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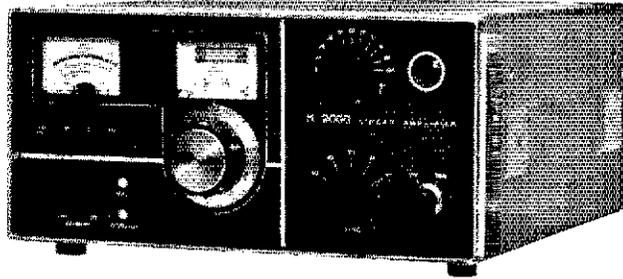


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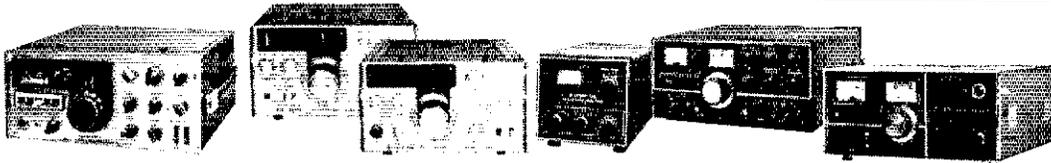
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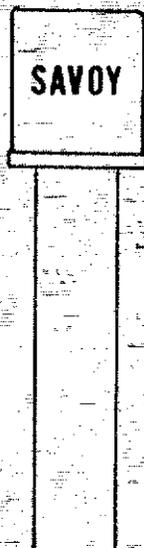
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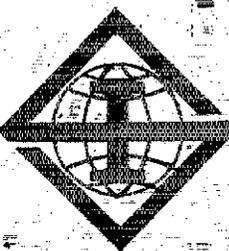
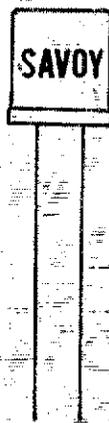
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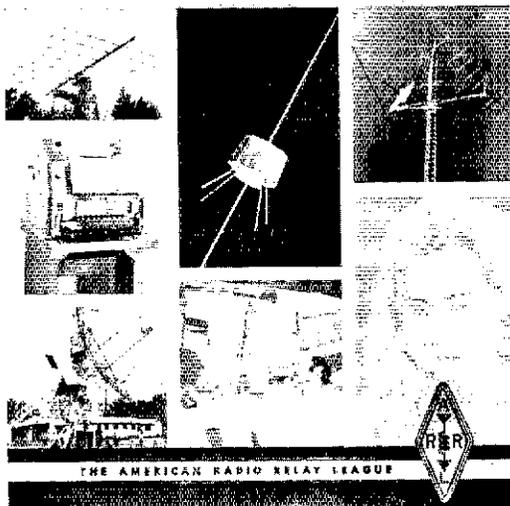
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OUR COVER:
So, let's quit talking about the energy crisis and do something about it, see page 46.

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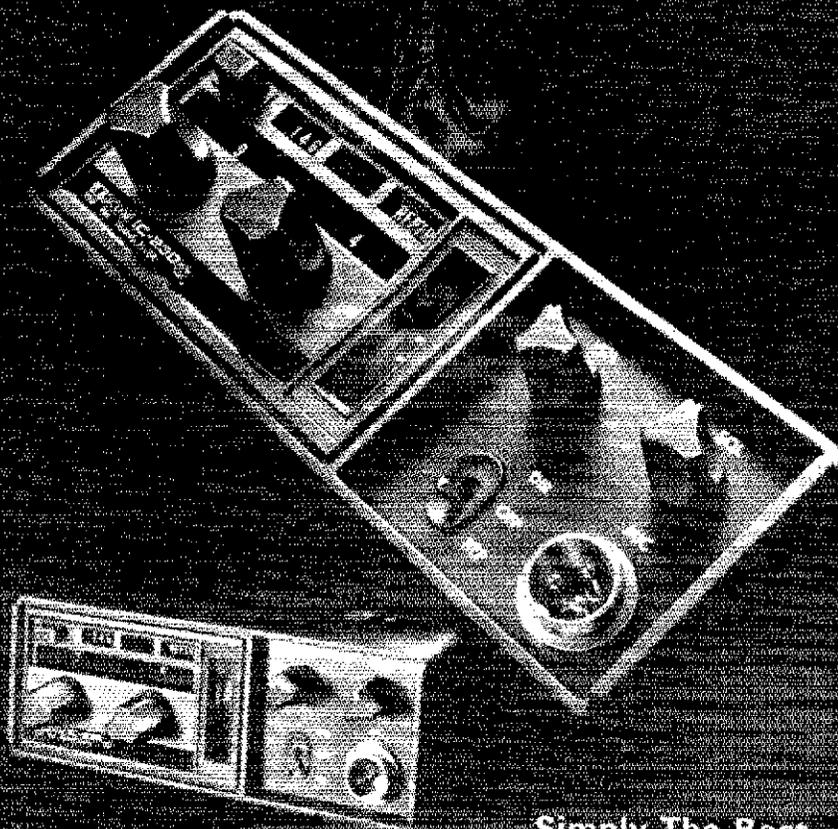
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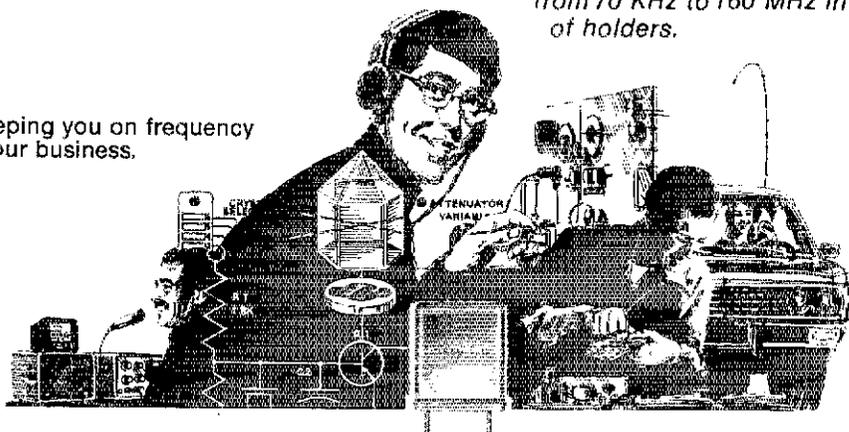
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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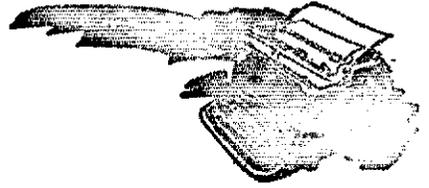
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"It Seems to Us..."



MEMBERSHIP OPINION ASSESSMENT

EVERY MEMBER of the American Radio Relay League will receive, sometime after the middle of March, a four-page questionnaire on which to record his or her attitudes and opinions on various aspects of the FCC proposals to "restructure" the Amateur Radio Service. The results will form the basis for formal comment by ARRL to the Federal Communications Commission.

This procedure to obtain views of U.S. members (questionnaires will not be sent to others) was chosen by the Board of Directors at its annual meeting in mid-January. Information on the proposals had not by then been long enough in distribution to permit adequate time for members and affiliated clubs to evaluate the merits and demerits and form conclusions. Directors want to make certain that every member has a chance to be heard, after time to review the new FCC concepts. In their special meeting on May 15 to make decisions concerning Docket 20292, they will have the benefit of the survey results.

This will not be a yes/no questionnaire. Some of the proposals at first glance seem highly objectionable, but members may prefer modification of such rules as the more beneficial course for amateur radio than total rejection. Similarly, some of the concepts may have a basic favorable reaction but with some reservations; these should also have a means of expression. Thus the survey will be gauging the depth of your views, rather than the pure binary technique of yes/no.

A national survey of member opinion has not been undertaken by the League in many years. The directors have preferred to canvass regionally in each division, using various techniques of their own choice. However, it was realized that, especially in this case, the national impact is paramount, and so while each director will still sponsor the mailing to his own division members, the questions will be of identical phrasing.

The questionnaire will be designed mechanically for rapid transfer of information to data processing techniques, which will be centralized at Hq. so that national trends as well as area breakdowns of information can be obtained. Questions will also cover your age, license class, and other demographic information — a statistical bonus of data about our membership as long as the expenditure (some \$9,000) is being made.

The January issue of *QST* contained highlights of the proposal. The February issue published the entire text of the docket. The survey mailing will additionally contain a summary of the major points on which opinions are solicited, perhaps with suggestions on alternative means of accomplishing the same FCC objectives. Study all these carefully (along with any other sources if they are authoritative); discuss them with fellow hams and at Club meetings. Then record your answers and get the worksheet back in the mail promptly so your voice will be heard.

QST

League Lines . . .

Watch your mail box! Along about the time this issue of QST arrives, you'll also be receiving an ARRL survey, mailed by the Hq. to all U.S. members, relating to the FCC's restructuring proposal, Docket 20282. Please return it promptly, as we hope to have a tabulation of the responses in the hands of directors by the first week in May. And if you don't receive a survey form by the first of April, let us know in a hurry so we can send you one in time for your return to be counted.

Amateur license fees are reduced effective March 1 (see "Happenings" this issue). Help spread the word, as any overpayment after March 1 cannot be refunded!

Amateur radio has again been recognized by IEEE. A portion of the technical program at Intercon-75 in New York City will be devoted to amateur antenna design and application -- Session L, the afternoon of April 7. See "Haps" for details.

"The Ham's Wide World," distributed through Modern Talking Picture Service, 4 Nevada Drive, Lake Success, N.Y. 11040, continues to be in such heavy demand that during the past 12 months 262 requests could not be accommodated because of prior bookings. As of last October, more than 600 bookings were scheduled for the following 12 months. Moral -- get your request in early, and give alternate dates if possible.

The ARRL supplementary forms (available only from ARRL -- not FCC) for repeater license applications have helped to streamline the paperwork at Gettysburg. One local received a license for a brand-new remotely controlled repeater in only nine weeks, a considerable improvement over the old situation, and we've heard there are even better records. There are still some problem cases dating back to 1973 and before, but things are looking up.

Westpark Radiops bulletin says a ham in Akron (rather carelessly) announced his location at one of the large mall parking lots and that he would be back on the repeater after some shopping. Some thieves did some shopping in his absence, taking all ham equipment and the stereo tape deck. A word to the wise. . .

A manufacturer of electronic anti-theft devices asked FCC for a rule waiver to permit wide-band sweeping of (among others) 6.3 to 7.7 MHz. FCC granted the request for other segments, but not for this one, saying it could cause interference to the amateur 40-meter band.

Reports of the Board meeting and FCC actions this month have squeezed out minutes of the Executive Committee meeting in January, so we're here recording approval of 614 applications for Life Membership. The total is now 5157, with the year-end rush to beat the dues increase running up the total of those on the installment plan to over 2,000.

The W7 QSL Bureau reports the monthly intake of cards is off about 2,000 per month from "normal." Some speculation about causes: worldwide inflation has caused some stations to cut back on QSLing; overseas societies who handle outgoing cards for their members have not yet caught up with the growth of the amateur service in their countries; some feel that less new contacts are being made because of poor conditions brought on by the low point in the sunspot cycle; fewer ships to carry sea mail make deliveries sporadic. Whatever the cause, the key word in "QSL watching" is patience!

A broadcast station on another continent has been causing QRM to amateur 75-meter nets in the States. The ARRL Intruder Watch and the FCC Treaty Branch are working on the problem; official complaints have been filed with the country concerned.

Quote-of-the-month (from W4NQQ): I started to send my renewal in early to beat the price rise. Then I thought again and decided to wait and pay more in line with what it is worth. Thanks for doing a fine job and keep it up.

A Message from the President:

To all ARRL Members

One of the major reasons for existence of the American Radio Relay League ever since its founding sixty years ago has been representation of interests of our members before regulatory councils, both national and international. In pursuit of this responsibility, for some time now we have been engaged in a pitched battle involving the 220-MHz band. The struggle appears soon to be reaching its climax, with the Federal Communications Commission scheduled (according to its advance agenda) to consider Class E Citizens band matters at an early March session.

It is four years since the Electronics Industries Association filed its original petition to steal 2 MHz from amateurs. It is a year and a half since the Commission issued its notice of Inquiry and Notice of Proposed Rule Making for 1-MHz CB use of 220. There is little on the official records to show any developments in the interim — other than volumes of comment from interested parties, the great majority opposed to creation of Class E.

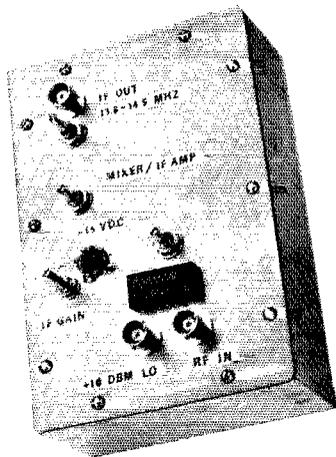
Yet our various lines of Washington intelligence, supplemented by grapevine rumor, indicate that a good deal *has* been going on behind the scenes. And the resultant omens have turned out to be correct for the most part, at least so far. The most recent tangible evidence is an end-of-year notification to the FCC by the Office of Telecommunications Policy that, on re-examination of the whole matter from their standpoint, this Executive Office of the President not only now accepts the concept but urges speedy FCC action to give birth to Class E!

What continues to disturb us is that none seems able to identify for certain the true source of the pressure — and it *is* pressure — to establish Class E. The records show that it is not CBers themselves; many are actually against it, preferring 27 MHz. It is not the engineering contractor hired by FCC to study the CB matter, since his studied conclusion was that no more frequencies are needed (advice the Commission asked for and paid for but seems at the moment to be completely ignored.) Even the OTP parrots the theme of a “larger public need for radio,” but like all the others fails to document such a statement. OTP even adds the trite cliché of “a disciplined radio service responsive to the needs and interests of the private citizen . . .” *What* needs? *What* interests?

And so we are left with the dollar sign as the major impetus, a conclusion supported by OTP's own mention of a “market size approaching half a billion dollars per year.” Can the OTP really have been hypnotized by industry into believing such a preposterous figure? *Electronics* magazine in its 1975 annual market summary and forecast shows the current CB market as *less than the amateur*, and projection for 1978 at only 16 million dollars. Can a magazine this respected in telecommunications be so far wrong? Or is it the government planners, listening to the siren call of industry, who are off base? Does anyone really believe that a 1975 market of 12 million dollars will multiply more than 40 times in a few years?

The OTP letter causes much distress to us also because it now takes the view that 222-224 MHz is the proper location for Class E. This smacks of Russian roulette, since the initial proposal of EIA was 220-222; the proposal of the Commission was 224-225; the first acceptance by OTP suggested 223-225; now it is 222-224. To us this points to only one conclusion: on careful reconsideration, OTP really is not convinced that there can be the “disciplined” service it has specified — so it is making doggone certain that Class E scofflaws will stay away from important government operations at 225 MHz. At the same time, OTP has apparently forgotten the United States neighbors in Canada and Mexico, for no mention in their letter to Chairman Wiley is made of potential interference to 220-MHz operations in these countries from a Class E service. And this at a time when international cooperation is of such major importance in preparation for the 1979 World Administrative Radio Conference.

A little over a year ago Commissioner (now Chairman) Richard E. Wiley told a group of land mobile people seeking more space that it was not likely to be allocated “until a convincing record is made in terms of need based on actual usage — and whatever portion of this scarce natural resource is allocated now or in the future to land mobile interests must be properly utilized.” We fervently hope the Commissioners apply the same principles in evaluating the Citizens Radio Service at their March sessions. — W2TUK



Using the Double Balanced

Mixer in VHF Converters

BY EDWARD L. MEADE, JR.,* K1AGB

Every now and then, one or another of the area vhf/uhf enthusiasts shows up at a ham gathering with a thimble-sized package labeled "Double-Balanced Mixer." Immediate proclamations are made that this is the "best thing going" and it will be installed forthwith in the next version of the station converter. Somehow, these converters never seem to materialize, probably because there is a dearth of application information on these little gems available to the amateur. In this article we will cover most of the pitfalls in double-balanced diode-mixer application as a down-converter, and demonstrate appropriate methods of making a commercially manufactured unit work — properly.

THE EVER-INCREASING rf spectrum squeeze is prompting special-application receiver manufacturers to incorporate mixing schemes with high inter-port isolation and reduced inter-modulation-distortion (IMD) products. Overall performance characteristics of the broadband double-balanced mixer (DBM), be it active or passive, have made it the most popular of all mixer types. A technical description of the properties of broadband double-balanced diode mixers, along with their implications, has been presented the amateur fraternity¹, and will not be covered in detail. A homemade DBM, similar in construction to the

Hewlett-Packard 10514A, has also been described as the heart of a 144-MHz converter.² Both of these papers serve to point the way in the technique of vhf-receiver mixing. In this article, we will concentrate mainly on simple, yet effective, methods of enabling an inexpensive commercially manufactured DBM to meet its published specifications as a mixer/down-converter in vhf and uhf amateur receiver service. An integral i-f amplifier will also be introduced.

Mixer Comparisons

Is a DBM really better than other types? What does it offer, and what are its disadvantages? To answer these questions, a look at more con-

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¹ This and all references are listed at the end of the article.

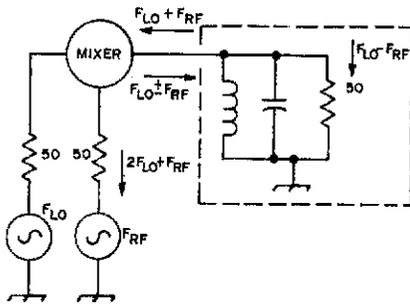


Fig. 1 — The i-f port of a double-balanced mixer is matched at $f_{LO} - f_{RF}$ and reactive at $f_{LO} + f_{RF}$. In this configuration conversion loss, rf compression and desensitization levels can vary ± 3 dB while harmonic modulation and third-order IMD products can vary ± 20 dB.

ventional "active" (voltages applied) mixing techniques and some of their problems is in order. The reader is referred to a recent article in *QST*³ dealing with mixers. Briefly reiterated, common single-device active mixers with gain at vhf and uhf are beset with problems of noise, desensitization and small local-oscillator (LO) isolation from the r-f and i-f "ports." As mixers, most devices have noise figures in excess of those published for them as rf amplifiers and will not provide sufficient sensitivity for weak-signal work. To minimize noise, mixer-device current is generally maintained at a low level. This can reduce dynamic range, increasing overload potential, as defined in the terminology appendix. Gain contributions of rf amplifiers (used to establish a low system noise figure) further complicate the overload problem. LO-noise leakage to the rf and i-f ports adversely affects system performance. Mixer dynamic range can be limited by conversion of this noise to i-f, placing a lower limit on mixer system sensitivity. Generally 20 dB of mixer midband, inter-port, isolation is required, and most passive DBM can offer greater than 40 dB.

A commercially manufactured double-balanced diode mixer offers performance predictability, circuit simplicity and flexibility. Closely matched Schottky-barrier hot-carrier diodes, commonly used in most inexpensive mixers of this type,

provide outstanding strong-signal mixer performance (up to about 0 dBm at the rf input port) and add little (0.5 dB or so) to the mixer noise figure. Essentially, diode conversion loss from rf to i-f, listed in Table I, represents most of the mixer contribution to system noise figure.[†] Midband isolation between the LO port and the rf and i-f ports of a DBM is typically > 35 dB — far greater than that achievable with conventional single-device active-mixing schemes. This isolation is particularly advantageous in dealing with low-level local-oscillator harmonic and noise content. Of course, selection of LO devices with low audio noise figures, and proper rf filtering in the LO output, will reduce problems from this source.

Not to be overlooked in the quest for a rugged vhf receiving mixer are prototype balanced and double-balanced active JFET mixing schemes recently described.^{4,5} Although offering excellent performance in most areas, they are still developmental and not generally available for amateur experimentation.

Often listed disadvantages of a diode DBM are (a) conversion loss, (b) LO power requirements, and (c) i-f-interface problems. The first two points are closely interrelated. Conversion loss necessitates some low-noise r-f amplification to establish a useful weak-signal system noise figure. Active mixers also have this requirement, as will be demonstrated later. Additional LO power is fairly easy to generate, filter, and measure. If we accept the fact that more LO power is necessary for the DBM than is used in conventional single-device active mixing circuits, we leave only two real obstacles to be overcome in the DBM, those of conversion loss and i-f output interfacing.

To minimize conversion loss in a DBM, the diodes are driven by the LO beyond their square-law region, producing an output spectrum which in general includes the terms:

- Fundamental frequencies f_{LO} and f_{RF}

[†]See appendix on noise figure.

This top view of the DBM/i-f amplifier shows the plastic mixer package plus rf/LO inputs and i-f output jacks clearly marked for cabling. The unit is mounted on the open face of a standard 6 X 4 X 2-inch aluminum chassis. This shielding is necessary to prevent the 3N140 from picking up external signals in the 14-MHz region.

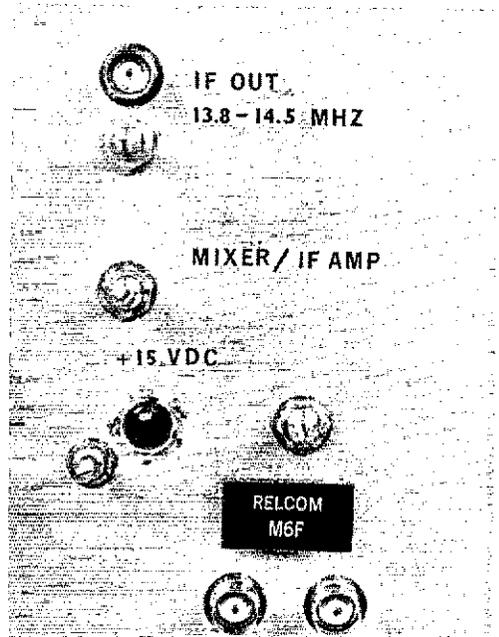


TABLE I

| Manufacturer: | Relcom | Anzac | MCL | MCL | MCL | MCL |
|--------------------------------|---------------|--------------------|-----------------------|---------------------|---------------------|---------------------------|
| Model | M61* | MD-108 | SRA-1 | SRA-1H | RAY-1 | MA-1 *** |
| Frequency range, LO | 2-500 | 5-500 | 5-500 | 5-500 | 5-500 | 1-2500 |
| MHz | rf | 5-500 | 5-500 | 5-500 | 5-500 | 1-2500 |
| | i-f | 100-500 | 100-500 | DC-500 | DC-500 | 1-1000 |
| Conversion loss, Mid-range | 9 dB Max. | 7.5 dB Max. | 6.5 dB Typ. | 6.5 dB Typ. | 7.5 dB Typ. | 8.0 dB Typ. 6-2.5 GHz. |
| Isolation, LO - RF | 35-40 dB Min. | 40 dB Min. | 45 dB Typ. | 45 dB Typ. | 40 dB Typ. | 40 dB Typ. |
| mid-range LO - i-f | 25-35 dB Min. | 35 dB Min. | 40 dB Typ. | 40 dB Typ. | 40 dB Typ. | 40 dB Typ. |
| Total input power: | 50 mW | 400 mW | 500 mW | 500 mW | 1 W | 50 mW |
| LO power requirement: | +7 dBm (5 mW) | +7 dBm (5 mW) | +7 dBm (5 mW) | +17 dBm (50 mW) | +23 dBm (200 mW) | +10 dBm (10 mW) |
| Signal 1-dB compression level: | Not spec. | Not spec. | +1 dBm | +10 dBm | +15 dBm | +7 dBm |
| Impedance, all ports: | 50 ohms | 50 ohms | 50 ohms | 50 ohms | 50 ohms | 50 ohms |
| Price class: | ** | \$7 Single unit | \$9.95 Single unit | \$15.95 5+ units | \$31.95 4+ units | \$99.95 Single unit |

All specifications apply only at stated LO power level.

* 1968 data.

** Units provided by a second source.

*** SMA connectors standard.

Relcom, Division of Watkins-Johnson, 3333 Hillview Ave., Palo Alto, CA 94304.

Anzac Electronics, 39 Green Street, Waltham, MA 02154.

MCL - Mini-Circuits Laboratory, 837-843 Office Ave., Brooklyn, NY 11203.

- All of their harmonics
- The desired i-f output, $f_{LO} \pm f_{rf}$
- All higher order products of $nf_{LO} \pm mf_{rf}$ where n and m are integers.[‡]

The DBM, by virtue of its symmetry and internal transformer balance, suppresses a large number of the harmonic modulation products. In the system described here, f_{LO} is on the low side of f_{rf} ; therefore, numerically, the desired i-f output is $f_{rf} - f_{LO}$. Nonetheless, the term $f_{LO} \pm f_{rf}$ appears at the i-f-output port equal in amplitude to the desired i-f signal, and this unused energy must be effectively terminated to obtain no more than the specified mixer-conversion loss. This is not the image frequency, $f_{LO} - f_{i-f}$, which will be discussed later.

In any mixer design, all rf port signal components must be bypassed effectively for best conversion efficiency (minimum loss). Energy not "converted" by mixing action will reduce conversion gain in active systems, and increase conversion loss in passive systems such as the diode DBM. Rf bypassing also prevents spurious resonances and other undesired phenomena from affecting mixer performance. In this system, rf bypassing at the i-f-output port will be provided by the input capacitance of the i-f interface. I hasten to point out that the DBM is not a panacea for mixing ills, and its effectiveness can be reduced drastically if all ports are not properly terminated.

DBM Port Terminations

Most DBM-performance inconsistencies occur because system source and load impedances presented to the mixer are not matched at all frequencies encountered in normal operation. The

terminations (attenuator pads) used in conjunction with test equipment by manufacturers to measure published performance characteristics are indeed "broadband" matched. Reactive mixer terminations can cause system problems, and multiple reactive terminations can usually compound these problems to the point where performance is very difficult to predict. Let's see how we can deal with reactive terminations.

The I-F Port

The i-f port is very sensitive to mismatch conditions. Reflections from the mixer/i-f amplifier interface (the pi network in Fig. 2) can cause the conversion loss to vary as much as 6 dB. Also greatly affected are third-order intermodulation-product ratio and the suppression of spurious signals, both of which may vary ± 10 dB or more. It is ironic that the i-f port is the most sensitive to a reactive termination, as this is a receiving system point where sharp-skirted filters are often desired.

Briefly, here is what happens with a reactive i-f-port termination. Fig. 1 shows a DBM with "high side" LO injection and an i-f termination matched at $f_{LO} - f_{rf}$ but reactive to $f_{LO} + f_{rf}$. The latter term re-enters the mixer, again combines with the LO and produces terms that exit at the rf port, namely $2f_{LO} + f_{rf}$, a dc term, and $f_{LO} + f_{rf} - f_{LO}$ (the original rf-port input frequency). This condition affects conversion loss, as mentioned earlier, in addition to rf-port VSWR, depending on the phase of the reflected signal. The term $2f_{LO} + f_{rf}$ also affects the harmonic modulation-products spectrum resulting in spurious responses.

One solution to the i-f-interface problem is the

[‡]See appendix for mixer terminology.

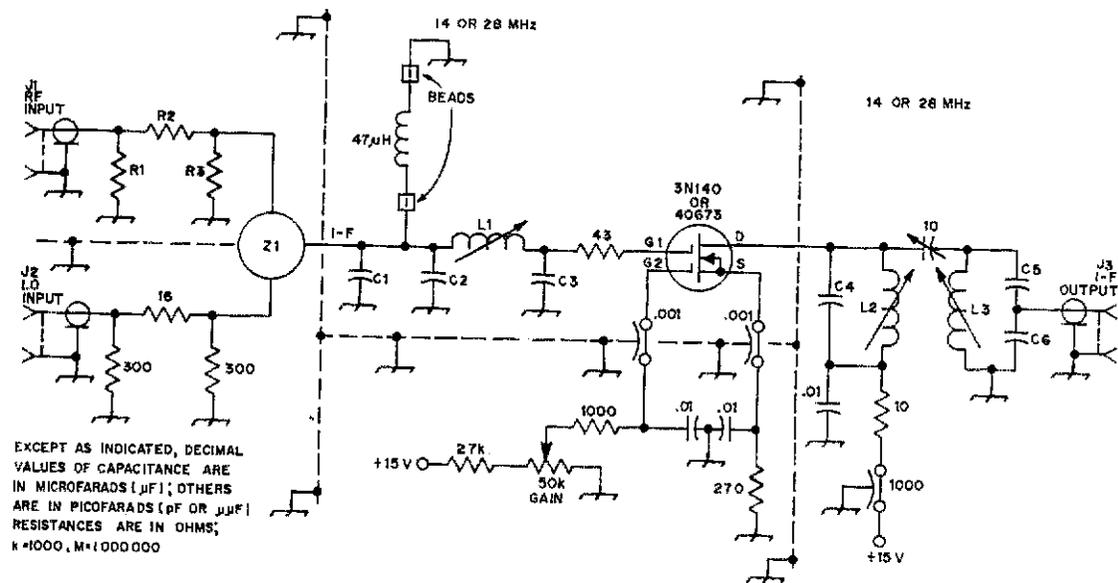


Fig. 2 - A schematic diagram for the double-balanced mixer and i-f post amplifier. The i-f can be either 14 or 28 MHz. Parts values are given in Table II.

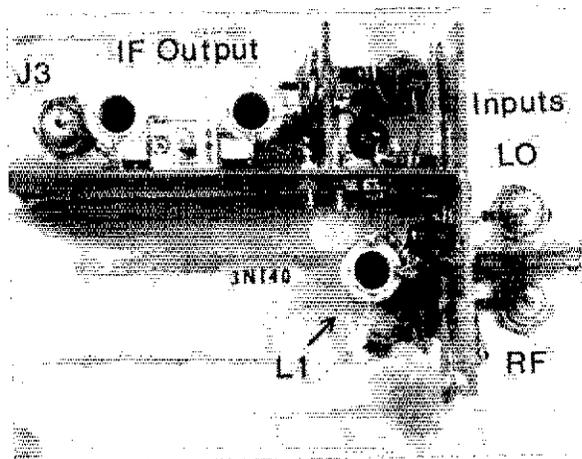
use of a broadband 50-ohm resistive termination, like a pad, to minimize reflections. In deference to increased post-conversion system noise figure, it seemed impractical to place such a termination at the mixer i-f output port. While a complimentary filter or diplexer (high-pass/low-pass filters appropriately terminated) can be used to terminate both $f_{if} + f_{LO}$ and $f_{if} - f_{LO}$, a simpler method can be used if $f_{if} + f_{LO}$ is less than 1 GHz and $(f_{if} + f_{LO}) / (f_{if} - f_{LO}) \geq 10$. Place a short-circuit termination to $f_{if} + f_{LO}$, like a simple lumped capacitance, directly at the mixer i-f terminal. This approach is easiest for the amateur to implement and duplicate, so a form of it was tried - with success. In our circuit, C1 serves a dual purpose. Its reactance at $f_{if} + f_{LO}$ is small enough to provide a low-impedance "short-circuit" condition to this term for proper mixer operation. Additionally, it is part of the input reactance of the mixer i-f-amplifier interface. Fortunately the network impedance-transformation ratio is large enough, and in the proper direction, to permit a fairly large amount of capacitance (low reactance) at the mixer i-f-output port. The capacitor, in its dual role, must be of good quality at vhf/uhf (specifically $f_{if} + f_{LO}$), with short leads, to be effective. The mixer condition $(f_{if} + f_{LO}) / (f_{if} - f_{LO}) \geq 10$ is met at 432 and 220 MHz with a 404/192-MHz LO (28-MHz i-f) and on 14 MHz with a 130-MHz LO (14-MHz i-f). At 50 MHz, with a 36 MHz LO, we are slightly shy of the requirement, but no problems were encountered in an operating unit. The pi-type interface circuit assures a decreasing impedance as i-f operation departs from midband, thereby lessening IMD problems.

§ Presentation and calculation format of these terms is based on "low side" LO injection. See the appendix for explanation.

The LO Port

The primary effect of a reactive LO source is an increase in harmonic modulation and third-order IMD products. If the drive level is adequate, no effect is noted on conversion loss, rf compression and desensitization levels. A reactive LO source can be mitigated by simply padding the LO port with a 3- or 6-dB pad and increasing the LO drive a like amount. If excess LO power is not available, matching the LO source to the mixer will improve performance. This method is acceptable for single-frequency LO applications, when appropriate test equipment is available to evaluate matching results. For simplicity, a 3-dB pad was incorporated at the LO-input port as an interface in both versions of the mixer. Thus the LO port is presented with a reasonably broadband termination, and is relatively insensitive to applied frequency, as long as it is below about 500 MHz. This implies that frequencies other than amateur assignments may be covered - and such is indeed the case when appropriate LO frequencies and rf amplifiers are used. Remotely located LOs, when adjusted for a 50-ohm load, can be connected to the mixer without severe SWR and reflective-loss problems in the transmission line.

Broadband mixers exhibit different characteristics at different frequencies, due to circuit resonances and changes in diode impedances resulting from LO power-level changes. Input impedances of the various ports are load dependent, even though they are isolated from each other physically, and by at least 35 dB electrically. At higher frequencies, this effect is more noticeable, since isolation tends to drop as frequency increases. For this reason, it is important to maintain the LO power at its appropriate level, once other ports are matched.



The RF Port

A reactive rf source is not too detrimental to system performance. This is good, since the output impedance of most amateur preamplifiers is seldom 50 ohms resistive. A 3-dB pad is used at the rf port in the 50- and 144-MHz mixer to 14 MHz, and a 2-dB pad is used in the 220/432-MHz mixer to 28 MHz, although they add directly to mixer noise figure. Rf inputs between about 80 and 200 MHz are practical in the 14-MHz i-f-output model, while the 28-MHz-output unit is most useful from 175 to 500 MHz. Mixer contribution to system noise figure will be almost completely overcome by a low-noise rf amplifier with sufficient gain and adequate image rejection.

Image Response

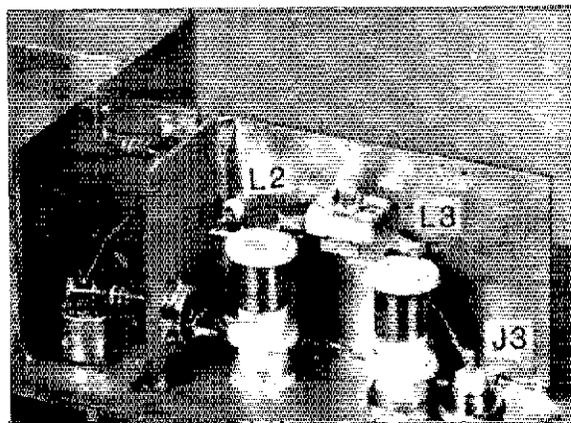
Any broadband mixing scheme will have a potential image-response problem. In most amateur vhf/uhf receiver systems (as in these units) single-conversion techniques are employed, with the LO placed below the desired rf channel for non-inverting down-conversion to i-f. Conversion is related to both i-f and LO frequencies and, because of the broadband nature of the DBM, input signals at the rf image frequency (numerically $f_{LO} - f_{i-f}$ in our case) will legitimately appear inverted at the i-f-output port, unless proper filtering is used to reduce them at the mixer rf-input port. For example, a 144-MHz converter with a 28-MHz i-f output (116-MHz LO) will have rf image-response

The bottom view of the DBM/i-f amplifier shows component and shielding layout. L1, the mixer-amplifier interface inductance and associated components are indicated. C1, with its wide silver-strap leads, is connected directly between the mixer i-f output pin and the copper-clad ground plane with essentially zero lead length. Connection between the mixer output pin and other components (L1, C2 and the rf choke for d-c return) is made by using excess lead from C1. The 43-ohm, 1/4-W resistor in the 3N140 gate 1 lead is connected between the high-impedance end of L1 and a spare terminal on the coil form. The device gate No. 1 lead and resistor are joined at this point. It is important that input/output isolation of the 3N140 be maintained as it is operating at high gain. Mixer packages other than the M6F may have different pin connections and require slightly different input-circuit layout and shielding. Double-sided copper-clad board was used throughout.

potential in the 84 to 88-MHz range. TV channel 6 wideband-fm audio will indeed appear at the i-f-output port near 28 MHz unless appropriate rf-input filtering is used to eliminate it. While octave-bandwidth vhf/uhf "imageless mixer" techniques can improve system noise performance by about 3 dB (image noise reduction), and image signal rejection by 20 dB — and much greater with the use of a simple gating scheme — such a system is a bit esoteric for our application. Double or multiple-conversion techniques can be used to advantage, but they further complicate an otherwise simple system. Image noise and signal rejection will depend on the effectiveness of the filtering provided in the rf-amplifier chain.

Mixer Selection

The mixer used in this system is a Relcom M6F, with specifications given in Table I. Suitable substitute units are also presented. The M6F is designed for printed-circuit applications (as are the recommended substitutes), and the lead pins are rather short. While mixers are available with connectors attached, they are more expensive. The simple package is suggested as, aside from less expense, improved interface between mixer and i-f amplifier is possible because of the short leads. The combining of mixer and i-f amplifier in one converter package was done for that reason. Along these lines, the modular-construction approach permits good signal isolation and enables the mixer-amplifier/i-f system to be used at a variety of



This is a side view showing construction details for the double-tuned i-f output circuit. The 3N140 drain lead passes through the shield wall via a small Teflon press-fit bushing and is connected directly to L2. A dc-input isolation compartment along with device gate 2 biasing components (bias configuration modified slightly after photograph was taken), can be seen to the left of the i-f-output components. L2 and L3 are spaced 1-1/8-inch (2.9 cm) center-to-center in the 14-MHz model shown, and 1 inch (2.5 cm) apart in the 28-MHz unit.

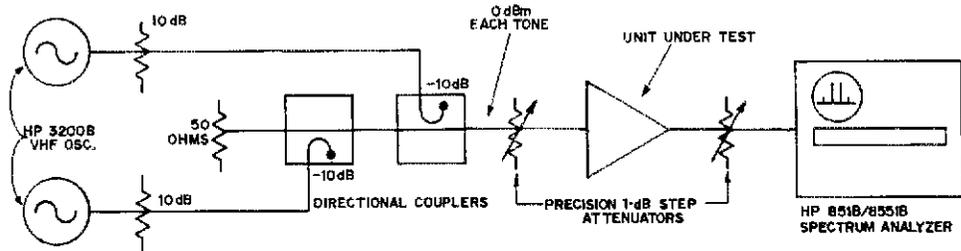


Fig. 3 — A test setup used by the author to measure IMD. The first attenuator adjusts the input level to the unit under test. The second one provides a means of staying within the linear range of the spectrum analyzer.

rf and LO-input frequencies, as mentioned earlier.

Most commonly available, inexpensive DBM are not constructed to take advantage of LO powers much above +10 dBm (10 mW). To do so requires additional circuitry which could degrade other mixer characteristics, specifically conversion loss and inter-port isolation. The advantage of higher LO power is primarily one of improved strong-signal-handling performance. At least one manufacturer advertises moderately priced "high-level" receiving DBM which can use up to +23 dBm (200 mW) LO power, and still retain excellent conversion loss and isolation characteristics, shown in Table I. The usefulness of mixers with LO power requirements above the commonly available +7 dBm (5 mW) level in amateur receiving applications may be a bit moot, as succeeding stages in most amateur receivers will likely overload before the DBM. Excessive overdesign is not necessary.

In general, mixer selection is based on the lowest practical LO level requirement that will meet the application, as it is more economical and results in the least LO leakage within the system. As a first-order approximation, LO power should be 10 dB greater than the highest anticipated input-signal level at the rf port. Mixers with LO requirements of +7 dBm are quite adequate for amateur receiving applications.

Application Design Guidelines

While the material just presented only scratches

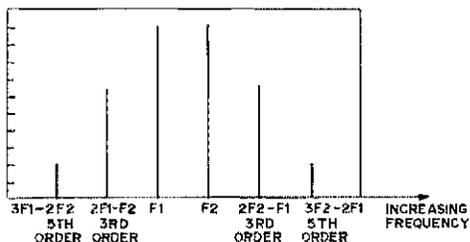


Fig. 4 — Typical third- and fifth-order two-tone IMD-signal distribution.

the surface in terms of DBM theory and utilization in amateur vhf/uhf receiving systems, some practical solutions to the non-ideal mixer-port-termination problem have been offered. To achieve best performance from most commercially manufactured broadband DBM in amateur receiver service, the following guidelines are suggested:

- Choose i-f and LO frequencies that will provide maximum freedom from interference problems. Don't "guesstimate," go through the numbers!
- Provide a proper i-f-output termination (most critical).
- Increase the LO-input power to rf-input power ratio to a value that will provide the required suppression of any in-band interfering products. The specified LO power (+7 dBm) will generally accomplish this.
- Provide as good an LO match as possible.
- Include adequate pre-mixer rf-image filtering at the rf port.

When the mixer ports are terminated properly performance usually in excess of published specifications will be achieved — and this is more than adequate for most amateur vhf/uhf receiver mixing applications.

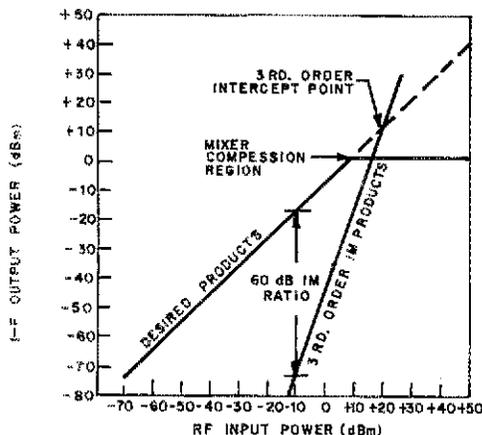
The Combined DBM/I-F Amplifier

A low-noise i-f amplifier (2 dB or less) following the DBM helps ensure an acceptable system noise figure when the mixer is preceded by a low-noise rf amplifier. A pi-network matching system used between the mixer i-f-output port and gate 1 of the 3N140 transforms the nominal 50-ohm gate-input impedance (at 28 MHz) specifically for best noise performance. The network forms a narrow-band mixer/i-f-output circuit which serves two other important functions: It helps achieve the necessary isolation between rf- and i-f-signal components, and serves as a 3-pole filter, resulting in a monotonic decrease in match impedances as the operating i-f departs from mid-band. This action aids in suppression of harmonic-distortion products.

Table II
DBM/I-F AMPLIFIER
PARTS LIST

| | 14 MHz i-f output | 28 MHz i-f output |
|--------|--|---|
| C1 | 470 pF JF D 4711 or equal. | 300 pF JF D 3011 or equal. |
| C2 | 590 pF SM | not used |
| C3 | 180 pF SM | 51 pF SM |
| C4 | 39 pF SM | 18 pF SM |
| C5 | 56 pF SM | 22 pF SM |
| C6 | 300 pF SM | 150 pF SM |
| L1 | 9 turns No. 18 enam., close-wound on a 3/8-inch (.95 cm) diameter red-slug coil form. | 9 turns No. 24 enam., close-wound on a 1/4-inch (.65 cm) diameter green-slug coil form. |
| L2 | 18 turns No. 26 enam., close-wound on a 3/8-inch (.95 cm) diameter red-slug coil form. Tap down 7 turns from top for 3N140 drain connection. See text. | 12 turns No. 26 enam., close-wound on a 1/4-inch (.65 cm) diameter green-slug coil form. No tap used. |
| L3 | Same as L2 but no tap, spaced 1-1/8 inch (2.9 cm) center-to-center with L2. | Same as L2, spaced 1 inch (2.5 cm) center-to-center with L2. |
| R1, R3 | 300 ohm, 1/4 W carbon. | 430 ohm, 1/4 W carbon. |
| R2 | 16 ohm, 1/4 W carbon. | 11 ohm, 1/4 W carbon. |
| Note: | Ferrite beads can be replaced by a 10-ohm, 1/4 W carbon resistor at one end of the choke, if desired. | |
| | SM = Silver Mica. | |

The combined DBM/i-f amplifier is shown schematically in Fig. 2 and pictorially in the photographs. In the 14-MHz model, the 3N140 drain is tapped down on its associated inductance to provide a lower impedance for better strong-signal-handling ability. The 3N140 produces about 19 dB gain across a 700-kHz passband, flat within 1 dB between 13.8 and 14.5 MHz. A 2-MHz passband is used for the 28-MHz model, and the device drain is connected directly to the high-impedance end of its associated inductance. Both



amplifiers were tuned independently of their respective mixers, and checked for noise figure as well as gain. With each i-f amplifier pretuned and connected to its mixer, signals were applied to the LO and rf-input ports. The pi-network inductance in the i-f interface was adjusted carefully to see if performance had been altered. No change was noted. I-f gain is controlled by the externally accessible potentiometer. Passband tuning adjustments in the drain circuit are best made with a sweep generator, but single-signal tuning techniques will be adequate. While I have no difficulty with the non-gate-protected 3N140, a 40673 may be substituted directly if desired.

