PTL 1282 Monterey, W. DePere WI 54178.

SELL Swan 500C w/117XC, $495.00, Ham-M rotator $90.00, Mosley TA33 $95.00, 20' Rohn tower. All new never used. WA5WKR, L.D. Niblack, 2708 NW 120th St., Oklahoma City, OK 73120 405-751-4515.

WANTED: Heath SB-610, SB-630, HP-13A, HP-23A, IG-102, SB-100-1, IM-28, PK-3, 336, IT-28, GH-12A kits or assembled. Give condition, price. Sell: HQ-170C, SSB, CW, AM, 160-6M, excellent, w/matching S-200 Spkr, manual - $160. Millen 90801 transmitter, manual, - $25. Mint BC-645-A-#20, JT-30C — $5.00. FOB. W2FMB, 34 Warren St. Whippany, NJ, 07981, 201-887-4511.

WORLD Radio's used gear has trial-terms-guarantee! KWM1 — $199.95; KWM2 - $695.00; SR160 — $149.95; Swan 500 - $299.95; TR4 - $399.95; SB34 - $249.95; Galaxy 5mk2 $259.95; GC550 — $379.95; Interceptor 6/2 receiver — $199.95; 75S1 - $299.95; SX101 — $159.95; SX146 — $149.95; NC155 — $89.95; HX30 (6M-SSB) — $129.95. Free "Blue-Book" list for more. 3415 W. Broadway, Council Bluffs, IA 51501.

SELL DX-60B and HG-10B $90, SB-600 speaker $15, Richard Sanders, 326 Howell Ave. Riverhead, NY 11901.

COLLINS 75A-4 3.1-2.1 filters, manual, condition good $335.00 Chas W. Rogers, P.O. Box 338, Manasquan NJ 08736.

FOR SALE, Marauder HX10 $200, TT4 Page Printer $95, Model 14 $75, 14TP $50, SX42 $95, HA14 Kompact Kilowatt less ps $100, Will ship REA. WA2DVU.

HICO 753 Triband Transevr with power supply, 200 watts, $100 you ship. Scott Diseth 8813 121st St. SW Tacoma, WA 98498.

2METER FM mobile RCA CMC-20, 2 chan. xmtr-rcv, 20w, 6/12v, fully narrow band, with accessories and 34tr-94rcv xtals $50, SR-46A 6m $50, GPG-6 6m 5/8 wave, ground plane $15, CDE AR-22R rotor with 100 ft. cable $20, you pay shipping. Bruce Palmer, WA7MPA/Ø 222 E. Kansas City ST., Rapid City, SD 57701.

MINT Johnson Ranger I $75, AR-22 Rotator $25. Used but still good 3047Ts — make an offer, W7GKF 2229 Briggs,Missoula MT 59801

MINT NCX-5, AC supply, $385. NCL-200, $340. — Everything $690. Harold Greene 211 Circuit, Hanover, MA 02339 — 617-878-1266.

SELL: NCX-500, AC-500 Brand new condition; $385. H. Taubin, W2GCW 192-15A 69th Ave., Flushing NY 11365.

SELL good Swan 175, $89. Wilson Martin 1127 W. 10th Pl., Mesa, AZ 85201.

NEED instruction manual or manufacturer's addresse of surplus electron tube tester TV-2A/U, Federal Television Corporation, KP4JM Jose E. Saldana Box 7388 Cidra, Puerto Rico 00639.

SQUEEZE KEY, the ultimate electronic keyer. Compact, IC circuit board, built-in double lever paddle, sidetone speaker. Beautiful import. $79.50. Sase for brochure. Dave Kennedy, W9DIL, Farview Rd., RR No. 1, Elburn, IL 60119.

SALE S.B. 400 Heath SSB exciter xtnl condition. Ship Collect. $195. K6GG R.J. Hahn, 740 E., Sycamore St., Willows, CA 95988.