DBM/I-F Amplifier IMD Evaluation

Classical laboratory IMD measurements made on the DBM/i-f amplifier indicate that third-order IMD is 48 dB down from both tones of a two-equal-tone rf-input test signal consisting of -10 dBm each tone. The tones were closely spaced in the 144-MHz range, and converted to 14 MHz with a +7 dBm, 130-MHz LO. Close spacing was necessary to ensure third-order products would appear essentially unattenuated within the relatively narrow i-f-output passband. In operation, as simulated by these test conditions, equivalent output signal levels at J3 would be strong enough to severely overload most amateur receivers. Perhaps the early Collins 75A series, R390A and those systems described by Sabin⁶ and Hayward⁷ would still be functioning well.

The Low-IMD Contest Converter

The DBM/i-f amplifier units presented are integral components of a vhf/uhf receiving system designed specifically for simultaneous multiband vhf-contest operation in very close quarters. The June, 1974 VHF Contest proved the systems adequate. Antenna separations of less than 20 feet at any heading produced no desensitization, cross modulation, or IMD in the receiving systems during simultaneous operation with 2 kW PEP at 50 MHz, 1 kW at 144 and 220 MHz, and 450 W at 432 MHz. The Drake R4 series and an R390A were used as tunable i-f receivers following the converters.

Briefly described, the contest receiving converter on each of the bands, 50 through 432 MHz,

(Continued on page 164)

Fig. 5 — A third-order intercept point is determined by extrapolating the desired product curve beyond the mixer compression point and intersecting with the third-order IM-product curve. In this case LO power is +7 dBm, conversion loss is 5 dB.

Offset Tuning and Keying Modifications for the **HW-101**



BY GLEN CARLSON,* W6KVD

Front-panel view of the HW-101, showing positions of the panel controls for the offset tuning, left, and the ON-OFF-ZERO switch, right.

MOST HAMS are aware of the transceiver syndrome: on cw, rarely does a fellow ham come back to you exactly on your transmitting frequency. You may then tune him in, with a resulting change in your frequency. Under good conditions, your friend will retune for you, and no harm is done, but in the presence of severe interference this procedure can result in loss of contact. So, if you are interested in tuning in your off-frequency friends without losing them in the process, this information may be for you. It applies directly to the Heathkit HW-101, but the general procedure may be applied to other transceivers to provide receiver offset tuning.

Basically, the idea is to provide means for connecting a voltage-variable-capacitance diode in parallel with the VFO tuning capacitor in the HW-101, as shown in Fig. 1A, to offset the receiver frequency when the transceiver is in the cw mode. A stable source of negative voltage is supplied by the network in Fig. 1B. Control of the system is the function of the network 1C.

How It's Done

The locations for the offset control, R6, and the control switch, S1, are indicated on the front-panel photograph of the HW-101. This requires drilling two holes in the panel, but no trouble should be encountered if marking and drilling are done carefully. Balanced appearance of

the transceiver is maintained, if a knob-operated wafer switch is used for S1. The mounting screw in the upper right corner of the panel makes a good place for attaching the two terminal strips used in wiring Network C.

Network A is wired on a 3-lug terminal strip, and mounted under the screw holding the VFO output transformer, T94. (Multidigit numbers used here are Heath designations for HW-101 parts.) The 1N649 was selected for CR1 because it was a fat little silicon diode, presumably with a lot of junction capacitance. Other small-signal silicon diodes should be usable, probably with somewhat different reverse-voltage vs junction-capacitance characteristics. Most such diodes should work as voltage-controlled capacitors well enough for this application.

Voltage applied to Point X will always be negative, so that the diode cannot conduct. The higher this voltage, the lower the capacitance exhibited by CR1. Thus we raise the VFO frequency by increasing the negative voltage at Point X, and lower the frequency by dropping the voltage.

The isolating resistor, R1, keeps rf out of the dc bias line. The input, Point X, is of high impedance, so the bias line must be shielded to prevent ac modulation of the diode. Small coax was used, but any well-shielded wire should serve equally well. The cable was pulled out of the top-front portion of the VFO assembly.

* 2588 Hermosa Street, Pinole, CA 94564.

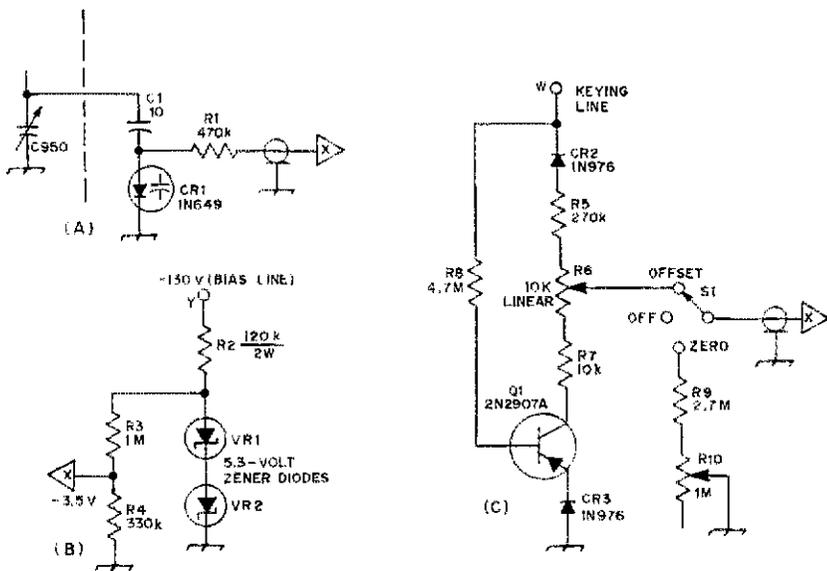


Fig. 1 — Three small networks are assembled on terminal strips, in modifying the HW-101 for offset tuning. Network B maintains the -3.5 bias for the tuning diode, CR1, when the transceiver is in the TRANSMIT mode. Network C selects the mode of operation, and provides for readjustment of the degree of receiver offset.

With Network A installed it is possible to check the tuning range and bias-voltage requirements of the diode used for CR1, using a temporary external bias source. The signal from the VFO should be monitored in an accurately calibrated receiver, or checked with a counter. The HW-101 tunes from 5.0 to 5.5 MHz. With Network A connected, but with zero voltage at Point X, set the VFO to its lower limit. Apply negative voltage at Point X, and check the frequency change resulting from increasing bias, in small increments, making curves similar to those in Fig. 2. Note at what voltage the curve begins to be nonlinear. Then repeat the process with the VFO set at the high end of its range. With a series capacitance, C1, of 10 pF, the 1N649 frequency change was linear up to about 6 volts, and the offset tuning available was more than enough for most operating purposes. To provide for tuning either way, a "center" bias voltage of -3.5 was selected, but in retrospect it was found that -3 or even -2 would have served equally well.

Network B was then installed, and the VFO was aligned according to the instruction manual. It and Network C serve two requirements: The voltage at Point X must be stable during transmitting periods, and it must be adjustable during receiving. Because the range of bias voltage desired was as yet undetermined, the system was designed as shown. A 3-lug terminal strip mounted on the control bracket, between the VOX DELAY and BIAS potentiometers is used for the components of Network B.

As the offset-tuning feature was to be used only, on cw, the keying line was made the sense source.

This line is at -55 volts when the key is up, and zero when it is down. The following conditions

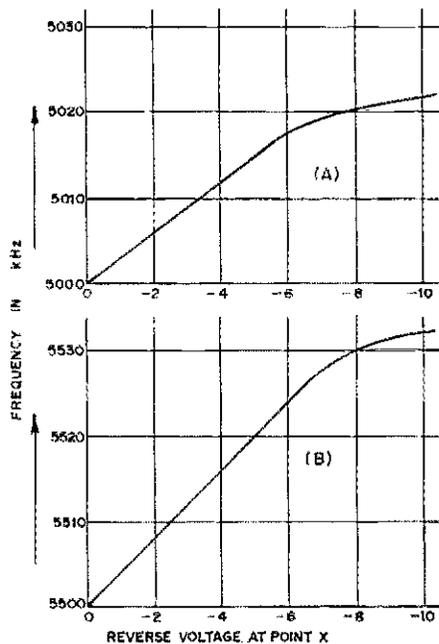


Fig. 2 — Typical curve of frequency shift for increasing values of bias voltage for the tuning diode, CR1. Only part of the linear portion of the curve is used in actual practice.

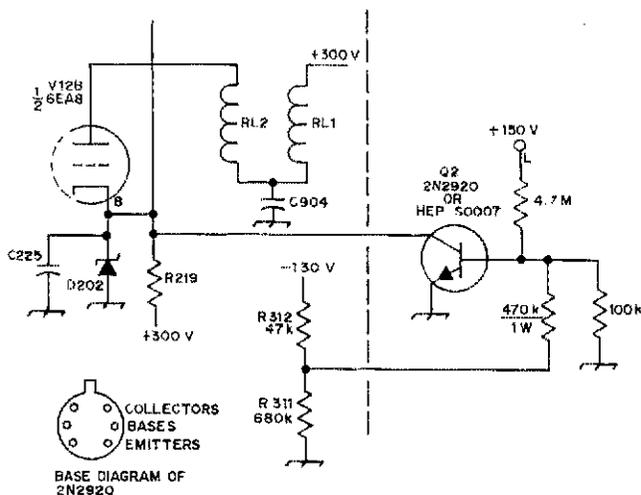


Fig. 3 -- Modification details for reduced delay time in cw keying of the HW-101 to eliminate loss of first dot. Parts to the left of the broken line are in the original circuit. They are identified by the Heath numbers.

apply when the switch, S1 of Network C, is in the OFFSET position.

When the key is up, the -55 volts present at Point W biases the base of Q1 into conduction, through R8. Collector current from Point W flows through the collector load resistance (R5, R6, R7), and through the diode, CR3, to ground. Current flow through R6 causes the arm-to-ground voltage to be -3.5 when the arm is at its center of rotation. When the arm is at the top of the control range the voltage at Point X is -4.5 , resulting in a change of about 3 kHz. At the bottom of the range it is about -2.5 volts. The total change in frequency is approximately plus-or-minus 3 kHz from the normal receiving frequency. Greater changes were experimented with, but tuning with the control became difficult.

When the key is down, Point W is grounded. Q1 is turned off for lack of bias, and the collector resistance is isolated from ground by Q1 and CR2. Network B assumes control of the voltage at Point X, and R6 has no effect on the transmitting frequency.

Using the Offset Tuning

With S1 in the OFF position, the transceiver works as originally designed. When the switch is in the ZERO position the receiving frequency is raised by an amount determined by the setting of R10. This feature was intended to make zero-beating of cw stations easier. It will be 100-percent accurate only at the dial setting where you make the adjustment. For example, if you adjust R10 to move the RECEIVE frequency up to the TRANSMIT frequency at 7050 kHz, your zero-beat adjustment will be accurate on 14,050, 21,050, etc. Within 50 kHz of this frequency you will be reasonably close.

Caution: The ZERO position is intended to zero-beat a station in the RECEIVE mode only; the receiving frequency is moved up 1 kHz to where your transmitting frequency normally is. If

you transmit with S1 in the ZERO position, your transmitting frequency will also be moved up 1 kHz. So, use the ZERO position of S1 only in the RECEIVE mode.

With S1 in the OFFSET position, variation in the keying-line voltage (which is not regulated) can lead you to think that a station has drifted or jumped in frequency by a slight amount. So, keep S1 in the OFF position when checking for frequency stability.

The Case of the Missing Dot

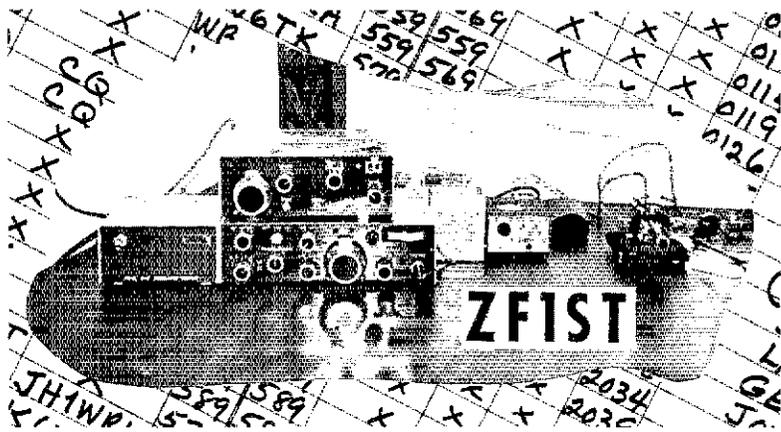
With the HW-101 (and most other ssb transceivers) it is quite likely that, in transmissions starting with a dot, that first dot will not be heard on the air if the keying speed is 20 wpm or more. A starting W becomes M, R sounds like N, and so on. The fault may be unknown to the operator, because he hears the complete sequence in his sidetone monitor. In the HW-101 the trouble is the result of delay in operation of relays RL1 and RL2. It takes time for the voltage buildup on the grid of V12B to drive this triode into conduction, which will, in turn, operate the two relays.

The network at the right side of Fig. 3 reduces this delay time by lowering the bias on V12B (voltage on the cathode, Pin 8) when the key is down. When the transceiver is in the cw mode, the junction of R312 and R311 is tied to the keying line (-55 volts). The base of Q2 goes positive, causing the transistor to conduct, lowering the cathode voltage on V12B. The tube conducts much faster, and all dots are transmitted.

The case of the 2N2920 contains two transistors. Their elements are connected in parallel for this application, increasing the current-handling capability.

The circuit modifications have been in use in the author's HW-101 for several months, during which they have increased the enjoyment derived from use of the transceiver.

QRP SHAKEDOWN



Caymanian Style!

BY DOUG DeMAW,* WICER/ZFIST
AND BILL MARTINEK,**W8JUY/ZF1WM

THERE'S SOMETHING SPECIAL about doing one's DX work with QRP equipment, but when low power is used while operating as a DX station it is difficult for an inspired operator to avoid being ecstatic. A QRP junket to Barbados in 1972 proved that with only 2 watts of output on 14 MHz, and with a simple dipole antenna, one could practically work the world.¹ However, at so low a power level there were times when a few more decibels of cw signal strength could have turned a "no-contact" effort into one of success. Since 1972 WICER has experimented with various power levels and dipole antennas, trying to determine where the practical break might be respective to power output *versus* portability, power-supply drain, and effectiveness of communication. In fact, a 175-watt commercial hf-band transceiver was hauled to Barbados in 1973 to provide a reasonable reference for future and past QRP efforts from that part of the world.²

In the ensuing period it was decided that something in the 10-watt dc-input class would probably serve one's needs afield if DXCC wasn't

an immediate objective. It seemed logical that at least two bands of operation would be necessary to provide operating periods during day and night hours, allowing for normal band conditions, of course. Finally, a design was put on paper late in July of 1974. It is shown in Fig. 1. The transmitter would cover part of the 40- and 20-meter bands. It would contain an SWR indicator, sidetone oscillator, and receiver muting circuit. It would be VFO controlled, have break-in delay, operate from 12 volts dc, and draw less than 2 A from the power supply. Assuming an idealistic 70-percent efficiency from the solid-state PA stage, approximately 7 watts of output would be available. The increase over the amount used in 1972 would come to nearly 6 dB, and that could mean the difference between success and failure on marginal OSOs.

A crash program followed the design period of the transmitter: kick-off time for a two-week QRP exercise from Grand Cayman Island was set at September 28, 1974. Fortunately, the rig went together quickly, and few "bugs" developed. It turned out that the unit was compatible with the June/July 1974 *QST* receiver, so the two items would be used during the trip.

The Operating Site

Since W8JUY (Bill) and his XYL (Jean) had never visited the West Indies, WICER and his XYL

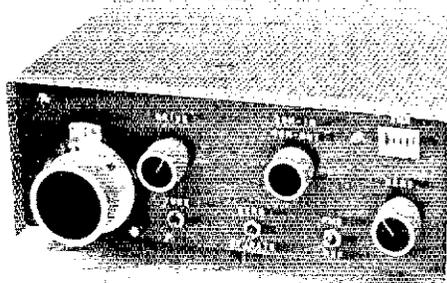
* *QST* Technical Editor.

** 221 Boardman Ave., Traverse City, MI 49684.

¹ DeMaw, "The QRP Challenge — Barbados Style," *QST* for July, 1973, p. 62.

² Recent Equipment, *QST* for Feb., 1974, p. 46.

Close-up view of the 20/40-meter solid-state transmitter. The cabinet is homemade from 1/16-inch aluminum stock. A cover was made from perforated aluminum which was obtained at a flea market. Kurz-Kasch aluminum knobs are used on the controls. The large knob on the vernier drive was cut down on a lathe to make it thinner, and to permit the set screw to mate with the drive shaft. An SWR-indicator meter is seen at the upper right. Green tape labels identify the controls on a green panel.



(WICKK) invited them to share the experience. Bill had not been a QRP man in recent years, so was intrigued by the prospect of trying his hand as a low-power DX operator. Bill hand-carried his new FT-101B along . . . just in case! It turned out to be a good idea, for during the time we were on the island we used his rig for some hf-band and 160-meter work, giving a new country to many U.S. amateurs.

The short drive from Owen Roberts Airport on Grand Cayman to Ron Sefton's (ZF1SB) Spanish Bay Reef Resort on the north end of the island took only a few minutes. We noticed that the land was extremely flat, and that the sea grape and palm trees were the significant vertical objects that our signals would have to contend with. It looked like a good rf shot in any direction from any part of the island.

Early the following morning we went about the task of erecting antennas. We were situated in ocean-front apartments approximately 50 feet from the water's edge. Behind the living quarters was a 40-acre field with only foot-high sea-grape bushes, and a few short trees were available around the compound for use as guy anchors. It looked good, so we lashed a rusty old 30-foot pipe mast to the outer wall and roof peak of Bill's dwelling. A 130-foot inverted L was supported by the pipe, and the barbed-wire fence was commissioned as a ground system. (We couldn't use the water pipes for grounding because all of the plumbing was done with plastic pipe.) The mast supported a pair

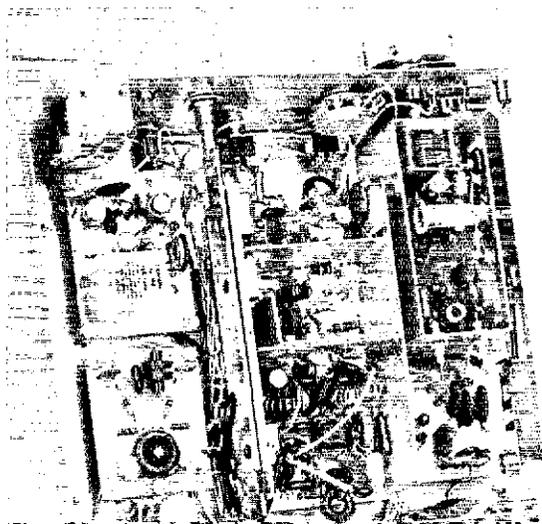
of coax-fed sloping dipoles — one for 40 and one for 20 meters. The high end of each ended up rather close to ground, roughly 25 feet.

We knew as we labored under the hot sun and intense humidity that this would be an ideal place for environmental testing of the new QRP station, and that is a consideration when designing equipment for field use. After the task was finished the antennas were checked for SWR, and the end-fed 160-meter wire was matched by means of a simple L network.

The Transmitter

The VFO is an adaptation of the one described in *QST* for November, 1974, page 22. It can be seen that this circuit is not for beginners to tackle, and for that reason we are not providing a blow-by-blow circuit description. There are no templates or additional data available for this project. Advanced builders should have no difficulty getting a "handle" on this equipment, and can design a suitable pc board for the circuit. The design outlook for the VFO was treated thoroughly in the earlier issue of *QST*. The main difference in the versions is the operating frequency and the offset circuit at CR1. Since it is desirable to keep a VFO running all of the time to minimize warm-up drift, the operating frequency needs to be offset during receive. That prevents the VFO from interfering with the received signal. In standby 12 volts dc is applied through K1C to saturate CR1.

Interior view of transmitter. The VFO box is at the upper right with its aluminum cover removed. Directly below the VFO is the sidetone module. The large assembly occupying the center of the chassis is the rf power strip. Three miniature slide switches are ganged by means of a pc-board strip (left on power module). At the upper left is seen the break-in delay assembly. Below it is the SWR-indicator module.





ZF1WM (left) and ZF1ST at work preparing the 30-foot mast for erection at Spanish Bay Reef.

When it is saturated C2 is placed in parallel with tuning capacitor C1, thereby dropping the operating frequency several kHz below the transmit frequency. A larger capacitor can be used if the operator wishes to "kick" the signal out of the band completely. This 7-MHz VFO stabilizes in 30 seconds. Drift was measured as 25 Hz from a cold start. Stability in models duplicated will vary in accordance with the capacitors used in the frequency-determining section of the Q1 tank. No two capacitors of a given type or brand will act the same way in a VFO.

The transmitter power strip, Q4 through Q6, uses a 2N2222 as a buffer/doubler. Shield compartments isolate the stages to enhance stability. On the side wall of each compartment is a miniature slide switch for changing bands. The switches are ganged by means of a flat strip of pc-board stock. Small rectangular holes are cut in the strip to accommodate each switch handle. A quarter-inch diameter metal shaft is soldered to one end of the strip and is brought out through the front panel for push-pull band-change action. This was done to assure short lead lengths in the switching lines. Q5, the driver, is an RCA TO-5 device to which a crown-type heat sink is added. The PA, an RCA 40977, is mounted on a large heat sink fashioned from a piece of 1/16-inch-thick aluminum stock. The sink is formed into a U-shaped piece, 2-1/2 x 1-3/4 inches in size. The lips of the U are 1 inch high.

To make network design easier, the 8-ohm collector impedance of Q6 is stepped up to 32 ohms by means of T1 (1:4 transformer). A half-wave filter is used as a PA tank. The constants given are for matching 32 ohms to 50 ohms in the first section of each filter, with a loaded Q of 1. The last half of each filter is set to match 50 ohms to 50 ohms, also for a Q of 1. The low Q assures good bandwidth and minimum difficulty with PA instability, yet it provides good rejection of harmonic energy. No tuning controls are required.

A 7-MHz parallel-tuned trap is used at the output of the 20-meter half-wave filter. This was necessary in order to suppress a small amount of 7-MHz energy which passed through the PA and filter section (half-wave filters are low-pass filters). A pure sine wave appears at the transmitter output

when full power is being fed into a 50-ohm load. No harmonic current could be seen when examining the waveform by means of a high-quality 50-MHz scope.

The circuit for generating a sidetone, Q10, was garnered from the Ten Tec Argonaut. It is simple and provides an output frequency of approximately 700 hertz.

Although it is not shown in the schematic diagram, an SWR bridge is installed between the arm of S1D and K1B.³ It is helpful to have that as part of the package, thereby eliminating the need to carry a separate instrument and one more coax cable.

A drive control, R2, was included to permit using the transmitter as a low-power exciter with Class AB solid-state amplifiers. The so-called QRPP operator (5 watts or less) can set the power output level by means of R2.

Someone may wonder why there are two output coupling capacitors between L3 and the base of Q5. The technique serves to equalize the output from the transmitter, thereby avoiding the necessity of an equalizing network of more conventional design. By tapping the 180-pf capacitor down on L3, the drive to Q5 is lessened considerably during 40-meter operation.

This circuit performs smoothly and provides a quality cw note. There are no clicks or chirps. Output on 40 meters was measured as 7.2 watts. The 20-meter power output is 6.7 watts.

Operating

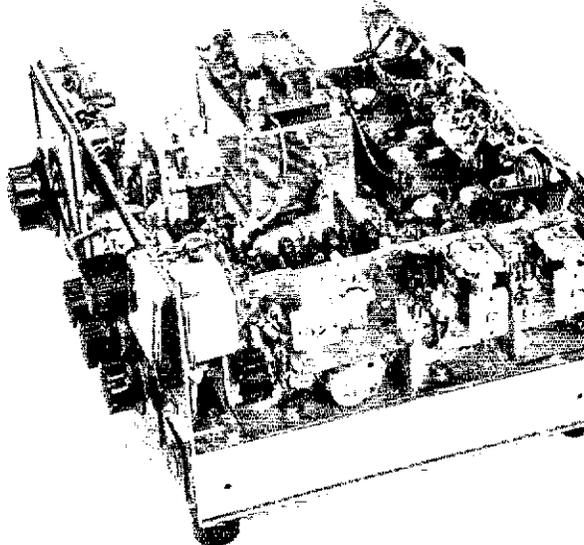
Ron Sefton must be one of the world's most helpful hosts, for he rounded up a five-band trap vertical and had it installed on the roof of the quarters used by W1CER. The resort caters almost exclusively to scuba divers and snorkelers, but we realized quickly that hams were welcome there too! We had to install the radials before the antenna could be checked for SWR. Two wires were cut for 40 meters, and another pair were added for 20 meters. We decided to use the barbed-wire fence as an additional ground system, hoping for reasonable performance on 80 meters. The idea proved to be an acceptable one, for the SWR on all five bands, 80 through 10 meters, was less than 2:1. The ZF1ST QRP station was directly under the vertical (roughly six feet), and the two dipoles were no more than 20 feet from it. The vertical would be used by ZF1WM with his transceiver.

There was some question concerning how the stations would interfere with one another —

(Continued on page 59)

³The bridge circuit and pc-board layout are identical to those shown in *QST* for June, 1973, p. 13.

Side view of the K1ZJH 50-MHz transceiver, with cover removed, showing the transmitter rf amplifier stages, not completely seen in the top view, Part I.



A State-of-the-Art

QRP Transceiver for 50 MHz

Part II

BY PETER J. BERTINI,* K1ZJH

INSO FAR as practical, description of the K1ZJH 50-MHz transceiver was divided to put receiving assemblies in Part I and transmitting units in Part II. Several board assemblies serve both functions, including the 9-MHz filter in Part I. This concluding portion covers other dual-purpose units of the transceiver, as well as those used for transmitting only. As in Part I, order of appearance is indicated by unit numbers in the block diagram, Fig. 1.

The 5-MHz VFO

The VFO and the 36-MHz crystal oscillator, Fig. 6, determine both the transmitting and receiving frequencies. The VFO design was adapted from one used by W1K1K in a 20-meter ssb transmitter.² The Colpitts oscillator uses an RCA 40841 MOSFET, Q5, with gates tied together. A 1N914 stabilizes the gate voltage, reducing harmonic generation by limiting device transconductance on positive voltage peaks. Two medium-gain 2N2222A transistors, Q6 and Q7, in an emitter-follower circuit match the VFO output to 50 ohms. The 5-MHz energy passes through a low-pass filter, to eliminate harmonic output from

the buffers. It then goes to the transmitting and receiving mixers through RG-174/U coax.

Oscillator voltage regulation was not found necessary, but can be done with a 9.1-volt Zener diode from the oscillator drain to ground. This diode and the 220-ohm resistor already in the drain lead should not be in physical proximity to frequency-determining circuits of the VFO, as heat dissipation by the resistor and diode might cause oscillator drift. A diode-switched capacitance (C19 and C20 in series) off-sets the VFO during lsb operation, to preserve dial calibration.

The VFO is set to cover 5.08 to 5.19 MHz, giving band coverage of 50.08 to 50.19 MHz. This allows operation in the upper portion of the cw-only band at 50.0 to 50.1, and also cw or ssb in the first 90 kHz of the voice band. Most current use of both modes is in this range. More coverage can be had by using a larger capacitor (more plates) for C18. Note that the ceramic padder, C21, has a negative temperature coefficient. Its "N" value can be selected experimentally, if the N330 specified does not correct oscillator drift adequately. Or, a smaller capacitor of the more common N750 type, used in parallel with an NPO, can be tried, to correct drift in environments different from that in which the author's rig operates.

* Patsun Road, Somers, CT 06071.

² *The Radio Amateur's Handbook* "A 20-Meter Sideband Transmitter," 1973 Edition, p. 414.

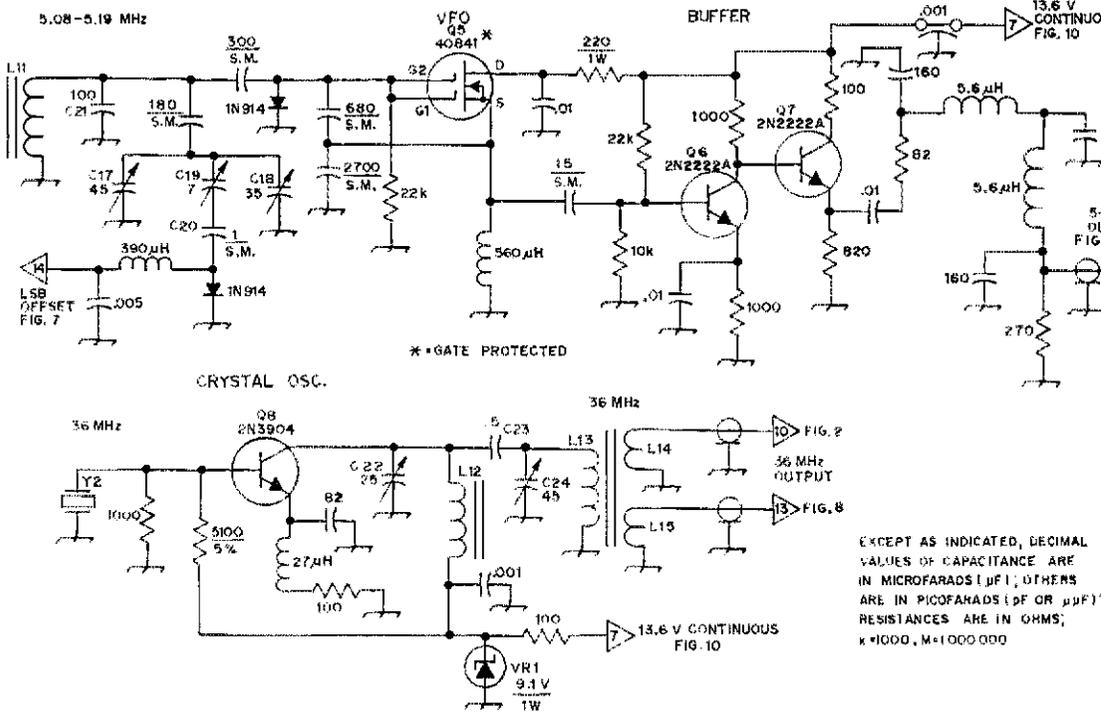


Fig. 6 - Schematic diagrams of the VFO and 36-MHz oscillator used in the K1ZJH 50-MHz transmitter. Parts not described are numbered for text reference.
 C17, C24 - Ceramic trimmer, 7 to 45 pF.
 C18 - Shaft-type miniature variable, 35 pF.
 C19 - Ceramic trimmer, 1.5 - 7 pF.
 C20 - 1-pF silver-mica.
 C21 - 100-pF disk ceramic, neg. temp. coef. Select N value for minimum oscillator drift. N330 used.

- C22 - Ceramic trimmer, 5 - 25 pF.
- C23 - Gimmick capacitor; two 1-inch lengths No. 24 Teflon wire, twisted to give desired mixer-injection level, 1.5 V pk-pk.
- L11 - 26 turns No. 26 Teflon wire on 1/2-inch toroid core (Amidon T-50-2, red).
- L12, L13 - 12 turns like L11, except Amidon T-50-6, yellow.
- L14, L15 - 1 turn each, bifilar-wound at low-Z end of L13.
- VR1 - 9.1-volt 1-watt Zener diode.

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μμF) RESISTANCES ARE IN OHMS; K=1000, M=1000000

The VFO dial is an old National Type MCN, with a Jackson Brothers ball-bearing vernier drive in place of the original planetary mechanism. This gave the smooth free feel that is so important in a dial that is to be used for receiver tuning, as well as for VFO control. No peaking or tracking controls are needed, as the limited tuning range of the equipment eliminates tracking problems.

Except for the main tuning capacitor, C18, and its padder, C17, both of which are visible in the top view, lower left corner, the VFO assembly cannot be seen in the photographs. The circuit board and VFO components are in a Minibox-type enclosure, for thermal and electrical isolation. The box is under the 25-kHz oscillator board, left center of the top view. It is important that the mounting of all VFO parts be rigid, and special care should be given to the dial drive and variable capacitor assembly. If necessary, the front panel and chassis can be reinforced with additional thickness of aluminum, in these areas.

36-MHz Heterodyne Oscillator

This oscillator, shown schematically in the lower portion of Fig. 6, also serves both transmitting and receiving functions. A 2N3904 transistor, Q8, is used with a 36-MHz crystal, Y2, in a reliable overtone oscillator circuit, to furnish injection for both transmitting and receiving mixers. In the receiver it heterodynes the signal to the 14-MHz range in the first mixer, Q1, Fig. 2. In transmitting it beats with the 14-MHz output of the second transmitting mixer, Q13, Fig. 8, to produce the 50-MHz signal that is fed to the amplifier stages of Fig. 9.

The oscillator collector voltage is Zener-diode regulated, to maintain frequency stability and rf output level with varying supply voltage. Two lightly coupled tuned circuits are used to reduce harmonic content in the output. The gimmick capacitor C23 is adjusted to provide the minimum coupling needed to develop 1.5 volts pk-pk for the

mixers. The second tuned circuit, L13-C24, was added after the 36-MHz oscillator board was made. It is seen in the upper-central portion of the top-view photograph, above the oscillator assembly.

Sideband Generation

The sideband generator, Fig. 7, is the largest and most complex subassembly in the transceiver. It is seen in the middle portion of the bottom-view

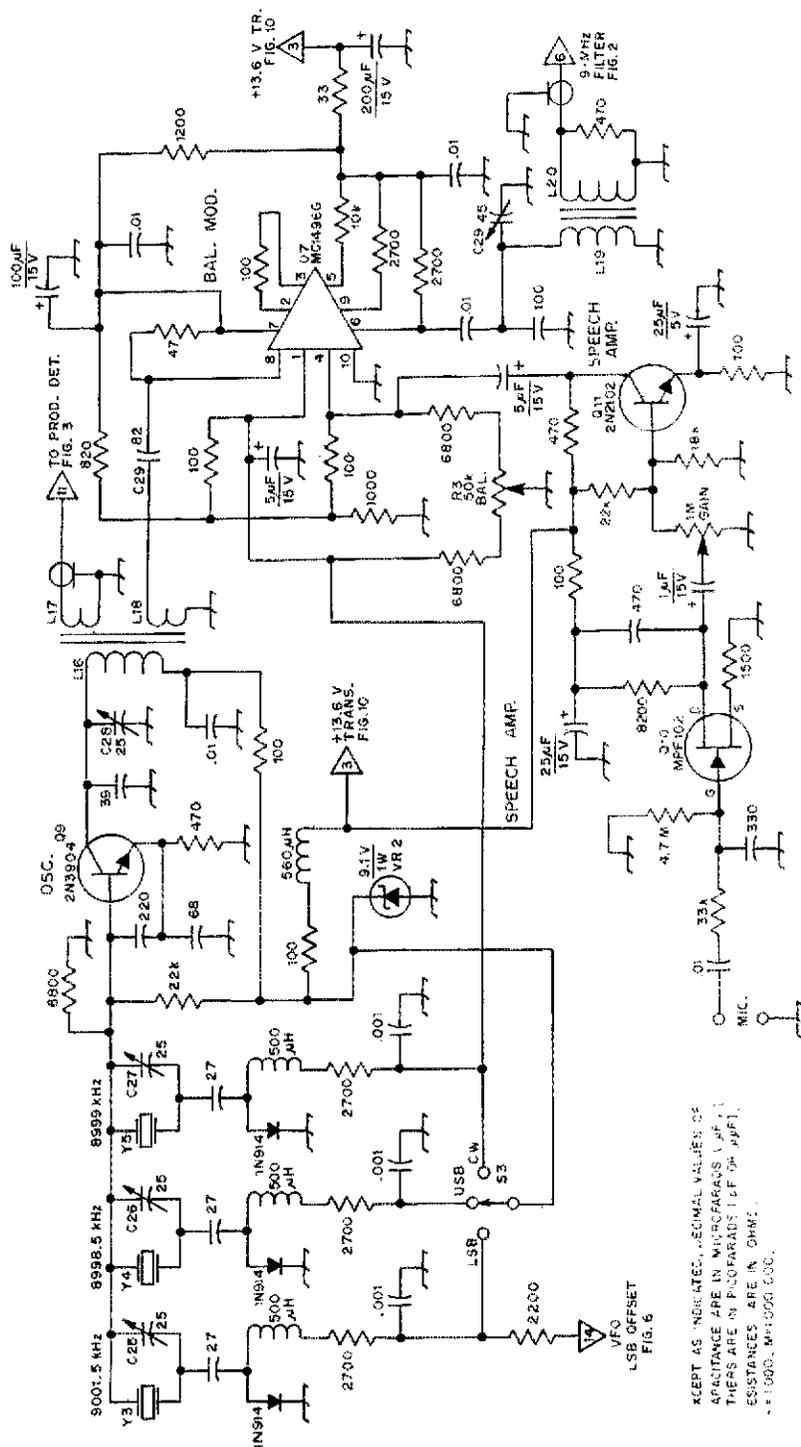


Fig. 7 — Schematic diagram for the sideband generator in the 50-MHz transceiver. Parts not described are numbered for text reference. C25-C28, incl. — Ceramic trimmer, 5 — 25 pF. C29 — Ceramic trimmer, 7 — 45 pF. L16 — 32 turns No. 26 Teflon wire on 1/2-inch toroid core (Amidon T-50-2, red). L17, L18 — 2 turns each, bifilar-wound at low-Z end of L16. L19 — 20 turns like L16. L20 — 9 turns No. 28, on core of L19. R3 — 50,000-ohm control. R4 — 1-Megohm audio control. S3 — Single-pole 3-position wafer switch. Fig. 5 — Balanced modulator IC (Motorola MC14986). VR2 — 9.1-volt 1-watt Zener diode. Y3, Y4, Y5 — Crystals, frequencies as indicated, ordered with FL1 (Spectrum International XF902, XF901, and XF903, respectively).

EXCEPT AS INDICATED, NOMINAL VALUES OF CAPACITANCE ARE IN MICROFARADS (µF), RESISTANCE ARE IN OHMS.

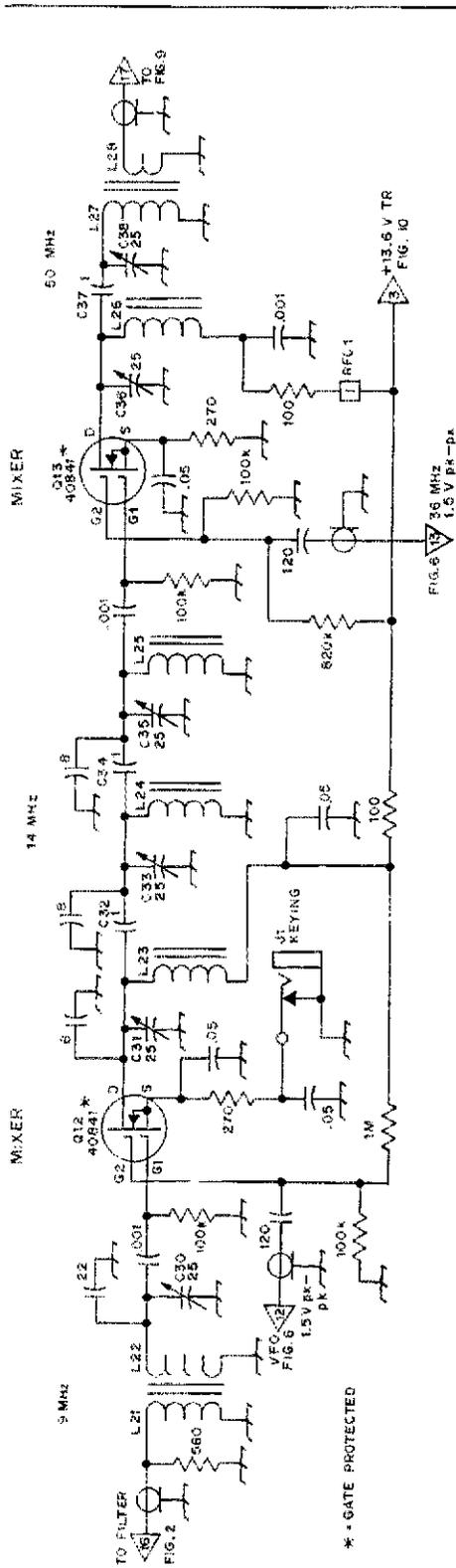


Fig. 8 - Schematic diagram of the transmitter mixer assembly for the 50-MHz transceiver. C30, C31, C33, C35, C36, C38 - Ceramic trimmer, 5 - 25 pF. C32, C34, C37 - Gimmick capacitor; two 1-inch lengths No. 24 Teflon wire, twisted three times; approx 1 pF. J1 - Closed-circuit jack. L21 - 10 turns No. 26 Teflon, on 1/2-inch toroid core (Amidon T-50-2, red). L22 - 30 turns like L21, on same core. L23 - 27 turns like L21. L24, L25 - 30 turns, like L21. L26, L27 - 8 turns, like L21. L28 - 2 turns on same core as L27. Q12, Q13 - Gate-protected MOSFET (RCA 40841). RFC1 - 4 ferrite beads (Amidon 4S-101).

photograph. Included are a crystal oscillator, Q9, two speech stages, Q10 and Q11, and a balanced modulator, U7. The three crystals, Y3, Y4, and Y5; are available for use with the KVG filter, and their frequencies are selected to provide upper and lower sidebands and cw, while maintaining the dial calibration for all modes.

The balanced modulator is a Motorola MC1596G IC, using information supplied by K7QWR.³ BFO injection is critical for maximum carrier suppression. There should be 150 mV developed at Pin 8 of U7. This can be adjusted by substituting other values for the 82-pF coupling capacitor, C29. A multiturn Trimpot was used for the carrier balance control, R3, for accurate and stable carrier nulling. Since there is no rf energy at this point, only a dc level, the control can be located away from the balanced-modulator circuitry at any convenient point, with no deleterious effects.

In the cw mode the carrier suppression is purposely unbalanced, to generate a carrier at the MC1496G output, and also a crystal within the filter passband is used. Operation with a-m is possible, though not shown here, by increasing the value of the 1000-ohm resistor, R5, used for carrier insertion. A point will be found where satisfactory a-m is generated, minus one sideband, of course. The two frequency-setting capacitors, C25 and C26, associated with the two sideband BFO crystals, are used in conjunction with R3 in nulling the carrier. All settings interact, and it will be necessary to repeat adjustments several times, for maximum carrier rejection on both upper and lower sideband. The trimmer C27, for the cw BFO crystal, is simply set at the point where no further increase in carrier output is obtained.

The output of the balanced modulator goes to the KVG filter, where the unwanted sideband and

³ Hejhall, "Integrated Circuit Balanced Modulator," *Ham Radio* September, 1970.

any trace of carrier are removed. Resistive loading of the KVG ports in the *transmit* mode (resistors across L20 and L21) was done for impedance matching.