CHRISTIAN Ham fellowship is now organized for Christian fellowship and witness among licensed amateurs. Free gospel tract sample and details on the organization on request. Christian Ham Callbooks, listing members, $1 on donation. Christian Ham Fellowship 5857 Lakeshore Dr. Holland MI 49423

FOR SALE TR3 with ac power supply and remote vfo, Sand Ameco pre-amp $400. Collins 30S one with spare 4CX1000 $800. Call weekends only 212-528-8056. Peter Orlando K2CVZ.

WILL sell Collins 75A4 serial 4172 500, 2500 filter $375. 312-255-8814. L. A. Jackson 5701 Kingsley Dr. Indianapolis IN 46220.

FOR SALE: Mint Apache and SB10 $145, HW22, mike, bumper mount $60. Stan K1RQY 90 Middle Rd. E. Greenwich RI 02818.

SELL Central Electronics 100V transmitter, very clean $320. Gonset Super 12 converter, good $25. Walter Ghsh 1221 N. 72nd St. Wauwatosa WI 53213.

SALE Hallicrafters SX100 receiver, Hammarlund HX50 transmutter, both for $300. Ameco TX86 transmitter, Regency ATC1 converter, Mosley TA33 jr beam. W9AMN 4809 Marathon, Madison WI 53705.

FOR SALE CAP 200 w ssb transceiver Heath HW18-1 4602.5 and 1630 kHz. Assembled and tested never used. Insured and shipped for $120. K5LRC J. D. Clowdus, Box 73 Springer OK 73458.

FOR SALE: KWM2 †15122, 516F2 $875, 30L1 new $445, used $345, 312B5 $275, 399C1 $165, 62S1 $475, 75S1, 32S1, 516F2, 312B4 $700. Waters Nuverter $125. Waters Codax keyer $45. Galaxy 300 PSA 300 $185. SP600JX17, cabinet $250. James W. Craig 29 Sherburne Av. Portsmouth NH 03801.

SELL: HT-37, $175; Drake 2B, $175; Johnson Valiant I, Make Offer, Dale M. Johnson, K9VUJ/WB9AVV, 15800 Buckhill Rd., Sw, Lot No. 78, Burnsville MN 55378. Tel: 435-5895 after 5 PM.

YAESU F LINE — FLDX-400, FRDX-400, with all extras, mech. filters, mic, 6 & 2 convtrs, FM det. & xtra fnls, pft-used 20 hrs., $500 MP-33 1 yr. old. Offers welcm. N. DeLoye, WA6ENV, 2141 Fallen Leaf Pl., Tustin, CA 92680.

FOR SALE Collins 180T-2 antenna coupler - Ideal for yacht or apartment — Remotely tunes any antenna 35 feet long from 2.0 to 30.0 Megacycles — Built-in wattmeter — coupler, remote control and 50 feet control cable, $235.00 Jack Yeoman, W8VHY R No. 4 Washington Court House, OH 43160.

"HOSS Trader Ed Moory" says he will not be undersold on Cash Deals! Shop around for your best price and then call or write the "HOSS" before you buy! Used Equipment: Swan 270B Cygnet, $399.00; Swan 500CX, $418.00; Drake TR-4, $518.00; R4-B, $349.00; T4-XB, $365.00; GT-550, $409.00; L4-B, $609.00; Ham-M Rotor, $85.00; TH6-DXX, $132.00; NEW ROHN 50 Ft. Foldover Tower Prepaid, $199.95; New Mosley Classic 33 and Demo Ham-M Rotor, $199.00; New Hallicrafters HA-20 VFO, $149.95; November Special, New W2AU Quad, Reg. 1$99.95), Cash Price $80.00. Reconditioned Equipment: Swan 350, $275.00; 75A-4, $319.00; TR-3, $359.00. Moory Electronics Co., Phone 501-946-2820 P.O. Box 508, Dewitt, AR 72042.

TOLEDO Mobile Radio Association's 16th annual hamfest and auction will be held February 21, 1971, Lucas County Recreation Center, Maumee, OH. $1.00 registration, open table sales. Map and info write: TMRA W8HHF, Box 273, Toledo, OH 43601.

ANALOG computer, Donner desktop Model 30. Ten built-in amplifiers. Excellent for science fair, mathematical problems, etc. $90. DX60-A xmtr with crystals and manual, price is $60. Home brew electronic keyer, new "Vibro-Keyer" $25. Elmac AF-68, M-1070, cables, manual $80. Pentron continuous-loop Message Repeater/CQ Caller, VOX, cartridges, tape $45. Viking 500, Viking SSB Adapter, cables, manuals (sorry, no shipping) $300. HW-12, HP-13, HRA-10-1 calibrator, Hustler mast/resonator, speaker, cables, manuals $110. Johnson TR Switch $19. James code practice oscillator/RF monitor, manual $10. Lambda regulated power supply Model C-281 $25. Everything in good condition, no junk. Bill Shepherd, 12,000 Twin Cedar Lane, Bowie, MD 20715, 301-262-0155.

A.R.R.L. Handbook 1926, 1931, 1933, 1935, 1938, 1946 others. Antenna Book 1939. Hints & Kinks 1937. CQ Vol. I Nos. 2,3,4,6,7. Gernsback's E.I. catalog No. 20 (1918). Various QSTs 1924 to 1940. What do you need? Wanted QST Sept. 1917 to complete Vol. III. W5ABY, 4808 Braeburn, Bellaire, TX 77401.

FOR SALE: Viking pacemaker $125. Hy Gain DB 62, $20. Mosley 3 element 15 meter beam $10. Small prop pitch rotator and sylsens $25. Large prop pitch and sylsens $50. 6 foot rack using 4-1000A with solid state power supply all bands $200 Paul Nevru Jr., P.O. Box 663 Bristol, CT Tel. 203-582-4885.

HYGAIN TH4 Triband beam and 36 foot crankup tower both in good used condition $50. Buyer must pickup F. Janson K6SHJ 1425 Westgate Ave., West Los Angeles, 90025 CA 477-5474.

HEATH HW-16 Excellent Condition $85, Johnny Wise 422 3rd St. Lawrenceburg TN 38464

FOR SALE: Tubes, New — 3-400Z $20. ea., 4CX250R $25. ea., 8138 $10.ea, PC Networks — PI 195-1 $10.ea., PI 195-2 — $15.00 ea., and Henry Radio 2K-3 — $10.00 ea. Wanted: 500 Hz filter for Collins 75S-1. Bill Cooke, WA6PTE 765 Limerick Ct., Sunnyvale, CA 94087.

STATION SALE: SX-101A *excell cond*, $185, Marauder $175, Warrior Linear $160, both in *very* fine condition and with internal solid state power supplies. All plus antenna relay, cables, etc. for $520. L.A. area deal preferred. Terry Chappell, Harvey Mudd College, Claremont, CA 91711 Tel 714-626-8511.

NOVICES: For sale HW-16 with 8 xtals for 40 and/or 15 meters. 8 months old excellent condition. $99, You ship. Russ Hummel W64PGT, 9941 Duryea Drive, Richmond, VA 23235.

HA-350 Lafayette SSB, AM, CW Receiver equipped with 6 to 1 vernier *dial and CW filter. Excellent Condition. $60.00.* WB2DPW, 33 Ascot Road, Yonkers, NY 10710, 914-961-3332.

LAMPKIN 105-B Frequency Meter for sale. Perfect condition. All manuals included. $150, Paul Mayer, 287 Benjamin St., Benton Harbor, Michigan 49022.

DRAKE TR-4 for sale - in excellent condition, got little use, w/power supply ask $475. Write Andy, WB2QOL, 29 Valley Rd. Scarsdale, NY 10583.

SELL: Heath Transceiver SB100, CW filter, HD power supply, extras. $8-610 Monitor Scope, Astatic mike 10D guaranteed Mint $350 SB-200 Linear pair spare tubes, $200 FOB, K4JK 3958 Tanglebush Ln., Huntsville, AL 35810.

EWM-2 with Waters rejection tuner, Collins speaker, A.C. Power supply. 30-S-1 amplifier, Millen antenna bridge, Audio frequency meter, Oscilloscope. Local sale preferred. Your proposal welcomed. H.C. Dressel, 2 Genesee St., Batavia, NY 14020.