Transmitter Mixers

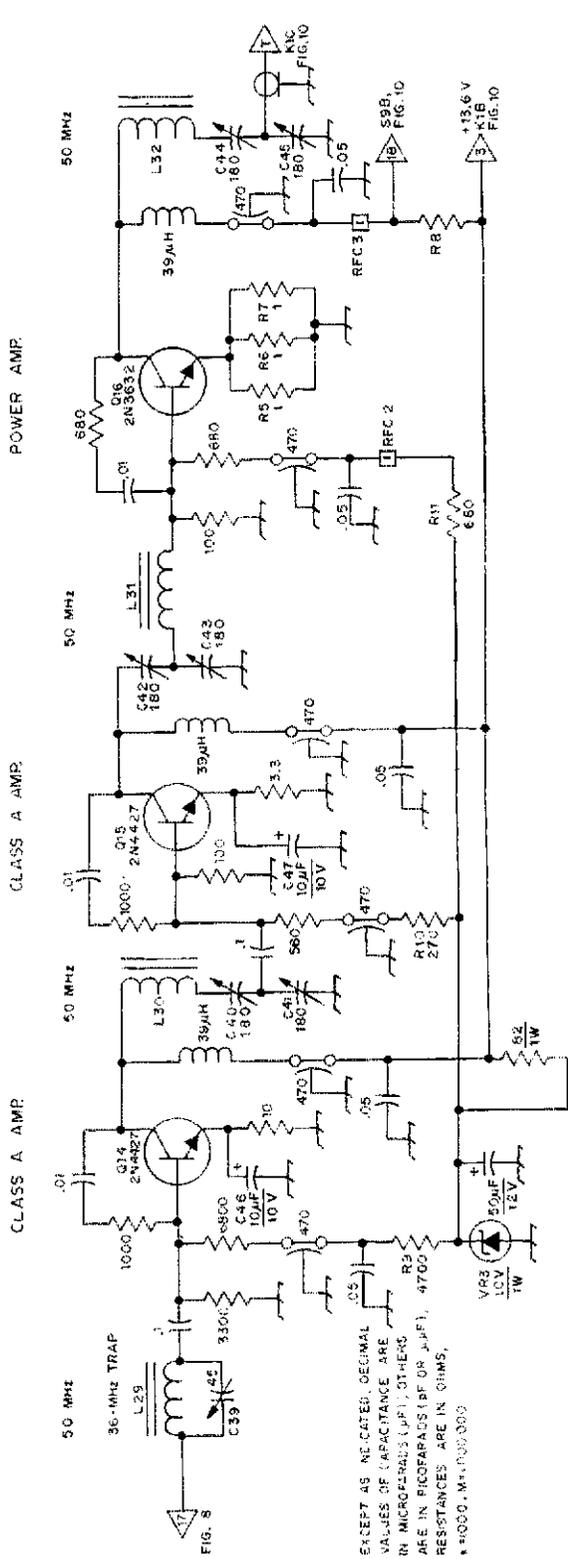
The transmitting converters bring the 9-MHz signal up to 50 MHz in the opposite order of conversion to that of the receiving section. Both mixers, Q12 and Q13, are 40841 MOSFETs. The first up-converts the 9-MHz filter output to a 14-MHz bandpass i-f, by heterodyning it with the 5-MHz VFO output. Three lightly coupled tuned stages follow this mixer, forming a 14-MHz bandpass filter. This is very important, reducing spurious mixing products that would otherwise be compounded in the next mixer, and also eliminating harmonic multiples of the VFO frequency. (The tenth harmonic could be especially troublesome.) The source ground return of the first mixer is keyed for cw operation, via J1 in Fig. 8.

The second transmitter mixer combines the 14-MHz i-f with energy from the 36-MHz heterodyne oscillator, to produce the desired 50-MHz signal. Two lightly coupled 50-MHz LC stages

Fig. 9 — Schematic diagram of the transmitter rf amplifier stages.

- C39, Ceramic trimmer, 7 — 45 pF.
- C40-C45, incl. — Mica trimmer, 9 — 180 pF (Arco-Elmenco 463).
- C46, C47 — Small tantalum electrolytic, 10 μ F, 10 volts. (Mallory MTP-106M010 P1D).
- L29 — 10 turns No. 26 Teflon on 1/2-inch toroid core (Amidon T-50-2, red).
- L30 — 5 turns, like L29.
- L31 — 6 turns, like L29.
- L32 — 9 turns, like L29.
- Q14, Q15 — 2N4427 (RCA). 2N3866 also usable for Q15.

- Q16 — 2N3632 (surplus). 2N3375 also may be usable.
- R5, R6, R7 — 1-ohm 1/2-watt composition resistors in parallel.
- R8 — Meter shunt, wound to give 500-mA full-scale deflection with meter used. See Fig. 10 and text.
- R9, R10 — Approximate values; adjust for collector currents of 80 and 100 mA for Q14 and Q15, respectively.
- R11 — Approximate value; adjust for idling current of 30 mA for Q16, or best linearity in two-tone text.
- RFC2, RFC3 — 4 ferrite beads (Amidon 43-101).
- VR3 — 10-volt 1-watt Zener diode.



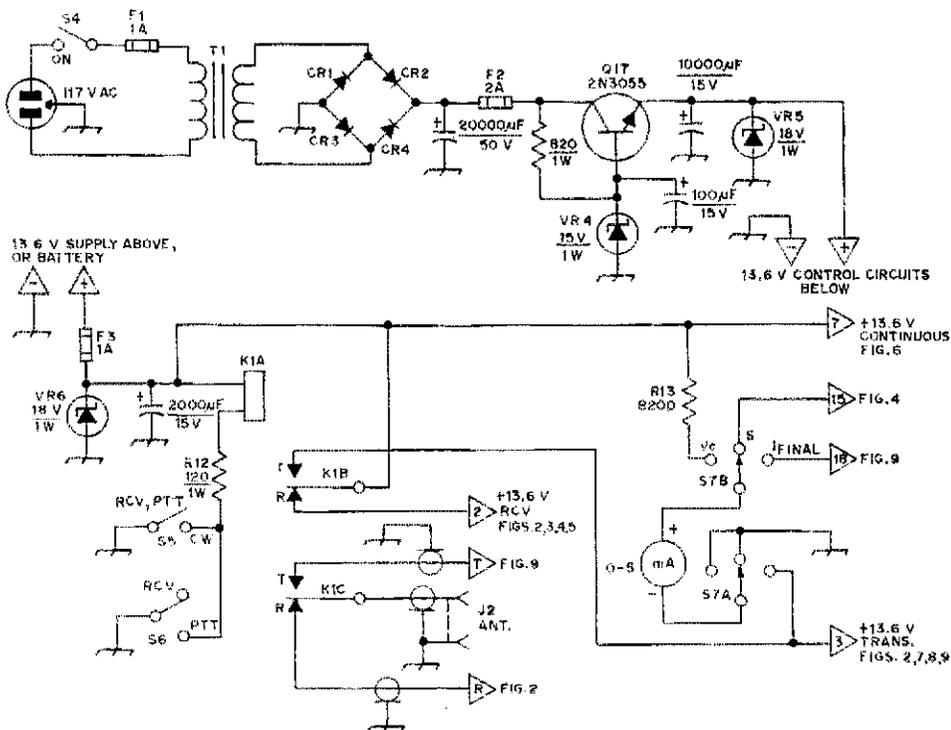


Fig. 10 — Schematic diagram of the power supply and control circuits for the 50-MHz transceiver. Capacitors are electrolytic, values in μF .

- CR1-CR4, incl. — 100 PRV, 1 A.
- F1, F3 — 1-A fuse.
- F2 — 2-A fuse, slow-blow.
- J2 — Coaxial jack, S0-239.
- K1A, K1B, K1C — Miniature 2-pole, 2-position

- relay, 120-ohm coil. Vary value of, or eliminate, R12 for other coil resistances.
- S4, S5 — Spst toggle.
- S6 — PTT switch on microphone.
- S7 — Double-pole, 3-position wafer switch.
- R13 — 8200 ohms, or value to give 50-vdc full-scale deflection with meter used.
- VR4 — 15-volt 1-watt Zener diode.
- VR5, VR6 — 18-volt 1-watt Zener diode.

follow the second mixer. These reduce 36-MHz and harmonic feed-through, as well as any undesired mixer products present. As with the 40673 MOSFETs, 1.5 volts pk-pk is the recommended injection level at Gate 2 of the 40841.

Amplifier Chain

Three stages are needed to bring the 50-MHz output up to the 3-watt level. The first two are 2N4427s, biased for Class-A operation. Heat sinks are needed to dissipate the heat generated in Class-A service. The 2N4427 is designed for uhf service, and it is fairly "hot" at 50 MHz. Much empirical design went into the development of a stable circuit, resulting in quite a few gray hairs for the author. Collector-to-base degenerative feedback is used to reduce the gain of the 2N4427s, and this improved the stability and linearity of both stages. A 2N3632 overlay transistor loafs along in the output amplifier stage. This larger-than-necessary type was used mainly because it is plentiful and

low-priced on the surplus market,⁴ and it works well at 50 MHz. The final stage runs Class B, producing about 1.5 watts average ssb output.

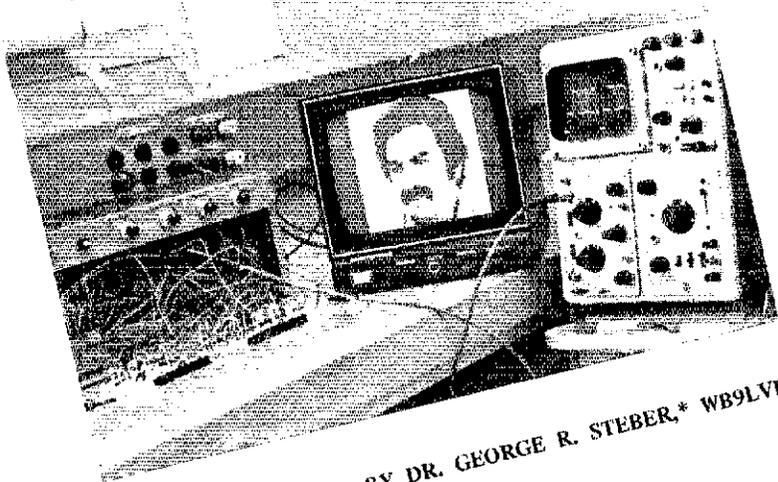
The base-biasing resistors of the 2N4427 stages, R9 and R10, may have to be altered slightly to obtain the desired collector currents indicated in the parts list. The idling current for the 2N3632 is 30 mA. All base-bias levels are developed from a 10-volt line, Zener-diode regulated to insure a linear operating region for the devices, with varying supply voltages. A two-tone test⁵ will indicate proper biasing of the 2N3632 amplifier, and also the maximum average collector current for the

(Continued on page 181)

⁴ 2N3632s have been available on surplus from Carl Barish, WA3BIV, 7498 Thouron Ave., Philadelphia, PA 19150, and Polypaks, Box 942M, Lynn, MA 01940.

⁵ *The Radio Amateur's Handbook*, Two-Tone Test scope patterns and generator, pages 401 and 527, 1973 and 1974 Editions.

SSTV to Fast-Scan Converter



Part I

BY DR. GEORGE R. STEBER,* WB9LVI

THE STATE of the art in modern communications facilities has resulted in an increase in the amount of pictorial information that can be transmitted from one place to another. Visual information has a very special significance, as evidenced by the emphasis man places on his visual senses for survival. Slow-scan television (SSTV) gives us an opportunity to transmit and view pictorial information and therefore affords us the use of our powerful visual senses in amateur radio communication. It is of little wonder, then, that SSTV represents a fascination that is rapidly growing in the ham fraternity.

The basic principles and equipment used for the reception and transmission of SSTV pictures were originally developed by Macdonald and have been in use for several years.^{1, 2, 3, 4} Standard equipment consists of a CRT monitor using a long-persistence phosphor such as P7 to view the picture, a sampling camera or flying-spot scanner to create the video signal, and an audio tape recorder to store and play back pictures of special interest. P7 phosphor is widely used because pictures are sent at an 8-second frame rate and the yellow afterglow is needed to store and display a complete picture. The afterglow is relatively weak, and consequently SSTV pictures are usually viewed in a darkened room to enhance the contrast. As slow scanners

readily admit, the intrigue of viewing pictorial information usually outweighs any inconveniences that might be encountered in viewing the pictures, such as darkening the room.

Recently, additional accessories and innovations have emerged to add to the flexibility and convenience of operating slow scan. Among these are the character-generator keyboard and the fast-to-slow scan converter of W0LMD.^{5, 6} Described in this article is another innovation in SSTV, a solid-state digital *slow-scan to fast-scan* converter. At first glance, it may seem impossible to speed up an SSTV picture since the output picture rate should never exceed the input picture rate. As it turns out, for still pictures, it is very possible to do this, provided a video refresh memory is employed as shown in Fig. 1.

During operation, each incoming SSTV line is captured by a line buffer and added to the video refresh memory, a line at a time. The refresh memory acts as a high-speed disk or drum and continuously recirculates the SSTV picture information at a fast rate to provide conventional fast-scan television (FSTV) video. The scan conversion takes place in the line buffers, which accept and store a single SSTV line and deliver it to the video refresh memory at the appropriate time at the FSTV rate. Actually, two line buffers are employed to capture alternate SSTV lines, which ensures that no part of the incoming SSTV picture will be missed during the scan conversion. A multiplexer (shown as the switch in Fig. 1) is used

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¹ This and all subsequent references are listed at the end of this article.

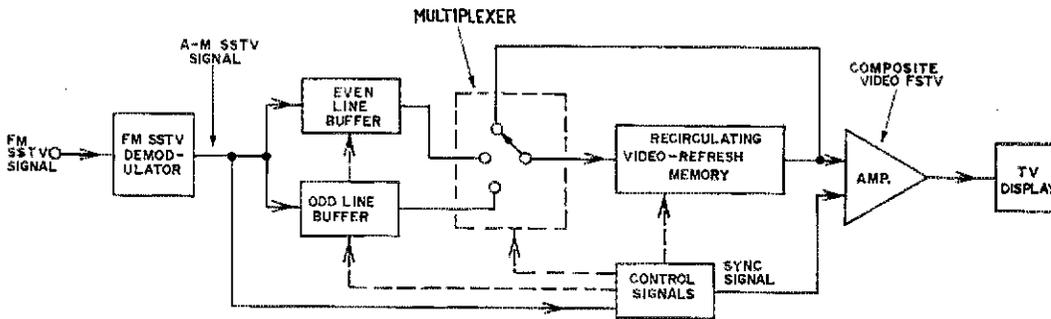


Fig. 1 -- Block diagram of slow- to fast-scan converter. Signals derived from the input SSTV signal are used to generate control signals for switching the multiplexer and clocking the data into the line buffers and main memory.

at the input of the main memory to select either new input lines or to recirculate the lines already stored. Appropriate control signals are generated from the incoming SSTV to coordinate the buffer captures and transfers. To provide output, a video amplifier combines horizontal and vertical synchronizing signals and the FSTV video to produce a composite FSTV signal that may be used with any television set or monitor. Many of the details on how all of this is accomplished are covered later in this article.

Among the many advantages to viewing SSTV on a regular TV set are: the high brightness of the picture which allows one to view it in ordinary room light, no annoying trace line or flicker, and a black-and-white rather than a yellow-and-white picture.

If an SSTV picture could be received and stored in a memory, it has long been known that through appropriate circuitry it could be speeded up and viewed on a conventional television display. The problem up to this point has been the availability of suitable low-priced memories. Commercial slow-to-fast-scan converters, such as the Hughes MSC-1 or Colorado Video's Model 260, for example, have been available for several years and

perform the scan conversion extremely well. However, expensive storage tubes or magnetic disks are employed in these systems and the high cost of these devices usually precludes widespread amateur use. Interestingly enough, if one examines the memory requirements for storing an entire amateur SSTV picture, one finds that they are considerably less than commercial television requirements. Therefore, alternative methods of picture storage can be investigated, such as digital storage in the form of an integrated-circuit semiconductor memory.

In recent years there have been significant advances in semiconductor memories, both from the standpoint of cost per bit and decreasing physical size. A prime example is the metal-oxide semiconductor (MOS) integrated circuit. Present technology offers a 1024-bit dynamic MOS shift register such as the Intel 1404 or Signetics 2504 in an 8-pin dual in-line package for a cost approaching one-half cent per bit when ordered in large quantities. These devices have also been appearing on the surplus market recently at much lower costs and it appears that the cost will decrease further as more devices become available. This chip has already found extensive use in alphanumeric CRT displays and cw memories.

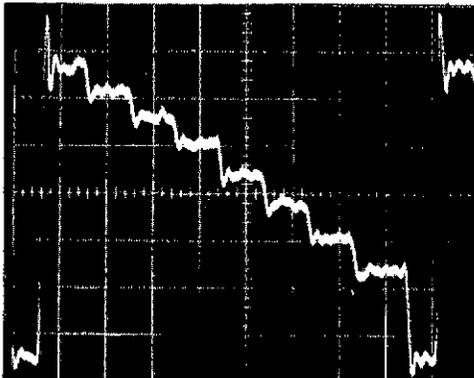


Fig. 2 -- Demodulated a-m signal from one line of an SSTV picture. The picture is a gray-scale test pattern with eight different brightness bars corresponding to a white bar on the left of the picture and ranging to a black bar on the right. The horizontal sync pulse precedes the white bar at the left of the photo. The signal is termed positive video since white corresponds to the most positive value of the voltage. Except for a change in the time base, this signal looks identical to an FSTV signal.

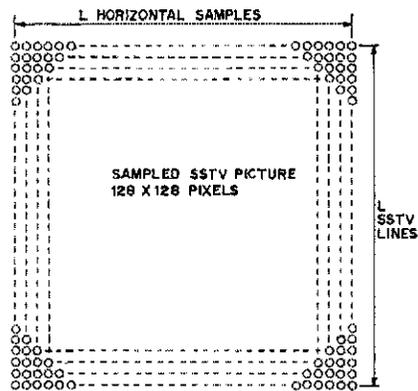


Fig. 3 — Sampling of an SSTV picture. This illustration shows how the original picture is divided into an array of $L \times L$ picture elements. Each element in the array corresponds to the brightness level at the sampled point. For SSTV, L is chosen as 128.

A new application for the MOS shift register is a video refresh memory for a slow-scan to fast-scan converter. Such an application is described in this article, together with details of a working model that has been in operation for over one and one-half years. The author hastens to add that this article is not intended to be primarily a construction treatise, but represents a tutorial guide for those wanting to understand and build equipment of this type for their own use. We point out in advance, also, that some of the parts may be difficult to obtain, the layout of some boards may be critical, and a certain minimum amount of test equipment is needed for troubleshooting. Nevertheless, there are undoubtedly some advanced amateurs who could tackle a project of this type with a high probability of success and the circuit diagrams are therefore included.

This article is organized into several sections which cover current SSTV and FSTV standards, the effects of sampling and quantization on picture quality, digital scan-conversion techniques, and actual hardware implementation of a scan converter.

Amateur Standards — SSTV Vs. FSTV

Slow-scan television has officially been with us since July 16, 1968, when the FCC issued its Slow Scan Report.⁷ It is interesting to note that only bandwidth limitations were imposed at that time and that no specific video standards were adopted concerning narrow-band TV. Macdonald, however, had previously demonstrated a system for slow-scan image transmission which utilized an fm subcarrier to modulate an ssb transmitter.² One of the advantages of this method was that it would produce a greater degree of noise immunity than an equivalent-bandwidth a-m subcarrier system. Therefore, in the absence of official standards and

the demonstrated advantages of using an fm subcarrier, Macdonald's system has been universally adopted by radio amateurs worldwide by informal agreement.

The Macdonald system uses an fm subcarrier frequency of 1500 Hz for black video and 2300 Hz for white video with intermediate brightness values corresponding to frequencies between 1500 and 2300 Hz. A frequency of 1200 Hz (blacker than black) was chosen for the horizontal and vertical sync pulses, which provides effective "retrace blanking" without the need for additional blanking circuits.

To be useful, the SSTV signal must be fm demodulated at the receiving site where it is converted to an a-m signal. An example is shown in Fig. 2 of the demodulated a-m signal corresponding to the brightness levels of one horizontal line of a gray-scale test pattern. For the most part, the a-m video signal will be of principal interest in this article since it contains the pictorial and synchronization information in a form commonly found in FSTV signals.

A typical SSTV picture signal consists of from 120 to 128 horizontal lines occurring at a rate of 15 lines per second. Each line is amplitude (brightness) modulated in accordance with the pictorial information and can resolve about 60 cycles per line (i.e., under closed-circuit conditions, each line would be capable of displaying up to 60 black elements and 60 white elements). At the end of each line there is a 5-ms horizontal sync pulse except at the end of the complete picture when there is a 30-ms vertical sync pulse.

Fast-scan television (FSTV), on the other hand, displays a picture of 525 interlaced lines at the rate of about 15,750 lines per second. Each line can resolve up to about 250 cycles, depending on the quality of the set. Pictures are a blend of two interlaced fast-scan frames of about 262 lines each, with each frame having a vertical rate of 60 Hz.

The problem of scan conversion is essentially one of storing and speeding up the slow-scan signals to match those of FSTV. This may be done using line buffers and a refresh memory so that a direct connection from the scan converter to the television set will enable one to view slow-scan pictures. As we shall see, the crucial element in the scan converter is the video refresh memory.

Picture Sampling and Quantization

The resolution and gray-scale capability of the SSTV picture determine the size of the refresh memory needed. This is because the number of digital bits required for a picture is proportional to the number of points that can be displayed on a line and the number of brightness levels desired.

For purposes of digital storage, the original continuous-tone SSTV picture is sampled in space and quantized in brightness to produce a digital picture. That is, the picture is broken up into an array of picture elements (called pixels) where each element has a brightness value assigned to it. This is done by sampling the a-m SSTV signal with an

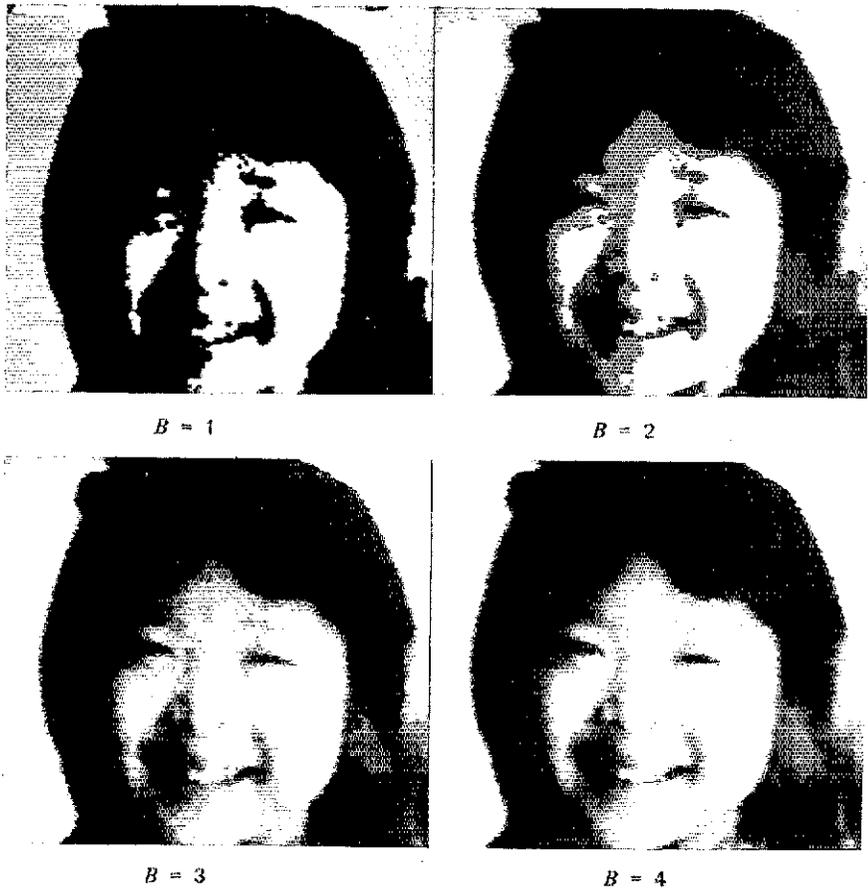


Fig. 4 — Examples of slow-scan pictures with various values of B . The actual number of contrast levels is equal to 2^B , i.e., for $B = 2$ there are four levels: black, white, and two shades of gray.

analog-to-digital (A/D) converter at regular intervals along each horizontal line. The voltage information obtained at each of these points will be of discrete values because of the A/D converter. This sampled picture can be thought of as a matrix of $L \times L$ points, each of which assumes one of 2^B brightness levels. This is illustrated in Fig. 3.

The question we must now ask is, "What are the requirements on L and B to produce an acceptable picture?" Clearly the picture will be acceptable provided the number of samples L and brightness levels B is large. However, since the number of bits per picture is $N = L \times L \times B$, it is clear that N should be small to reduce refresh memory requirements and cost. For example, a commercial television picture would require a large refresh memory since it has been estimated that an equal-quality digital picture is equivalent to about 500×500 samples ($L = 500$) and 64 brightness levels ($B = 6$). For SSTV the requirements are much less but the exact values are open to discussion.

Much research has been done on the different effects of L and B in relation to the quality of the displayed picture. It is known (see Huang, for example⁸) that the use of small values for B will reduce the resolution and small values for L will introduce spurious edges and quantization noise. Also, low values for B produce a contouring effect in the picture similar to painting by numbers.

Is there any trade-off that can be made between L and B and still preserve picture quality? Much light was shed on this question by Scoville,⁹ who conducted a series of subjective tests to determine the best values of L and B for general-purpose commercial-quality television pictures. Three original pictures containing different amounts of detail were used for the tests. From each of these pictures, new pictures with various values of L and B were generated. Observers were then asked to rank the pictures in terms of subjective picture quality. Analysis of the results indicated that:

1) Picture quality is not linearly related to N but depends on the amount of detail in the picture.



Fig. 5 — Comparison of an unprocessed 128-line SSTV picture and the same picture digitally processed for a 256-line presentation.

2) For pictures with a large amount of detail, such as a picture of a crowd or pictures involving lettering, only a few brightness levels are needed. Pictures with less detail, such as pictures of faces or other close-ups require a large number of brightness levels to be pleasing to the eye.

These results are interesting in the light of the type of transmissions usually found on SSTV. Many slow scanners use menu boards or keyboards to generate alphanumeric information about their rigs, name, location, etc. For these situations, only a minimum number of brightness levels are needed. On the other hand, when the operator turns the camera on himself for a close-up, a large number of brightness levels are required to produce a smooth continuous picture.

The author ran a series of tests using digital-computer-generated pictures to determine the best values of L and B to be used in the slow-to-fast-scan converter. It was found that the values of $L = 128$ and $B = 4$ (16 brightness levels) produced excellent pictures where large amounts of detail or lettering are involved. Very good pictures of faces and close-ups were also obtained with these values of L and B but some contouring was noticeable. Examples shown in Fig. 4 illustrate the point. The values of $L = 128$ and $B = 4$ yield $N = 128 \times 128 \times 4 = 65,536$ binary bits of information. Changing B from 4 to 5 would improve the facial pictures a little, but it was felt that because of QRM and QRN effects the additional cost to include the extra bit would not be justified. It should be mentioned that of the hundreds of amateurs who viewed the author's unit at the Dayton convention in 1974, the vast majority were impressed by the quality of the picture and could find little fault with the slight amount of contouring. The stability and contrast of the picture outweighed most other considerations.

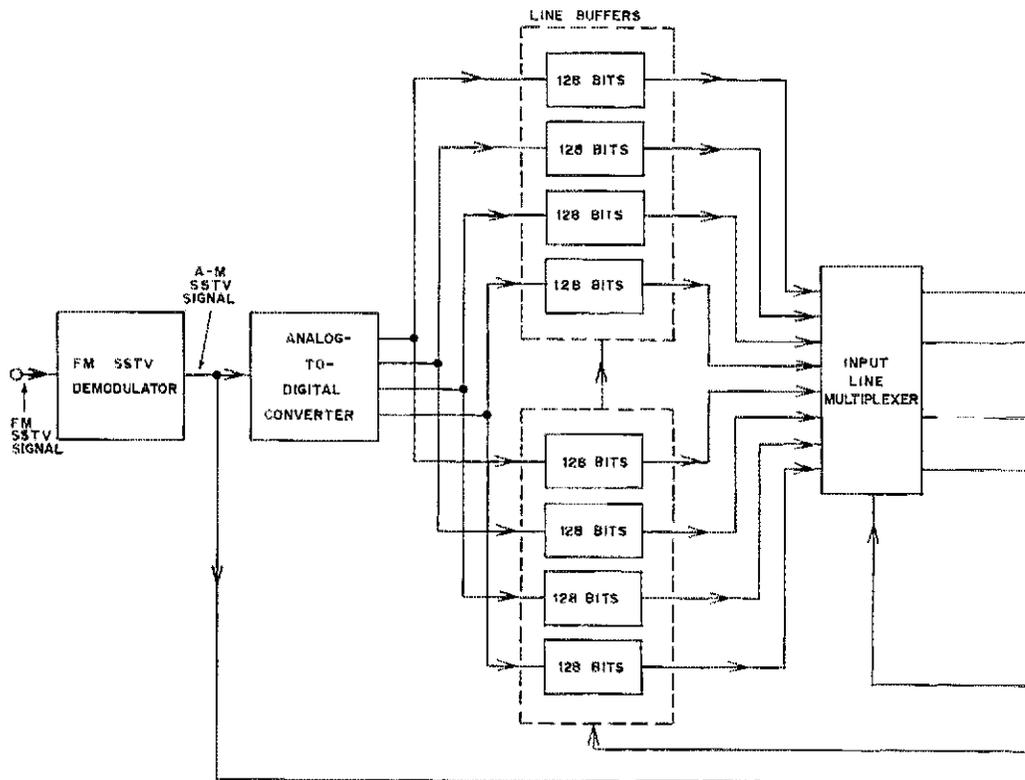
The author has also experimented with a new technique intended to increase the apparent reso-

lution of the picture by employing both a horizontal and vertical digital-averaging process. The processing circuitry is easy to construct and results in a displayed picture of 256 lines with 256 pixels per line. As an added bonus, the process provides additional shades of gray which are mathematically derived from those picture elements stored in memory. Fig. 5 shows a comparison between a standard 128-line SSTV picture and a digitally processed picture of 256 lines. From a collection of pictures, a sample group of twelve people questioned by the author overwhelmingly chose the processed pictures over the regular pictures for reasons of smoothness, improved gray scale, and overall better appearance. One of the persons, however, steadfastly insisted that some of the 128-line pictures appeared better for artistic reasons so the improvement may only be a subjective one. It was also noted that when persons were asked to compare photographs rather than the CRT image the choice was not as decisive. This difference perhaps could be attributed to the type of film used, exposure, etc. Nevertheless, when viewing the CRT image the digitally processed pictures appeared better to the group by a large margin. The details on performing the digital image processing are covered later in the article.

Digital Scan Conversion

If analog line buffers and an analog refresh memory were available, the block diagram of Fig. 1 could be directly implemented. Analog components such as magnetic disks, delay lines, or charge-coupled devices might be pressed into service for this application; however, they are either difficult to obtain or very expensive. On the other hand, as noted earlier, digital shift registers are decreasing in price and rapidly becoming available on the surplus market.

Once the decision has been made to go digital, provisions must be made to convert from analog to



digital and vice versa. The block diagram of Fig. 1 is therefore modified as shown in Fig. 6 by the addition of suitable A/D and D/A converters and MOS digital shift registers.

Since we have assumed in the preceding section that the slow-scan picture would be digitally processed to produce a line 128 bits wide with 16 levels of brightness, this implies that each line buffer will consist of four parallel shift registers, each 128 bits long. Also since there are 128 lines in the picture, the main video refresh memory will consist of four shift registers each of which is 16,384 bits long. In terms of pixels, there are 128 pixels per line and 16,384 pixels per picture.

During operation, the amplitude-modulated SSTV signal is sampled, converted into four binary bits and presented to one of the line buffers. There are 128 such pixels taken of each horizontal line. As each pixel is entered, the previous pixels are shifted to the right. At the end of this process the pixels corresponding to the SSTV line are completely stored in the buffer. In the next step in the sequence, the even and odd buffers are interchanged and the process is then continued on the next line with no loss of input information.

At the appropriate time the previously stored SSTV line is clocked into the main MOS memory at the fast-scan rate. The lines are loaded sequentially, as controlled by an address counter in

the control circuitry. This is a synchronous data transfer and the main memory is not stopped or slowed down for this transfer to take place. Therefore, a continuous FSTV signal may be generated by employing a high-speed digital-to-analog converter at the output of the main memory shift registers. The horizontal and vertical synchronization signals can be added later and a composite FSTV signal will be produced.

As might be expected, there are rather complicated timing problems that have to be solved to assure proper synchronization of the buffers and the main memory. The circuitry also has to be carefully designed to avoid "glitches" and noise problems; however, it is possible to construct most of the circuits to meet these requirements by using standard TTL gates.

As mentioned earlier, considerable improvement in the picture can be obtained by generating a 256 line \times 256 pixel image through digital processing. Fig. 7 shows the three steps required to perform the processing. First a 128-pixel shift register is connected to the main memory to generate a second TV line identical to the original line. The result is that at point A there appears a picture consisting of 256 lines with each SSTV line displayed twice. The picture would appear slightly objectionable if viewed on a CRT because the line doubling tends to accentuate any sync distortion

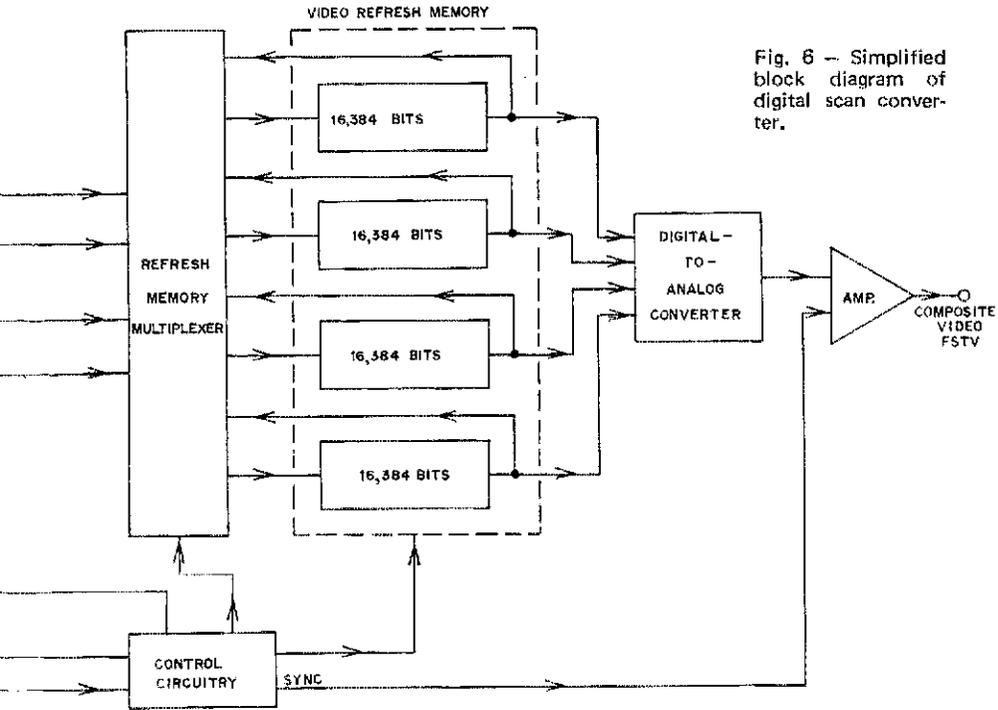


Fig. 6 - Simplified block diagram of digital scan converter.

that may be present. To obtain a true averaged line the signal at A is fed to another 128-pixel delay line and to a 4-bit digital full adder which performs the necessary averaging. It works this way. If the line in the buffer and the incoming line are the same, the resultant arithmetic average of the adder is equal to the original line. But if the two lines are different the arithmetic average is computed along the new line for each pixel on the line. The average is simply computed by taking the carry bit plus the most significant bits out of the adder (which is equivalent to shifting by a power of two or dividing the sum by two). The result at B is a 128-line SSTV picture interlaced with an additional 128 lines corresponding to the average of the

surrounding lines of each. That is, an average has been taken in the vertical direction between adjacent vertical picture elements.

In the next stage each 1/2 picture element along each line is averaged with each adjacent 1/2 picture element to provide additional continuity along the line. This is accomplished easily by utilizing a 1/2-pixel delay line and again averaging the original plus the delayed picture element. The result of this is to generate a 256-pixel line artificially. Finally, the output of the digital full adder is fed to a digital-to-analog converter for video output. It should be noted that the result of adding two four-bit numbers is a five-bit number so

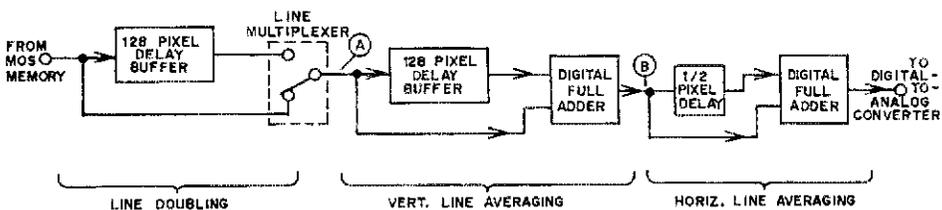


Fig. 7 - Illustration of digital image processing.

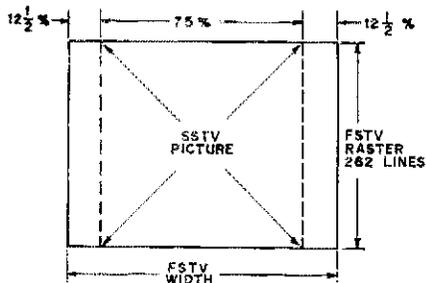


Fig. 8 - Aspect-ratio conversion, showing the relationship of a conventional television raster to the SSTV picture format. The dashed lines show the viewing area for the SSTV picture using every other FSTV scan line and 75% of each line. A digitally processed picture uses about 256 lines.

that additional brightness levels are generated by digital averaging and should therefore improve the potential for displaying a more continuous picture.

There is one other problem that must be corrected before an acceptable display is obtained. When the video is fed to the TV monitor, the aspect ratio of the raster must be modified. Aspect ratio is a quantity that relates the horizontal to the vertical picture size. Commercial television employs an aspect ratio of about 4 to 3, to produce a rectangular picture. SSTV, however, uses a 1-to-1 format to produce a square picture. To produce an undistorted display on a regular television set, only a 1-to-1 area of the screen must be used. Aspect-ratio conversion can be accomplished electronically by compressing an SSTV line into approximately 75% of a regular TV line and blanking the remaining 25% as shown in Fig. 8. This produces a rectangular SSTV format centered on the face of the TV screen. It has also been found helpful in some cases to decrease the CRT raster overscan found in most TV sets by decreasing the height and width for zero overscan. This produces a slightly smaller but brighter picture.

Additional Remarks

When viewing SSTV on the TV monitor with the scan converter one is able to see the SSTV picture begin forming at the top of the CRT and proceeding downward line by line without flicker or fading. Because of the digital storage used, an SSTV picture may be stored indefinitely in the memory without loss of information, provided, of course, that the power is left on. The author has found it possible and convenient to store pictures in this manner during the video portion of a QSO and to make appropriate comments on them during the voice portion of the QSO. It is amazing how much additional detail one can discover if the pictures can be scrutinized for more than the usual 8 seconds.

Part II of this article will appear in a subsequent issue of *QST*. In that part we shall go into the

specific circuitry required to perform the scan conversion.

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Strays

While doing some research on WWII, I came across the following: "Goering and Milch both accepted that the German electronics industry had fallen far behind that of the enemy. A basic reason was that while Britain and America had actively encouraged amateur radio enthusiasts, in Germany the amateurs had been systematically persecuted by the Reich authorities. . . . In March 1943 Goering stated, 'The main blame belongs to Ohnesorge (Minister of Posts) - he never wanted to relax his grip on anything. We smashed up the amateur radio "ham" clubs and wiped them out, and we made no effort to help these thousands of small inventors. And now we need them.'"

The source is David Irving, *The Rise and Fall of the Luftwaffe. The Life of Field Marshall Erhard Milch* (Boston: Little, Brown and Co., 1973), p. 214. Milch was the senior Luftwaffe Field Marshal after Goering.-W2BFE

STOLEN EQUIPMENT

Motorola Mocom 70, No. KA2090, Richard Hambley, WB2TNL, 16 Gaslight Drive, South Weymouth, MA 02190.

TR 22 No. 640115 with crystals, R.J. Eberly, W4NDT, 7130 Lanier St., Annandale, VA 22003. HR2B, No. 49-01257. Ralph L. Archbold, W8SSW, 2122 Miami Rd., Euclid, OH 44117.

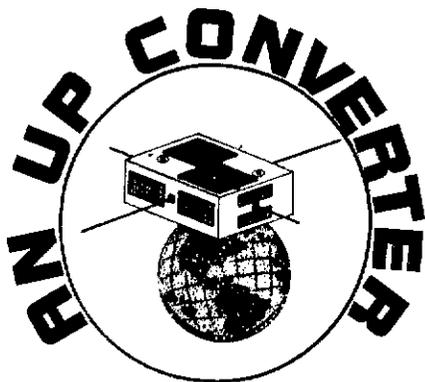
GTX-2, No. 2958 stolen from K9HSK. Contact Evansville (Ind.) Police Department.

Drake ML-2, No. 10434. Louis Chmielowiec, PO Box 57, 18400 Exchange Ave., Lansing, IL 60438.

Motorola HT-220, Nos. L24J6W and M74J74. E.S. Janacek, Union Carbide Corp., PO Box 3370 Brownsville, TX 78520.

Midland 13-505, No. 030303. Reward. Dan Turner, WA4BRO, 165 Sloan St., Roswell, GA 30075.

Regency HR-2A with internal modifications plus extra xmit crystal deck. David Lewis, WA4FXT, 617 Marswen Dr., Nashville, TN 37216.



FOR OSCAR RECEPTION

*Want to work Oscar with a single transceiver?
That's not been possible until now.
Adding an up converter to a 2-meter ssb
transceiver does the trick.*

BY THOMAS McMULLEN,* WISL

MANY AMATEUR OPERATORS who wish to receive the 10-meter signals from the Oscar satellites do so with an average receiver that is already "at hand" in the shack, sometimes adding a preamplifier for improved performance. Others use a converter to translate the signals to a lower frequency where the station receiver is more stable or more sensitive.

However, there is another approach that should be explored — that of converting the 10-meter signals *up* to a higher band. Just a very short time ago this system would have been impractical, if not ridiculous, because of the complexity and size of the equipment involved. Recent developments in two-meter transceivers make the up-conversion scheme practical and attractive. A nearly "ideal" Oscar package can be obtained by the addition of a small converter which allows a normal transceive style of operation with the vhf equipment.

There are several makes of 144-MHz ssb transceivers available, but only a few are beginning to appear on the market in the Western Hemisphere. The KLM Echo II was used here to evaluate the technique and test the performance of the converter that was assembled. This particular transceiver had been modified to permit cw operation as well as the usual ssb — a desirable feature to look for in any equipment being contemplated.

In some instances it may seem a bit redundant to convert a 28-MHz signal to 144 MHz, only to

have it converted back down to 28 MHz in the receiver first mixer. However, there are reasons why this scheme is not all that bad, and a chief one is that the frequencies do not translate directly in all cases. A secondary, but important, consideration is that it may not be desirable or possible to modify the equipment to accept a 28-MHz input. And of course not all transceivers have 28 MHz as a first i-f.

The Converter

If the pc board and parts-placement layout appears familiar, it is because an existing design was modified to serve our purpose. Rather than go through the entire process of developing a new board, the "Rochester" converter was rehabilitated for this project.¹ Most suppliers of amateur radio pc boards have this pattern on hand, and many have etched and drilled boards in stock. There have been a few changes to some parts of the circuit, necessitating the placing of one capacitor on the foil side of the board. In operation the converter reverses the process of the original in that it first amplifies the 10-meter signals in Q1 (Fig. 1), then mixes them with 116.45-MHz energy in Q2, to provide an output between 145.85 and 145.95 MHz. The original oscillator and harmonic-generator circuit proved adequate with a slight modification; a third-overtone crystal with a fre-

¹ Cupp and Oneske, "The Rochester VHF Converters," *QST*, August 1973.

* Assistant Technical Editor, *QST*.