YOUR BEAM-Quad-Vertical stays up Longer with fine Stainless hardware Fasteners! Guying-Antenna accessories. Lists 15 cents! W8BLR, 29716 Briarbank, Southfield, MI 48075.

FOR SALE: QST, January 1924 to date, $275. CQ, January 1950 to date, $60. 73, October 1960 to date (complete set), $30. Excellent condition, in library magazine boxes. Al Brogdon, K3MO, 2956 Hewitt, Silver Spring, MD 20906.

SALE: HW-16 transceiver, manual, lowpass filter and five 15 meter xtals. Excellent condx. $105 and I pay shipment. WN4ODH, David Wells, 537 Va. Ave., Statesville, NC 28677.

WANTED: Gonset Communicator IV 2 meter transceiver, late model with dual tuning knob, in good condition. WA6PFL, 3869 Farm Hill Blvd., Redwood City, CA 94061[1].

SELL: EICO 710 GDO, Lafayette HA-144 xcvr, Johnson LP filter (2)RCA 703B vidicons, Donald Porter Box 111, Coronado Hall, U. Of N.M., Albuquerque, NM 87106.

MOSLEY TA-33 Jr. Tribander beam $50.00 plus shipping or will trade for tower — WA1EBJ 40 N. Broadway, Haverhill, MA 01830.

WANTED - imprinted 3/8 tapes for old Sig. Corp. Oscillator TG-34A contact WA6PLB-94590

TRADE LX150 Receiver for Triband or Quad antenna. Write or call WB5BEZ, 9251 Savanna Drive., Shreveport, LA 71108 - 318-686-1921.

SELL: NC-270 Receiver - $95, Transmitters: T-60, AM/CW, $40; *Rice 720, $40. All excellent condition. Rich Mandelbaum,* Scarborough, NY 10510 (Westchester County).

FLORIDA home on lake for sale desire sell ham as built for one., age and health reason write details A.T. Tidwell Rte A2 Dunnellen, FL 32630.

NCX5 Mark II, Calibrator, and NCXA $400.00; Heath SB200 Linear $200.00; Drake CC1 Console with 6 & 2 converters, calibrator and supply $160.00; Waters phone patch with compressor $50.00. All excellent condition. Philip Schwebler, W9GGL, *4536 N 50 St., Milwaukee, WI 53218.*

WANTED — Collins 312B4 Station control give price and condition. Sell — Gonset 676 Transceiver 80 thru 6 meters with AC, DC supplies, ceramic mike, like new $195.00 Ed Spencer, W7TME, 1254 Heather Lane, SE Salem, OR 97302 503-364-1435.

LINEAR BUILDERS! 30 AMP Filament Chokes for GG Linears. $5.00 each Postpaid USA. Vonn R Murrell, K4HHA, Rich Road, Newport, TN 37821.

SELLING Out, Deluxe Station SB-300, SB-401, SB-200, perfect, $595.00. SASE for list of accessories and other goodies cheap. Carl King, 21 Aberdeen, Scotch Plains, NJ 07076.

SX-71 Receiver $75, Heath Apache $75, both excellent condition with manuals. K1LNL 14 King Philip, Barrington, R.I. 02806.

SB200 Heathkit Linear mint condition, $185. Emmett Bonner W4MXP, 2533 N. Quincy St., Arlington, VA 22207.

Pi-tek, excellent, $75.00, Lafayette tube tester, $15.00. B & W 327 6 mtr filter, $15. Franklin Davy, 39 Third St., Frenchtown, NJ 08825.

SELL mint Drake AC-4 $70; Wagner Xmtr 3600-3600 at 1 amp 110/220 pri. $25 fob. W0AIH Paul Bittner, Virginia, MN 55792.

FOR SALE: Heath SB-401 xmtr. Needs Neutralization. Must sell. First $125.00 takes it. WA3IID, 2405 Greendale Rd., Wilmington, DE 19810.

SELL: Galaxy GT550, RF550, SC550, AC400, VOX35C, CAL35, Mint, in original cartons, $550 FOB Walt Atkins 1609 Valley Rd., Champaign, IL 61820.

MUST sell KWS-1, 75A4, mike, electronic keyer, all-band vertical, all in good condition, $750 or best offer. No shipping. Steve Kanne, W6EHW, 213-277-6620, 3261 Coolidge, Los Angeles, CA 90066.

HR-10R receiver- one year old, excellent. $55 firm: I pay shipping. Mike Gundy WN5AUY, 802 Highland Park, West Point, MS 39773.

FOR SALE: 1- Ameco TX, 6&2 for $100, like new. 1- Swan 250 C with power supply and speaker $400. You pay shipping charges. M.O. Only. Sam Zito 9800 Pine Ave., Niagara Falls, NY 1-716-297-3647 14304.

COLLINS 75A-2A, 0.5KC, 3.1KC, filters $195; Knight R-100A w/cal, $50, WR2HLM, Bill Weller, 86 E. 23 St., Huntington Station, Ny 11746.

FIRST fair offer takes my Hallicrafters HA-1, Autronic keyer, B&W 551A coax switch. W1VG. L. A. Morrow, 99 Bentwood Rd., W. Hartford, CT 06107 Phone 203-521-0416.

SHAWNEE 6 meter 6-12-115v, transceiver, $120. Tiny Tiger generator, new 1970, $65. Vibroplex Presentation, case, $30. WA0ZMA, Quarters 4213A, USAF Academy, Colo., 80840.

SB200 linear, new tubes, completely checked out, like new $200.00. Want M-28SSR RTTY. Drake Spr4 with Cal., RV4, A.C. and D.C. power cables, crystals "New" warranted $400.00 Want 300I linear. WA4WIA: 1645 Dobbs Lane; Birmingham, AL 35216.

COLLINS 75A-4, Latest model, with 3.1 and 2.1 filters and noise blanker; KWS-1. Both for $950. Wanted: Collins 312B-5 station control, Bob Bush, Box 204, Little Valley, NY 14755. Phone Evenings 716-945-3505.

NC-270 $100, Viking II, VFO $70, Complete Station $145. *Excellent for Novice. All in good condition. Jeff, WN4QLF, 521* E. Broad ST., Statesville, NC 28677 Tel. 704-872-1248.

HEATHKIT SB-301 Receiver, factory aligned, all bands .1 Microvolt sensitivity $325.00 Bob White, 314 Tamerlaine, Houston, TX 77024.

HUNTER BANDIT 2000C - Only a few left of this most famous two KW PEP Linear Kit. Full Guarantee - sold on first order basis - Complete with tubes $329.95. Freight prepaid in the U.S.A., APO and FPO. Grey only. Hunter Sales, Inc — Box 1128 - Des Moines, IA 50311.

WANTED: Gonset GSB 201 Linear. W8OAR 3915 Grosvenor, Cleveland, OH 44118.

FOR the finest in Ham gear, and the best selection, write for a catalog. Amateur Radio Headquarters 1916 7th St., West, Billings, MT 59102.

LAFAYETTE HA-460 transceiver 5 element beam and halo for above, like new $95. Heath HR 10B receiver, *excellant condition, $50.00 Steve Clegg, WA2DCX, 80 Andover Lane,* Matawan, NJ.

SELL: Complete Galaxy III mobile station excellent cond. Now in use $200.00 J. Henrichsen K9KOY 431 Frank Ave., SE Huron, SD 57350 605-352-9267.

GROUNDED grid filament chokes 30 amps, $5. Plate chokes, 800 Ma, $3.00. 3-30 Mcs. PPUSA48. William Deane, 8831 Sovereign Rd., San Diego CA 92123.

CRYSTALS airmailed. QST Novice special, all frequencies, all bands, FT243, active-accurate, five or more $1.25 each, less than five $1.50. Fast service from mid-America. ssb, MARS, Marine, custom finished, etch stabilized. FT243 .01% 3500-8600 kc. $1.50 (minimum five, same or mixed $1.75.) Crystalize your *net, minimum ten, same frequency $7.45. 1700-3499 and* 8601-13500 fundamentals and 10,000-30,000 overtones $2.95. Add 50c/crystal for .005%. Add 75c/crystal for HC6U hermetics above 20000. Airmail 10c/crystal, surface 6c, builders crystals, inquire, Free order bulletin. Your crystal shop since 1933. Bob Woods W0LPS C-W Crystals, Marshfield MO 65706.