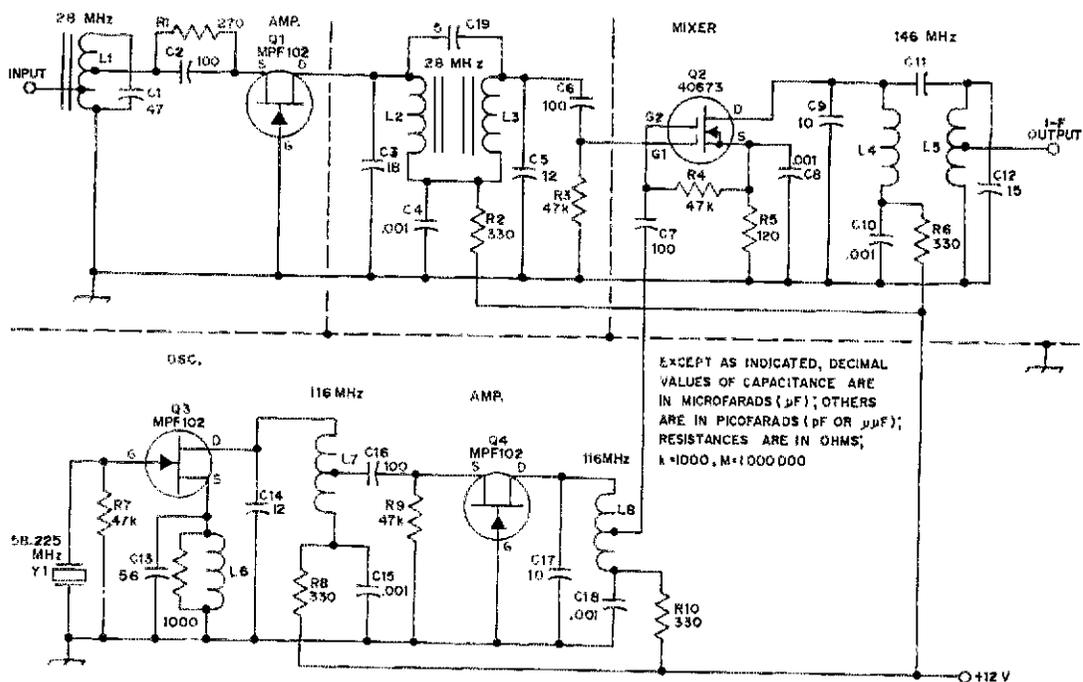


Fig. 1 - The schematic diagram of the "Rochester" converter as modified for up-conversion.

- C11 - Two 1/2-inch pieces No. 18 insulated hookup wire, twisted together 1/2 turn.
 L1, L2, L3 - 18 turns No. 28 enam. wound on Amidon T-30-6 core. L1 tapped at 6 turns and 11 turns from ground end.
 L4, L5 - 5 turns No. 20 enam., formed by using threads of 1/4-20 bolt as a guide. L5 is tapped 2 turns from the ground end.

- L6 - 10 turns No. 24 enam. close wound on the body of a 1000-ohm 1/2-watt resistor.
 L7, L8 - 5 turns No. 20 enam., formed the same as L4. Both are tapped 2 turns from the hot end.
 Y1 - 58.225-MHz crystal. International Crystal third-overtone type in FM-1 (wire leads) or FM-2 (pins) holder. Calibration tolerance of .0025% at a load capacitance of 20 pF used here. General-purpose (.01%) tolerance may be adequate in most instances.

quency of 58,225 was used instead of the 38,6-MHz unit specified earlier. A buffer stage (O4) is necessary to allow some rejection of unwanted harmonics while maintaining a suitable injection voltage for the mixer.

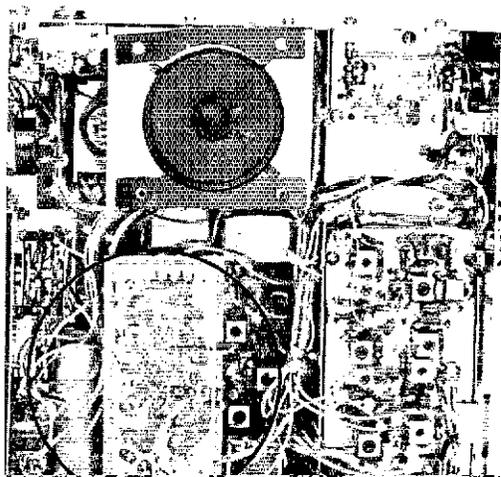
Construction

The assembly of the converter is greatly simplified by the use of a ready-made board, since for the most part the work consists of placing the

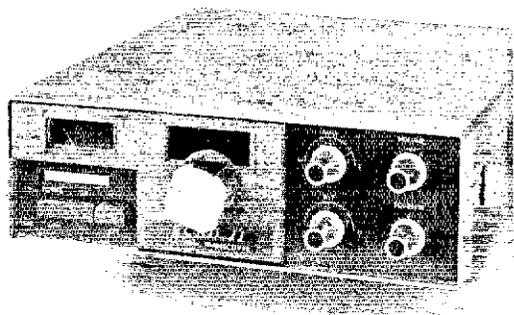
component leads through the holes and soldering them in place. If the parts placement shown in Fig. 2 is followed, it is hard to go wrong.

Because of slight differences in materials used in toroids, it will be necessary to adjust the input

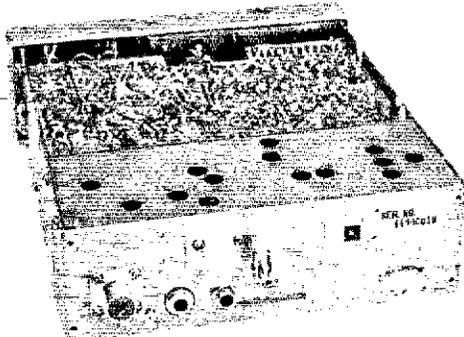
In this particular model transceiver, room was available to mount the converter in an inverted position just below the speaker. A small bracket is fastened under one of the bolts that also holds a transformer to the bottom sidewall. Cables are routed along with existing wiring harnesses and tied in place. The 28-MHz input connector is fastened to the rear apron of the equipment.



The KLM Echo II transceiver was used as a test vehicle for the Oscar Up-Converter. It operates in the ssb mode normally, although a cw modification had been added to this one by KLM.



Addition of the converter inside the transceiver case required the placing of a 28-MHz input connector on the rear apron for convenience. The installation was done without drilling new holes by utilizing two existing screws to hold the bracket. The small-diameter coaxial cable was routed through a convenient hole already formed in the rear wall.



and interstage tuned circuits to resonance after the converter is completed. This was done by the substitution method, placing different values of capacitance across the windings while monitoring the signal on a receiver. There are miniature trimmers available that would fit into the space, but the cost of these devices is a bit high. Alternatively, larger trimmers could be mounted below the pc board, if the builder allows enough space between the board and the enclosure to which it is fastened. Proper operation of the oscillator and buffer stages can be ascertained by using a grid-dip meter to indicate output on the correct harmonic of Y1.

There is sufficient space in some transceivers to allow the converter to be mounted internally, as

was the case in the Echo II unit shown in the photographs. A small bracket was fastened to the rear apron of the equipment to provide a mount for the 28-MHz input connector. Where a transceiver is too compact to allow this style of assembly, the converter could be fastened in a small Minibox for shielding. A source of +12 V, and a small-diameter coax for input and output connections makes the wiring job simple. In some equipment it may be necessary to disconnect the receiver input wiring from the T/R relay but this was not done in the Echo II. The output from the converter was wired in parallel with the receiver input lead. Any small amount of noise picked up by the receiver was masked by the output from the converter. However, in areas of high local activity

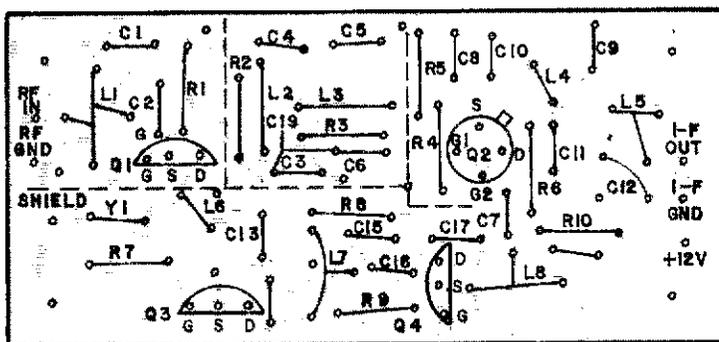
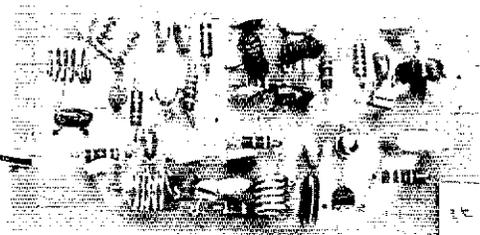


Fig. 2 — PC-board layout and parts-placement guide for the converter. Foil side shown. C19 is mounted on the foil side.



Top view of the modified Rochester Converter. A mounting bracket has been fastened to the lower right corner. The 28-MHz input is to the upper right, with the rf amplifier along the top of the board. Oscillator and buffer stages are located along the bottom portion. The i-f output coils, L4 and L5, are at the upper left with C11 (twisted wires) just below L4, adjacent to the resistor. The shields between stages have been omitted for a better view.

or high ambient noise levels, it will be necessary to disable the normal receiver input.

Performance

Sensitivity of the converter was sufficient that the residual output of a Model 80 signal generator could be heard clearly. A 1- μ V signal was loud enough that it evoked the immediate reaction of turning down the audio gain control on the transceiver. Ignition noise picked up by the variety of antennas tried was strong enough to be bothersome at times, further attesting to the sensitivity of the converter — it also pointed out the usefulness of the noise blanker in the Echo II. Considering the performance of the converter/transceiver combination, the addition of a preamplifier or an i-f post amplifier was not considered necessary. Additional gain could even be detrimental by causing overloading or intermodulation problems — there was no evidence of these problems during several tests.

Since the first i-f in the transceiver is at 28 MHz, the question of possible "leak-through" of local signals was raised. No indication of this type of interference was found during receiving tests, but admittedly it could happen. The output circuit of the mixer (L4, L5, C11) has a band-pass characteristic centered on 146 MHz and should provide a high degree of attenuation to hf-band signals.

In areas where strong local operation does cause such leakage of signals through the converter it will be necessary to install a high-pass filter between the converter output and the receiver input. Designs for such filters can be found in the ARRL *Handbook*. Because the filter will be used at essentially zero power level, it can be made physically quite compact. Of course good shielding and high-quality coaxial cable is a must in any effort to keep unwanted signals out — the best filters in the world will do no good if there is a path around them.

QST

NEW BOOKS

The Amateur Radio Vertical Antenna Handbook, by Capt. Paul H. Lee, USNR, K6TS. Published by Cowan Publishing Corp., Port Washington, L. I., NY 11050. Soft-cover version, 6 x 9 inches. Number of pages including index, 136. Price: \$5.

Once in a while a new book is introduced for use by radio amateurs who take their antenna work seriously. This reviewer got the impression while reading Lee's book on vertical antennas that the author was directing his text toward such a group of readers. It is refreshing to find it is not just another "make-a-buck" hack effort, a syndrome which seems rather widespread in today's amateur radio publishing field. Another consideration a reviewer should keep foremost in mind is the matter of quality of production versus market price. Because of rising production and paper costs many recent books contain inferior-grade paper and almost unusable half-tone presentations. Yet the price is almost absurd for what is being offered. *The Vertical Antenna Handbook* contains good paper, and sharp print contrasts nicely against it for easy reading. The graphics are of uniform style and contrast, and the only criticism one might be tempted to make would be in connection with the Smith charts. They have been reduced in size, necessarily, to a dimension which requires this reviewer to use a magnifying glass when studying them!

The book contains 20 chapters, all written in the first-person manner. According to the author, the material in the book is principally a re-edited

compilation of antenna articles he has written over the past 22 years. The continuity is good, however, and a liberal amount of footnote reference is given to point the reader in a proper direction for in-depth study of the topics treated.

Among the subjects covered are: optimum antenna design for DX work, basic principles of verticals, impedance matching, directional-array design, broadbanding, earth effects, antenna modeling, and several practical examples of multi-band vertical antennas for DXing. In connection with the latter there are examples of remote-control matching networks for use at the base of the antenna one might build.

Most of the theory in this book is pretty standard, and is similar to that found in the classic antenna books written by the old masters, Jasik and Kraus. The data are organized and rendered well, and it is convenient to have the information on vertical antennas contained in a single book. No need to search through various technical journals and books in quest of the basics on vertical-antenna design; the subject is rounded out quite adequately in this book, at least for most amateur work.

An interesting question-and-answer presentation is found in the final chapter of the book. The less-informed amateur may find that part of the publication of value in boning up on antenna theory. *The Amateur Radio Vertical Antenna Handbook* should make a useful addition to any ham's personal technical library. — WICER

Wire Antennas, by William S. Orr, W6SAJ, 6 x 9 inches. Publisher, Radio Publications, Inc., Box

149, Wilton, CT 06897. Price: \$3.95. Pages: 192 including index.

The full title of this latest book by Bill Orr is "Simple, Low-Cost Wire Antennas for Radio Amateurs." The "simple and low-cost" really tell the story because all of the antennas described are simple and low cost. If you are an antenna nut, and what ham in his "right" mind isn't, then you'll want a copy of the book. One antenna described, for example, is the "CIA Special" which Orr calls a "Disguised All-Band Antenna System," -- all bands in this case being 50, 144, and 220 MHz. We gotta' admit the idea is cute -- and technically sound. However, Orr missed the boat because, while the antenna looks like a TV installation, it *could* be used for TV reception if the bands were dead.

The book consists of 13 chapters and starts off with simple, sugar-coated antenna theory, and then takes you into many different antenna designs, including wire beams, verticals, multiband systems and so on. We like the book and recommend it. -- *W1ICP*

Radio Encyclopedia, S. Gernsback's, 1927. Published by Vintage Radio, Box 2045, Palos Verdes Peninsula, CA 90274, 7-1/2 x 10-1/4 inches, 176

pages, illustrated. Price \$9.95, hard cover, \$12.95.

This book is another addition to the Vintage Radio Book Series¹ and is a reprint *in toto* of the original Gernsback publication of the middle 1920s. Although the book concerns mainly broadcast radio and contains very little about amateur radio (*QST* is mentioned as a *Q* signal -- "general call to all stations") it is full of items that should be of interest to the collector and historian interested in this period.

A true encyclopedia, the book lists information on all branches of knowledge of the subject and is arranged alphabetically by subject. Included are items of apparatus (pancake coil, petticoat insulator), personalities (Armstrong, De Forest, and two Gernsbacks), technical terms (side bands, Maxwell's corkscrew rule), and abbreviations (abbreviations are broken down into several categories: International radio telegraphic, radio/electrical and amateur -- "The transmitting amateurs of the U.S. use their own peculiar abbreviations . . ."). There are many line drawings and photographs throughout.

An interesting book full of nostalgic and just plain entertaining reading and looking. -- *W1CUT*

¹"New Books," *QST*, Apr. 1972, p. 40.



March, 1925

... Inflation strikes again! Single-copy price for *QST* goes up 25% -- from 20c to 25c. Happily, membership dues remain the same, \$2.

... The concept was born a year ago at a dinner in Paris attended by Hiram Percy Maxim and a number of leading European hams. Now, in April, delegates are invited from all over the world to the City of Light, hopefully to form an International Amateur Radio Union to coordinate worldwide activities.

... An organization is certainly needed -- DX is almost commonplace, even with the simplest gear, especially on 20 meters. The effect of sunspots is recognized, but not that this is the peak of a cycle. The cry is "down, down" in wavelength -- 6CNC even shows us how to get on the new 5-meter band.

... At the other end of the spectrum, hams using 160 meters (actually, 150-200) have to observe quiet hours during prime RC time and Sunday mornings to avoid interfering with broadcast church services. We can even use spark, but the decrement has been decreased from .2 to .1!

... A granddaddy of the "--O-Ject" products of more recent years is a tuned audio transformer designed to peak near 1,000 cycles. GE's version is first-rate, says the reviewer, but RCA blundered theirs by too wide a band-pass, having the dollar sign of the BCL market additionally in mind.

... A young feller named A. L. Budlong has an extensive analysis of the various types of reflex circuits; he doesn't seem to think much of any of 'em. A separate article treats the "Deresnadyne," which prevents r.f. amplifier oscillation through control of plate voltage rather than the usual neutralization.

... QRR is adopted as the official distress signal in amateur communication.



March, 1950

... The League is still battling with FCC to save the Class A (Advanced) license from proposed extinction; the Commission wants to abolish it and require the Extra Class for most phone operation.

... Crystals -- read all about 'em in W1JFQ's extensive review of various cuts, circuits and preferred tubes. The old faithful "Tri-tet" still holds up well.

... Construction interest is strong, and these are the days of fairly good distributor coverage, all seeking customers through advertising -- Allied and Newark in Chicago; Radio Shack in Boston; Sun in D.C.; Wholesale in Baltimore; Leeds, Harvey, Terminal and (of course) Harrison in N.Y.; Steinbergs in Cincinnati; Radio Products in L.A.; WRL in Council Bluffs.

... Don Mix, WITS, has a simple but effective 4-tube superhet for 80-40 coverage without coil changing; he tunes the input to select the desired band, one being the "image" of the other by proper oscillator frequency selection.

... You can protect that valuable final amplifier tube with a "clamp" circuit, but, says W1DX, it also can be used as a modulator for the casual phone operator not interested in high-power output.

... Surplus gear is still fairly plentiful, with BC-221s among the most-desired items; Bev Dudley uses various harmonic combinations to calibrate this very stable frequency meter.

... If your house lights flicker with keying, WSKCY suggests bringing 230 volts into the shack and using an autotransformer for better regulation.

... Ten DXers are on the CC Honor Roll, with (naturally) W1FH at the top. -- *W1RW*

EMERGENCY

Who said hams "ain't" ingenious? If this article doesn't "turn you on," then we have limited hope for ham radio. W2DNZ has really got to be "something else" — read on!

BY EDWARD YADZINSKI,* W2DNZ

THIS ARTICLE is largely a result of the 1974 ARRL Field Day exercise. Rule No. 11b provides for 100 bonus points if one or more contacts are made using equipment that is powered totally by a source of energy that is derived from "natural" power. The rule states further that fossil fuels or their derivatives are not allowed and that commercial mains or batteries may not be used.

With that incentive, the author could not resist testing an idea that had lingered for some time: Is it possible and practical to devise an electric generating system using man-power and a bicycle mechanism to deliver enough energy — 100 watts or more — so that it would be a meaningful source of communications power in a time of need? After conducting a few simple experiments the answer to the question was manifestly yes. The jury-rigged, garden-variety mechanical system described here hopefully will serve to encourage more sophisticated experimentation and design that would inevitably result in a more efficient application of the principle.

Man-Bike-Power!

As can be seen from the photos, the system is basic and simple. The rear wheel of a five-speed bicycle is used to friction drive a small-treaded lawn-mower wheel which was force-threaded directly onto the shaft of an old 12-V dc automobile generator, from the junk box of course. Power was taken directly off the generator to run an amateur hf transceiver — an FT-101B. Voltage regulation was accomplished by connecting a VOM across the generator and pedaling so as to maintain a voltage reading of 13.5 volts or so.

* 487 Berryman Drive, Buffalo, NY 14226.

[EDITOR'S NOTE: Club or Field Day officers should really give some serious thoughts to the ramifications of this article. For example, instead of stealing gasoline from the club members' cars you can always put those goof-off Field Day participants to work pedaling for power.]

The generator was mounted so that the wheel on its shaft would be in line and make direct contact with the bicycle wheel. The amount of contact pressure was found to be important if not critical, and this pressure was varied by spring-loading the generator to the bike wheel and adjusting the tension in the spring with a turn-buckle. Another advantage derived from the spring was that it allowed compensation for the circumferential irregularities of the wheels. The orientation of the generator to the wheel was such as to ensure that the direction of the bicycle wheel rotation would tend to push the generator away from the contact point. A function of the spring was to apply an opposing force and thereby maintain the needed contact and pressure. For this to be possible the generator had to be mounted on a pivot which allowed it to rotate a few degrees horizontally toward the wheel when the spring was attached.

With the 27-inch bicycle wheel driving a 5.75-inch generator wheel, and with the derailleur-type gear system set at the fastest speed, this ad-lib system allowed for the generator to be rotated at about 1125 rpm when delivering full output under man-power conditions. A refinement was to add 32 μ F of capacitance across the output terminals of the generator to reduce to an insignificant level the hash caused by the armature.

The mounting of the bicycle was accomplished by building a frame of two-by-fours. A one-inch pipe was U-bolted to the top bar of the bicycle frame allowing about twelve inches to extend out over the rear wheel. The rear of the bicycle was then suspended from the frame and stabilized at the wheel hub, using improvised brackets on each side. The front wheel was removed to facilitate portability and to improve vertical stability when a solid log or block was placed under it. A long aluminum bar was used to provide additional stability from the rear to the top of the wooden frame.

ELECTRICAL

ENERGY

via Man Power

The method for stabilizing the front wheel — in the true spirit of Field Day.

When completed, this method of suspending and bracing the rear of the bicycle proved to be highly stable, and allowed a person to "ride" and pedal as hard and as fast as possible without concern for tilting or wobbling. It would have been much easier if an exercise-type bicycle could have been used, but the one available did not have a high enough gear ratio or wheel size to make its use feasible, although the exerciser idea was a good one otherwise.

The results were that several QSOs were made with ease. To power the FT-101 B, the system developed about 110 to 120 watts resulting in an rf output from the transceiver of 30 to 40 watts or so. The power lost is accounted for by the three tube filaments, pilot lights, fan, LEDs, relays and losses in the power-supply voltage-conversion circuitry, not to mention the relatively little power consumed by the solid-state circuitry.

It was recognized that significantly more rf output could be possible if a completely solid-state transceiver were used. However, the objective at this time was to use a man-powered system to demonstrate that the power level achieved was sufficient to operate a modern transceiver.

An early thought was to power a solid-state QRP rig using a standard bicycle head-light generator. That would have satisfied the Field Day rule, but would not be a viable demonstration of emergency preparedness, since QRP power levels, although better than nothing, hardly provide much sense of security during an actual emergency.

With regard to reliability it is clear that a man-powered system holds some distinct advantages over most other natural methods. For example, in their present state of development, wind- and solar-power systems are dependent upon favorable weather conditions. Even with their storage batteries, such systems could not be absolutely relied upon to produce sufficient energy for emergency communications at some arbitrary



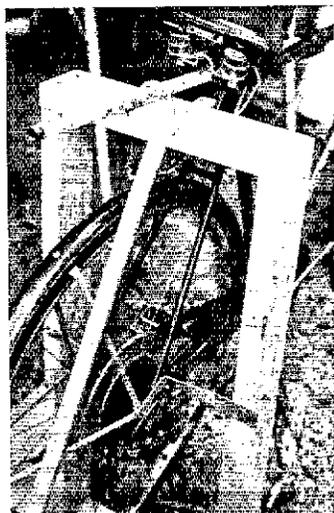
moment of compelling need. In this sense a man-powered system has great merit.

Other Design Options

The natural question follows: What methods and techniques constitute optimum design for a man-powered electric generating system? Certainly an optimized system would be related only in principle to the crude demonstration system shown in the photos.

Some design considerations suggesting themselves are: use of a direct drive system from pedals to generator shaft; the determination of optimum rates of pedaling incorporating proper ratios of associated sprockets or gears; use of low-friction bearings and high-quality gears; mechanically linking the individual's arms to the system to assist the legs (when leg muscles began to tire we simply pushed on our knees with our hands); exploitation

This shows the method of suspending and bracing the rear of the bike.



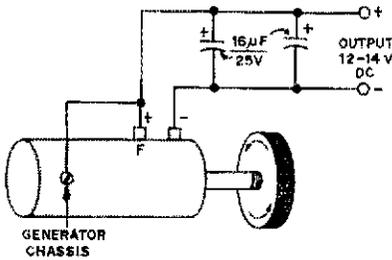


Fig. 1 — "F" is the field terminal of the generator. For this application the field terminal is connected directly to the frame. "F" is also the plus B terminal. The remaining terminal is minus B. The generator used was a Delco-Remy 12-V dc, Model 1100304.

of the flywheel principle; careful choice of a generator for the system so as to obtain the highest possible efficiency; choice of an efficient voltage-regulator circuit; inclusion of a battery-storage system.

Perhaps the most interesting of the items mentioned is that of the flywheel, which, due to its energy-storage properties, can offer several advantages to a man-powered system. For example, a flywheel would tend to act as a mechanical voltage regulator. This is due to the fact that in a one-man pedaled system there are two power strokes per pedaled cycle which produce voltage irregularities in pace with each pedal stroke. Once rotating, a flywheel would tend to apply a relatively constant force to the rotating mechanical system, resulting in a more regular rotation of the generator shaft, therefore diminishing the voltage irregularities.

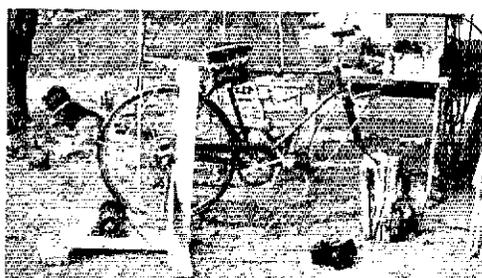
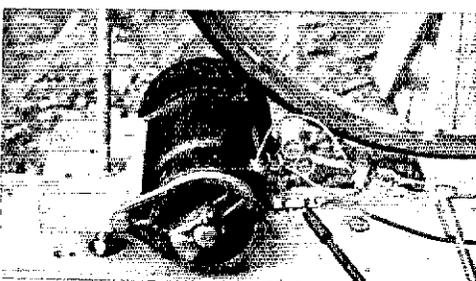
Possibly the most important benefit to be derived from the use of a flywheel in a man-powered system is that of efficient energy storage. It is not within the scope of this article to explore that point further except to state that it is possible to store a relatively large amount of energy in a flywheel. Indeed, a great deal of research in this area has been underway for some time (see *Scientific American magazine*, December, 1973, p. 17).

It is logical that the reader would want to know the results of the actual "in the field" operation of the system. First of all, lest anyone be misled, it was a dramatic experience to "ride" the bike and pedal up to about 13 volts without a load, and then to suddenly feel the drain of 90 to 120 watts being taken from the system when the switches were thrown, filaments heated and key pressed. It felt a good bit like suddenly having to pedal at a fast pace up a steep hill. For Jan, K2PLT, and the author — two "mid-thirties" operator/riders at the W2DNZ/2 Field Day site — it was quite a physical challenge. However it was possible for us to maintain the necessary pace for periods of several minutes — enough time to heat the filaments and make solid contacts. For someone in top physical condition, much longer periods of operation would have been possible, but at least we were able to demonstrate the viability of the idea.

As an aside, we certainly gained an appreciation for the magnitude of the electrical energy that is consumed daily by average American households. Imagine if consumers were allowed to use only that power generated by themselves! The thought is untenable, of course, but it did help us to realize just how much energy comes through those wonderful electric power lines.

The operating results were that QSOs were made with VE2CVR/2, W9BS/9, K4PUZ and W7AW/7 on 20 cw and WB8JBM/8 on 75 phone. The reports were all S9 except for an S7 from W7AW/7. The antenna was a 136-foot, center-fed zepp, fed with twin-lead, and erected about 40 feet high in a deep woods area. On 2 meters, fm, QSOs were made on 94 simplex with WA2DSI, WB2ELW, and WB2YNV, all with reports of full quieting, using a 10-watt transceiver and a vertical antenna at 35 feet.

The author would like to express his appreciation and thanks to Jan Williams, K2PLT, for his enthusiasm, ideas and generous assistance in locating parts, assembling and operating the man-powered apparatus. QST



Left photo: This shows the contact point between the bike wheel and generator wheel. The long threaded bolt is the vertical axle that allows the generator to rotate horizontally toward the bike wheel, because of the pressure from the spring. The probes are from the VOM. Right photo: The complete system showing bike, wooden frame, generator, VOM, and so forth. Lest anyone trespass, that is K2PLT's basset hound, Josephine, keeping watch.

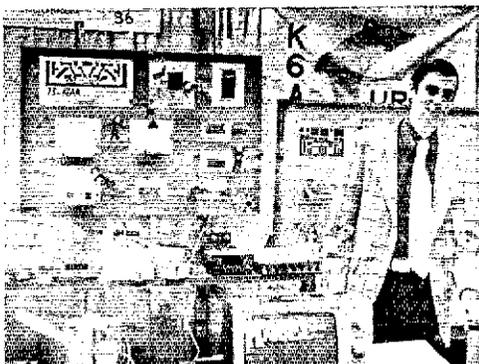
Silent Keys

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

WA1DDE, Edmund J. Bernier, Easthampton, MA
 W1FG, Burton Synnot, Chichester, NY
 W1KHM, Thomas L. Brown, Winsted, CT
 Ex-W1MFI, Henry Meyer, Hyannisport, MA
 WA1NRY, Thomas J. Fitzsimmons, Lowell, MA
 K1RCW, Edward J. Blaine, Whitinsville, MA
 WN1TBQ, Paul J. Boutin, Bennington, VT
 K1TVB, Walter S. Parker, Exeter, NH
 W2ASQ, Harry Dallas Fogg, Trenton, NJ
 K21G1, Lewis B. Thornton, Flushing, NY
 W2ILF, Joseph A. Bernacki, Laurence Harbor, NJ
 K2KXX, Howard H. Thomas, Oakridge, NJ
 WB2SUG, Edwin M. Fitzpatrick, Westwood, NJ
 W2TJQ, Charles J. Simmons, Hackensack, NJ
 W2TT, Alvin W. Cross, Collingswood, NJ
 W2UH, Henry L. "Harry" Bock, Troy, NY
 W2WXX, John J. Coyle, Phillipsburg, NJ
 WB2ZHM, Joel A. Bernards, Rockaway, NY
 W3AUM, Walter R. Rice, Harrisburg, PA
 W3EXB, Henry G. Dorsett Jr., Bethesda, MD
 W3EZL, Russ E. Shettler, Oil City, PA
 W3LF, J. Harold Deetz, Cumberland, MD
 K3PDU, Clifford T. Harrell, Lanham, MD
 W3RUW, Edgar R. Matheny, Uniontown, PA
 WN3SLB, Carlton M. Ozias, Roxborough, PA
 W3SPZ, Lino Berteotti, Bridgeville, PA
 WA4BLW, Shaw Hudson, Winter Haven, FL
 W4DSG, Chesler L. Bradley, Winter Haven, FL
 W4KA, Robert S. Sevier, Jackson, TN
 W4JDB, John N. Gillum, Charlottesville, VA
 W4KKM, Howard C. Luttgens, Hollywood, FL
 WA4LGE, Alphons J. Sack, Ft. Lauderdale, FL
 WB4LHQ, Jerry L. Picher, Columbus, GA
 W4LUA, George Stuckey, Augusta, GA
 WA4MHS, Leo F. Houghton, New Port Richey, FL
 W4MKB, Joseph W. Hart, Naples, FL
 W4MLF, Carl Trout, Alexandria, VA
 W4SHU, Albert B. Stewart, Clearwater, FL
 W4ZD, James P. Born, Jr., Lithonia, GA
 W5HRQ, Jesse F. Jones, Vicksburg, MS
 W5BU, Louis N. Goodman, New Orleans, LA
 W5GGC, Rudolph M. Rubin, Midland, TX
 W5HWV, Rolf G. Jarlen, San Antonio, TX
 WASLFG, Homer F. Beitis, Oklahoma City, OK
 W5NGU, Howard B. McIntyre, Denton, TX
 W6AKU/W7AFM, Tudy A. Brink, Fresno, CA
 W6CEZ, Edward Charles Doell, Los Altos, CA

WB6EUP, Huston E. Summers, Los Angeles, CA
 WN6GKS, Melvin M. Tilley, La Canada, CA
 W6HMA, Elburn R. Oxner, Lompoc, CA
 W6INE, Kenneth M. Skinner, Oakland, CA
 W6INZ, J. W. Masters, Anaheim, CA
 W6IS, Marold F. Ross, Garden Grove, CA
 W6KFY, Violet Johnston "Pat" Peterson, San Diego, CA
 W6KL, Harold M. McDonald, Los Angeles, CA
 W6LPB, Darrell R. Pedersen, Indio, CA
 WB6NHC, Bruce P. Piersall, Santa Barbara, CA
 K7CXP, Leonard Maillet, Pocatello, ID
 W7FEE, Paul C. Johnston, Cut Bank, MT
 K7GRQ, Martin F. Swanson, Portland, OR
 K7JAT, Karl E. George, Laurel, MT
 K7KLP, George W. Marshall, Helena, MT
 K7KME, William O. Samuelson, Helena, MT
 K7OIX, Charles H. Shown, Phoenix, AZ
 WA7TZB, Leo D. Convery, Sun City, AZ
 W8AA, Ralph H. Carpenter, Friesland, MI
 W8AFY, John Patterson, Springfield, OH
 W8AY, Willard Henderson Leeth, Terra Alta, WV
 W8CDD, George L. Thompson, St. Clair, MI
 W8GKT, John C. Stretton, Galesburg, MI
 K8JIV, John L. Prindle, Berea, OH
 W8QFA, Thomas Hall, Yellow Springs, OH
 WB8QVB, John H. Goshorn, Worthington, OH
 WA8RNP, George Huffman, Morrice, MI
 W8UGD, George W. Eastman, Ossineke, MI
 W8WBT, Alvin G. Russell, Grosse Pointe Woods, MI
 W8ZZZ, Kenneth G. Springen, Dayton, OH
 W9AZA, Kenneth C. Maas, Sr., Burlington, WI
 W9GVO, John L. Ruth, Lyons, IL
 WB9KYO, Denny D. Rotramel, Indianapolis, IN
 W9PTH, Leslie R. Applegate, South Bend, IN
 WA9SPW, John M. Sprawl, Logansport, IN
 W9SVX, Dr. Robert D. Burley, Beardstown, IL
 Ex-W9UYJ, Edmond J. Alexander Sr., St. Louis, MO
 W9UZE, Elmer C. Moffitt, Clinton, IL
 W9VOR, Robert K. Prior, Loyal, WI
 W9WN, Griffith M. Morgan, Urbana, IL
 WA9ZZI, Mark E. Pierce, Lake Bluff, IL
 W0FP, Thomas J. Innis, Bettendorf, IA
 WN0JCP, Ethel R. Gibbons, Rochester, MN
 W0MOW, Harold A. Lesteberg, Goldfield, IA
 ZL2LA, Robert A. Dixon, Picton, New Zealand
 DL3VD, Werner W. Diefenbach, Kempton, Germany
 9Y4TE, L. LaMotte Kerr, Port of Spain, Trinidad
 ON4ZA, Jules Fleurbay, Zeebrugge, Belgium
 Ex-GSSU, Lord Fraser, Lonsdale, C.H. P.C. London, England

Strays



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

Here's WB6UIA, Pete Mathews, (president of the United Radio Amateur's Club) manning his Club's booth at the Southwest Division Convention in San Diego, last November. Featured in this display were steps in preparing circuit boards.



Hints and Kinks

For the Experimenters



HANDY HOMEMADE ADAPTERS

The two adapters shown in the accompanying photograph are simple to assemble and useful for hams using their 2-meter rigs for both base and mobile operation. The adapter at the top is for connecting one chassis jack to another. Two male phono plugs (RCA type) and a 2-inch piece of No.

16 wire are all that are necessary. Place the plugs back to back. Run the piece of wire through both male plugs, and solder the wire to plug tips. Be sure the backs are touching one another, then solder them together.

For the other adapter, drill out the hole in the reducing adapter (UG-175) to a 0.242-inch diameter, using a letter "C" size drill. Remove the nut and washers from the chassis jack. Solder one end of a 3-inch long, No. 16 wire to the center terminal of the chassis jack and the reducing adapter with a pair of pliers and thread the jack all the way into the 0.242-inch diameter hole.

Some resistance will be encountered because the steel chassis jack is cutting its own threads into the brass adapter. The reason for assembling these two pieces in this manner is that the chassis jack has a 1/4-32 thread and a tap for this thread is not readily available to the average ham. Solder the other end of the No. 16 wire to the center terminal of the PL-259 and trim off the excess wire. — Wayne L. Jung, WB9JQC

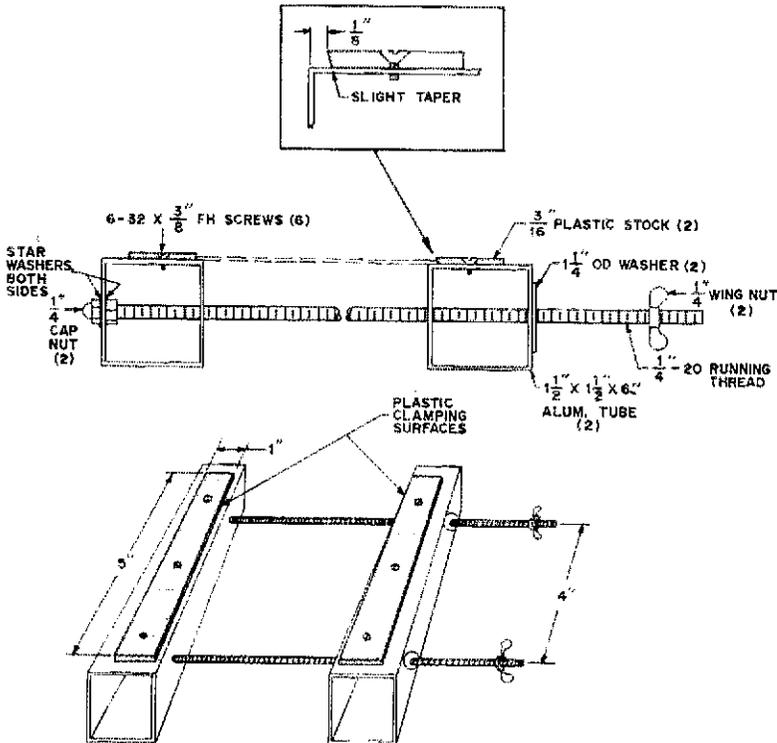


Fig. 1 — Printed-circuit-board rig. Wooden blocks can be used instead of aluminum tubing.

CIRCUIT-BOARD HOLDER

After only a brief exposure to working with circuit boards and the problems of supporting these unwieldy lightweights, it became obvious that some holding device was an absolute must. The commercially available clamps are beautiful, but they are expensive, and who needs all those universal joints?

The device I use was built from parts readily available and simple enough for a one-evening project. My unit has a width capacity of 6 inches, but this can be increased by using longer threaded rods (Fig. 1). For the ham with limited working space, this clamp has the advantage of being stored easily when not in use, freeing the operating position or kitchen table for other uses.

The 1-1/2 x 1-1/2 x 6-inch aluminum tubing used as a base for the clamp is available — usually as scrap — from any aluminum-awning fabricator. The material I found had a wall thickness heavy enough to be tapped for the No. 6-32 screws that hold the plastic jaws. Wooden blocks could be substituted for the aluminum tubing at some sacrifice in weight and appearance.

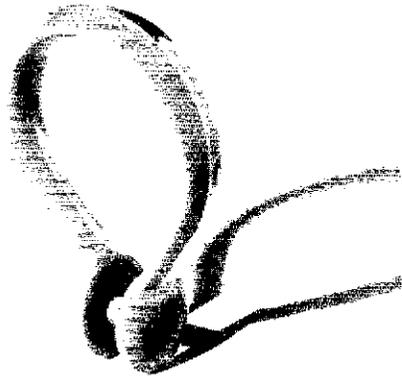
The screws, nuts, washers, and threaded rod are available at any hardware store. The 1/4-inch rod comes in 36-inch lengths at about 60¢ per length, so your total investment should not be more than a couple of dollars. The plastic jaws were cut from 3/16-inch sheet stock (2 pieces 1 x 5 inches). However, there is nothing sacred about these dimensions. The tapered clamping edge should be worked with care to obtain a true straightedge and a uniform taper from end to end. This is not as difficult as it sounds. Place a sheet of sandpaper on a perfectly flat surface and hand lap the edge while checking at intervals with a known straightedge.

The holes in the aluminum tubing to pass the 1/4-inch rods should be drilled for minimum clearance. This will permit smooth adjustment while avoiding sloppy action at the jaws. With a little effort and minimum expense you can roll your own circuit-board clamp for near-perfect working conditions on that next solid-state project. — *Dave Adams, W6DRM*

LOW-COST CABLE HANGERS

There is a frequent need for bringing coaxial cables and assorted control wires into the ham shack, or from one equipment rack to another in the same room. A neat installation will help to keep the numerous conductors from creating an octopus of disarray.

This writer recently purchased 12 plastic shower-curtain hooks for 79 cents at a nearby discount store, hoping to solve a problem the OM was having. It seems that he was trying to bring three coaxial cables, a rotator control line, and a shielded pair for controlling a remote tower-mounted antenna switch into the shack from outdoors. The cables were hanging in disorderly fashion between the tower and the entrance panel on the rear wall of the house. It was suggested that the lines be dressed neatly under the overhang of the house, approximately six feet above ground.

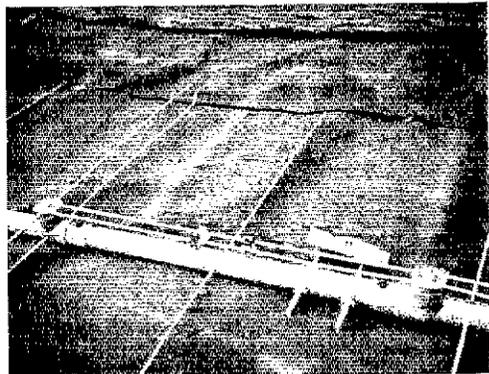


The shower-curtain hooks (see photo) turned out to be ideal for the application. A piece of heavy-duty guy line was stretched between the lower tower section and a support member for the sun porch, anchored in place, and equipped with six of the shower-curtain hooks. The cables were then run through the hooks to the point where they could be dropped down to the entry panel leading to the shack.

The style of hooks shown here are of the snap-together variety, thereby permitting them to be opened easily when it is necessary to add or delete a cable. One thing for sure, it beats holding bundles of wire together with vinyl-plastic electrical tape. The latter creates a sticky, disgusting mess after being exposed to the sun in warm weather. — *W1CKK*

ALUMINUM WIRE CONNECTIONS

When using aluminum wire for elements and matching stubs on a 220-MHz Yagi, I needed a way to make easily adjustable connections to the Twin-Lead and to the shorting stub. The solution was to use large Fahnestock clips, slipped over the ends of the wire before the array was assembled. A pair of clips were soldered together to make the shorting stub. Incidentally, the insulators shown were made of plastic pipe fittings, drilled to fit over the 7/8-inch boom, and slotted with a saw to take the stub wires. — *Donn G. Shankland, W8WVS*

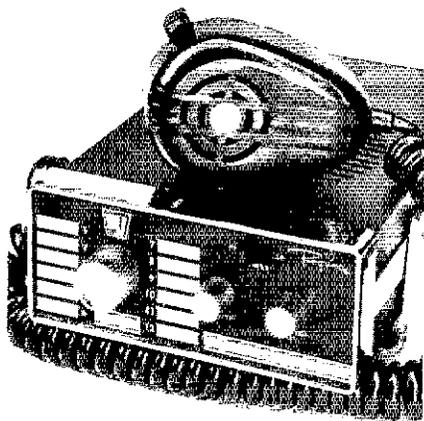




Recent Equipment



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



Regency

HR-220

Transceiver

THE WORD "utility" best describes the new HR-220 transceiver. The unit has been kept simple for maximum effectiveness while in the car or at home. Its compact size and the lack of extraneous controls make the unit ideal for mobile operation. As shown in the photograph, the four controls, which include the channel-selector switch (12 receive, 12 transmit channels), squelch, volume control, and selectable power-level switch, can be seen from left to right. The power switch is part of the volume control.