150M APN9 Loran receiver $25. Central Electronics 20A xmtr ssb/a-m/cw 160-10, w/deluxe VFO $75. TS186D frequency meter 100-10,000 MHz $65. Gertsch FM4A frequency multiplier up to 30gc capability, cost $2000, $250. Trade receivers, H-P test *equip, Valiant gear, list large sase. W4API Box 4095, Arlington* VA 22204.

SIGNAL-ONE, 7583B, 3283, CS7 new sealed box, warranty, at low price. Will trade for Collins, Drake. 7583B mint condition $395, 3283 mint $475 Don Payne K4ID Box 525 Springfield TN. Nites 615-384-5643. Days 615-384-5573.

FOR SALE NC300 receiver with xtal calibrator, speaker $110. DX60 with VFO, Vfo $55. All excellent condition. W9LZV/1 38C Adams, Newport RI 02840, 401-847-8452.

NATIONAL NC303 with 6, 2 & 1¼ meter converter $160. DX100, grid block keying $45. J. Clubb 73 Red Top Drive, West Hartford CT.

QSLs printing of all kinds. Reasonable, fast, Free samples, information. Cohen, Drawer Q, Pittsford NY 14534.

WANTED Two 304TL tube sockets or Johnson 124-213-1, W4RLR.

SALE HW16 transceiver, manual, low pass filter and five 15 *meter xtals. Excellent condx. $105, and I pay shipment.* WN4ODH David Wells 537 Va. Av., Statesville NC 28677.

HEATHKIT twins SB301/401. Receiver has 2 and 6 meter converters, ssb/a-m/cw filters. Transmitter has own crystal pack. Perfect condition with all cables and manuals. First $500 gets it. Pick up only. W2NZ phone 516-541-9355 evenings.

DERRICK Electronics will not be undersold on new Swan equipment. We'll beat any legitimate deal anywhere. Check around, then write Derrick Electronics 108 E. ElPaso, Broken Arrow OK 74012.

YOUR Heathkit professionally wired, debugged and calibrated for 15% of kit price. John C. Allen WA7OAE 1232 NW 201st St Seattle WN 98177.

HEATHKIT SB300 with all modifications of SB301 except WWV, includes a-m cw and 2 meter converter, excellent $180 Walt Strawman WA8PVS 610 Pioneer, Kent OH 44240.

SELL Invader 2000, HQ170C, HQ105TR, scope, crankup tilt tower, TA33, HamM, misc parts. No shipping. W2IVF W. Goble 39-17th Av. East Paterson NJ 07407.

VIKING Invader 2000 perfect clean condition with electronic TR switch and factory fitted RTTY. Need space. Bargain $350. K8UBG 1137 Cedar Point, Sandusky OH 44870. Michigan ham. I lost your inquiry; please repeat.

FOR SALE Drake T4XB transmitter with MN4 match box and homebrew power supply. Drake R4B receiver and D104 mike, $500. Contact Harold Stoudt W3CJP Tuckerton Road, Reading PA 19605.

NOVICES R100 s-meter, xtal calib. DX40. Both firm. $100. WN7OKN 506 S. Gilbert, Powell WY 82435.

DISCOUNT prices, new equipment, factory sealed cartons, full warranty! Galaxy GT550 ($550) $459. R530 ($795) $669. FM210 ($229) $185. Swan 270B ($499) $420. 500CX ($565) $475. Ham-m with indicator ($129.95) $99.95. TR44 ($69.96) $59.95. Antenna specials HyGain TH6DXX ($179.95) $140. HyQuad ($129.95) $104. HyGain 400 rotator ($189.95) $149.95. Mosley CL36 ($172) $135. CL33 ($145.15) $115. TA33 ($133.10) $106. TA36 ($167.85) $134. New Drake equipment R4B ($475) $390. T4XB ($495) $415. New TriEx W51 self supporting tower (Reg.$393) $333 prepaid. BTI LK2000 (Reg.$795) $674. Write for quote on items not listed. Discount Radio Sales, Box 6044, Lubbock TX

SELL Drake 2B receiver with calibrator. Good condition. $150. Dean Barnett 309 N. 16th, Blytheville AR 72315. 501-763-6231.