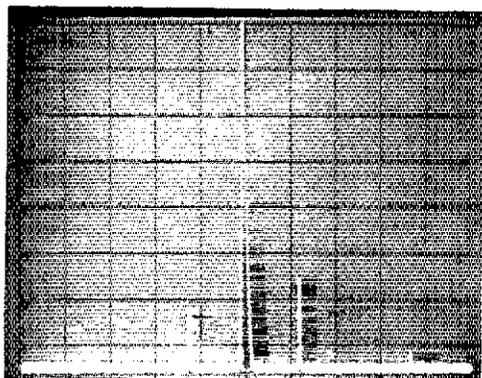
The writer had the opportunity to install the HR-220 in his car, but being primarily a low-band (3 to 30 MHz) operator, it was a new experience having more than just the usual complement of "passengers." Most hf-band rigs this author has had experience with were ones that had dials, meters, different gain controls and other features. The latter type of rig is fine for the home station, but hardly a convenience while driving an automobile. However, the design of the HR-220 makes mobile operation a pleasure.

The Circuit

One circuit board is used for the entire rig. Each stage of the transmitter, at both the input and output terminations, has tuned circuits that appear to have done their duty. The spectral analysis revealed that the unit evaluated had spurious emission *below* or *at* the value specified by the manufacturer. The 220-MHz band is in the midst of important public-service and aircraft frequencies so the need for a "clean" rig is an important one, as on all amateur bands. Regency is to be congratulated for the low spurious output of their system.

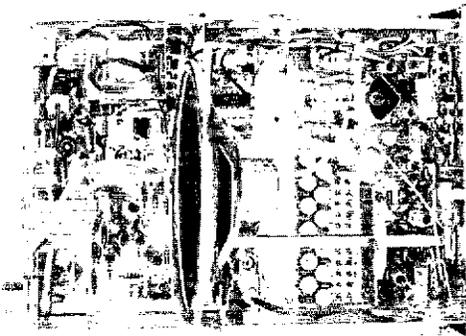
Two power levels are obtainable from the front panel. In the low-power position, the driver transistor operates at reduced collector voltage, which is developed across an 82- Ω dropping resistor. This resistor is shorted out in the high-power position. The selectable power levels are nice when one travels in and out of the primary coverage areas of repeaters.

Protection of the output transistors is accomplished by means of an SWR-detector circuit in the



Spectral display of the HR-220. The horizontal axis of the display represents frequency (10 MHz per division) and the vertical axis amplitude (10 dB per division). As shown here, the spurious output is at or below the values specified by the manufacturer (-55 dB). The large "pip" is the fundamental frequency (223.5 MHz). The power switch is in the high power position.

Top view of the HR-220. The transmitter chain is at the right, and the trimmer capacitors for crystal-frequency adjustment are to the left of the switch wafer. The speaker hides the crystal sockets for the receiver local oscillator. A relay shown in the upper left handles the T-R switching. The speaker has been tilted upright for better viewing.



output side of the final amplifier. This circuit works as a simple feedback network. As the SWR increases, due to a mismatch condition, the driver-stage bias level is increased accordingly. This system samples the reflected rf voltage at the antenna terminal and rectifies it to drive a transistor switch. The switch controls the bias states of the predriver stages of the transmitter chain. When the reflected rf voltage becomes too high, caused by a mismatch, this change is reflected to the "variable resistor," which in turn reduces the input level. Another device which protects the unit from misuse is a diode across the power leads. This simple addition prevents the radio from being damaged by a cross in power-supply polarity. A fuse in the +12-V line is included for further protection.

The receiver portion utilizes numerous tuned circuits at every stage (selectivity), and there is shielding around the low-level oscillator stages. Each of the outputs from the two mixers (there are two i-fs) passes through a filter. The rf amplifier in the receiver uses a bipolar transistor, and the stage appears to have favorable overload-immunity properties. Measured sensitivity agreed with the manufacturer's nominal specification. There were no problems in copying most fringe-area stations. A feature which contributes to the small size of the HR-220 is the use of two ICs. In the receiver portion the second mixer and local oscillator are combined in one stage by means of an IC. The second IC is in the discriminator circuit. The audio amplifier uses several transistors to develop three watts of power. That amount is more than sufficient to override road noise and conversation within the car. The deviation is factory set at 5 kHz, but is adjustable from zero to ten kHz. The local oscillator in the transmitter section has trimmer capacitors for putting the crystals exactly on frequency. However, the receiver counterpart circuit has no such provision.

Performance and Operation

Since the review model arrived, there has been a marked increase in 220-MHz activity in the New England area. It was exciting to this reviewer to be a part of the upsurge in activity. While being used in the car for several months, the unit operated normally under a wide range of temperature and road conditions. The rig was stable in all respects. Both squelch and frequency stability remained excellent from ranges of 20 to 150° F. (The location of the unit was very close to the main air

stream of the heater system.) The built-in speaker is located at the top of the cabinet. In installations where the dash board is used for mounting, the audio can be muffled. However, a terminal strip on the rear apron provides the option of having an externally mounted speaker.

If the addition of an electrically coupled Touch-Tone pad is contemplated, it is necessary to permanently wire the system in at the microphone jack — there is no option for a simple installation. The instruction manual contains suitable information for general operation. It could be improved in regard to technical content should troubleshooting become necessary. A crystal-frequency table, listing the crystals required for the different repeater and simplex frequencies, is included in the manual. The method of obtaining these crystal frequencies is explained with the help of some simple equations.

The rig comes complete from the factory with high-impedance microphone, mobile-mounting bracket, security bracket, dc-power cord with fuseholder, and a pair of crystals for simplex operation at 223.5 MHz. — *W1ABV*

Regency HR-220 Amateur Transceiver

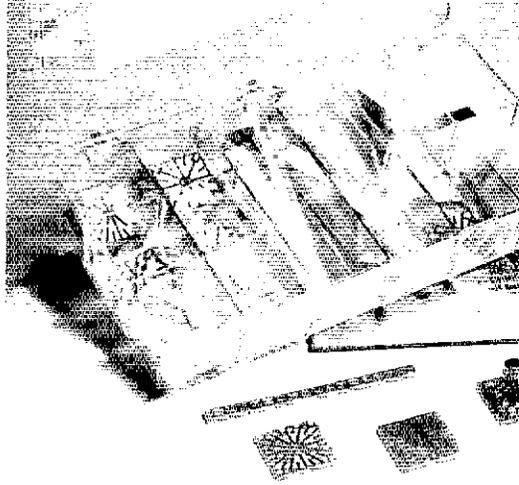
- Power output: 1.5 watts in the LOW position, 10 watts in the HIGH position at 13.5 V dc.*
- Sensitivity: 0.5 μ V for 20 dB of quieting; 0.22 μ V to open squelch.*
- Dimensions (HWD) and Weight: 2-1/4 \times 5-1/2 \times 7-1/2 inches, 3-1/2 pounds.*
- Power requirements: 13.8 V dc nominal. Useful range, 11.5 to 14.5 V dc, 2.5 A during transmit (high power), 0.8 A receive.*
- Channel capability: Provision for 12 channels.
- Transmitter crystal frequency: Operating frequency divided by 18.
- Receiver crystal frequency: Operating frequency plus 10.7 MHz, divided by 4.
- Color: Black.
- Price class: \$240.
- Manufacturer: Regency Electronics, Inc., 7707 Records Street, Indianapolis, IN 46226.
- *Measurements made in ARRL lab.

• New Apparatus

CHRISTIANSSEN MINI-MOUNTS

If you are an experimenter, you may be interested in the Mini-Mounts pictured in the photograph. The Mini-Mount system is based on the use of miniature etched patterns. Patterns available include various types of IC mountings and component arrays. No holes are needed for mounting the etched boards as they have pressure-sensitive adhesive backing, and they can be moved or replaced as a breadboard circuit is developed.

Mini-Mounts are available from Christiansen Radio, 3034 Nestall, Laguna Beach, CA 92651. In addition to the Mini-Mounts, Christiansen Radio also has several electronic kits available. — *W1ICP*

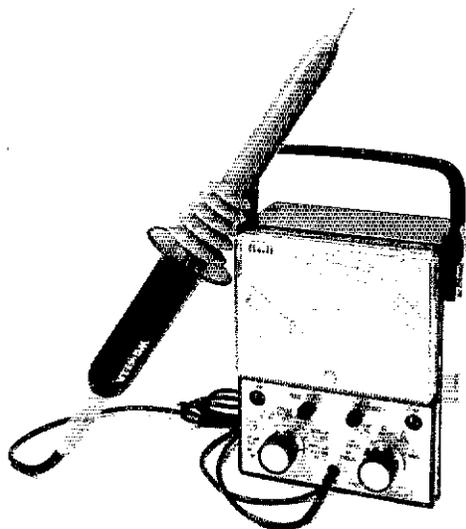


RCA WV-500B SOLID-STATE VOLTOHMVOM AND ACCESSORIES

Every ham shack should contain some basic items of test equipment, especially if the amateur is to do troubleshooting and repair or building of his own gear. One of the first such items that most amateurs acquire is a voltmeter — one having the capability of also measuring resistance and direct current. The volt-ohm-milliammeter (VOM) type of instrument is popular because of its portability; it is self-contained, and requires no ac power for operation. The chief disadvantage of a VOM is that it requires some small amount of power from the circuit under test to provide a usable meter deflection, making it almost useless for measuring low-level signals or voltages in high-impedance circuits such as on the agc line of a receiver or at the grid of a vacuum tube. For these applications an electronic voltmeter is required, such as a vacuum-tube voltmeter (VTVM). A VTVM is not portable, however, usually requiring power from the ac line to heat filaments, etc.

Modern solid-state electronic voltmeters, such as the RCA WV-500B, combine the portability of the VOM and the sensitivity of the VTVM, offering the advantages of both but the disadvantages of neither. Four battery-powered bipolar transistors in an amplifier arrangement that provide a nearly infinite circuit-input impedance accounts for the sensitivity of the WV-500B. The instrument comes complete with three 9-V batteries which power the metering circuit (and a fourth 1.5-V battery which is used for resistance measurements only).

In appearance the WV-500B can easily be mistaken for a common VOM; the case measures 5 × 7 × 3-1/2 inches and has a carrying handle. A glance at the range switch will reveal that this instrument has greater sensitivity than that obtained from a VOM, however. There are eight dc voltage ranges, 0 to 0.5, 1.5, 5, 15, 50, 150, 500, and 1500 volts, and eight current ranges as above for milliamperes. Resistance measurements may be made in any of seven ranges, R × 1 through R × 1 MΩ (R × 1,000,000), with 10 units on the ohms calibration range appearing at midscale. Seven ranges permit the measurement of ac voltages, 0 to 1.5, 5, 15, 50, 150, 500, and 1500 volts (rms sine waves). Calibration scales also exist for indicating



peak-to-peak values of sine or complex waves, being approximately 2.8 times the rms value for the above full-scale ranges. A single switch is used to select the desired range, no matter what the function. A separate function switch provides for selection of dc current, ac volts, -dc volts, +dc volts, or ohms. A sixth position turns the instrument off.

Accuracy on all ranges is specified as ±3% of full scale. Input resistance for dc voltage measurements is 11 MΩ on all ranges, including the resistance of the 1-MΩ resistor in the permanently attached probe (switched in with a DC/AC-OHM slide switch). Input resistance on low ac ranges is 830 kΩ shunted by 70 pF, and is somewhat higher on the 500- and 1500-V ranges. Frequency response is ±1 dB in the range from 30 Hz to 3 MHz. One striking feature of the basic 50-μA movement is a mirrored scale which enables one to obtain accurate scale readings by avoiding parallax. This is

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A New Look AT AN OLD PROBLEM

BY THEODORE J. COHEN,* W4UMF AND
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RADIO FREQUENCY INTERFERENCE (RFI) has probably been with us since the first amateur stations came on the air some 70 years ago. And fed by the technology that developed during and following WW II, the problem has become an increasing source of irritation between radio operators and their neighbors. Home-entertainment electronic devices now abound, with most families owning at least one television receiver, an a-m or fm radio, and any one of several audio devices (such as a phonograph, an intercom, an electronic guitar, or an electronic organ). Given the innate perversity of these objects to intercept radio signals, it should surprise no one to learn that RFI is one of the most difficult problems we amateurs face in our day-to-day operations.

The Problem

It has always been assumed by the consumer (and apparently by the manufacturers of home-entertainment equipment!) that if a device intercepts radio signals from a nearby amateur station, the amateur would take steps to correct the problem. Typically, to keep peace in the neighborhood, it was the amateur who installed the base-to-emitter bypass capacitors in his neighbor's solid-state phonograph, or the high-pass filter in the television receiver next door. Then too, it was the amateur who usually and, not infrequently, took the blame when a malfunction not related to the installation of these components caused a failure in his neighbor's set! Has this "solution" been fair to either the consumer or to the radio operator? Most assuredly not! The number of RFI

complaints is now becoming so large that the time has come for the manufacturers of home-entertainment equipment to take the design precautions necessary to reduce the susceptibility of their products to radio-frequency signals.

Some manufacturers have asserted that it is not necessary to design equipment so as to reduce susceptibility to interference because only one percent of those who purchase their products will actually experience RFI. This, however, is clearly an under-estimation. The tremendous growth in radio communications over the past decade has brought vastly increasing numbers of transmitters in close proximity to home-entertainment equipment. An example of this growth is the more than one million transmitters now operating on frequencies assigned to the Citizens Radio Service. Most of these stations, like amateur stations, are located in homes, and thus are close to television receivers, radios, and audio equipment used for home entertainment. The map of Arlington, Virginia, shown in Fig. 1 demonstrates that a high density of radio transmitters is to be found in urban and suburban areas today. Prepared from Federal Communications Commission (FCC) licensing records, this map shows the areas in which signals are likely to be intercepted from known amateur stations (large circles, 600-ft. radii) and Citizens Radio Service stations (small circles, 200-ft. radii). Not shown are fixed stations in the Land Mobile Service, military radio installations, microwave relay stations, commercial repeaters, broadcast stations, experimental stations, or mobile radio stations, which also number in the hundreds in this area. It is readily apparent that no electronic device in this sample area is immune to the likelihood of strong near-field radiation from a radio transmitter of some kind. Yet Arlington is

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** Technical Advisor, ARRL RFI Task Group, 225 Main St., Newington, CT 06111.



Arlington, VA — RF Saturation!

but an example of a situation which is becoming increasingly common in every part of our country, and indeed, the world.

How Serious is the RFI Problem?

In 1973, the FCC received 42,000 RFI complaints. Of these, 38,000 involved interference to home-entertainment equipment. Most important, 34,000 of these would never have come to the Commission's attention if the manufacturers had corrected design deficiencies in their home-entertainment products at the time of manufacture. In the case of television interference (TVI), FCC experience shows that 90% of the problems experienced can only be cured at the television receiver. Further, when it comes to audio equipment, the *only* cure for RFI is by treatment of the audio device experiencing the interference. There is nothing an amateur can do to his transmitter which will stop a neighbor's phonograph from acting like a short-wave receiver. It should be emphasized that phonographs and Hi-Fi units are not designed to be receivers, but simply audio devices.

It is clear, therefore, that almost all RFI problems experienced with home-entertainment devices result from basic design deficiencies in this equipment. The few small components or filters which would prevent RFI are often left out of otherwise well-designed products as manufacturers attempt to reduce costs, and hence, to reduce the prices of their products.

The Solution — Consumer Protection

Given the present unacceptable situation, what

can we as amateurs do to help the consumer resolve the RFI problem? One step which should certainly be taken is to advise our friends and neighbors to inquire, before they make a purchase of an electronic device, whether the product has been certified for operation in the presence of a radio transmitter. Manufacturers must be made to recognize the RFI protection of their home-entertainment equipment has become essential and that this must be incorporated. Further, where interference is being experienced, the consumer should be encouraged to contact the manufacturer of his equipment and to request that the *manufacturer* furnish the components or services necessary to eliminate RFI.

This is not to say, however, that we should not continue to assist in resolving RFI problems. Radio amateurs have typically sought to assist their neighbors in correcting RFI problems, even where those problems were in no way attributable to the performance of the transmitter. In the interest of good neighborhood relations, we should continue to provide assistance. However, CBers and operators in other radio services are most likely unqualified technically to provide this free service or may be disinclined to do so, and this will result in increasing numbers of cases which will not be easily resolved. Ultimately, of course, it is the manufacturers' responsibility to correct those deficiencies which lead to the interception of radio signals.

What Are Manufacturers Doing Today?

Many responsible manufacturers have a policy of supplying filters for eliminating television interference when such cases are brought to their attention. A list of these manufacturers, and a more thorough treatment of the RFI problem, can be found in the League's RFI packet which has been prepared by the ARRL Task Group.¹ If a given manufacturer is not listed in the packet, it is still possible that he can be persuaded to supply a filter; this can be determined by writing either directly to him or to the Electronic Industries Association (EIA).²

We know of one nationwide retail company that has been correcting susceptibility problems experienced by their television receivers, and that has been doing so at no cost to the consumer. Now, that's a commendable policy! This same company will also modify their audio products to reduce susceptibility to interference, and again, it doesn't cost the consumer a cent.

With respect to audio devices, some manufacturers will now supply modified schematic diagrams showing the recommended placement of bypass capacitors and other components to reduce

¹ Chairman, V. C. Clark, W4KFC. RFI packet may be obtained from Group Secretary, Ted Cohen, W4UMF, 8603 Conover Place, Alexandria, VA 22308. Be sure to include a large (9 x 12 inch) manila envelope with 40c postage affixed thereto.

² Electronic Industries Association, 2001 Eye Street, N.W., Washington, DC 20006. Attention: Director of Consumer Affairs.

of susceptibility. One large American manufacturer of Hi-Fi equipment has in some cases supplied the necessary components free of charge, although no consistent policy has been evident and the consumer must still pay to have a serviceman install the components. These developments are encouraging when you consider that only a year ago, one major manufacturer, on receipt of an RFI complaint concerning one of his products, suggested that a cut-off switch be installed in the speaker lead to cure the RFI problem! Recognizing that RFI problems are increasing at an alarming rate, a recent Consumer Products Engineering Bulletin issued by the Electronics Industries Association states in part:

"Because of the proliferation in the past few years of rf transmitting equipment (a-m, fm, TV, radar, radio amateur, Citizens Band, etc.) it is a necessary requirement of good equipment design to engineer circuits with build-in interference rejection.

"Original equipment manufacturers can no longer expect the servicemen to correct normal type interference problems in the field. The cases are becoming too frequent and the cost of correction too high to ignore this interference in the original design."

While these are encouraging developments, it appears likely that meaningful and widespread corrective action by equipment designers will require both pressure from consumers and establishment of suitable government standards. Voluntary after-the-fact measures on the part of manufacturers simply are not enough. It is a foregone conclusion that as long as the inclusion of additional components for susceptibility reduction increases a manufacturer's costs, however slightly, there will be reluctance to take steps to improve equipment designs by the manufacturers themselves. What appears to be necessary, therefore, is federal legislation giving the FCC the authority to regulate the manufacture of home-entertainment devices and thus, to protect the consumer.

In the early days of TVI, some manufacturers showed great concern about the interference problem. Some of them installed high-pass filters on all their sets at the point of manufacture. However, they claimed, and probably rightfully so, this procedure was an unnecessary cost. They felt that TVI cases and the need for filters could be handled on a case-by-case basis. However, this approach no longer works, and it certainly doesn't apply where hi-fi interference is involved. We hear dialogue from manufacturers to the effect that they would be happy to install preventative circuitry in their equipment *if all the other manufacturers would do likewise*. One way to accomplish this is with FCC authority.

Federal Legislation Needed

So widespread is the RFI problem (due in large measure to the proliferation of CB activities) that it has come to the attention of the Congress. Further, Congress has become aware of the manu-

facturers' responsibility to provide equipment which is not susceptible to RFI. The late Representative Teague of California, for example, introduced a Bill (HR 3516) into the 93rd Congress which would have required that "... radio and television receivers meet certain technical standards for filtering out interference." This bill, however, did not address the susceptibility of audio equipment. A more encompassing bill which would enable the FCC to require incorporation of interference-rejection circuitry in various types of electronic devices is given in the appendix.

From recent indications, legislation similar to that shown in the appendix will be sought by the FCC as part of its legislative package to the 94th Congress (1975-1977). In his comments to a recent meeting of the IEEE Electromagnetic Compatibility Group (20 November 1974, Washington, DC), Ray Spence, FCC's Chief Engineer, stated that while the Commission will make every effort to cooperate with manufacturers of home-entertainment devices in resolving RFI problems, the Commission would vigorously seek federal legislation which would give it the right to regulate the manufacture of this equipment.

Susceptibility Standards

Even with enabling legislation, however, the FCC could take no action to regulate the manufacturers until susceptibility standards are established. One method for establishing RFI standards would be to determine the strength of rf fields which may be encountered in typical residential areas, and to design home entertainment devices to operate properly in these fields. Obviously, a great number of factors interact to determine the field strength which may be encountered in any given situation — factors such as the relative location of the transmitting antenna and the home-entertainment equipment, and the effective radiated power for the transmitting installation. Thus, it is not possible to forecast accurately the signal levels likely to be encountered in any given situation. It is possible, however, to predict the range of field-strength levels likely to be encountered in the vicinity of typical transmitting installations.

Consider, for example, a Citizens Radio Service installation employing 10-watts PEP output and an isotropic antenna (-2.15 dB gain relative to a dipole). At a distance of roughly 10 meters (30 ft.) from this antenna, the field strength is 1.8 volts/meter (V/m). Given that interdwelling distances on the order of 10 meters are realistic for today's urban and suburban areas, it appears that 2 V/m is near the lower acceptable level for any susceptibility standard adopted.

With respect to an upper limit for susceptibility standards, consider the case of an amateur installation employing 1200 watts PEP output (2000-watts PEP input with the final amplifier running at 60% efficiency) and a directional antenna with 8-dB gain relative to a dipole. For

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High Claimed SS Scores

The following high-claimed SS scores are those received at Hq. by January 10. From left to right are shown the call, claimed score, number of contacts, number of multipliers. Full results will appear in a later issue. — WA1PID

| Call | Score | Contacts | Multipliers |
|-----------------------|---------|----------|-------------|
| CW | | | |
| W6RR (W6RTT, opr.) | 172,350 | 1149-75 | |
| W7RM (K7VPE, opr.) | 168,150 | 1131-75 | |
| W6MAR | 163,800 | 1092-75 | |
| K7NHV | 161,550 | 1077-75 | |
| WA7NIN (W6OAT, opr.) | 160,800 | 1072-75 | |
| K4PUZ | 156,074 | 1069-73 | |
| W9YT (K9ZSE, opr.) | 154,800 | 1032-75 | |
| W6HX (WB6OLD, opr.) | 154,500 | 1030-75 | |
| W6NUT | 153,750 | 1025-75 | |
| K4GSU | 153,446 | 1051-73 | |
| W31PI | 152,884 | 1033-74 | |
| K6CQI (W6PAA, opr.) | 152,850 | 1019-75 | |
| WA2UOO | 150,818 | 1037-73 | |
| K3PFL | 149,700 | 998-75 | |
| W11BY | 148,444 | 1003-74 | |
| W1MX (WA8WNU, opr.) | 147,000 | 1000-74 | |
| K31ST | 147,750 | 985-75 | |
| WA01NP (WA0HWA, opr.) | 144,540 | 990-73 | |
| WA1PID | 143,700 | 971-74 | |
| W02YD (WA2SKO, opr.) | 142,500 | 950-75 | |
| WRKIC | 141,450 | 934-75 | |
| W1ZM (WA2CLO, opr.) | 141,488 | 956-74 | |
| K6OVJ | 140,890 | 965-73 | |
| E61BR | 140,850 | 919-75 | |
| W2PV (K1ZND, opr.) | 140,748 | 951-74 | |
| W7TMI | 139,200 | 938-75 | |
| W5WMI | 138,972 | 934-74 | |
| WA0CVS | 138,846 | 951-73 | |
| K4VX (K4POL, opr.) | 138,700 | 950-73 | |
| W7JR | 137,678 | 943-73 | |
| W8CON | 137,492 | 939-74 | |
| WB1DU (WA3BF, opr.) | 137,100 | 914-75 | |
| WA1STN | 136,900 | 925-74 | |
| W8SD1X (K5YAA, opr.) | 136,802 | 937-73 | |
| WA5LS | 136,500 | 910-75 | |
| K7MNF77 | 136,200 | 908-75 | |
| K6GXR | 135,750 | 905-75 | |
| WA1DUY (WA2LQZ, opr.) | 134,680 | 910-74 | |
| WA5ZNY | 133,052 | 899-74 | |
| W3CR1 | 133,050 | 887-75 | |
| W6DGH (WB6ZVC, opr.) | 132,600 | 884-75 | |
| W5R1X | 130,600 | 897-77 | |
| WB4FAE | 130,464 | 906-77 | |
| WB2RI1 | 129,300 | 862-75 | |
| WB9G1C | 128,772 | 882-73 | |
| KP41AJ | 128,160 | 890-72 | |
| W3RI1H | 128,004 | 884-75 | |
| WA1A1BW | 128,004 | 877-75 | |
| WA3GUL | 127,800 | 853-75 | |
| W7SP4 (V17Z, opr.) | 127,576 | 862-74 | |
| WB201U1 | 125,400 | 836-75 | |
| W7GKF | 124,800 | 832-75 | |
| WB4YIG | 124,460 | 889-70 | |
| W4QCW (WA8ZDT, opr.) | 124,392 | 852-73 | |
| K0ZCM (W0LBP, opr.) | 123,900 | 826-75 | |
| W5QJH | 123,876 | 837-74 | |
| W1DAL | 123,728 | 836-74 | |
| W9ROM | 122,248 | 826-74 | |
| K6JLL | 122,202 | 837-73 | |
| WA1ABV/1 | 121,952 | 824-74 | |
| WA121AH | 121,656 | 822-74 | |
| K4BAI | 121,350 | 809-75 | |
| K4FOA | 121,326 | 831-73 | |

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|--------------------|---------|--------|
| K3DPO | 100,800 | 672-75 |
| W4YUO | 100,788 | 681-74 |
| W4S1MK | 100,788 | 681-74 |
| W3YP (W3DOG, opr.) | 100,492 | 679-74 |
| W0JVP | 100,050 | 667-75 |
| WA6JVD | 100,048 | 676-74 |

Multi-operator

| | | |
|---------|---------|---------|
| KH6RS | 151,950 | 1012-75 |
| WB8MB/R | 147,022 | 1007-73 |
| W3DBT | 120,768 | 816-74 |
| W7ZO | 119,282 | 817-73 |
| W3EZT | 118,350 | 789-75 |
| K4CC | 110,800 | 732-75 |
| WA0RBW | 108,432 | 753-72 |
| W0QOQ | 108,000 | 750-72 |
| W9YH | 105,672 | 714-74 |
| WB6PH | 104,700 | 698-75 |
| W6OKK | 102,960 | 715-72 |

PHONE

| | | |
|-----------------------|---------|---------|
| W6HX (WB6CI, opr.) | 256,800 | 1712-75 |
| WA0CVS (WB0DJY, opr.) | 249,300 | 1662-75 |
| W6RR (W6RIT, opr.) | 237,244 | 1603-74 |
| WB201U | 228,200 | 1508-75 |
| WA7NIN (W6OAT, opr.) | 219,000 | 1460-75 |
| K7NHV | 218,700 | 1458-75 |
| K8SDTX (WA3GBU, opr.) | 218,250 | 1455-75 |
| W5MYA | 216,000 | 1440-75 |
| W4S1MK | 215,700 | 1438-75 |
| K0ZCM (W0LBP, opr.) | 209,124 | 1413-74 |
| WA8YVP | 202,572 | 1379-74 |
| W4SRX1 | 202,550 | 1349-75 |
| K4VX (K3FST, opr.) | 200,400 | 1336-75 |
| W1ZM (WA2CLO, opr.) | 199,800 | 1312-75 |
| W4SLES (K5LZO, opr.) | 194,350 | 1329-75 |
| K6FRB (WB6AIN, opr.) | 198,750 | 1325-75 |
| W2PV (WA1ABV, opr.) | 198,150 | 1321-75 |
| W7RM (K7VPI, opr.) | 197,136 | 1332-74 |
| W4GR1 (W3BOV, opr.) | 194,550 | 1297-75 |
| WA2UOO | 191,700 | 1278-75 |
| W5WMI | 191,700 | 1278-75 |
| WA1PID | 189,650 | 1271-75 |
| WB41VU | 190,238 | 1303-73 |
| K6OVJ (W6DSO, opr.) | 190,050 | 1267-75 |
| W3LPI (WA3HRV, opr.) | 184,200 | 1228-75 |
| W4SQXD | 182,550 | 1217-75 |
| W31ZT (WA3IAQ, opr.) | 182,400 | 1216-75 |
| W5IMN | 181,892 | 1229-74 |
| K3MNF77 | 180,708 | 1221-74 |
| W11C73 | 180,018 | 1233-73 |
| K6VCA | 180,000 | 1200-75 |
| W9YT (K9LBO, opr.) | 179,288 | 1228-73 |
| W8S1ZN (WB5F1, opr.) | 177,150 | 1181-75 |
| WB4VUP | 175,564 | 1193-74 |
| W7AWH | 175,200 | 1200-73 |
| W6OKK (WB6DSV, opr.) | 174,500 | 1162-75 |
| WA1KID (K1ZND, opr.) | 172,950 | 1153-75 |
| KP41AJ | 172,350 | 1149-75 |
| W45VDH | 171,750 | 1145-75 |
| W6CR1 | 171,384 | 1158-74 |
| WA2WMI/0 | 170,348 | 1151-74 |
| W5RFX | 170,236 | 1166-73 |
| WB4RFN | 169,798 | 1163-73 |
| WA4QOC (WA8ZDT, opr.) | 169,360 | 1160-73 |
| W6DGH (WB6ZVC, opr.) | 167,250 | 1115-75 |
| WB4BGY (W11LM, opr.) | 166,944 | 1132-74 |
| K5PIL | 166,148 | 1138-73 |
| WA0PAO | 166,032 | 1153-72 |

| | | |
|-----------------------|---------|---------|
| WB4DQM (WB4NEO, opr.) | 165,888 | 1152-75 |
| K9IU (WB9D7S, opr.) | 165,000 | 1100-75 |
| W4SFTP/5 | 163,800 | 1092-75 |
| W1MX (WA1KMK, opr.) | 163,728 | 1137-75 |
| W6ELG (WB6YBL, opr.) | 160,580 | 1085-75 |
| W3AZD | 160,500 | 1070-75 |
| K0GXR | 159,140 | 1090-75 |
| K1PKO/7 | 158,952 | 1074-75 |
| W5NSA (K7JCA, opr.) | 158,952 | 1074-75 |
| WSHGT (WB2UFG, opr.) | 158,804 | 1073-75 |
| K6CQI (W6PAA, opr.) | 158,360 | 1070-75 |
| WA0CPX | 158,250 | 1055-75 |
| WA3GUL | 158,118 | 1030-75 |
| K5FPO | 158,064 | 1068-75 |
| WB6BKB | 157,350 | 1049-75 |
| WA1NRY | 157,242 | 1077-75 |
| W8RC | 156,672 | 1088-75 |
| WB9HAD | 156,240 | 1085-75 |
| W60QO | 156,150 | 1041-74 |
| WA8YWX | 155,636 | 1066-75 |
| WB8AYC | 155,400 | 1050-75 |
| W7TMI | 154,496 | 1088-75 |
| W6ONY (WA9UCF, opr.) | 151,402 | 1037-75 |
| WA2LCC | 151,256 | 1036-75 |
| W4DMD | 150,818 | 1033-73 |
| WA1MAO | 149,796 | 1026-75 |
| WA1STN | 149,504 | 1024-75 |
| WB8YCI | 149,400 | 996-75 |
| WA3UTA | 149,100 | 994-75 |
| WA4F1W | 147,387 | 1011-75 |
| WA3NYU | 146,300 | 1045-75 |
| K9LWA | 146,292 | 1002-75 |
| K3ZAW | 145,708 | 998-75 |
| WB5FMJ | 144,150 | 961-75 |
| WB4IQE (WB4FDT, opr.) | 144,000 | 1000-75 |
| WB2SHH | 143,278 | 1008-75 |
| K2JOC | 142,672 | 964-74 |
| W4USN | 141,400 | 1010-75 |
| WA3AMH/3 | 141,192 | 954-74 |
| W5RTO | 139,500 | 930-75 |
| WA1EO1 | 139,430 | 958-75 |
| K4POL | 138,000 | 936-75 |
| WB2RJJ | 136,640 | 976-75 |
| K3DPO | 136,160 | 920-75 |
| K4FOA | 135,488 | 928-75 |
| W31MZ (W9SZR, opr.) | 135,504 | 941-75 |
| WB9G1C | 135,150 | 901-74 |
| WB4HAE | 133,298 | 913-74 |
| WA1LNO | 131,400 | 900-75 |
| K3JGI | 130,816 | 896-75 |
| WB4ONS | 130,836 | 881-75 |
| K5LUR | 129,608 | 953-74 |
| VF7Z/W7 | 129,312 | 898-75 |
| W4K1C | 129,270 | 910-75 |
| W3IN | 128,908 | 871-74 |
| W5OQQ/7 | 128,850 | 859-74 |
| W4MYA | 128,760 | 870-75 |
| W4WSI | 128,100 | 854-74 |
| WA1ABW | 128,084 | 902-75 |
| K1JHX | 127,680 | 912-75 |
| W2HPI | 127,658 | 899-74 |
| K4KZ2 | 126,728 | 866-75 |
| VE7WJ (V17BQ, opr.) | 126,720 | 880-75 |
| K4BAI | 126,144 | 864-74 |
| K0UYN | 126,000 | 840-75 |
| WB6ION | 125,268 | 858-75 |
| W3YP (W3DOG, opr.) | 125,124 | 913-74 |
| K3GJD | 124,800 | 832-74 |
| WB9CFP | 123,840 | 860-75 |
| W3J5X | 123,760 | 884-74 |
| WA0CWH | 123,180 | 821-74 |
| V1GGO | 122,546 | 828-75 |
| V1IGAS | 122,536 | 901-66 |
| WA1NIS | 122,406 | 887-75 |
| W3YXM (WA3QIA, opr.) | 122,220 | 873-74 |
| W2SZ (WA2SPL, opr.) | 121,440 | 880-75 |
| WB91JH | 120,596 | 826-74 |
| K4GL | 119,564 | 842-75 |
| K7RSC | 119,282 | 817-75 |

| | | | | | | | |
|----------------------|-----------------|-----------------------|-----------------|----------|-----------------|-----------|-----------------|
| W8KIC (WA3BGF, opr.) | 119,000- 850-70 | W5OIB | 109,624- 772-71 | WA4CTC | 102,528- 712-72 | WB5AXC | 140,296- 989-71 |
| WB6VZ1 | 118,080- 820-72 | KH611 | 109,066- 768-71 | WB8MMF | 102,346- 701-73 | W80000 | 139,576- 956-73 |
| WA2YH | 117,740- 841-70 | WA4UW | 107,136- 744-72 | WA10NB | 101,762- 697-73 | WA3FAL | 130,752- 908-72 |
| K5KSI | 117,150- 781-75 | K7LTV | 106,812- 774-69 | WB2MZU | 101,728- 748-68 | WA4BCY | 130,524- 894-73 |
| W3GM | 116,946- 801-73 | K4DJC | 106,412- 719-74 | W5KHP | 101,676- 687-74 | W4BF-B | 128,800- 920-70 |
| WA8ENP | 116,724- 827-71 | WA3LHG | 105,846- 767-69 | W5QWE | 101,104- 712-71 | W11BG1/J1 | 127,160- 935-68 |
| WA1JUY (WA1JY, opr.) | 116,476- 787-74 | W2HHC | 105,672- 714-74 | WA9GAM | 100,448- 688-73 | W6YX | 127,008- 882-72 |
| W5PAQ | 116,032- 784-74 | WA2LJM | 105,648- 744-71 | K5YAA | 100,110- 705-71 | W6SUN | 125,800- 850-74 |
| WB0GZR | 115,200- 800-72 | W4T | 105,540- 754-70 | WB4BUU | 100,010- 685-73 | W0LEE | 122,820- 890-69 |
| W3ZSR | 114,100- 815-70 | K4FOB | 105,420- 756-70 | | | WA11QJ | 122,400- 850-72 |
| K1DQV/I | 113,250- 755-75 | WA1KOC | 105,272- 738-72 | | | W6HPI | 122,348- 826-74 |
| W0UB | 111,860- 799-70 | WA0KQU | 104,784- 708-74 | | | WA8RMC | 118,570- 835-71 |
| W6PRP | 111,750- 745-75 | W2AZO | 104,512- 736-71 | W5LUJ | 175,650-1171-75 | W9VB | 113,820- 813-70 |
| WA0IAQ | 111,744- 776-72 | K0ZXF | 104,370- 735-71 | WB4MR1 | 174,196-1177-74 | W5FC/S | 112,500- 750-75 |
| W7GKJ | 111,580- 797-70 | W2HNG | 104,192- 704-74 | WB8JBM/8 | 168,484-1154-73 | WB81-UO | 112,140- 801-70 |
| W9VBV | 111,544- 764-73 | WA7OTT | 104,020- 743-70 | W3AU | 168,300-1122-75 | W6DOD | 111,836- 756-73 |
| W9ROM | 111,252- 762-73 | VE3HUM (VE3BVD, opr.) | 103,952- 712-73 | W6YRA | 164,688-1128-73 | K4EG | 110,880- 770-72 |
| WA7FFU/7 | 110,050- 775-71 | K4HAV | 103,952- 712-73 | WA4UPJ | 157,500-1050-75 | WA4ZZU/4 | 106,116- 717-74 |
| K4FU | 109,950- 733-75 | WA9NPM | 103,660- 730-71 | WA3KPI | 152,292-1029-74 | W8ZHB | 103,234- 727-71 |
| WA3SWI | 109,646- 751-73 | VE7AUA/W6 | 102,960- 705-73 | W8LF | 144,576-1004-72 | W8EDU | 102,120- 740-69 |
| WB4UOX | 109,624- 772-71 | K7JVR | 102,930- 705-73 | WB9IDS | 144,480-1032-70 | W2PU | 101,982- 739-69 |
| | | | | WA9PBK/9 | 141,912- 992-72 | K4CG | 100,200- 668-75 |

Multi-operator

Shakedown

(Continued from page 26)

certainly a supreme test of receiver performance! Luckily, no problems were experienced in that regard. Bill operated ssb most of the time, and ZF1ST was on cw. Therefore, the second-harmonic QRM problem wouldn't become manifest by the harmonic falling into the adjacent receiver's pass band. Only one RFI glitch occurred. When ZF1WM operated 10 meter ssb, his rf energy found its way into the solid-state keyer used by ZF1ST. The effect was one of speeding up and slowing down during cw sending periods . . . rather embarrassing to say the least! Eventually, a suitable arrangement of clip-lead grounding cured the problem.

Available time was divided between exploring the underwater wonders around the coral reefs and near ship wrecks, and amateur operating. Operating was done on a casual basis. One doesn't fill a log book during low-key operating, and that was not the intention anyway. Neither operator fancies himself as a hard-nose DX type. The exercise was intended more to learn what could be done with QRP, and to observe propagation conditions from that part of the world.

Approximately 350 log entries were made by ZF1ST. Nearly twice that number were entered by ZF1WM with his ssb operation. It should be stated that ZF1WM was much more active than ZF1ST. The effectiveness of the two stations, despite the considerable differences in antennas and power levels, was nearly identical. No doubt this would not have been true had both stations been utilizing the same mode - ssb or cw.

It was a pleasant surprise to fire up the 10-watter on the morning of October 9 at 1100 GMT and be called by JA7MBT after calling CQ on 40 meters. The signal reports both ways were RST 579. That QSO was followed by one with JH1WRL.

Each time we "opened shop," provided the band chosen was in good condition, a pileup resulted. It was fun working off the pileups from Europe while using the QRP gear, and it was rewarding to be able to confirm a "new one" for so

many stations around the world. Apparently there is very little cw activity from ZF1 land, at least on a regular basis, so the cw denizens elsewhere in the world appreciate a chance to work ZF1 stations who use that mode. The same situation seemed true during the 8P6 operations.

Some Final Comments

There weren't any mishaps during the stay on Grand Cayman, but there was a three-day period of concern for the jury-rigged antennas while a tropical storm buffeted the island. Winds up to 50 mph whipped the palms and antennas with vigor, but brass pounding and ssb "lip service" continued.

Another threat to the antennas came around 3 a.m. one morning when a herd of wandering cattle decided to visit the resort for the purpose of dining on the papaya trees and other tropical vegetation, which they did. One of them became entangled in the radial system and the coax feeder to the 40-meter dipole. WICER awakened quickly to the rattle of coax fittings on the operating table, and just in time to see the end of the 40-meter coax line vanish out of the window. Fortunately, Bill's XYL (armed with a broom) and WICER were able to chase the marauders away in time to save the antennas!

Some meaningful conclusions resulted from the Cayman experience: (1) A 10-watt cw transmitter is more practical than one which delivers 2 watts of output. (2) A two-band transmitter is desirable for round-the-clock QRping. (3) a 10-watt station with power supply is compact enough for air travel, and the gear can be hand-carried easily. (4) Relatively modest antennas perform well when near salt water. (5) *Radials and feed lines should be mounted at least eight feet above the ground if cattle are in the area.*

Licensing on Grand Cayman is not difficult. One can apply by mail, sending \$13 U.S. and a photocopy of his U.S. amateur license. Special suffixes can be requested at no extra charge. Licenses are renewable by mail, and it is believed that W8JUY has a renewal form on his desk in Traverse City, for toward the end of the trip he was heard muttering to himself about building a QRP rig and returning to the island!

QST

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY BILL MANN,* WA1FCM

Emergency Communications The Sky's the Limit

PLANS WERE CARRIED OUT much as they were outlined in September *QST*. The earthquake hit Alaska on schedule. A *scheduled* earthquake? Yes . . . a simulated earthquake to demonstrate amateur satellite emergency-communications potential set the stage for a test on September 28 employing Oscar 6 as the star attraction.

Assuming hf propagation crippled because of a severe solar storm, all communications into and out of Alaska were through Oscar 6. Message requests for supplies and health and welfare information concerning "victims" were sent just as they might be in a real emergency. Five Alaskan Oscar 6 ground stations were active: KL7s HAQ MF USA, and W6PVF/KL7 in Anchorage; KL7JDO in Kodiak. Nineteen other Alaskan hams participated in local communications (primarily in Kodiak) and fed traffic to the ground stations. Dozens of non-Alaskan amateurs are known to have participated which included stations in all U.S. call areas, Hawaii and Canada. Undoubtedly there were many more Oscar users who took part but either did not report their activity or did not appear in other stations' reports.

But there was more to the test than statistics indicate. In a report from Alaskan Section Emergency Coordinator KL7JDO, Tony cites the use of two repeaters to funnel traffic to the Oscar stations. The ground stations referred to orbital data for appropriate relay times. Army MARS stations also took part. It was noted that hf conditions actually *were* extremely poor, which was one of the premises for the test. Ground

* Assistant Communications Manager, ARRL.



stations continued on into the Sunday passes, still receiving and transmitting traffic.

Kodiak Emergency Coordinator KL7HRK reports that the local exercise included liaison with police and city officials, mobile surveillance of "affected" areas, a link to KL7JDO, and a link to the Kenai area via KL7HDX operating 2-meter fm, aeronautical mobile.

One of the highlights of the satellite endeavor was the transmission of a message from Hawaii's Gov. Ariyoshi to then Alaskan Gov. Egan. KH6IJ originated the message, the text of which read: "Hawaii stands by Alaska in this simulated emergency test." It was sent to KL7HAQ at 0817 UTC (Pass 8949), September 29.

The National Institutes of Health club station K3YGG was activated on September 28 and available to receive requests destined to the Washington, D.C., area. Several messages from Alaskans were originated to K3YGG.

Although a few problems were experienced as a result of some Oscar users attempting to make usual contacts without realizing the satellite was on for emergency-testing purposes, the feasibility of Oscar use for emergency communications was demonstrated well. At a December 10 briefing at NASA Headquarters for various government-agency officials, details of the operation were presented and the potential for amateur radio emergency communications via satellite was reviewed. Advantages of Oscar use proved to be: (a) reliability and predictability of communications within the coverage area with minimal propagation effects; (b) physically small antenna size and low power can still be effective; and (c) no holes in coverage area because of skip effects.

NTS Expands

At the end of March, we stuff a second candle in the Continental Traffic Net's birthday cake.

Messages to people all over the country were relayed by WB2ELF and WA2SLF from the Ridgewood, N.J., Public Library where they set up an exhibit of amateur radio.

This group of people gave their time to help collect Christmas toys for needy children. The Tacoma Wash., amateurs set up a station to relay information via WR7ACO to dispatch cars to the locations.



Although not the first National Traffic System (Daytime) net to begin operation, CTN's assumption of daily operation (April 1, 1973) is regarded as the official NTS(D) kick off.

The Daytime segment of NTS, as outlined initially in December, 1972, *QST*, was generally patterned after the long-established evening cycle of NTS to provide opportunity for operators who prefer (or are limited to) daytime activity to participate in a systematic, "teamwork" approach to traffic handling. A second objective was to provide for more rapid west-to-east flow of traffic. Unlike the evening nets, however, the "point of entry" to the daylight segment was (and to an extent still is) a national net (CTN) on 20 meters which has liaison stations from each of the 12 NTS regions to receive traffic for their respective region nets. In effect we had a half-cycle in the daytime segment.

Beginning in December, a new net — the Daytime Eastern Area Net (DEAN) — was established, meeting on 40 meters just before (at 1830Z) and after (2030Z) CTN. On early DEAN, traffic is passed to appropriate region representatives in the Eastern Area (roughly the Eastern Time Zone in the U.S. and Canada). Traffic for either the Central or Pacific areas is sent to a liaison station to CTN. On late DEAN, intra-area traffic is facilitated as well as distribution of traffic from CTN to region representatives.

This expansion is a step toward a full cycle of NTS(D). As NTS(D) activity continues to increase, it is hoped that similar area nets can be established in the Central and Pacific Areas. Region and section net sessions meeting before early area nets are also contemplated.

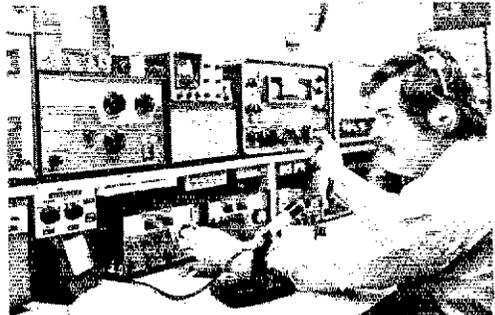
The test held last fall to demonstrate Oscar 6's potential as an emergency-communications vehicle was successful. Shown manning one of the 5 Alaskan ground stations is KL7HAQ.

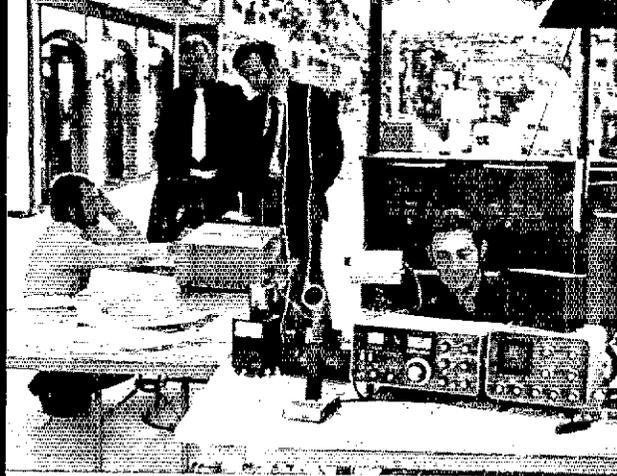
A goal of NTS is to get as many different people involved in organized, systematic traffic handling as possible (which is not to say that many of the "independent" nets that meet during the day aren't providing a good service!). NTS is built on teamwork where each participant shares in the work load. Ideally, each NTS net would have a different net control station and different liaison stations assigned for each day of the week. Most NTS(D) nets have not yet reached this point. We need more amateurs willing to devote a little time one day per week to perform NCS or liaison functions. We recognize that many people are not available during weekdays, but there are plenty opportunities on weekends, too.

If all this jargon concerning liaisons, regions, areas, etc., is unfamiliar to you, we invite you to send for the booklet *Public Service Communications*, which details NTS (Evening) operation. The same basic principles apply equally well to NTS(D) operation. With your request, please include a 6½" x 9½" (or larger) self-addressed envelope with 20 cents U.S. postage.

Kew Are Em

Interference is nothing new in amateur operation; the problem is compounded when we talk about deliberate interference, especially in relation to nets. The topic was raised at the July, 1974, Board of Directors Meeting; a committee was selected to further explore the extent of the problem and discuss the problem with FCC officials.





White Water Valley ARC members WB9KGR and WB9MXG (standing) and WB9LCN (right) sent Christmas radiograms for shoppers in Richmond, Ind., two December weekends. They also exhibited RTTY and SSTV equipment. The Public Service Diary tells more.

A questionnaire was sent to selected hf net managers as listed in the latest ARRL *Net Directory*. Over half of them were returned, with about 25% indicating at least part of the interference appeared to be deliberate.

In-person contact with FCC was made by the Communications Manager. A couple of the points raised were: (a) advising interfering stations that their operation is being reported to FCC and that they are being monitored only hampers the FCC's work, usually by causing the station to disappear but only temporarily; and (b) deliberate remarks by net stations to antagonize interfering stations must be avoided; interfering stations should be ignored insofar as on-the-air indication is concerned.

ARRL continues to work with FCC on the matter of interference. Net managers who responded to the questionnaire have been advised of additional steps which can be taken in cooperation with their net members in an effort to reduce malicious interference.

With the AREC

A suggestion was made in this column (April, 1974) that AREC groups plan a special section-SET since most natural and man-made disasters occur on local or statewide bases, not encompassing the whole country. Some groups have done just that, one example being New York City-Long Island. On October 6, a simulated hurricane seriously damaged two small towns there. This "pre-SET SET" was named "Operation Surprise." Traffic for the test was "affectionately termed 'Nowhere messages.'"

Things did not go as well as they could have considering the number of amateurs who populate the area and have signed up at one time or another as AREC members. This is exactly what needs to be found out. The AREC net frequency on 10 meters had too much local QRM and relocating the net is now under consideration. A list of net control stations for the various town nets is being made up for better inter-town/inter-county liaison. The "planners" stayed with the operation to the end and those participating non-leaders became leaders during the activity. The biggest hurdle seemed to be in getting more people interested in tests, not just waiting till the real disaster occurs. That's where you really fit in. A little time spent in a drill that an EC or two put a lot of time into

planning and then evaluating is worth a lot. It is encouraging to see groups readying themselves for what can be successful handling of a misfortune or an unfortunate handling of a successful catastrophe.

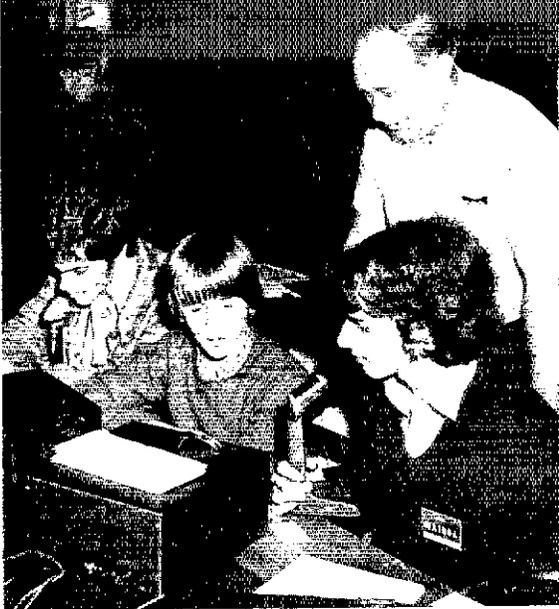
■ A tally of the participants involved in public service activities taken from the reports turned in for the February QST Public Service Diary shows 696 amateurs. The activity reports include a variety of alerts, emergencies and events handled or sponsored by AREC/RACES members and other similar groups. There are more people taking part and more events being reported than ever before. Is this because there are more public-service oriented groups, more work being performed, more p-s recruiters getting action or is it that only more reporting is being done? We're not sure, but it's a welcome increase. We think these people deserve the recognition, and wonder how many more are doing the same kinds of things, that we don't learn about. There are varied accounts telling of natural disasters, accidents, medical emergencies, drills and special events, turned in by SCMs, SECs, ECs, club officials, public relations managers and individuals who were involved or spotted an article in a newspaper.

We receive pamphlets, booklets and newsletters from time to time, from SECs and ECs, which they use to inform and enlist active amateurs into their AREC programs. This is another way we find out about public-service-minded amateurs. These brochures and letters sometimes include purposes of AREC, descriptions of their emergency plan and alerting procedures, when regularly scheduled tests, alerts, drills and nets are conducted, a list of ECs or AREC members and sometimes a little information and news about them, duties of ECs and AREC members, and when meetings and get togethers are held.

If you are interested in these types of involvement and want to know more, contact your SCM or drop us a note. We'll tell you who's in charge and how to sign up. As is said on television, "Try it — you'll like it." — *WA1STO*

■ At this time of each year we applaud those SECs who faithfully report AREC membership totals and activities month after month. This year, the number of SECs reporting went up each month by one or two except for one time, thus making the number of AREC members reported to go up also as the year progressed. Between 35 and 46 SECs mailed statistics here throughout the year. There are still five sections without any SEC. Seems to us someone in those sections would be willing to spend time coordinating emergency preparedness in their area. Many of these sections have AREC activity and likewise for those whose SEC does not report each time. The most active sections, though, have active SECs.

Seasons greetings were sent via radio by Wellesley, Mass. ARS members (l. to r.) WA1QJU; Doug Hart, observer; WA1RGA; and (standing) WN1TBY.



Last year 478 SEC reports were sent to Hq. from 55 different sections. This year there were 525 reports from 58 different sections. Last year 29 SECs reported every time as compared with 26 this year. Sections with no reporting for the whole year were 3 less than last year. Those sections having 100% reporting for 1974 follow, with the number in parenthesis showing how many years of solid reporting has taken place. They are: Alta (13), Colo (9), Del (1), EMass (9), Ill (1), Ind (1), Kans (2), Ky(1), Mich (6), Miss (2), Mo (1), Nev (7), NC (1), NFla (3), NTex (3), Okla (3), Org (5), SDgo (4), SCV (1), Sask (10), SFla (23), Utah (7), Va (4), Wash (4), WVa (4), WMass (2), WNY (3). SFla's 23 years, Alta's 13 years and Sask's 10 years of continuous reporting are something to be proud of. Those reporting for their section every month since at least July are: Alask, Ga, Mar, NLI, NNJ, Ohio, SV, SJV, SBar, SNJ. No reporting was done through the year by those sections that follow: CZ, Iowa, La, Me, Man, MDC, Minn, NH, NMex, NDak, SF, SC, Vt, W.L., Wisc, Wyo; three sections fewer than last year's list.

■ SEC reports received in December totaled 42 covering 14,688 AREC members. At this time last year 44 reports were sent, listing 13,340 AREC members. Those sections reporting were: Ala, Alask, Alta, Colo, Del, EMass, Ga, Hawaii, Ill, Ind, Kans, Ky, Mar, Mich, Miss, Mo, Nev, NLI, NC, NFla, NNJ, NTex, Ohio, Okla, Ont, Org, SV, SDgo, SJV, SBar, SCV, Sask, SFla, SNJ, STex, Utah, Va, Wash, WVa, WMass, WNY, WPa.

Traffic Talk

Each month the "Station Activities" section of QST reports the total traffic handled by each station who reports to his or her Section Communications Manager. This not only acknowledges the efforts exerted by traffic handlers, but serves as an indicator of where our traffic-handling strengths and weaknesses lie. More importantly, it provides the data to determine general trends in amount of traffic being handled. The number of different reports received and the total traffic for each section is totaled each year for analysis in a leadership bulletin.

If you're not reporting your message totals (per guidelines established in the booklet *Operating an Amateur Radio Station*) to your SCM, we're not getting a complete picture of this aspect of the public-service scene. Traffic totals are important!

■ *Nitpick Dept.* On cw nets we occasionally hear the following when the NCS excuses stations: "UR QRU QNX." Huh? "Your I have nothing for you"?

■ *National Traffic System.* Let's rehash a long-standing NTS principle which applies equally well to both the evening and daytime segments of NTS. On local and section nets, coverage is what we're

after. That is, as many stations as possible within the local area or section as possible to receive traffic (as well as to originate messages!). At region level and above, the key is *representation*. Representation is accomplished by means of an assigned (by lower echelon net manager) liaison station. Unless traffic is unusually heavy or conditions very poor, there should only be one liaison station for any given function. Stations who report into higher level nets as "alternates" when not needed or before the assigned rep has a chance, run the risk of bogging down net operation and causing confusion. More experienced stations will monitor net sessions and only report in when a call for additional help is made by the NCS or if he knows his help is required.

■ *December Reports.* Newly appointed TEN Mgr., W0ZHN is pleased with Saskatchewan activity and the increase in traffic (offset by horrible conditions), and has awarded certificates to WA0YNC and WB0HSP. The highest monthly total of traffic since 1971 was handled on 1RN. The "Bill Shaw Annual Award" in memory of WB2VEJ, is awarded to WB2LZN for outstanding ability in the Second Region Net during 1974. A D3RN certificate goes to WA3QFF and second year certifications go to W3CWC and WA3s ATQ CIG DUM PZO QLG. This month's stats, the highest of the year for D3RN, are the result of the many dedicated operators, writes WB2FWW/3. W4DQS, WA4FSL and WB4ZKG were recipients of 4RN certificates. DEAN Mgr., WAMCR offers thanks to the support given by the six regions and is happy with the initial achievements. A D1RN certificate was sent to WA1IOG. A good month's business was done by RN7, says Mgr, W7KZ. More EAN certificates are added to last month's list issued by K2K1R, Mgr, and went to: W1s CF TM, WA1s HSN LNF MXV POJ, WA2s AYC CLB CXY DSA PJJ SHT, WB2s OYV RKK, K3DZB, WA3SWF, K4s JIQ JM SCL, WB8s BPY KKI, VE1AMR, VE2AUH, VE3s DBG EHF. If you saw your call listed but haven't received the certificate, please let Bud know. Christmas put PAN over the 2000 mark but there was too much doubling up on assignments to make Mgr. K7NHL 100% happy. The DEAN collection and distribution net helps a lot, reports CTN Mgr, K7IFG. DRN7 will try an early session starting Feb. 1 on a trial basis.

| Net | Sessions | Traffic | Avg. | Rate | %Rep. |
|-----------------------|------------------|---------|-------|-------|-------|
| EAN | 31 | 3183 | 102.7 | 1.872 | 98.4 |
| DEAN | 54 | 926 | 17.1 | .571 | 89.8 |
| CAN | 31 | 2165 | 69.8 | 1.385 | 99.7 |
| PAN | 31 | 2009 | 64.8 | 1.240 | 97.3 |
| 1RN | 62 | 954 | 15.4 | .557 | 93.3 |
| DIRN | 31 | 352 | 11.4 | .506 | 88.5 |
| 2RN | 79 | 934 | 11.8 | .854 | 97.5 |
| D2RN | 30 | 356 | 11.9 | .615 | 100.0 |
| 3RN | 62 | 694 | 11.2 | .500 | 95.7 |
| D3RN | 31 | 509 | 16.4 | .565 | 96.7 |
| 4RN | 53 | 1041 | 19.6 | .678 | 86.1 |
| RN5 | 62 | 1317 | 21.2 | .539 | 85.9 |
| DRN5 | 27 | 213 | 7.9 | .269 | 56.0 |
| RN6 | 62 | 1094 | 17.7 | .492 | 99.5 |
| DRN6 | 61 | 1056 | 17.3 | .326 | 68.0 |
| RN7 | 60 | 615 | 10.3 | .560 | 71.2 |
| DRN7 | 24 | 30 | 1.3 | .095 | 25.8 |
| 8RN | 58 | 544 | 9.4 | .386 | 88.2 |
| D8RN | 31 | 419 | 13.5 | .639 | 94.6 |
| 9RN | 59 | 995 | 16.9 | .542 | 90.0 |
| TEN | 62 | 907 | 14.6 | .557 | 87.5 |
| DTRN | 55 | 283 | 5.2 | .209 | 50.0 |
| ECN | 62 | 731 | 11.8 | .504 | 96.2 |
| TWN | 52 | 416 | 8.0 | .289 | 63.9 |
| DTWN | 21 | 155 | 7.4 | .224 | 57.4 |
| CTN | 31 | 945 | 30.5 | .462 | 96.0 |
| TCC Eastern | 150 ¹ | 1185 | | | |
| TCC Central | 99 ¹ | 966 | | | |
| TCC Pacific | 131 ¹ | 1432 | | | |
| Sections ² | 4306 | 24982 | | | |
| Summary | 5528 | 51408 | 9.3 | | |
| Record | 4736 | 51705 | 28.5 | | |

¹TCC functions not counted as net sessions.
²Section and local nets reporting (133): APNS (AB), MTN (MB), APN (Mar.), CMN GBN ODN OPN OQN WOEN (ON), WQ-V/UHF (PO), AENB AEND AENJ AENM AENR (AL), ASN (AK), ATEN HARC (AZ), OZK (AR), NCN NEN SCN (CA), CCN SSN (CO), CN CPN CSN NVHFTN (CT), DEPN DTDN (DE), EMTN EPTN GN NEPN QFN QFTN FPTN VEN (FL), IMN (ID), ILN (IL), JFN QIN TIN (IN), I75MN TLN (IA), KWN QKS QKS-SS (KS), KNTN K'N KYN MKPN (KY), LAN LSN L'N (LA), SGN (ME), MDCTN MDD MEPN (MD), EMRPN EM2MN NENN WMN WMPN (MA), MACS OMN WBSN (MI), MNN MSN MSPN PAW (MN), MSBN MSN MTN (MS), ACE J2AN MoAREC MoN MoSSB MSN PH SCEN WEN (MO), MTN (MT), TCAREC WNN (NE), NHVTN (NH, VT), NJN NJPN NJSN (NJ), NMN (NM), NLI NLIPN NYS (NY), CN NCSSBN I7EN VHFNT (NC), OSSBN O6MTRN (OH), OFON O1Z OPEN OTWN STN (OK), BSN OSN PAAREC (OR), CLTN EPA EPAK&PTN PFN PTTN WPA (PA), LEN SDN (SD), TN TNN (TN), TEX TEX-SS TPN (TX), BUN UCN (UT), VN VNTN VSN VSN (VA), NSN WSN (WA), WEN WVN (WV), WSSN (WI).

Transcontinental Corps

TCC-Pacific Dir., K5MAT writes that there were terrible winds, windstorms and unreliable equipment which made for a bad month. TCC Eastern and Central set up extra schedules for the Christmas traffic load and ops were cooperative in taking on extra work at a busy personal time. TCC-Eastern certificates were issued to WA2PJL WR2PYM W3EML K3DZB.

| Area | Functions | %Successful | Traffic | Out-of-Net Traffic |
|---------|-----------|-------------|---------|--------------------|
| Eastern | 170 | 88.2 | 1185 | 3695 |
| Central | 113 | 87.6 | 966 | 2196 |
| Pacific | 158 | 82.9 | 1432 | 2889 |
| Summary | 441 | 86.2 | 3583 | 8780 |

The TCC roster (December): Eastern Area (W2FR, Dir.) - W1s NJM QYY, K1SSH, WA1s MSK POJ, W2s FR GKZ KAT7, WA2s DSA ICB KCW PJL UWA, WB2s FLF PYM RKK, W3EML, K3s CB DZB MVO O1O, W4UQ, K4KNP, WB4SGV, WB8PJ, K8KMO, WA8HG, WB8FIT, VE3SB. Central Area (K0AEM, Dir.) - W4OG, WB4DXN, W5s GHP MI QU UGE UJJ, W9s CXY DND NXG, WA9EED, WB9KPX,

W0s HI INH LCX QMY ZHN, K0BIX, WA0TNM. Pacific Area (K5MAT, Dir.) - W5s RE ILL, K5MAT, W6s BGF HVB EOT MLF RSY UE VNO VZT ZRJ, K6HW, WA6DEI, WB6s AKR OYN, W7s BQ GHT KZ, K7s IWD NHL NHV QFG, W0s IW LQ, K0DRL, WB0HCK.

Independent Net Reports (December)

| Net | Sessions | Traffic | Check-ins |
|------------------------|----------|---------|-----------|
| 7290 Traffic | 42 | 706 | 1964 |
| 75 Meter ISSB | 31 | 1077 | 1525 |
| North American Traffic | 25 | 616 | 234 |
| 20 Meter ISSB | 21 | 854 | 249 |
| Hit & Bounce | 31 | 1282 | 420 |
| Hit & Bounce Slow | 20 | 401 | 313 |
| Mike Farad | 16 | 110 | 262 |
| IMRA | 26 | 518 | 1206 |
| Mission Trail | 31 | 371 | 869 |
| Northeast Traffic | 22 | 78 | 197 |

Public Service Diary

■ San Juan, PR - Jan. 28, 1974. When KP4DMI fell and broke his arm, his wife called for help via

Public Service Honor Roll December 1974

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCMs). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 1 point regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points.

| | | | | | |
|----------|----|----------|----|--------|----|
| W4RQS | 69 | WA6DMB | 52 | WB2LZN | 45 |
| WB0HOX | 65 | WA0TNM | 52 | WAJAT | 45 |
| WA1SHO | 64 | VF3GPN | 52 | WBVBR | 44 |
| WA2DSA | 64 | W5RBB | 51 | WA1PAZ | 44 |
| WB2PYM | 64 | WR1RX | 51 | W2EC | 44 |
| W5GHP | 64 | WA1POJ | 50 | WR2IRX | 44 |
| WA5ZZA | 64 | WA3UKZ | 50 | K3O1O | 44 |
| WA1QKD | 62 | WA4EBL | 50 | WA3PHQ | 44 |
| WA1MSK | 61 | W6RFI | 50 | WA3SVH | 44 |
| WR2FWW/3 | 61 | WA9QV7/9 | 50 | WB4RGL | 44 |
| WA3DUM | 61 | WA2D1W | 49 | WB4DXN | 44 |
| WA30LG | 61 | W2MTA | 49 | WB5DXB | 44 |
| WA51QU | 61 | W31CS | 49 | WB6AKR | 44 |
| W70CX | 61 | WB4DJU | 49 | WB6TYA | 44 |
| K0BIX | 61 | WA4GBC | 49 | K9ZTV | 44 |
| WB0HBM | 61 | WA4HOL | 49 | WA0MLE | 44 |
| WB2FLF | 59 | WB4ZSO | 49 | W00MY | 44 |
| WB2RKK | 59 | WB5IGF | 49 | VF1ARB | 44 |
| WB4FDT | 59 | K5MAT | 49 | VE3GT | 44 |
| VF2DRC | 58 | WA61VA | 49 | W2FR | 43 |
| WB5EMA | 57 | W7GHT | 49 | WB4OXT | 43 |
| VE3FRG | 57 | WB8ZA | 49 | WB4SVH | 43 |
| WA1OME | 56 | WB8KKI | 49 | WA6CY | 43 |
| K3KAJ | 56 | K9KSA | 49 | WB6VBG | 43 |
| WA3VDO | 56 | W9MFG | 49 | WB8PAV | 43 |
| WB4GHU | 56 | W9NXC | 49 | W00E | 43 |
| W4WNY | 56 | K0MRI | 49 | WA1PGY | 42 |
| WB3HHS | 56 | W00YH | 49 | WB4FKJ | 42 |
| WA8HGH | 56 | WB8ITT | 48 | WA5VBM | 42 |
| WB8JGW | 56 | WB2JJD | 47 | WA0FMD | 42 |
| WB0CZR | 56 | WA2PCF | 47 | WB0KWI | 42 |
| VF3POZ | 56 | WB2RKF | 47 | KL7JDO | 42 |
| WB4ZMK | 55 | WA3SXU | 47 | VF3GOL | 42 |
| W5UGF | 53 | WB4FCB | 47 | WB2UFG | 41 |
| WB6PVH | 53 | W40GG | 47 | WA4BCS | 41 |
| VE1AMR | 53 | W5MYZ | 47 | K4IAE | 41 |
| WA1MHJ | 52 | W7DAN | 47 | W00TF | 41 |
| WA1RGA | 52 | W9MMP/9 | 47 | W0WYX | 41 |
| W2OE | 52 | WB0JUV | 47 | WA1TXI | 40 |
| WA4WXZ | 52 | VE3GIG | 47 | WB4ZSZ | 40 |
| WB5BH-W | 52 | VE3SB | 47 | WB5HVV | 40 |
| | | WA1MJE | 45 | | |

WR4AIE. KP4DKZ answered and provided the necessary help. — (KP4QM, SCM W.I.)

■ Loudonville, NY — Aug. 30. While tuned to the Halo Net, W2APF heard a call for a special drug for a patient in Brazil from PY4ZAD. He relayed the request to a drug manufacturer who located the medicine in England. W2APF then contacted the English doctor and phone-patched him to the Brazilian doctor, and the drug was delivered. — (G. Lynn)

■ Oshawa, ON — Sept. 15. VE3EBZ/mobile 3 saw an overturned car and called for help through repeater VE3RPT. VE3PQ answered and called police who asked for the hams to make another call requesting an ambulance. — (VE3EBZ)

■ Clifton, NJ — Sept. 16. A request for special fluorescent lamps needed in treating an Italian child was received by WB2HPV from I4MKN and I4LX. He located the lamps, picked them up and took them to an airport to be flown out. — (WA2FDZ)

■ Petal, MS — Oct. 13. A fire in a remote rural area was called in to the Petal Volunteer Fire Department and WASOD relayed the information via two meters to W5LSG. The latter then went to the scene and asked for additional equipment and medicine via 146.94. — (WB5DCY, SCM MS)

■ Middletown, OH — Oct. 20. An automobile accident was spotted by WB8EKV who then requested help via WR8ABS. WB8ODS responded and called police. — (WB8CLF, EC Butler Co.)

■ Harris Co., TX — Oct. 28. After a funnel cloud was sighted, the Emergency Operations Center was activated by WASWG. Emergency generators were furnished for rescue workers by amateurs whose on-the-scene reports of weather conditions, need for aid to refugees and their property, were relayed to c.d. officials. — (KSHXR)

■ Englishtown, NJ — Oct. 30. WB2PLU/mobile 2 called K3ZFD for help after spotting a disabled truck on the N.J. Turnpike. Officials were notified. — (WA3IWX, EC Bucks Co.)

■ Vancouver, BC — Nov. 9. Two people fighting in the center of a divided highway were seen by VE7AZG and VE7BI/mobile 7. They auto-patched the information to the police. — (VE7PB, SEC BC)

■ Mobile, AL — Nov. 9. K4LXU heard OA4SS in Lima, Peru, trying to contact Denver, CO, International Earthquake Center to get a seismographic reading to determine if a tidal wave would hit. Springfield College's physics lab in Mobile was contacted and the information was phone-patched to Lima. The information was confirmed later from Denver. — (WB4VGG)

■ San Antonio, TX — Nov. 26. K7QLZ/mobile 6 reported an accident through the Western Country Cousins Net. W6VXJ relayed the information to the police. — (W6VXJ)

■ Lufkin, TX — Nov. 27. WB5DGG came upon an auto collision and after steering clear of it called W5CNM via WR5ACF, and police were phoned. — (WA5VBM)

■ Long Island, NY — Nov. 8 - Dec. 2. The Long Island Mobile ARC turned in a public service log containing the reporting of 11 accidents, 12 disabled vehicles, two brush fires, and an in-operative traffic light. — (K2QPF, EC Oyster Bay)

■ Prince George's and Howard Cos., MD — Dec. 1. Heavy winds and rain caused power and phone lines and trees to fall down across roads which were flooded. WA3FKW notified the Red Cross of stranded people and impassible roads. Howard and Prince George's Cos. AREC were activated with 32 amateurs on the road reporting lines down and damage. — (WA3SWS, EC Howard Co.)

■ Allegany and Garrett Cos., MD — Dec. 1. A violent snow storm felled trees, stranded motorists and knocked out State Police, State Highway Commission, County Fire Boards and telephone company communications. The Maryland Emergency Phone Net was alerted and W3DFW, EC for Allegany Co. and W3BHE initiated their emergency

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for December Traffic

| Call | Orig. | Recd. | Rel. | Del. | Total |
|---------|-------|-------|------|------|-------|
| W3CUL | 359 | 1433 | 1284 | 114 | 3190 |
| W0WYX | 49 | 839 | 116 | 723 | 1727 |
| W6RSY | 81 | 855 | 771 | 9 | 1716 |
| K0ONK | 169 | 574 | 559 | 13 | 1315 |
| W3VVR | 332 | 434 | 362 | 21 | 1149 |
| WB0HOX | 107 | 432 | 380 | 34 | 953 |
| K0ZSQ | — | 434 | — | 434 | 868 |
| W6YBV | 26 | 412 | 377 | 42 | 857 |
| K9CPM | 60 | 370 | 76 | 338 | 844 |
| WA2DSA | 49 | 410 | 360 | 11 | 830 |
| WA3QYY | 84 | 389 | 348 | 7 | 828 |
| WR2RKK | 69 | 401 | 271 | 78 | 819 |
| WA8MCR | 127 | 344 | 328 | 16 | 815 |
| WB2PYM | 48 | 390 | 350 | 18 | 806 |
| WB6OYN | 24 | 368 | 311 | 26 | 729 |
| WB2FLF | 40 | 341 | 310 | 30 | 721 |
| W4DQS | 29 | 321 | 310 | 9 | 669 |
| WA8HGH | 38 | 336 | 245 | 23 | 642 |
| WB2JRX | 63 | 275 | 263 | 11 | 612 |
| VE3SB | 71 | 290 | 218 | 29 | 608 |
| WA3ATQ | 227 | 192 | 184 | 2 | 605 |
| K7NTG | 357 | 118 | 92 | 26 | 593 |
| WA0TMM | 18 | 297 | 274 | — | 589 |
| K4SIH | 75 | 289 | 203 | 16 | 583 |
| W6IPW | 18 | 278 | 274 | 4 | 574 |
| WB6PVH | 27 | 275 | 119 | 152 | 573 |
| WA1QME | 87 | 213 | 187 | 83 | 570 |
| W9DND | 31 | 272 | 259 | 5 | 567 |
| KH6IAC | 163 | 213 | 99 | 84 | 559 |
| VE3GOL | 170 | 227 | 127 | 33 | 557 |
| K6GMI | 45 | 271 | 188 | 52 | 556 |
| WA1QKD | 85 | 232 | 217 | 15 | 549 |
| WA1POJ | 45 | 259 | 222 | 20 | 546 |
| WA1RYL | 75 | 232 | 170 | 50 | 527 |
| WA1MSK | 28 | 276 | 193 | 18 | 515 |
| WA4FBI | 37 | 258 | 209 | 24 | 508 |
| W5UGE | 30 | 241 | 205 | 32 | 508 |
| W3FR | 21 | 306 | 178 | 1 | 506 |
| W2KAT/3 | 15 | 253 | 209 | 23 | 500 |

BPL for 100 or more originations plus deliveries

| | | | | | |
|--------|-----|----------|-----|----------------------|-----|
| K7CC | 372 | W5SHN | 138 | WB2RKF | 109 |
| WA7FVT | 301 | W3BNR | 135 | W1DMH | 108 |
| WA3RCA | 296 | W511 | 135 | WA3UKZ | 108 |
| WA0AUX | 217 | WA8YVT | 134 | WB5BFW | 108 |
| K6RPN | 183 | WNTUAX | 133 | K66JAO | 107 |
| WB5HVV | 169 | W7DAN | 133 | W2URP | 106 |
| W81RX | 165 | WA2EPI | 130 | VE3GFN | 106 |
| W6RFF | 164 | WN2UJD/2 | 127 | WB4ED1 | 105 |
| VE3FRG | 155 | WA2PCF | 124 | WB8KQJ | 105 |
| VE3GRR | 145 | VE3EHF | 124 | W0INH | 105 |
| K6GNI | 144 | WA9QVI | 121 | W5GHP | 103 |
| WB4MXG | 141 | W3CWC | 117 | WA1SHO | 100 |
| W8QCU | 141 | WB8HHC | 116 | WN8PIV | 100 |
| WA6WYD | 139 | WB8JY | 114 | WN9PWO | 100 |
| WB4ZMK | 138 | WA5ZZA | 113 | WN2UJD/2 (Nov. 1962) | 100 |
| | | VE3GJG | 112 | | |

More-Than-One-Operator Station

| | | | |
|------|-----|---------|-----|
| K4MC | 181 | K4BFT/4 | 150 |
|------|-----|---------|-----|

BPL Medallions (see December, 1973 QST, p. 59) have been awarded to the following amateurs since last month's listings: WA3VBM.

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.

plan. Messages to concerned relatives from stranded motorists were passed until regular communications were restored. — (W3FA, SCM MD)

■ Sussex Co., MD — Dec. 1. The Delaware Emergency Phone Net was in session for over two hours providing communications to Delaware beach communities lashed by strong winds and

(Continued on page 166)

Happenings of the Month

BOARD MEETING HIGHLIGHTS

Discussions of FCC's restructuring proposals in Docket 20282, continuing preparations for the World Administrative Radio Conference in 1979 and the "changing of the guard" at headquarters were primary concerns of the ARRL Board of Directors when it met at the Holiday Inn, Hartford, on January 16-17, 1975. There was a thorough discussion on how to inform the members concerning the restructuring docket and how to gather the members' input on what the League's position should be. A special ad hoc committee drew up a time table under which a "Survey of Membership Attitudes and Opinions" would be sent to all ARRL Members by early March, minutes 21 and 23. The surveys would be returned to Hq. for computer tabulation and the results would be in the directors' hands by early May. The Second Board Meeting, normally the third Thursday in July, was moved to May 15 (minute 19) so that the Board could then formulate League policy in time for the June 16 deadline in Docket 20282. Equally important to what the Board did on the docket is what it did not do - no positions were taken regarding any of the restructuring proposals, because the Board felt there had not been time for an information exchange between members and directors.

A discussion of preparations for the World Administrative Radio Conference in 1979 occurred at minute 4 with oral reports of President Dannals and Vice Presidents Clark and Eaton. Minute 84 ordered a response in Docket 20271, FCC's inquiry into proposals to be offered by the United States at the WARC, to include return of the 160 meter band, expanded hf privileges and vhf/uhf/shf allocations which will protect the amateur future in space communications.

On other FCC matters, the Board reviewed recent developments in the Class E CB proposal, Docket 19759 - still a live threat to our 220-MHz band. Comment is to be filed (minute 89) in the Class D CB restructuring docket, 20120, which will draw attention to the relationship of that matter to Class E and to amateur restructuring. The action of the General Counsel, in requesting a stay in the effective date of Docket 19555 on environmental policy and for reconsideration of its application to the amateur service, was unanimously confirmed by the Board (minute 88). Citing "unforeseen consequences of Docket 18803," the Board expressed (minute 60) its support for actions "to permit amateurs to continue to take advantage of the unparalleled capability of radio remotely controlled stations." There will also be petitions to FCC freeing up amateurs in their choice of codes

and speeds for RTTY (minute 17) and for examinations to be given in the Spanish language (minute 20). The basic responsibility for preparing FCC filings was assigned to the General Manager and his staff (minute 18).

Speaking of the General Manager, the Board at minute 12 accepted with regret the early retirement at his request of John Huntoon, W1RW, who has held the post since 1961, and unanimously adopted a commendatory resolution (78) praising his accomplishments. Richard L. Baldwin, W1RU, assistant general manager since 1963, was named to the post (minute 13) effective February 1, 1975. The Board approved a national convention to be held in San Diego in 1978 (minute 50) and separately authorized preparation of a workbook for these affairs (8). A first step toward establishment of an historical library was taken at minute 47. Appreciation of the work done by volunteers was apparent in minute 49 which formalized the policy of calling on officers, directors and members wherever they can provide a service. An attempt to return to one Board meeting per year was twice defeated (minutes 39 and 65), even though favored 11 to 5; as an amendment to the Articles and Bylaws, offered without prior notice, it required an affirmative vote of three-fourths of the directors, or 12. But amendments were readily made with respect to standing and advisory committees (minutes 58, 59 and 86). Directors Albright, Arnold, Griggs and Thurston were reelected (35) to one-year terms on the Executive Committee. Thomas Watson, W6DW/W6VM, was chosen as a public director of the ARRL Foundation for three years; ARRL Board members Egbert, Wicker and Zak were also appointed as Foundation directors (36). And the ARRL Technical Merit Award was conferred at minute 83 on Dr. Karl Meinzer, DJ4ZC, and Mr. Werner Haas, DJ5KO, both members of Amsat Deutschland e.v., for their work on Amsat/Oscar 7.

Turning now to operating matters, the Board approved (27) development of an emergency operations workbook; called for exploratory discussions on a world-wide alerting procedure for disaster communications (28); and asked for expansion of WIAW emergency bulletins to include net information (29). A special Bicentennial WAS is established for 1976 by minute 62; and minute 25 calls for a DXCC award for cw, in addition to the mixed award and DXCC phone presently available, with communications after January 1, 1975 to count.

The Board commended the *Reseau des Emetteurs Francais* on their Fiftieth Anniversary; the RFI Task Group and its secretary, Ted Cohen,

At the top — new General Manager Dick Baldwin, W1RU; ARRL President Harry J. Dannels, W2TUK; Secretary and retiring General Manager John Huntoon, W1RW.



W4UMF, for work toward elimination of radio frequency interference problems; the Emergency Communications Advisory Committee and chairman Bud Cone, WA4PBG, for work in general but specifically on the RACES docket, 19723; Lewis G. McCoy, W1ICP, beginner and novice editor of *QST*, for 25 years of service to the League; and Robert York Chapman, W1QV, past director of the New England, whose faithful service was acknowledged by his election as an honorary vice president (minutes 75, 56, 63, 79 and 76 respectively).

The complete minutes appear at the end of this department.

W1RW RETIRES

As noted above, John Huntoon, W1RW, retired on January 31 as General Manager of ARRL and Editor of *QST*, which posts he has held since 1961. Happily, he'll continue in the important (but unpaid!) functions of Secretary of ARRL and of the International Amateur Radio Union through the end of his present term (January 15, 1976).

As a student in Glen Ellyn, Illinois, John converted the high-school science club into a radio outfit, acquired W9KJY in 1932, and plunged into the traffic game. Stints as route manager for Illinois and corps area net control for the old Army Amateur Radio System helped lead to his election in 1936 as Section Communications Manager for Illinois. He served several terms as secretary to the Chicago Area Radio Club Council, and helped run the 1936 Central and 1938 National Conventions in Chicago, taking time out during the latter to win the code-speed contest.

On February 8, 1939, John "turned pro," coming to West Hartford as an assistant secretary, and trading W9KJY for W1LVQ. In 1942, he took a leave of absence and joined the Coast Guard as a chief petty officer — first in the radio school at Atlantic City and later in communications intelligence work in Washington. Postwar, W1LVQ was initiated into international conference work by A. L. Budlong, W1BUD, at Atlantic City in 1947. The two were a team at the 1949 Inter-American Radio Conference and the 1959 World Administrative Radio Conference, in Geneva. "Bud" appointed John as assistant General Manager in 1956; the Board picked John for the top job in 1961 at the retirement of W1BUD.

W1RW now ought to have time for some of the several avocations he's sampled in the past: gardening, bee keeping, astronomy, telescope-building, sports-car rallying, cryptanalysis, clarinet playing and photography, not to mention several facets of ham radio. He and his wife, Pat, live in East

Hartford; they have three daughters and three grandchildren.

— . . . —
We'll introduce the new General Manager, Richard L. Baldwin, W1RU, next month.

FEES FOR LICENSES DROP

A bit of good news in a world of inflation: the basic fee for a new, renewed or modified-and-renewed amateur license drops March 1 from the present \$9 to a new rate of \$4; straight modifications drop to \$3, and duplicate licenses to \$2. Novice, RACES and military recreation authorizations remain free; special calls, where authorized by Sections 97.51 and 97.53 *only*, remain at \$25 in addition to other fees which may be due.

Docket 19658 began in December 1972 with a proposal to raise fees so that FCC could recover from licensees the full expenses of operating the Commission. Amateur fees were proposed at \$10 at that point. In the spring of 1974, despite heavy protests (including ARRL's), FCC issued an order putting most of those fees into effect, but within a few days was forced to retract the action by an order of the Supreme Court which said that FCC had authority to reclaim only part of its expenses, that part which represented the "value to the recipient" of the service received from the Commission. Accordingly a new schedule was proposed, with amateur fees pegged at \$6 basic, \$5 for straight modifications. The League again filed comment in opposition, pointing out that there was no tangible benefit to the recipient in an amateur license since he could not use his license for any pecuniary gain (see page 66, December 1974 *QST*) and that, accordingly, these licenses should be issued without fee.

The gist of the Commission's remarks in the Report and Order make it clear that FCC interprets the Supreme Court mandate to mean, "value of what the recipient receives at its cost to the government," rather than the actual cash value of the license to the recipient! Nevertheless, the new schedule at least brings amateurs to parity with commercial operator licenses, where the first, second or third class tickets are also pegged at \$4. Most other licenses in the Safety and Special Radio Services, including CB, also drop to \$4.

Please spread the word, since FCC says it can't refund overpayments.

ENVIRONMENTAL POLICY RULES

On December 19, 1974, the Federal Communications Commission released an amendment to its basic rules effective January 20 to conform to the National Environmental Policy Act of 1969. On January 10, 1975, it issued a further order, amending individual radio service regulations to implement the basic rule. For the amateur service, the following rule became effective January 24:

"Section 97.41 Application for station license.

(i) Each applicant in the Safety and Special Radio Services (1) for modification of a station license involving a site change or a substantial increase in tower height or (2) for a license for a new station must, before commencing construction, supply the environmental information, where required, and must follow the procedure prescribed by Subpart I of Part I of this chapter (sections 1.1301 through 1.1319) *unless Commission action authorizing such construction would be a minor action with the meaning of Subpart I of Part I.*" [Our emphasis].

Although most amateur installations clearly fall into the "minor" category (towers under 300 feet, not located in a wildlife preserve or in a scenic and recreational area, etc), amateurs were required by the basic amendment to file a statement with every application after January 20 that "This application is not a major application as defined in Section 1.1305 of the Commission's Rules." Envisioning a horrid backlog if amateur applications were to be rejected for want of this statement, the ARRL promptly filed for a stay "until three months after the Commission has . . . made available for widespread distribution a revision of FCC form 610 containing the environmental statement. . ."

The Commission promptly rejected our petition (and others similar to it) but with rather encouraging words:

". . . As the League states and as we are fully aware, it would be rare, indeed, for an amateur operator to construct an antenna tower which is 300 feet in height or which would for any other

reason be a "major" action within the meaning of the environmental rules. In this respect, we note that structures of 300 feet in height require aviation hazard clearance, where information concerning the height and location of the structure is required, and the need for clearance is made known to the Commission, and that amateur structures in this category are also rare. It should therefore be apparent that we do not intend to reject or hold up amateur applications for want of a statement that the facilities in question are "minor" facilities. . . ."

ARRL has also filed a petition for reconsideration to have amateurs exempted from the environmental policy rules since — because amateurs can operate from almost any place under the mobile and portable rules, can tear down and reconstruct an antenna support every day of the year, and so on — the rules are meaningless for our service.

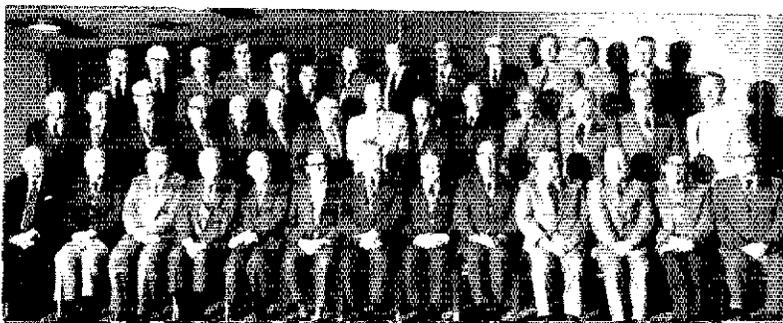
STAFF VACANCY

The retirement of WIRW and promotion of WIRU will cause some additional changes in the assignments of the General Manager's immediate staff. We'll need another hand for correspondence with members on regulatory questions, the handling of WAC awards, preparation of *QST* copy, tour guide duty, sorting incoming mail, doing public relations work and a myriad of other duties from time to time. The position is really that of a trainee carrying the title, Membership Services Assistant, and the salary, accordingly, will be modest. A good memory, lively interest in people and the world, but especially the ability to spell correctly and write clearly are the prerequisites, along with an amateur license and a few years' experience in the organizational side of the hobby. Resumes, separate from any other correspondence, should be addressed to: Box A, c/o ARRL, Newington, Conn. 06111.