HEATHKIT Marauder $150. Free extras. WB2RBF 186 E. Nassau, Islip Terrace 11752.

RANGER II, SX111 both $200. WA5RYN/Ø 1004 N. Walnut, Colorado Springs CO 80905.

4 KW cw transmitter new unused Wilcos 96D 4-27 MHz with manual & 8 spare final tubes $400. Charles Sabelberg Box 142, San Andreas CA 95249.

WANTED Collins S-Line, quote price and condition. WB9BQV, Don, 4409 Prospect, Downers Grove IL 60515.

WANTED Drake 1000LP, Hustler 4BTV and resonator. Hustler II mobile. Carsner 935 Geary, San Francisco CA 94109.

SB300 mint $175. Charles Talbott K3ICH 8405 Old Marlboro Pike, Upper Marlboro MD 20870. Tel. 301-420-5271.

HQ180AC $249.95. HamM $99.95. New. Ronald M. Nagata W6RQZ 1330 Curtis St. Berkeley CA 94702. 415-526-7345.

SELL or trade Swan 250C, TV2, blanker, switcher, power. $600 or make offer. FOB. WA6CPP 14472 Davis, Lodi CA 95240.

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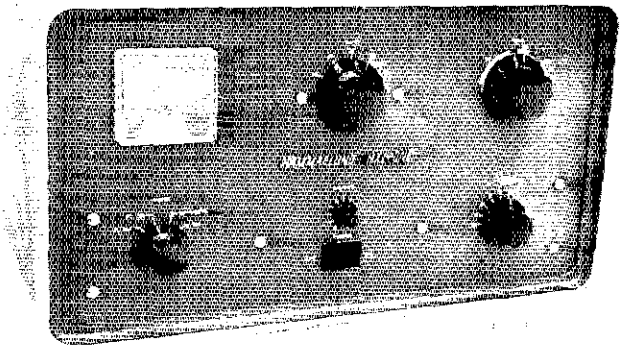

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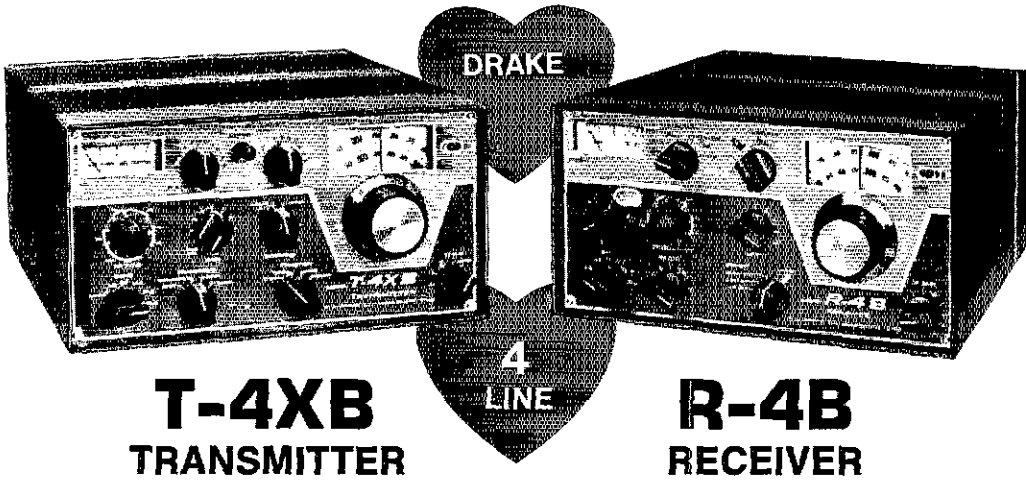

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