HAM RADIO AT IEEE INTERCON

Amateur radio was given a spot on the program of IEEE INTERCON-74 for the first time in history. We are happy to find that a place on each

The Board, by call sign — all names and positions are in the Minutes, and so are omitted here to save space. Left to right, seated: W7PGY, W1HHR, W0PAN, W6KW, Treasurer Houghton, W1RW, W2TUK, W1RU, W4KFC, W6ZRJ, W0FZO, WB4CBP, W9PRN. Second row: W0RIW, W8JM, VE3CJ, W5EYB, W5ACY, W0BWJ, W4DQD, W3PS, W0SIN, K2SJO, PR Counsel Waters, W8ETU, W9HPG, W1CER. Top: WB4ANX, W3SW, W4WHN, WA0IAW, W0BUO, W3KT, VE2MS, W1NJM, W1DGL, W1BDI, VE2VW, W1UED, K0HRZ.



An Ernie Ash Plaque, in memory of the late VO1AA, QSL manager for a quarter century, has been presented to the Society of Newfoundland Radio Amateurs to be awarded each year to the amateur receiving the greatest number of DX QSLs through the bureau. In the photo, Bill Coffen, VO1KM, the present QSL manager, holds the plaque. Others, from left, are Ernie's daughter Helen, wife Mary, son Roy, and Nate Penney, VO1NP, vice president of SONRA. (Photo and info via John C. Tessier, VO1FX)



year's program will exist for amateur radio, proving once again that significant contributions to the art can be made by amateurs. This year's program in NYC will be held on Monday afternoon, April 7, from 2 to 5 p.m., Session No. L.

The topic will be antennas. Antenna measuring techniques will be treated by Richard Knadle, K2RIW. Jerry Sevick, W2FML, will discuss short vertical antennas for hf and mf applications. ARRL Hq. involvement includes program organization and coordination by WICER, and papers by K1PLP and W1YNC. Jerry Hall will speak on physically shortened antennas for use from 1.8 to 10 MHz. Anthony Dorbuck's theme will cover basic considerations for limited-space antennas.

This year's symposium will be held at the Americana Hotel. We hope for a good turnout, as the larger the audience the greater our chances for repeat performances on the programs in years to come.

MASSACHUSETTS HEADPHONE LAW

The Massachusetts General Court (legislature) has adopted a law governing headsets:

"Section 13 of Chapter 90 of the General Laws is hereby amended by adding the following sentence:

"No person shall operate a motor vehicle while wearing headphones, unless said headphones are used for communication in connection with controlling the course or movement of said vehicle."

Thanks to Attorney Duncan Kreamer, W1GAY, for sending us the text.

ONTARIO AMATEURS COMMENDED BY CNIB

The Canadian National Institute for the Blind recently expressed its appreciation to the Radio

Society of Ontario, sponsors of the CNIB Amateur Radio Club, in the following letter addressed to RSO President Bill Loucks, VE3AK:

Dear Mr. Loucks:

No review of your work with CNIB would be complete without a most sincere expression of our appreciation. In my work as Managing Director I am in almost daily contact with our eight divisions across Canada and I am frequently being told of the great satisfaction and sense of achievement enjoyed by over 260 blind Canadians who have been licensed.

When your society adopted blind operators as a public service in 1967 when only a handful were involved in radio, none of us expected the tremendous growth and national developments that have taken place in just seven and a half years.

In congratulating your society for your constructive assistance I wish to acknowledge the professional expertise that each member willingly volunteered as the project advanced. Your members guided the program, extended the work to all ten provinces of Canada and, at the same time over 200 served as sponsors for blind hams across Ontario. Your society has been the leader in amateur radio service not only for Ontario but to help development in other provinces as well.

In short, your Society's continuing interest and the successful fund raising and active participation of so many of your members has given rise to a program that to our knowledge is unparalleled in any other country. For your magnificent contribution towards the well being of blind Canadians may I express not only the warm hearted appreciation of CNIB but also my personal thanks for the establishment of a program that has become an integral part of CNIB service.

Sincerely yours,
R.C. Purse,
Managing Director.

Thanks to the RSO magazine, *Ontario Amateur*, from which this letter was reprinted.

W2TUK, W1RU -- during the latter's "job interview."

March 1975



FCC EXAMINATION SCHEDULE

These schedules change from time to time, and thus it would be advisable to verify the examination times by phone before visiting an FCC office. Of course, no tests are administered on national holidays. Additional examination points are listed after the office schedule in most districts; at such places, appointments should be made during the month previous through the district engineer. The completed form 610 and check or money order for \$4 should be filed in advance. An applicant may appear at any FCC examination point regardless of where he lives. Recent changes are in bold face.

1 Boston, Mass. 02109; Indiana & State Streets; **Tues.-Wed. 9-11 A.M.** Exams with code test, **Wed. only, 9 A.M.** Also conducts examinations at Bangor, Me. in May and Nov.; Hartford, Conn. in **Jan., Apr., July & Oct.**; Portland, Me. in April and Oct.

2 New York, N.Y. 10014; 641 Washington Street; **Wed., 9 A.M.** Also conducts examinations at Albany, N.Y. in Mar., June, Sept., and Dec.

3 Philadelphia, Penn. 19106; 2nd & Chestnut Streets; without code test, **Mon.-Wed., 10-12 A.M.**; with code test **Tues.-Wed., 8-9 A.M.**

4 Baltimore, Md. 21201; 819 Geo. M. Fallon Federal Bldg., 31 Hopkins Plaza; **Mon., 8:30 A.M.**

5 Norfolk, Va. 23502; Military Circle, 870 North Military Highway; **Thurs., 9 A.M.** Also conducts examinations at Salem, Va. in Apr. & Oct.; Wilmington, N.C. in June & Dec.; Winston-Salem, N.C. in Feb., May, Aug., and Nov.

6 Atlanta, GA 30303; 1602 Gas Light Tower, 235 Peachtree Street, N.E.; **Tues. and Fri., 8:30 A.M. to noon; exams with code test, Fri. only 8:30 A.M.** Also conducts examinations at Columbia, S.C., May and Nov.; Nashville, Tenn. in Feb., May, Aug., and Nov.; Memphis, Tenn. in Jan., Apr., July, and Oct.; Knoxville, Tenn. in Mar., June, Sept., and Dec.; Birmingham, Ala. in Mar., and Sept., **Montgomery, Ala. in June and Dec.**

6S Savannah, Ga. 31402; Bull & State Sts., P.O. Box 8004, by appointment one week in advance only.

7 Miami, Fla. 33130; 51 S. W. First Avenue. Exams with code test, **Thurs. 9 A.M.**; others, **Tues., Wed., 8 A.M. - 1 P.M.** Also conducts examinations at Jacksonville, Fla. in Apr. and Oct.

7T Tampa, Fla. 33606; 500 Zack Street; by appointment made one week in advance only.

8 New Orleans, La. 70130; 600 South Street; with code, **Tues., 8 A.M.**, others, **Tues.-Wed., 8:30-noon.** Also conducts examinations at Jackson, Miss. in June and Dec.; Little Rock, Ark. in Feb., May, Aug., and Nov.

8M Mobile, Ala. 36602; 113 St. Joseph Street; call Monday for appointment.

9 Houston, Texas 77002; 515 Rusk Avenue; without code **Fri. 8 A.M. to noon;** with code, **Thurs., 9 A.M.** Also conducts examinations at San Antonio, Texas in Feb., May, Aug., and Nov., at Corpus Christi, Texas in June, and Dec.

9B Beaumont, Texas 77701; 300 Willow Street; by appointment one week in advance only.

10 Dallas, Texas 75202; Rm 1367, Federal Bldg., 1100 Commerce St., **Tues 9 A.M.** Also conducts examinations at El Paso, Texas in June and Dec.; Lubbock, Texas in March and Sept.; Oklahoma City in Jan., Apr., July, and Oct.; Tulsa in Feb., May, Aug. and Nov.

11 Los Angeles, Calif. 90012; Rm 1754; 312 N. Spring St.; **Wed. 9 A.M.** and **1 P.M.** Also conducts examinations at Bakersfield, Calif. in May; Las Vegas, Nev. in Jan. and July; Phoenix,

Ariz. in Jan., Apr., July, and Oct.; Tucson, Ariz. in Apr. and Oct.

11SD San Diego, Calif. 92102; 1245 Seventh Avenue; by appointment one week in advance only.

12 San Francisco, Calif. 94111; 555 Battery Street; **Fri., Extra 8:30 A.M.**; others with code, **10 A.M.**; without code, **8:30 A.M.** Also conducts examinations at Fresno, Calif. in Mar., June, Sept., and Dec.; Reno Nev. in Apr. and Oct.

13 Portland, Ore. 97204; 319 S. W. Pine St.; **Fri. 8:45 A.M.** Also conducts examinations at Boise, Idaho in Apr. and Oct.; Klamath Falls, Ore. in May.

14 Seattle, Wash. 98104; 909 1st Avenue; **Fri. 8:45 A.M.** Exams also given elsewhere in **Ida., Mont. and Wash.**; write Seattle for information.

15 Denver Colo. 80202; 19th Street between California and Stout Streets; **1st and 2nd Wed. 8:30 A.M.** Also conducts examinations at Albuquerque, N. Mex. in Apr. and Oct.; Rapid City, S. Dak. in May; Salt Lake City, Utah in Mar., June, Sept., and Dec.

16 St. Paul, Minn. 55101; 4th and Robert Streets; **Fri., 8:45 A.M.** Also conducts examinations at Jamestown, N. Dak. in Oct.; Marquette, Mich. in May; Sioux Falls, S. Dak. in Mar., June, Sept., and Dec.

17 Kansas City, Mo. 64106; 601 E. 12th St.; **Thurs., 1 P.M.** Also conducts examinations at Des Moines, Iowa in Mar., June, Sept., and Dec.; Omaha, Nebr. in Jan., Apr., July, and Oct.; St. Louis, Mo. in Feb., May, Aug., and Nov.; Wichita, Kans. in Mar. and Sept.

18 Chicago, Ill. 60604. 230 South Dearborn Street; **Fri., 8:45 A.M.** Exams also given elsewhere in **Ill., Ind., W. Ky., and Wisc.**; write Chicago for information.

19 Detroit, Mich. 48226; 231 W. Lafayette Street; **Fri., 9 A.M.** Exams also given elsewhere in **Eastern Ky., Ohio, Mich., and W. Va.**; Write Detroit for information.

20 Buffalo, N.Y. 14202; 1305 Federal Bldg., 111 West Huron St.; **Fri., 9 A.M.**; for groups of 8 or more, by appointment. Also conducts examinations at Pittsburgh, Penna. in Feb., May, Aug., and Nov.; Syracuse, N. Y. in Jan., Apr., July, and Oct.; Williamsport, Penna. in Mar., and Sept.

21 Honolulu, Hawaii 96808; 502 Federal Building; **Wed., 8 A.M.** and by appointment. Exams also given elsewhere in Hawaii and on Guam; Write Honolulu for information.

22 San Juan, P.R. 00903; 322 U.S. Post Office and Courthouse, P.O. Box 2987; **Fri., with code 10 A.M., others, Thurs., Fri., 8:30 A.M.**

23 Anchorage, Alaska 99501; Rm G-63, U.S. Post Office Bldg., 4th & G Streets; P.O. Box 644; **Mon.-Fri., 8:30 A.M.-3:30 P.M.**; code tests by appointment only. Exams also given elsewhere in Alaska; write Anchorage for information.

24 Washington, D.C. 20554; 1919 M Street, N.W.; **Fri. 9:00 A.M. and 10:30 A.M.**

LICENSE REVOKED

In a case which stretches back to a "Show Cause" order in June 1972, the full Federal Communications Commission has supported the decision of its review board revoking the station license of Samuel C. McCluney, III, KØECG, of Jacksonville, Florida, and suspending his operator license for the remainder of its term. The Board in turn has upheld Administrative Law Judge Byron F. Harrison who concluded that McCluney had acquired his Amateur Extra Class license by fraud and misrepresentation. The Judge found that KØECG had held the General Class license since 1960, but upon renewal in 1970, the copy of the old license furnished with the application showed "Amateur Extra Class" in hand printing instead of the usual typed words. No trace of any upgrading of the license could be found in FCC records nor could the applicant furnish detail as to the time and place of an Extra Class examination.

MINUTES, THE 1975 ANNUAL MEETING BOARD OF DIRECTORS THE AMERICAN RADIO RELAY LEAGUE January 16-17, 1975

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in annual session at the Holiday Inn, Hartford, Connecticut, on January 16, 1975. The meeting was called to order at 9:35 A.M., with President Harry J. Dannels, W2TUK, in the Chair, and the following directors present:

Roy L. Albright, W5EYB, West Gulf Division
Max Arnold, W4WHN, Delta Division
Charles M. Cotterell, W9SIN, Rocky Mountain
Richard A. Egbert, W8ETU, Great Lakes Division
J. A. Gmelin, W6ZRJ, Pacific Division
Paul Grauer, W0FTR, Midwest Division
John R. Griggs, W6KW, Southwestern Division
Phillip E. Haller, W9HPG, Central Division
Harry A. McConaghy, W3SW, Atlantic Division
Larry E. Price, W4DQD, Southeastern Division
Larry J. Shima, W0PAN, Dakota Division
A. George Spencer, VE2MS, Canadian Division
John C. Sullivan, W1HHR, New England Division
Robert B. Thurston, W7PGY, Northwestern Div.
L. Phil Wicker, W4ACY, Roanoke Division
Stan Zak, K2SJO, Hudson Division

Also in attendance, as members of the Board without vote, were Victor C. Clark, W4KEC, First Vice President; Noel B. Eaton, VE3CJ, and Carl L. Smith, W0BWJ, Vice Presidents; and John Hutton, W1RW, General Manager. Also in attendance, at the invitation of the Board as non-participating observers, were the following Vice Directors: Jesse Bieberman, W3KT, Atlantic Division; Edmond A. Metzger, W9PRN, Central; Thomas M. Kulas, WA0-IAW, Dakota; John H. Sanders, WB4ANX, Delta; Richard W. Pitner, W0FZO, Midwest; John E. Lindholm, W1DGL, New England; Donald B. Morris, W8JM, Roanoke; Maurice O. Carpenter, K0HRZ, Rocky Mountain; and Ted R. Wayne, WB4CBP, Southeastern. There were also present Honorary Vice Presidents F. E. Handy, W1BDI, and Charles G. Compton, W0BUO; Treasurer David H. Houghton; General Counsel Robert M. Booth, Jr., W3PS; Canadian Counsel B. Robert Benson, VE2VW; Assistant General Manager Richard L. Baldwin, W1RU; Communications Manager George Hart, W1NJM; Senior Assistant Secretary Perry F. Williams, W1UED; QST Technical Editor Doug



W1NJM, W4WHN

DeMaw, WICER; and Public Relations Consultant Don Waters.

2) On motion of Mr. Price, seconded by Mr. Gmelin, after discussion, unanimously VOTED that Item 5 of the Agenda will be, "Receive reports and consider recommendations of committees," that Item 5(g) will be "Report of the ARRL Foundation," that Item 7 will be "Election of Directors for the ARRL Foundation," and that the appointment of committees will become Item 8(b).

3) On motion of Mr. Thurston, seconded by Mr. Griggs, unanimously VOTED that the minutes of the 1974 Second Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

4) At this point, oral reports were offered by the officers and counsel of the League, during the course of which the Board was in recess from 10:17 to 10:32 A.M.

5) Mr. Albright, as Chairman, presented the report of the International Affairs Committee. Mr. Zak, as Chairman, presented the report of the Plans and Programs Committee and, on his motion, seconded by Mr. Cotterell, VOTED, at 11:38 A.M., that the Board does now resolve itself into a Committee of the Whole to discuss the report. The Committee rose at 12:01 P.M. and reported to the Board.

6) The Board was in recess for luncheon from 12:04 P.M. to 12:49 P.M.

7) Mr. Griggs, as Chairman, presented the report of the Membership Affairs Committee. Moved, by Mr. Haller, seconded by Mr. Thurston, that the Communications Manager make available an appointment to be titled "Regional Emergency Coordinator" and make such appointment with the approval of the Executive Committee and concerned Section Communication Managers. After discussion, on motion of Mr. Shima, seconded by Mr. Albright, VOTED, 9 votes in favor to 7 opposed, that the matter is referred to the Emergency Communications Advisory Committee for study; Messrs. Gmelin, Griggs, Haller and Price requested to be recorded as voting opposed to referral.

8) On motion of Mr. Griggs, seconded by Mr. Shima, after discussion, unanimously VOTED that the Membership Affairs Committee is authorized to prepare a booklet on the staging of ARRL National Conventions.

9) On motion of Mr. Haller, seconded by Mr. McConaghy, after discussion, VOTED that the General Manager make available for sale at a reduced price at the earliest possible date a complete set of the League's 13 publications with

appropriate advertising to encourage sales.

10) The Board was in recess from 1:32 to 1:45 P.M.

11) Moved by Mr. Grauer, seconded by Mr. McConaghy, that at least a General or Conditional if disabled would be the minimum class required for SCM candidates. After discussion, on motion of Mr. Cotterell, seconded by Mr. Sullivan, VOTED, 7 votes in favor to 6 opposed, that the matter is laid on the table.

12) Mr. Shima, as Chairman, presented the report of the Management and Finance Committee. At this point the President read to the Board a letter from John Huntoon, W1RW, requesting early retirement as General Manager of the League. On motion of Mr. Cotterell, seconded by Mr. Thurston, unanimously RESOLVED, that the Board of Directors of the American Radio Relay League, Incorporated, accepts with deep regret the wish of John Huntoon, W1RW, to retire as General Manager of the American Radio Relay League and as editor of its journal *QST* effective January 31, 1975, and does hereby heartily approve his request to take accrued retirement benefits in a lump sum.

13) On motion of Mr. Egbert, seconded by Mr. Shima, unanimously VOTED, at 2:00 P.M., that the Board does now resolve itself into a Committee of the Whole to consider Headquarters staff matters. The Committee rose at 5:10 P.M. and reported to the Board. On motion of Mr. Shima, seconded by Mr. McConaghy, unanimously VOTED that Richard L. Baldwin, W1RU, is appointed to serve as General Manager of ARRL Headquarters effective February 1, 1975.

14) On motion of Mr. Shima, seconded by Mr. McConaghy, unanimously VOTED that the Management and Finance Committee review past policy decisions of the Board with respect to financial matters and make such recommendations to the Board as are deemed appropriate.

15) On motion of Mr. Cotterell, seconded by Mr. Shima, VOTED that the firm of Ernst & Ernst is appointed League auditor for the year 1975; Mr. Price requested to be recorded as voting opposed.

16) The Board was in recess for dinner from 5:30 P.M. to 8:04 P.M.

17) Mr. Price, as Chairman, presented the report of the Legal and Regulatory Committee. On motion of Mr. Gmelin, seconded by Mr. Price, after discussion, unanimously VOTED (Canadian Director Spencer abstaining) that the General Manager is directed to prepare for filing by the General Counsel a petition for rule making seeking the deletion of the restrictive reference to radioteleprinter codes and speeds contained in Section 97.69(a) and (b) of the Commission's rules.

18) On motion of Mr. Price, seconded by Mr. McConaghy, after extended discussion, unanimously VOTED that it is the policy of this Board that the Headquarters staff, under the supervision

of the General Manager, be assigned the responsibility for preparing submissions to FCC and responses to FCC Notices of Proposed Rule Making and Notices of Inquiry, and that such filings be reviewed by the General Counsel for legal form and language before transmittal to FCC.

19) On motion of Mr. McConaghy, seconded by Mr. Shima, unanimously VOTED that the second Board meeting scheduled to be held the third Thursday in July, 1975, be changed to the third Thursday in May 1975, so that the Board may formulate comments to be filed on the matter of Docket 20282.

20) On motion of Mr. Price, seconded by Mr. Gmelin, after discussion, unanimously VOTED (Canadian Director Spencer abstaining) that the General Manager is directed to prepare not later than March 1, 1975, for filing by the General Counsel, a petition for rule making seeking to implement the instruction of the Board contained in Minute 18 of the Second 1974 Board meeting relative to Spanish language amateur examinations in the Commonwealth of Puerto Rico.

21) On motion of Mr. Gmelin, seconded by Mr. Albright, unanimously VOTED that the Board now proceed as if in a Committee of the Whole for the purpose of developing an orderly system to insure adequate membership input into the formulation of a League policy position on Docket 20282, amateur license restructuring. After extensive discussion, on motion of Mr. Shima, seconded by Mr. Arnold, VOTED (Canadian Director Spencer abstaining) to form an Ad Hoc Committee consisting of the President, the General Manager, three directors and the public relations consultant, to develop and recommend a concept, timetable and procedure for the method of securing membership opinion on the proposals of FCC Docket 20282; Mr. Albright requested to be recorded as voting opposed. On motion of Mr. Gmelin, seconded by Mr. Price, unanimously VOTED to resume deliberations as a Board. The President announced appointments to the Ad Hoc Committee as Messrs. Clark, Baldwin and Waters, and Directors Egbert, Shima and Sullivan. During the course of the above procedure, First Vice President Clark temporarily occupied the Chair.

22) The Board recessed at 9:52 P.M., reconvening at 8:47 A.M. on January 17, with all directors and other persons hereinbefore mentioned in attendance except Mr. Lindholm.

23) At this point Assistant General Manager Baldwin, at the request of Mr. Clark, reported the recommendations of the Ad Hoc Committee, outlining the proposed mechanics of a survey of membership attitudes and opinions on the FCC proposals in Docket 20282 for "restructuring" the Amateur Radio Service. After extended discussion, on motion of Mr. Price, seconded by Mr. McConaghy, unanimously VOTED (Canadian Director Spencer abstaining) to adopt the recommendations and report of the Ad Hoc Committee. First Vice President Clark temporarily occupied the Chair during a portion of the proceeding.



W1HHR, W1DGL

QST for

24) As liaison director, Mr. Zak presented the report of the Contest Advisory Committee. As liaison director, Mr. Price presented the report of the DX Advisory Committee and, on his motion, seconded by Mr. Gmelin, after discussion, unanimously VOTED that the Editor of QST shall cause to be published in QST annually a cumulative list of holders of the S-Band DXCC Award.

25) Moved, by Mr. Price, seconded by Mr. McConaghy, that at the request of the DX Advisory Committee, a DXCC certificate be available from ARRL endorsed for cw-only contacts in the same fashion that phone-only DXCC certificates are offered, specific regulations for the award to be developed by the Communications Department. After discussion, on motion of Mr. Albright, seconded by Mr. Gmelin, unanimously VOTED to amend the motion to provide that the starting date for contacts to qualify for the award will be 1 January, 1975. The question then being on the motion as amended, the same was unanimously ADOPTED.

26) The Board was in recess from 10:20 A.M. to 10:38 A.M.

27) As liaison director, Mr. Arnold presented the report of the Emergency Communications Advisory Committee. On motion of Mr. Albright, seconded by Mr. Arnold, after discussion, unanimously VOTED that in accordance with Minute 40, January, 1974, Board meeting, and on recommendation of the Emergency Communications Advisory Committee, the Board recommends the General Manager proceed without delay to prepare a sample pamphlet or workbook, containing consolidated and indexed information necessary for operation by amateur radio stations during emergencies, and coordinate the draft with the ECAC.

28) On motion of Mr. Arnold, seconded by Mr. McConaghy, after discussion, unanimously VOTED that the ARRL-IARU staff and IARU representatives undertake exploratory discussions with the appropriate representatives of Canadian, U.S. and foreign agencies relating to a world-wide alerting procedure for disaster communications.

29) On motion of Mr. Arnold, seconded by Mr. Zak, after discussion, unanimously VOTED that the routine WIAW emergency bulletins be expanded so as to provide pertinent information pertaining to the nets that are operating within the disaster area and give general guidance to amateurs regarding participation in the emergency action.

30) At this point, Mr. Shima reported to the Board on developments in, and current status of, the ARRL Foundation.

31) Mr. Smith presented the report of the Ad Hoc Committee on Interference to Nets. On his motion, seconded by Mr. Griggs, after discussion, unanimously VOTED that the General Manager conduct an educational program on methods of dealing with malicious interference to amateur radio public service nets, and continue working with FCC personnel on measures to eliminate such interference from the amateur bands.

32) At this point Mr. Clark reported to the Board on accomplishments of the ARRL RFI Task Group.

33) As liaison, Mr. Smith presented reports of the VHF Repeater Advisory Committee and, after extensive discussion, on his motion, seconded by Mr. Price, unanimously VOTED (Mr. Spencer abstaining) that the General Manager, using material supplied by VRAC, is directed to prepare petitions for filing with the FCC requesting those



K1ZND, WAØIAW, WB4ANX

changes enumerated in Minutes 25, 62, 63 and 64 of the July, 1974 meeting of the Board.

34) The Board was in recess for luncheon from 12:07 to 12:48 P.M.

35) The Chair announced that the Board would now proceed to the election of four directors to the Executive Committee for the ensuing year. Mr. McConaghy nominated Mr. Thurston. Mr. Arnold nominated Mr. Albright. Mr. Thurston nominated Mr. Arnold. Mr. Zak nominated Mr. Griggs. Mr. Haller nominated Mr. McConaghy. Mr. Price nominated Mr. Gmelin. On motion of Mr. Thurston, seconded by Mr. Sullivan, unanimously VOTED that the nominations are closed. The Chair appointed Messrs. Metzger and Carpenter as Tellers. The Tellers announced the results of the balloting as follows:

| | |
|---------------|----|
| Mr. Albright | 15 |
| Mr. Thurston | 14 |
| Mr. Arnold | 13 |
| Mr. Griggs | 11 |
| Mr. McConaghy | 6 |
| Mr. Gmelin | 5 |

Whereupon Roy L. Albright, W5EYB, Robert B. Thurston, W7PGY, Max Arnold, W4WHN, and John R. Griggs, W6KW, were declared elected as members of the Executive Committee for the ensuing term. (Applause).

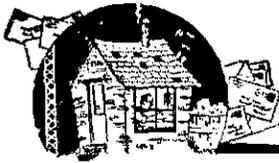
36) On motion of Mr. Shima, seconded by Mr. Gmelin, unanimously VOTED, at 12:58 P.M., that the Board does now resolve itself into a Committee of the Whole to consider matters concerning the ARRL Foundation. The Committee rose at 1:23 P.M. and reported to the Board. On motion of Mr. Thurston, seconded by Mr. Haller, unanimously VOTED to adopt the report of the Committee and elect as directors of the ARRL Foundation Thomas Watson, W6DW/W6VM, for a three-year term; Richard A. Egbert, W8ETU, and Stan Zak, K2SJO, for three-year terms; and L. Phil Wicker, W4ACY, for a two-year term.

37) On motion of Mr. Zak, seconded by Mr. Arnold, unanimously VOTED that the reports of the directors to the Board of Directors are accepted and the same placed on file.

38) At this point, the following committee appointments were announced by the Chair:

| | |
|-----------------------|---|
| International Affairs | Mr. Albright, Chairman Mr. Spencer, Mr. Zak |
| Plans & Programs | Mr. Thurston, Chairman Mr. Griggs Mr. McConaghy |

(Continued on page 168)



Correspondence From Members -

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

RESTRUCTURING

● After having studied the text of FCC Docket 20282, I have come to the conclusion that the Commission has done an excellent job in presenting a workable proposal which, if adopted, will do much to advance our hobby. However, I have great reservations concerning the proposed structure of the beginning levels, particularly the "Communicator" class. To open the already crowded 2-meter fm frequencies to a flood of neophytes (many of whom will be converts from the 11-meter bedlam) is an invitation to disaster. The proposal grants too many privileges outright, and leaves no incentive for advancement.

The "Communicator" class can become an excellent springboard into our hobby, but we cannot allow it to become a stagnant pool. It is important that the beginners be truly challenged to improve their art. Simplex fm activity, perhaps in the 145 MHz segment, would be an adequate training ground. Later, after they have become familiar with procedures (and know enough code to copy a repeater ID) is the time to allow full vhf fm privileges. Also, make the license non-renewable, forcing some movement upward in the system (this should remain a requirement for Novices as well).

While we must not isolate the beginners completely from the (hopefully) good examples of experienced operators, we must really restrict them — not just kick them off of 6 meters where there is comparatively little fm activity anyway. Hold out the bait of repeater use, and Series B will prosper! — *Mark D. Johns, WAØRGV, Saint Paul, MN*

● One of the avowed "benefits" to be gained by the proposal is . . . "syphoning off some of the CB radio hobby activity." If your predictions in this regard are correct, and they likely are, you will be infusing the ARS with individuals who are, by definition, scowflaws. — *George S. Wilson, III, W4OYL*. The new proposed Communicator Class will enable myself and others to become full members of ARRL. — *John C. Rein*. The new restructuring proposal smells badly and we are 100% opposed to all of it. We do not want CBers on our repeaters. — *Tom Champlin, K5TLG*. I like the idea of making the Novice license renewable. This will encourage many who have difficulty garnering the code to make that little extra effort and succeed, rather than be discouraged and leave the ranks of amateurs unnecessarily. — *M. Crosby Bartlett, W9MC/WB4QFE*. The proposal, I feel, will only break down the caliber and quality of the Amateur Radio Service which many have worked hard to attain. The ARS does not need strength in numbers, but must retain its high standards of competence to remain a valuable contributor to our society. — *Vern A. Weiss, II, WA9VLLK*. The "mail order license" ought to be stopped. From personal experience I can cite the near loss of a

friend who failed the examination I was administering. It took some 4 years to regain this friendship of a person who thought I had let him down because I didn't assist him in the exam. — *R. Alfred Whiting, K3BRS*. We need more hams, and dropping the code requirement for the new class seems okay. — *C. S. Phillips, W1MDM*. Are we concerned about the current ham population because of the lack of income to various companies and/or organizations, or because we want to have a higher percentage of hams than any other country? — *Richard W. Randall, K6ARE*. The FCC is, it seems, going to "graduate" the Citizens Radio Service to the 2-meter fm band in one big leap. — *Jerry Purviance, WB4USH, Coryton, TN*. I would like simply to propose restructuring of the FCC. — *Charles V. Krantz, W4FKY, Lynchburg, VA*. Has the FCC gone mad, or are they planning to let hams destroy their own bands by allowing us to stuff ourselves with more and more power? — *Jeffrey N. Wayne, K1YLV*. If adopted, this proposal would overpopulate the already crowded Novice bands within a few years. A three or fourfold increase in users would produce so much interference that the 80, 40 and 15 meter Novice bands would become a wasteland. — *George H. Leinberger, II, WB5HKY*. My major objection to the license restructuring proposed by the FCC is the deincincentivization of the Extra Class license. I am very jealous of the privileges which I sweated blood to acquire and would not wish to share those privileges, especially the phone privileges, with others who could, but for reasons of lack of perseverance failed to achieve. It is my firmly held belief that *anyone* who can copy 13 wpm can, if they will, copy 20 wpm; I did, and I have operated cw for less than 10 hours total since I was first licensed in 1958. — *Albert M. Johnston, Jr., W9MZE*.

GREEN TURTLE SOUP

● I am proud to be a ham and a member of ARRL. In its tortoise like way, ARRL always wins the race and patiently moves mountains, though more flamboyant types may try to claim credit. Sail on! — *Bill Deutermann, Jr., WA3NGG, Bethesda, MD*

● I think you do a marvelous job for all amateurs. For the amount of money we each contribute, I don't know how you can do it. Over the years we in ARRL have had our problems with Wayne Green, and others who really feel that more can be done, but I do not agree with them for a minute. The ARRL has taken a firm, mature stand on all issues and we always come out on top. Radicals cannot touch an establishment such as ARRL. ARRL is always trying their hardest to do what is right for the majority. — *Thomas W. Billis, WB2VVG, Glens Falls, NY*

A YL'S VIEW

● As an active lady ham, I've come to feel more and more that women operators want to be considered as part of the mainstream of amateur radio, not singled out *because* they were bright enough to pass an exam. YLs are making their own mark *within* amateur radio in many of the traditional areas. Isn't it about time that we reevaluated the utility of Lou's column? If it's for the YLs it's of no utility. If it's for the fellows then the idea is offensive! — *Ellen White, W1YL, Burlington, CT*

BEDEVILED

● A casual glance at the world today is enough to convince me that Satan is alive and very much present. But must we have his name among the select group of *QST* advertisers as well? Regardless of how good their equipment might be, I will not buy from Satan Electronics, Inc., (*QST*, January, page 158), or any other like-named organization.

I urge you to remove them from our magazine as soon as possible. — *Alan D. Wilcox, W3DVX/WB4KRE, Charlottesville, VA*

PROBLEM SOLVERS

● Recently I had a problem involving using my Collins 32S3 with a foreign-made receiver. Contact with your technical people plus extra effort by your Bob Myers solved it. Not only am I of course delighted that the problem was solved, but at no time was anything but extreme patience and courtesy shown. I have a new appreciation of the League! — *Kurtz A. Fleithorn, W1FK, Southington, CT*

OOPS!

● I was reading your January 1975 issue and when I hit the picture on the bottom of page 70 under "Happenings of the Month," it became apparent that you do not have any Navy or ex-Navy personnel reviewing your copy.

The picture is of Vice Admiral R. G. Gooding (who happens to be one of my bosses), not Rear Admiral. (Vice Admiral has two stripes above the wide stripe, while Rear only has one stripe above the wide stripe). — *J. Bradley Flippin, K6HPR, San Diego, CA*

[EDITOR'S NOTE: And both the retiring and the new *QST* editor have Navy backgrounds — the shame of it!]

THE NEW HANDBOOK

● To advance to Amateur Extra and first class phone tickets, I have been using an old ARRL *Handbook* as a supplemental study reference with an electronics correspondence course.

The XYL thoughtfully bought the new '75 edition of the *Radio Amateur's Handbook* for me at Christmas. What a difference!

I offer my sincere congratulations on a fine job. Specifically — the outstanding info on solid state. The new edition is a masterpiece. — *William (Bill) L. Logan, WB8RCQ/9, Oaklandon, IN*

● The ARRL *Handbook* this year is the best investment on radio ever. Keep up the good work. — *Bob Heron, Canoga Park, CA*

GRIPES

● Here is my check for another year's membership in ARRL. I want to emphasize that it is strictly for the support of the League, and not

for a subscription to *QST*, for my interest in the magazine is minimal. . . .

I remember when the 75-meter phone band on any night was a whistle of heterodynes, while here and there some of the Kings of the Road blasted holes through the slush. These were the days of the monologue QSO when a man could hold the frequency long enough to develop a train of thought. Even the ham who couldn't make a contact across the street found it interesting, for there was discussion of interesting subjects. Now, everyone seems afraid to speak more than three words for fear of offending someone who has nothing to say. In my opinion, amateur radio died with the advent of single sideband, which ARRL shoved down our throats.

Oh, I own one of the things, and it spends more time in the factory than it does on my operating table. I finally gave up on its last flight. I sent the Bird all the way to California, and when it was returned I had a bill of \$25.03, of which \$24.00 was labor. Now, when a factory "technician" takes three hours at eight dollars per hour to find a defective tube and a bad resistor, I begin to wonder. The rig blew again within two weeks of its return, and I was so disgusted that I didn't even bother to notify the factory about it.

I used to work cw on both 80 and 40, and I had many friends whose "fists" I could recognize upon hearing the way they handled that bug. Now, there're keyers which make everyone sound alike. (Incidentally, most of the keyers can send a whole lot faster than the one who is attempting to use it.)

Let us now praise two-meter fm, where some computerized monstrosity will cut you off after three minutes. If I want to talk to someone for a three-minute interval I'll call him on the telephone.

The 75-meter phone band has degenerated into a bunch of groupies. Find an empty spot and call CQ. You will immediately be reminded that there is a round table in progress. Tune the band, and all you'll find is a bunch of cliques and clubs. I've been chewed out several times for attempting to break one of these clans when I wanted to speak to one I knew.

And so, *QST* comes in each month. The "technical" articles interest me not at all, for who wants to read about another keyer or a modification of the keyer? I read "League Lines," "Happenings of the Month," and see what the latest FCC regulations are. I don't even read the advertisements, because they all advertise the same gear; only the labels are different. I finish by reading Silent Keys. Then I chuck the magazine into the trashcan and wonder why the hell I waste my money on a subscription.

Mr. Editor, is there a remote possibility that amateur radio will ever come back? — *Eugene Charles, W4EZF, Seneca, SC*

MYSTERY ORGANIZATION

● I hear frequent reference to ARRL, usually referred to as "AR double L," on the various amateur bands. It appears that this mysterious organization has the same policy and engages in many of the functions of ARRL. I have been a member of ARRL for more than twenty years, and I believe that it is a great organization for the amateur fraternity. I am eager to join any other group which has similar objectives, functions, and services. Would you please provide me with the address of this mysterious competitive organization. — *Robert J. Grabowski, W5TKP, Houston, TX*

IARU News

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

HEADQUARTERS REPRESENTATIVES VISIT REGION I MEMBERS

Last month's column carried a report on the attendance of ARRL/IARU staff members W1RU and K1ZND at an ITU seminar in Geneva last September. Once in Europe for this purpose, it became economical for them to visit several of the IARU member-societies in that part of the world. The purpose of these visits was to confer with the officials of the various societies on the preparations being made on amateur radio's behalf for the 1979 general World Administrative Radio Conference. Societies were urged to maintain the closest possible liaison with their governments and, if possible, to arrange that the society be consulted during the formulation of the government's policies entering the conference. In turn, the society officials expressed their thoughts on the manner in which the IARU should proceed with its preparation and provided much valuable insight on the problems facing the Union.

Together, W1RU and K1ZND visited the officials of the *Union Schweizerischer Kurzwellen-Amateure* in Zurich, Switzerland, and the *Radio-klub der DDR* in East Berlin. Then they separated. W1RU went on to visit the *Amateurs Radio Algeriens* in Algiers, the *Association Royale des Radio-Amateurs du Maroc* in Morocco, and the *Union de Radioaficionados Espanoles* in Madrid. K1ZND proceeded to the *Central Radio Club of Czechoslovakia*, the *Radio Amateur Association of Greece*, the *Savez Radioamatera Jugoslavija* in Belgrade, and the *Romanian Radio Amateur Federation*. Both stopped in London on the way home to confer with the Secretary of the Region I Division, Roy Stevens, G2BVN.

Extensive travel on behalf of the IARU during 1974 was done by President Noel Eaton, VE3CJ,

in three separate trips. In April, VE3CJ attended the 40th anniversary celebration of the *Radio Club Venezolano* and proceeded from Venezuela to Mexico to confer with officials of the *LMRE*. In May, he visited the *Radio Society of Great Britain*, the *Oesterreichischer Versuchssenderverband* in Vienna, the *Associazione Radiotecnica Italiana* in Milan, the *Rede dos Emissores Portugueses* in Lisbon, and the *Irish Radio Transmitters Society*. In October, accompanied by ARRL/IARU Vice President Vic Clark, W4KFC, he conferred with the *Norsk Radio Relae Liga* in Oslo, the *Suomen Radioamatooriliitto r.y.* in Helsinki, the *SSA* (Sweden), the *Experimenterende Danske Radioamatører* in Copenhagen, and the *Union Belge des Amateurs Emetteurs/Unie van de Belgische Amateur-Zenders* (Belgium). In each case, the purpose was the same: to maintain and enhance communication between the national amateur radio societies of the world through their Union.

PAKISTAN AR SOCIETY ELECTED TO MEMBERSHIP

The December issue of the *IARU Calendar* carries word of the election of the *Pakistan Amateur Radio Society* as the IARU member representing its country. The *PARS* has 31 members, 14 of whom are licensed to transmit. Correspondence should be addressed to M. Noor Khan, Secretary, *PARS*, P.O. Box 65, Lahore, Pakistan. Total IARU membership is now 88.

The society reports that only citizens may obtain transmitting licenses. The only exceptions are for international agencies such as the Red Cross, United Nations, etc.

ANNIVERSARIES

Two major IARU member-societies are celebrating significant anniversaries this year. The



Radioklub der DDR President DM2HGO (left) and Vice President DM2BFE (right) welcome W1RU to East Berlin.

IARU FIVE-BAND WORKED ALL CONTINENTS AWARD

The IARU Five-Band Worked All Continents Award is an adaptation of the world-famous photograph of the earth as seen from the moon by Apollo 8. An endorsement for Six-Band WAC is available. Requirements for the award were listed on page 70 of *QST* for April 1974, and are available to U.S. and Canadian amateurs on request (self-addressed stamped envelope, please) from ARRL headquarters. Others may request this information from their own national IARU societies.



Reseau des Emetteurs Francais (France) marks its 50th, while the *Vereniging voor Experimenteel Radio Onderzoek in Nederland* (The Netherlands) celebrates its 30th.

Headquarters extends its congratulations to both, with wishes for their continued success in representing the interests of radio amateurs in their respective countries.

LMRE CONVENTION SLATED FOR TAMPICO, MEXICO

The *Liga Mexicana de Radio Experimentadores, a. c.*, IARU member-society in Mexico, announces that its annual convention will be held 29 May - 1 June, 1975, at the Holiday Inn in Tampico. More

information may be obtained from: Radio Club Petrolero, a. c., Apdo. Postal 1363, Tampico, Tam., Mexico.

SWEDISH SOCIETY ADDRESS

SM6CPI, the IARU Liaison Officer for the *Föreningen Sveriges Sändareamatörer (SSA)*, member-society for Sweden, has requested publication of the correct address for the headquarters of the SSA. There have been several misunderstandings about this address in recent months. The correct address for both correspondence and the QSL bureau is: SSA, Jönäkersvagen 12, S-12248 Enskede, Sweden. QST

New Apparatus (Continued from page 54)

a feature normally offered only on laboratory instruments.

Shown with the WV-500B in the photograph is an accessory high-voltage probe. It contains a 1090-M Ω multiplier resistor which, with the 10-M Ω input resistance of the meter (1-M Ω isolating resistor in the probe switched out), provides for a total input resistance of 1100 M Ω . Thus, the de-voltage ranges are extended by a factor of 100, with full-scale dc voltages becoming 150, 500, 1,500, 5,000, 15,000, and 50,000. (The basic 1500-V range is not used.) The normal probe of the '500B slips inside the body of the high-voltage probe and spring-contact fingers lock it in place. The high-voltage probe is designed to minimize the possibility of shock, and is especially useful for high-voltage measurements in very-high-impedance circuits such as the CRT anode voltage in a television receiver. It would also be a worthy addition to the amateur station for measuring power supply voltages in high-power transmitters or amplifiers. The probe body, RCA WG-411A comes without the 1090-M Ω multiplier resistor, available separately (RCA WG-206).

Price class of the WV-500B electronic voltmeter is \$100, and the HV probe and separate multiplier resistor is \$20. The manufacturer is RCA, Electronic Instruments Section, 415 S. 5th St., Harrison, NJ 07029. - K1PLP

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

FEEDBACK

In the article "Something for Nothing," page 35, Dec. *QST*, the formula for the total capacitance of a group of capacitors in series should have been shown as $C = \frac{1}{\frac{1}{C_1} + \dots}$, not $C_1 = \dots$.

There is an error in the formula for X_{LI} on p. 41 in *QST* for February, 1975. The correct formula is given by:

$$X_{LI} = \frac{Q_L R_{in} + (R_{in} R_0 / X_{C2})}{Q_L^2 + 1}$$

In the article "Frequency Counter - a Modular Approach," in January, 1975 *QST*, there are a couple of errors the reader should note. On page 28, Fig. 5, U12 should be a 7430, 8-input NAND gate IC. In Fig. 6, the time base chain referred to should read Fig. 4 instead of 7.

Partially because of the mad rush at Field Day *QST* deadline time, we inadvertently neglected to mention that the Conejo Valley ARC, W6HE/6, had the highest ED score of any group in the tabulation.

The Field Day score of W8DF/8, the Southern Michigan ARS, should be listed in the 3A Battery class rather than the 3A class. This correction places W8DF/8 at the top of the 3A Battery class listing.

450-MHz Band Plan

In July, 1974, the ARRL VHF Repeater Advisory Committee completed its study of band plans for the 52- and 422-MHz repeater segments and announced its recommendations. There was bound to be controversy about the 450-MHz plan, because the country was evenly divided between high-in and low-in patterns. Once the decision to adopt one national plan instead of regional plans had been made, half of the present users were almost certain to be unhappy with the outcome.

Over two years of study went into this decision. It was not made in secret; *QST* consistently has carried invitations for comments in "FM Repeater News," for example in January and May, 1974. Proponents of both the high-in and the low-in plans had good points in their arguments. Yet the VRAC elected to go high-in. Why? Let's look at both sides.

First, low-in. Commercial stations above 450 MHz create intermodulation products that fall in the amateur band, especially at the high end of the band. If this part of the band is used for repeater inputs, the amateur repeaters will be falsely triggered by these intermod products. This is especially a problem in metropolitan areas. A problem with harmonics from repeater outputs in the 220-MHz band falling in the upper part of the 450-MHz band has also been cited as a reason to go low-in, so these harmonics will not trigger the 450-MHz repeaters.

The opposite side of the coin is that, on analysis, high-in was fewer disadvantages. The original argument for high-in was stated in *QST* for June, 1972, page 98:

... much of the commercial gear now being sold contains receivers that will tune down to 442 MHz, but transmitters that will not go below 446 MHz without modification. . . . Adopting a high-in/low-out plan will allow hams to put the surplus gear into operation with a minimum of bother.

This doesn't begin to tell the story, though. On close examination, the commercial intermod problem appears to favor high-in. If amateur repeaters were low-in, then *their* intermod products would fall in the commercial band. It would be the responsibility of the amateur groups to eliminate any interference caused. This would involve the purchase of circulators, etc. By going high-in the possibility of amateur interference to commercial operations is not only greatly reduced, but the responsibility for elimination of intermod interference to amateur operations falls to the commercial operators. At about \$300 per circulator or more, this is an important consideration.

As for harmonics from 220 MHz, this is not a major consideration as only six channels - 447.80, 448.20, 448.60, 449.00, 449.40, and 449.80 MHz - fall on the second harmonic of 220-MHz repeater outputs. This is about 10% of the available repeater channels at 450 MHz if 50 kHz spacing is used, and 5% if 25 kHz spacing is used. Elimination of harmonic output at a repeater is fairly easy. Also, except on a lab bench or when equipment is in very close proximity, second harmonic interference is not especially severe because antennas

tend to radiate poorly at their second-harmonic frequencies. If the 450 plan were low-in, the harmonic problem would not be less, only different.

Interference is a fact of life at vhf and uhf, just as it has always been at hf. Of course, every reasonable step should be taken to reduce interference, or the effects of interference. One such step (for problems on 2 meters) that has been taken in the Chicago area (where high-in is used) is that every amateur uses a common low-frequency tone, low enough in pitch not to be heard through the receiver audio response, on his signal if he wishes access to a repeater. The professional journals call this a "continuous tone controlled squelch system" - CTCSS. General Electric uses the brand name "Channel Guard" and Motorola uses "Private Line" or "PL." With all the repeaters in Chicago using it to recognize amateur-originated signals it doesn't work a hardship on local hams; it's an essential part of each rig in the same way the microphone is.

In the short run, it would have been expedient to adopt "regional" plans, where high-in might be used in one area and low-in in another. In the long run, however, this would have created problems of its own, for example, for transient operators, for equipment manufacturers, and for operators near the "boundaries" of regions using different plans. The VRAC considered regional plans, but a majority voted to make the difficult decision now rather than put it off to a day when it would be even more difficult to make.

Keep in mind that these decisions are always open to discussion. It would be impossible to set up band plans and expect them to apply to all conditions. There are bound to be changes. However, it is important that you make your feelings known. In this case, your VRAC representative is the person to write to. The list of the VRAC representatives is given in Feb. *QST*, see "Happenings of the Month" section. Or, you can send your comments to Hq. and we'll forward the information to the appropriate representative.

Repeater Directory Registration

This will be the last call for repeater registration for the next edition of the directory. The deadline this year is April 1st. We would prefer it if you send the registration information on one of our forms, available from ARRL HQ. However, because time is short, if you send us the following information we can list your repeater: location, call, open (?), input/output frequencies, modulation type, access (carrier, tone, or whatever), autopatch (access) and the sponsor. Also, in order to keep our list of frequency coordinators current, please include information, if available, about your coordinator or council.

Quote of the Month

"You're in a weak signal area and your signal is very spotty, so squeeze the mic button a little tighter!" (Toronto FM Communications Society, Inc.)

Remote Base Operators

The ARRL Board of Directors, recognizing the importance of remote base operation, acted on a special resolution this year. If you are interested, read Motion 60 in the minutes of the meeting which appear in this issue in Happenings of the Month. - *W1JCP/WRIABH*

FLORIDA STATE CONVENTION

Jacksonville Beach

March 22-23

The ARRL Florida State Convention and 2nd annual Bold City Hamfest will be held at the Municipal Auditorium in Jacksonville Beach the weekend of March 22-23. Program highlights include live ATV transmissions from the auditorium to all TVs in the headquarters motel, technical sessions on RTTY, video and other topics, left-footed code contest, huge swap shop, latest in commercial ham equipment on display, MARS and QCWA meetings, ARRL forum with President W2TUK, other nationally prominent guests, 2-meter transmitter hunt, and much more! Helicopter tours will be available and a program of special activities is planned for the ladies. A shuttle bus will run hourly between the auditorium and motel and on special trips to a nearby shopping mall.

Registration is \$3 per family. For information and reservations write Doug Jacques, WA4QJM, Chairman, 1644 Mill Creek Road, Jacksonville, FL 32211.

MICHIGAN STATE CONVENTION

Muskegon

March 21-22

The Muskegon Area Amateur Radio Council are sponsors of this year's ARRL Michigan State Convention and Great Lakes Area Hamvention to be held March 21-22 at the Muskegon Community College, which features complete facilities for technical programs, net meetings, manufacturers exhibits and swap and shop. Parking at the door (free) for 1500 cars and dining facilities within the college make this event most comfortable to attend.

On Friday, March 21, the hospitality room opens at the Ramada Inn, with a Wouff Hong initiation at midnight - an event that has been well attended in recent years. Saturday the doors open at 8 AM for registration and a full day of programs ending at 5 PM. Special features will include net meetings, technical forums covering AMSAT,

COMING ARRL CONVENTIONS

March 21-22 - Michigan State, Muskegon.
March 22-23 - Florida State, Jacksonville Beach.
May 2-4 - Pacific Division, Fresno, California.
May 24-25 - Tennessee State, Knoxville.
July 4-6 - Georgia State, Atlanta.
July 5-6 - West Virginia State, Jackson's Mill.
August 1-3 - Canadian Division, Calgary, Alberta.
August 29-September 1 - Atlantic Provinces, Moncton, New Brunswick, Canada.
September 12-24 - NATIONAL, Reston, Virginia.
October 10-11 - Great Lakes Division, Columbus, Ohio.
October 17-19 - Midwest Division, Lincoln, Nebraska.
October 24-26 - Southwestern Division, Ventura, California.
November 1-2 - New England Division, Hartford, Connecticut.

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

RTTY, vhf-fm, ARPSC forum, SSTV, ARRL forum and a DX hounds session.

A Saturday evening dinner program is planned at the Ramada Inn, advance reservations are requested. Room reservation may be made by writing directly to the Ramada Inn, 2967 Henry Street, Muskegon, Michigan 49443 or by calling (616) 733-2651. Information, tickets and reservations may be had by contacting Hank Riekels, WA8GVK, Convention Coordinator, MAARC, Box 691, Muskegon MI 49443 (telephone 616-722-1378).



Michigan - The Blossomland ARA hamfest is Saturday, March 15, at the Berrien Co. Youth Fairgrounds, Berrien Springs. Advance registration \$1.50; \$2 at gate. Tables \$1. For info, write: BARA Hamfest, PO Box 175, St. Joseph MI 49085.

Michigan - The Copper Country Radio Amateur Asso's annual ham radio auction is Saturday, March 15, in Hancock. Everyone welcome to buy, sell or browse. Talk-in frequencies are 3.992 MHz and 146.94 MHz, plus 28/88.

Mississippi - The Old Natchez Amateur Radio Club's third hamfest is April 13 in Natchez, one of the oldest and most historic cities of the south. Contact K5OCM for details.

New Jersey - The Livingston Amateur Radio Club's annual hamgear auction is 8 PM Friday, March 21, at the Recreation Hall in Memorial Park next to Livingston High School. Building opens 7:30 PM. All gear must be tagged with seller's name or call and minimum opening bid; otherwise, opening bid from the floor. If you have gear to sell, bring it. Admission free.

New Jersey - The Knight Raiders VHF Club's auction and flea market is Sunday, March 23, at the Paterson YWCA, 185 Carol St. Free admission, free parking, refreshments available. Talk-in 146.94 MHz. Flea market tables: \$5 for full table; \$3 for 1/2. Reserve tables in advance by writing to: Knight Raiders VHF Club, Inc., K2DEL, PO Box 5054, Passaic NJ 07055.

North Carolina - The Metrolina hamfest and flea market is March 23 from 8 AM til 6 PM at the

(Continued on page 101)

this station, the field strength 10 meters to the front of the antenna is roughly 63 V/m, a field strength typical of that likely to be measured in the vicinity of amateur installations used for communications in the 14, 21, 28, and 50-MHz bands.

It should be noted that, compared with the field strength observed outside a building, the field observed inside a building will be reduced by losses in the structure. For any given building, the attenuation will depend on many factors, including the frequency used, the number of walls in the signal path, and the type of building material employed. Normally, a structural loss of 10 to 20 dB is assumed.

If we now take the previously mentioned lower and upper field-strength limits of 2 and 63 V/m, and assume a structural loss of 10 dB, the signal levels which may be observed within a building at 10 meters distance from the cited antennas are 0.5 and 20 V/m, respectively.

Thus, though interference potential can be aggravated by the indiscriminate use of unshielded speaker and/or unshielded interconnecting leads, analyses such as those presented here suggest that susceptibility standards for home-entertainment electronic devices be in the range 1 to 20 V/m. Further, it is suggested that measurements made to test the susceptibility of a device be made in the band 0.5 to 1000 MHz.

Even if the minimum RFI standards proposed above are adopted, devices produced in conformance with these standards will still be susceptible to interference from many sources. For example, the field strength at 100 meters (about 325 ft.) from a commercial broadcast station with 5 kW output and an isotropic antenna, and with the device under test located inside a building with a 10 dB loss factor, is 2 V/m. Thus, it must be emphasized that a susceptibility standard in excess of 1 V/m is a necessity.

It's Up to Us

If requests to manufacturers of home-entertainment equipment for those components and installation services necessary to relieve RFI problems are to be successful, each of us, when faced with an RFI problem, must make known our position to the manufacturers involved. While a respectful request for assistance will bring more cooperation than a blunt demand, do not hesitate to let the manufacturers know that they have a responsibility to the consumer for correcting the design deficiencies that are causing the problem. Before casting the first stone, however, make sure you're not sitting in a glass house. Certainly, if your own television receiver experiences no interference while you are on the air, it is most likely that interference to a more distant television receiver is not the fault of your transmitter.

Voluntary assistance by responsible manufacturers, however, can only be a temporary solution to RFI problems. To solve the problem

for all time requires legislation which will give the FCC the right to regulate the manufacture of home-entertainment devices — legislation which the FCC has already stated it will actively seek in the next Congress. Beyond this, the Commission will have to establish susceptibility standards with which to promulgate enabling RFI legislation. In this regard, the ARRL RFI Task Group has already submitted preliminary notes on such standards for the Commission's consideration.

We're working on the problem. And we're making progress. But if we are ever to enjoy the benefits of Amateur Radio in an atmosphere free from contention over alleged interference, we must all work together to resolve RFI problems now!

Appendix Suggested Bill for Legislation on Radio-Frequency Interference (RFI) IN THE HOUSE OF REPRESENTATIVES A BILL

To amend the Communications Act of 1934, as amended, to give the Federal Communications Commission authority to prescribe regulations for the manufacture, import, sale or shipment of electronic devices such that the susceptibility of these devices to disruptive radio-frequency interference is reduced to acceptable levels.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 303(s) of the Communications Act of 1934, as amended, is further amended by inserting "(1)" after "(s)", and by adding at the end thereof the following:

"(2) The Commission may, consistent with the public interest, convenience, and necessity, make reasonable regulations for the manufacture, import, sale, offer for sale, or shipment of electronic devices such that the susceptibility to interference of these devices, which in their operation fail to reject or filter out undesired radio-frequency emissions from licensed radio-frequency transmitters operating on their assigned frequencies and in accordance with good engineering practice, is reduced to acceptable levels. Devices subject to such regulations include, but are not limited to, television receivers, AM and FM radio receivers, tape recorders, high-fidelity audio systems, phonographs, intercom systems, electronic organs, public address systems, and electronic control devices.

"(3) No person shall manufacture, import, sell, offer for sale, or ship devices which fail to comply with regulations promulgated pursuant to paragraph (2).

"(4) The provisions of paragraph (2) shall not be applicable to carriers transporting such devices without trading in them, to devices manufactured solely for export, or to devices for use by the Government of the United States or any agency thereof. Devices for use by the Government of the United States or any agency thereof shall be developed, procured, or otherwise acquired including offshore procurement, under United States Government criteria, standards, or specifications."

QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How :

WA1PWZ tells a heartwarming tale that goes all the way back to the days when the old communications shack now housing KL7FBI (see below) was first erected against the rigors of war and weather. And *that* was long ago. . . .

Your "Elmer" series brought back interesting memories. When I enlisted in the old Air Corps at the onset of the 1941-'45 war I was "promised" that I would be sent to an advanced machine school in the line of work I had left as a civilian apprentice. Lo and behold, I found myself attending a radio operator-mechanic course. Until then all I knew about radios was how to turn them on and off. At the conclusion of twenty weeks of intensive training I was selected for additional training as an operator with the Fifth Air Corps in the Army Airways Communication System. In a few months I was out in the islands handling weather traffic, ETAs, ETDs, etc. Made many friends while bouncing around the Pacific thereafter, and a group of us AACs ops vowed we would upon discharge — some day — get ham tickets and keep in touch with each other.

Peace finally broke out but the days flew by and I kept putting off my visit to FCC. Just never got around to it. Then 28 years later (!) I met K1CHA during one of my frequent camping trips through New Hampshire. We got to talking about radio and my lack of an amateur license. He lamented,

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

"Boy, what you've been missing all these years!" That did it. I immediately crammed for my Novice and got it in short order. While working on my General, however, I landed in the hospital. This might have monkey-wrenched all my plans, but one of the consulting physicians was a former KP4 who urged me toward Conditional status. I took that step about two years ago.

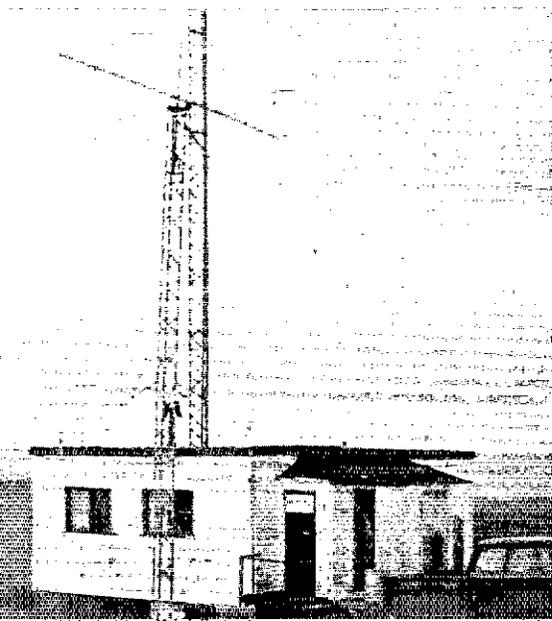
Never have I enjoyed anything more than returning to the air. I do regret that my New Hampshire Elmer joined Silent Keys before we had a chance to QSO. His widow is now a good friend of our family, though, and she insisted that I accept his collection of gear and enjoy it just as Ken had for so many years. The only thing now needed to make this picture complete is word from any of my old AACs buddies. Perhaps they'll spot this yarn and get in touch. — *Tom Galante, ex-WXXI, WA1PWZ*

Elmer was a long, long time a-comin', but he made it! We personally recall that all but a few military-produced radiomen without ham backgrounds were only too glad to hang up their headphones for other interests on return to civilian life. Exceptions like WA1PWZ are, as Tom will agree, most fortunate.

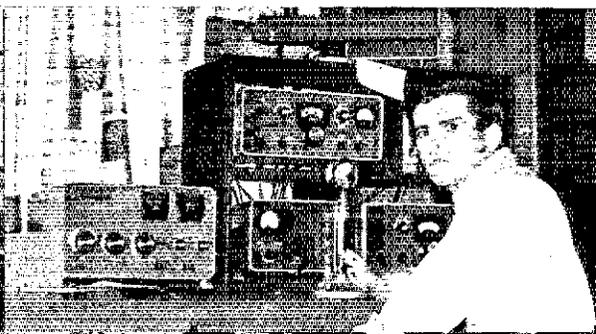
† † †

What :

40 CW HANGS in well on the night shift for dauntless DXers participating in ARRL's 41st International. This month's sessions, nearer the equinox, should see propagation improvement over February's openers. Barring those interesting but annoying short-term ionospheric instabilities,



KL7FBI, club station of USAF personnel stationed on desolate Sheyma Island at the far end of the Aleutian chain, radiates a standout Alaskan signal. Here K4KWQ takes his turn at the pileups. That hamshack, a hardy WWII leftover, still stands staunch and solid in wild north Pacific weather at your remote QTH of the Month. (Photo via KL7HRN/6)



of course, "How's" mail from 7-MHz buffs Ws 7LR 7YF 9NIX, Ks 2HYM 5JVF, WAs 2HHO 3SWF 4GAJ 5SOG 6SXL, Wbs 1EDW 2EHO 4FDT 5KUJ, WNs 6ARP 9LXX, VE3CUI, 13FIN and the literature of clubs or groups extoll the radiotelegraphy of A9XU, C21s DX ZO, C31s DV HF HR, CEs 2GL 3AVB 8AA 9AT, CMs 2AJ 2AQ 2AT 2CB 2FT 2RF 2VG 5DM 5GV 6CP 6HT 6SG 8RD, CN8CG, COs 2AP 2AQ 2BB 2DR 2KW 2RC 5DM 5CP 6LN 6VM 7ET 7RCB 8AY 8RCB 8VT, CPs 3CT 3GN 5GK, CRs 4BP 4BO 5AJ 6AI 6DN 6LA 6OZ 7BN 7CN 7IZ 7JO 7JU, CTs 10I 1VB 2BG 2BM 2BN 3WA, CEs 1AAC 2AQ 2AZ 3AQ 4CR 4LD 5CB 5CO 7CK, Djs 5PI 6VN 6ZM 7HZ 8FX 8YD, Dks 1CU 2FB 2VQ 3G1 3SN 4NH 4PH 4PP 5GT 9ZL, DLs 1FF 2MY 7LV 7NS 7RK 7XX 8CM 8EAF 9LD, DMs 2CYO 2DFL 2PFO 3KK 4ZXH, DU's 1XX 6RH, EAs 2FQ 2IA 3SS 4BV 4IS 4ME 5DS 5PS 6BH 6BO 6GB 7RA 8BF 8BK 8CG 8CR 8EA 8FF 8FI 8GR 8HI 8IR 8IEU, EI0REL, EL2FT, EP2s BQ SN, ET3USF, F's 2EO/SU 2JD/SU 2QQ/KP4 3NE 3XW 5CUK 6AA 6ARC 6BSU, 6DEN 6HV 8HV 8JI 8VJ 9KEL 9NF 9C9s 9D VN, Pgs 7AM 7AN 7AO 7AQ 7JB 7XZ 8BAR 8BKZ, FKs AI BV KAA KQ, FM7WH, FOs 8DF 8EG 8RM, FP8s AA AK BR CR KP YY, FR7AK, FW6s AA DX FYs 7AA 7AU 7YQ 8HHI, Gs 3ESE 3IBW 3JFC 3KAH 3LCJ 3MXJ 3QB 3RUX 3US 3VMW 3XTJ 4ALE 4SPT, GB2RN, GC2s FMV LU, GD4AM, Gl's 3VJ 5JIX 5UR, Gms 3JDR 3KCY 4KPD 6RV, GW4AZI, Has 1UJ 2KMX 3HE 4KYB 5KDO 5KKK 5KKU 7LM 8BO 8KUN 8KZB 9KOB 8MK, Hbs 9AFM 9AHA 9AOU 9AVQ 9BBB 9HQ 9KC 9NG 9ZE 9UL, HCs 1CW 1EE 1KP 1XG 2HM 2IK 2YL 8HM, HHS2WF, 5KL, HIs 3AMG 3CGX 3FJ 3PC 7MR 7RFM 7RFN 7RRN 8CNT 8FED 8GAM 8MMA 8RHK 8RHM 8RVR, Hks 2DP 3ASJ 3OQ 4EX 4IC 8BKX, HMs 1GP 1GV 1HS 2GM 2HH 2HI 4GF 4HU 4HV 5MG, HPIs AC XJS, HRI's AT KS, HZIs HZ KE SH, Is 1IXI 1WU 2NJ 2KLP 3ASE 3MMM 5IZ 5MPN 6BQI 8KFG, IS9s BXL 8PH LSV, IT9s AGA KZW, JAs 1OHV 2CG 2ELT 2INO 2KVL 3PZS 5BLZ 6JDN 7PHX 7MBT, JFIs AJE HMB, JG1CVE, JHIs DLF EIG, JX2HK, JYs 3ZH 9GR, KCs 4NI 6SX, KG6JAR, KH6s B1H BYG CF RS, KL7s AX FA HRF PL, KD4s DIW DPN DRNDRT EAJ EBR UW WL, KS6s DH DM, KV4s AM CI, KX6s BU GS LA, KZ5s AA BC CZ HG HW NG WA, LAs 5NM 6U, LU's 1CB 1DZ 1HDC 2ACZ 3EX 5ANO 5EGV 7HBC 7KAT 7WAH 8AD 8ADK 8BAO 9EAN, LXIs BX MK, LZs 1BJ 1FI 1KAU 1KCS 1KDJ 1VW 1XL 1XZ 2KDI 2KMB 2KMC 2KML 2KR 2KSO 2KSO 2RB 2UG, MIC, OAs 2NCD 2IDD 4AHA 4AHO 4TX 6DX 6NAO 6NAP, OE9AHI, OHs 1AA 1IJ 1PS 1XX 2B1H 2MM 2UO 3XT, OKs 1AHZ 1AQT 1DWA 1FF 1MKU 1MRS 1NR 2BEH 2BHG 2BOB 2CFK 2SEN 2SFS 3BDE 3DG 3KFE, ONs 4CI 5ME, OX3MO, OY6FERA, OZs 1DR 1LO 7HT 7JZ, P29MO, PA0CFW GBE 1WH/S2, P's 2AHA/KP4 2VD 7VL 9JT, Pys 1BA 1EAZ 1EPN 1HE 1RO 2AGG 2BME 2BW 2DES 2FEF 2FNB 2FRW 2FIP 2GIM 2GOK 2RG 4BXO 6AHU 6AM 6AOV 6AVC 6BK 6WF 7BJM 7BHO 7BPE 7BXC 7CCZ 7CER 7CFI 7CPB 7PO 7RX 7YH 7ZAA 8RW, PZ1AJ, SMs 2BJE 3EAC 3AYY 5BLA 5CFM 5CNO 5CSS 6CLI 6CKU 6FYJ 6GUL

7JZ/SU 8GOT, SPs 1DPA 2CMX 2IW 2KDT 2KFY 3KET 5GH 5PRG 8FWB 9AAJ 9DT, ST2AY, SVs 1CH 1DO 1FT 1FT 8WEE 8WII, TAs 2NA 3OX, TFs 3AW 5TP, TGs 4SP 4SR 9AC 9YN, TIs 2CF 2CV 2JRR 2MV 3HR, TJ1EZ, TR8PB, TU2s DF DO EB EF EF, UAs 1KED 2AP 3DDC 6CP 6HCZ 9ACs 9CCH 9CEQ 9CTW 9FBR 9LU 9OBK 9TS 9ACM 9BER 9DAA 9FBX 9KAW, UB5s BAZ JCG MZ ND, UC2s LW OAF OAO, UD6s DHU DJX, UF6s AAJ FAG FAW, UG6AG, UH8s BAH BO DU HBI YAL, UI8s IC IR JAA, UJ8s AESAF SS, UKs 1PAA 2BBB 2FAH 2GAN 2GKW 4UAC 4BAB 4WAC 5EAG 5IAI 5IAG 5OBE 5UAL 5WBG 6AAJ 6LAG 7NAA 8AAA 8AAL 9AAN 9FEW 9CAL 8KAC 8LAB 8ZAB, UL7s BW EAH GW JAA NAF NAR PBC, UM3MBA, UO5s GP PK, UP2s BAO OU OX NK, UQ2GW, UR2s GT RDQ RJ ST TAO, UT5s AA LH MD YP, UWs 3WZ 9WL, VEs 8CK 8DV 8MCB, VKs 1IA 2AHK 2AMB 2AXK 2BF 2BFJ 2BQO 2BTS 2BWC 2GZ 2ID 2IH 2OO 2QL 2SA 2XI 3ABR 3AUN 3BRC 3FC 3PH 3MR 4KX 4OP 4PB 4VB 4ZV/8 5FM 5LI 5KO 5MY 5NM 6GV 6WO 6WT 6ZE 7GK 7FR, VOIs EJ EM JN KE, VP's 1FBI 1FF 1MPW 1MT 2AR 2EEA 2EY 2GM 2KI 2KK 2LAW 2SAH 2ST 2MSO 2MMM 5CW 5DM 5RM 5WS 7BA 7DF 7NA 7NB 8MS 8NN 8NS 9AD 9GD 9GN 9HO 9HT, VQ9s D M, VRs 1AA 3AA 4BS, VSs 5MC 6DD 6DO 6HI, VU2s IN YK ZX, XEs 1ENF 1EO 1MMD 1PZ 1YA 2BP 2FFL 2LP 2RLP 3LB, XQ3s AL ED, XW8s ET HP, YB7AAU, YK5CDL, YNs 1HF 4M 8WP, YOs 2ASU 2BB 2IR, 3ANW 3AWD 4HW 4JY 5ALH 5BHH 6BCY 6EX 7NA 7VH 8AHL 9AEL 9XE, YS1s AG 5EH, YUs 1AJF 1DGH 1EXY 1NPZ 2BOP 2CBE 2CDD 2SE 2WPR 3APR 3BDE 3BO 3BDC 3DVO 3UMC 3URU 4AHU 4ELA 8SRJ, YVs 1AD 1AFJ 3VU 3YD 4AQ 4BF 4JJ 4TI 5ANF 5AXX 5BFZ 5CET 5TT, ZB2s CJ WY, ZC4CB, ZDs 7PS 8AJ 8MF, ZEs 1CU 1JV 2JS 3JO 5JJ, ZF1s AL RD ST VW, ZLs 1AU 1AIR 1AWW 1BHQ 1HY 1PF 1SV 2AFH 2AKM 2AMP 2CD 2IR 2LA 2KS 2TG 3ADY 3DR 3GG 3GQ 3RD 4AC 4NH, ZM7AJ, ZPs 4GZ 5AL 5EC 5GP 5RL 5VG, ZSs 1A 1EJ 1JW 1RY 2EM 2JL 2PR 5AX 5BO 5KI 5LB 5OE 5ZM 6AK 6ARS 6BHW/3D6 6IW 6KO 6ME 6MP 6RG 6QN 6US, 3A0s AA GV, 3B8s CV DO, 3B8s CV DO, 3Ds 2AJ 6AX, 4K1s D F, 4S7DA, 4U1ITU, 4X4GD, 4Z4s HF IX KE, 5B4ZW, 5T5s CJ FP, 5W1s AB AL, 5X5NK, 5Z4s LW PP, 6W8FP, 6Y5s BF SR, 7P8AY, 7Xs 2AN 5AN, 8P6s AK GC, 8RIG, 9H1s BB CH DV, 9J2s HE WR, 9L1JT, 9M2s CX DP, 9V1ZS, 9X5PT and 9Y4VU. . . . If you're willing and able to do battle with the SWBC monsters upband as W9LNQ, WAs 2EAH 3SWF and aforementioned contributors do, some of the following 7-MHz radiotelephones may interest you: As 2CCY 4XFE 35AT, C31s FO HO, CEs 2PC 3ACA 3ED 6EW, 6EZ, CM3GBC, CN8s BF BO CG HB HD, CO2s DC HQ, CRs 4BC 6LX 6MX 6NO 6UE 6UV 7JO, CTs 1DS 1JH 1MK 2BG 2BK 2BL 2BN 3AF 3AR, CXs 2AX 2CL 4CR, DJs 4AX 6QT/CT3, Dks 5EZ 8UB, DL7RT/HB0, DU6s AJ BG, EAs 4LH 6BH 8CR 8DI 8ID 9AI 9ES 9EY, 8Ls 2JC 7F, EP2s TW VJ, ET3FF, F's 2JD/5U 6ARC 6BPZ, Fc's 6CPV 9UC, FG7s AO XT, FK0IC, FO8EG, FP8s AA CT DH YY, FM7WN, FW0s GA IC, FYs AN BHI, GC2FMV, G13OQR, HCs 1NWN 2HW 2TV 8HM, HB0AON, HG5A, HH2WF, HIs 3JEI 3LFG 8XAW 8XKP, Hks 1NR 1QRC 3LT 4DEG 4DFN 5BWV, HM4GF, HPIs BE XCW XIS, Hrs



YB3AP is widely worked from Surabaja on 20 sideband. King enjoys the homebuilt approach with modest power to a pair of 12GB7s. (Photo via K6DT)

JY9GR is prominent among Jordan's growing DX gang. Roger prefers 14-MHz ssb work and signs DJ9GR when back home in Darmstadt. (Photo via K6DT)



1MM ISO 2GK 3AAW 4RFL, HsS 2AIG ØISB, HZ1s AB KE, Is 2KCT/TY 4RNR 8TKL. ISØs FDW RNU, JAs 2BAY 2BET 2HQ 2KVL 3BEA 4FUU 6UBK 6YB 7DRM 7YT 8YD 9APS ØIHA ØNCI ØQXØ, JD1AHO, JW8IL, JX2s FL HK, JYs 3ZH 9GR, KCs 4AAC 4NI 4USN 6SK, KG6JAR, KH6GQW, KP4s AN EAJ EN, KS6s DH EZ, KV4s DC FZ, KX6LA, KZ5s BC BD CQ PW VV, 1Us 4BCA 4FCH 5FSB 5HFI 6KAN 8AJG 9DLY, LX9LS, M1C, OA4s OS RC, OD5s HC IO, OE5 2NWL/YK 5CA/YK 6MG, ØIØMA, ØK2RZ, ØX3s, BH EA MQ, OYs 1M SNS, ØZSKT, P29FV, PAØJVY, PJs 2CW 2MI 2RR 9JR, PYs 21B 2VDH 2WV 7BOU 7YH, PZ1s CB CU, SM5BRS, ST2AY, SVs 1FT 1GA 1IFT 1ZZ ØWEE, TFs 3AW 5TP, TGs 8IA 9DJ 9FU 9KJ 9PU 9PW 9VS, TI2s AJF CF CV FV HP JO KF RT, TJ1EZ, TR8s DG SS VU, TU2s DF DO, UB5s AX JCG, UC2CS, UD6DF, UF6s CX HK, UH8BO, UI8LAE, UK9s AAN UAO, UL7SG, UØ5DN, UP2PAX, UQ2GW, UWØFB, YKs 2APK 2AVA 2BWC 2GK 2WC 2XI 3ØC 3ØZ 3WC 3ZL 4UP 5NC 5PB 5TM 6CT 6HD 7JJ 6LK 7DK 6GK, VPs 1AJ 1FF 1MT 2AA 2DA 2DM 2EEC 2GTE 2GMB 2LA 2LPB 2MSU 2MSV 2SAG 5JR 5KG 5RW 5WW 7BC 7BG 7DF 7DM 8NP 8NS 9AD 9GE, WA4GTB/KG6, WB4KSE/KW6, XEs 1CCW 1CRM 1EEM 1LA 2FY 2IH, XF1A, XT2AJ, XU1DX, XW8GV, YB7AAU, YNs 1FWN (SNS 1ZHL 2GR 6AV 8JES, YØ6EX, YS1s AG GMW, YUIDX, YVs 3AGT 4LF 4OW 5AMP 5DEL 5DEZ 5MO 7GX, ZBs 2FC CJ ZDs 3X 7FT, ZF1s BC GU RD SV WE, ZLs 1AA 1AMO 1AQ 1ARY 1BHO 1BKL 1CD 1HR 1HY 2BA 2BCØ 2BT 3ADZ 3GG 3ØB 4AA 4BO 4KE 4PO, ZM7s AH AI, ZP5s AR FP, ZS6s AK DN DW MP ZE, 3As 2EE ØFY, 3B8CV, 3Ds 2AE 2FR 6AW, 3V8BD, 4JØDI, 4S7s DA PB, 4UIITU, 4X4s HA UR, 5Ts CJ FP LO, 5U7s BA YK, 5X5NK, 5W1AU, 5Z4LW, 6W8s DY FP, 6Y5s BH DL GB MJ, 7X2s AH SMA, 8P6s AA AJ AO CJ, 8R1s AG CG G E, 9H1CW, 9L1JT, 9M2s CX DQ, 9V1SH, 9X5VA, 9Y4s AR T and VT. That's a good voice selection, all right, but the stuff is mostly split-frequency and almost cross-band in approach. And note the relative rarity of Europeans who must operate in the backyards of the biggest SWBC noise machines.

† + †

Where:

NORTH AMERICA — "QSLers of the Month" designated in QST mailbag DX excerpts from Ws 1ØPJ 6KHL, Was 7U2U 9UES, WB4WRK, WNs 6ETY 8RKE, KH6CF and FY2BKO for particularly punctual pasteboard performance include A2CAB, C21NP, CØ5DM, CR4BS, CTs 1SH 2BN, CX2AAJ, DM2BJD, ET3USE, FG7XL, H18XAW, HKØBKK, JH1VOE, JY9CR, KH6FMT, KP6KR, LU6dJX, M1C, VPs 1AJ 1FF 2MJK 5CW 8NP 9HN, WB4KSE/KW6, ZD7SD, ZF1AG, ZL1s AJL/c BKL/c, ZS6AFC, 6W8FP, 7Ø7DW, 8RIJ, 9G1s AR GG, 9J2BO and 9X5PT, along with QSL tenders Ws 3ASK ØELT ØGX, K9KXA, Was 2MVQ 3HUP 9PZU, VE3BOZ and G4BNH. Any kudos candidates on your wall? . . . We're available to assist DX ops with QSL chores, the rarer the better. (WA7U2U, WBS 2IHS 6RMG, WN3YKK, PY7APS) . . . By mid-December

K2FT had received some three thousand QSLs for KC4NI's Navassa visit but too many are arriving without self-addressed stamped envelopes. (W2ORA) . . . 1 QSL 100 percent, s.a.s.e. or s.a.e. with International Reply Coupons greatly appreciated. (Paul of KP1AA) . . . After struggling for a Cuban QSL eight long years CØ5DM quickly confirmed an enjoyable 40-meter cw rag-chew. (WB4WRK) . . . The Commonwealth of the Bahama Islands activated its new C6A prefix as of January 1st. Stations already licensed as VP7s simply append present suffixes. (C6ADF, ex-VP7DF) . . . K3LLL is designated as QSL manager for HR6SWA contacts made by K3HVG. (WN1JM) . . . VP2SG, previously listed as having a WB4 manager, says he now wants QSLs sent direct to his St. Vincent address. VP2SAI, by the way, is unlisted and unknown down that way. (W2MIG) . . . CG is a Canadian prefix introduced in January by the VE3 bunch. CG3HLL equals VE3HLL, etc. (DXNS) . . . WØ6 calls are now being added to the routine W6-K6-WA6-WB6 sequence, apparently skipping WC6. WB7s also should become more numerous shortly. (WWDXC) . . . I must agree completely with SY5MA's January comments on the QSLing delinquency of Statesiders. After operating from Jamaica, Anguilla, and in pursuit of ARRL's Five-Band WAS certification I've become convinced that W/KS collectively are the worst QSLers in the world. (WB4ZNH) . . . Cards for 6Y5LA's recent 160-meter outburst can go via W2DEO. Similarly, consult W9NFC re 6Y5BF's 1.8-MHz December radiations. (DXNS) . . . 'Alp! These italicized brethren need nudging toward QSLs from holdouts indicated: (W1ØP) ØG5HC of '63; (WISWX) FR7ZL, UJ8AC '66, VP8KF '73; (W6TTS) CØ2DL, CP1XU, CX1JM, DU7RCC, HK3CYV, 1U6FEP, W1FCR/HK3, YS1ESH, all for 5BDXCC on 40 or 80; (W9JI) FRØBCX, FWOAA, VP5MC, YJ8GS, 4M5ANT; (WØDBC) CWs 4AA 9BT, FY7s AV YL, KA6AY, 1Z2RI7, VE8AK, VPs 2AZA 2GTE 5MC, XØ2LR, ZD1GM, ZF1TW, 4M5PPG; (K4MZE) G5NX/LA/mm, HC1s AN LE, H1s 7RFM 8LPN, HK7BDA, HP1s EE NU, Is 3DHD ØKSL, LA3s IB/mm VR, LU1s IHDC 5AQ 5PD, LZ2KML, Pys 1DLC 7BOW, UT5YF, UW9WL, VP2SU, UJ4VMD, YV4TI; (K6DT) C31AZ, UG5ØA, YØ5AJ, all '73; (WA7ØBH) VP2s DA GMB; and (WB4ZNH) KC6LG. Any 'alp??

AFRICA — About those FAs active from Algeria in the '50s, I finally received FA9VE's QSL after a 24-year wait. Better a little late than never! (W1ØPJ) . . . I've added TL8LI to my managerial clientele which also includes F2FV, Fg&XT, FØØMB, F12FV and YN1FV. (F6BFH) . . . Experiencing some difficulty keeping up to date on logs from ZE1s DC and DX. Patience, gang. (WA9UES) . . . A flock of 3B9DL pasteboards were due to hit the mails last month. (DXNS) . . . ZD3G says he became C5AG in the new Gambian fashion as of January 1, 1975. (WCDXB) . . . According to ZD7SD, about two dozen sacks of



mail destined for St. Helena months ago evidently strayed en route from Capetown. They'll probably be located eventually. (LIDXA)

SOUTH AMERICA - DXers still needing QSLs for my previous activity as PY7APS/Q in 1967, PY0APS '68, PU7APS '69, ZV7APS '70 and/or PV7APS '71 are welcome to apply to my *Callbook* address. I'd like to close the logs by August. (PY7APS) . . . Please announce that I have no QSLing connections with PY4s or other DX stations. (K9UTN) . . . PZ1AP is the workhorse behind Surinam's VRAS bureau. (LIDXA) . . . XYI, WN4FVU received her first DX confirmation in person from YV5EED while visiting in Caracas. (WB4ZNH) . . . Operator Eugenio de CE9AT promises thorough QSLing upon return to Chile from the South Shetlands in May. (DXNS)

ASIA - I now use the Vietnam call originally issued to Ambassador Porter. K4ASI will handle all QSLing for XVSAC contacts dating after December 4, 1974. (ex-BV2AB-TJ1AZ) . . . Manager K7UXK still receives cards for my HS4AKF work from January through July of last year. Jay hopes to clear the books by May. (WA7CIP) . . . Special QotM recognition should go to JH1VDF who came through in six days to confirm my first Asian. (WN8RKF) . . . Anyone still needing confirmation of QSO with HL9VM during my Korean tour from September '73 to July, 1974, should try my *Callbook* QTH. (WA2JFK)

EUROPE - Because their QSLs must go the bureaus route I think it only fair to allow Russian amateurs a year or so before calling them to QSL account. I send cards to all DX stations worked and only wish I could get the over-all results produced by Moscow's Box 88. UK0HAB/M, incidentally, is a ship-server in the far north and his QSLs will be delayed. (W0BMM) . . . LX1DC declares the LX1CR lately working W/Ks on 7-MHz cw to be unauthentic. (W8SSU) . . . Sory. I'm not QSL manager for the C31FB so active on 20 and 40 cw of late. (F9AP) . . . I'll be happy to answer QSL inquiries concerning my SV0WMM operation from October '71 through last April. (WB2JGZ)

OCEANIA - Ten thousand QSLs were ordered from the printer for recent FK0/EW0 AA DX-GA-IC emanations by K6s RIR YFZ and WB6LTI. The huge confirmational task is well under way. W6NJU's own YJ0GS cards should now be circulating but Gary says a printshop delay slows YJ8BL deliveries. (WCDXB) . . . To the catalog of individual specifications now but be apprised that all recommendations are not necessarily either accurate, complete or official. . . . CE9AT, Correo Naval, Punta Arenas, Chile (or via RCC)

OK2DC lately hunts W/K/VEs almost daily near 14,210 kHz around 1400-1500 GMT. Away from Kuwait Bill signs WA4GLA in Tennessee. (Photo via W3HMK)

- CT2BP, Box 253, APO, New York, New York, 09406
- EL7E, P.O. Box 538, Monrovia, Liberia (or via DK3IA)
- FK8AI, Box 12, Tontouta, New Caledonia
- HB9AQM/T19 (to HB9AQM)
- HH2V, V. Lemoine, P.O. Box 428, Port-au-Prince, Haiti
- HM1HI, Hill, Box 11, W. Seoul, Korea
- HS2AIG, P.O. Box 5815, APO, San Francisco, California, 96330
- I1IMC, O. Trulli, via S. Francesco d' Assisi 10, Collegno (TO), Italy
- JT1AO, P.O. Box 116, Ulan Bator, M.P.R.
- K2FI/VP2D (to K2FI)
- KG4NY, Box 55K, FPO, New York, New York, 09593
- KL7HRN/6, Sgt. E. Luteran, PSC Box 1374, Mather AFB, California, 95655
- P29KE (via RSGB, attn. BRS32669)
- PY1ZBI, RMC J. Echols, NavComTech Gp., Rio de Janeiro, APO New York, New York, 09881
- TG9KJ, Box 115, Guatemala City, Guatemala
- UA9VH/JT1, Box 639, Ulan Bator, M.P.R. (or via CRC, attn. HA9VB)
- VP1PW, Private Bag No. 16, Belize, Belize
- VP8NT, Box 189, Port Stanley, Falkland Islands
- VP9HM, Box 1104, Hamilton, Bermuda
- WA1PZQ/VP7, M. Drooker, AUTECS, Box 697, FPO, New York, New York, 09559
- WA3JTC/ZPS, R. Manahan, U.S. Mil. Gp., Asuncion, APO, New York, New York, 09881
- XE2MRE, Box 1468, Ensenada, Baja California, Mexico
- YB0ABV, Lt. Col. R. Brown (W0OL), NAMRU-2, Jakarta, APO, San Francisco, California, 96356 (or via WA7OBV)
- YN7MHW, P.O. Box 327, Managua, Nicaragua
- 9G1JD, P.O. Box 3247, Kumsai, Ghana
- 9G1LZ, A. Pomfret, P. O. Box 3785, Kumsai, Ghana (or to G3LZZ)
- IBV2B (via WB2UKP)
- C31FB (see text)
- C31JH (to K6BR)
- C3UL (to WA9JNK)
- CSAG (to ZD3G)
- C8ADF (to VP7DF)
- CR7WD (to W3YYY)
- CT1FL (via W3HMK)
- CT1FC (to W3YYY)
- FP2MJ (via G3HXV)
- FG7AN (via WA3EUS)
- FG0BKZ (via F6BBJ)
- FH0RX (via DJ9ZB)
- FI0JN (to I8JN)
- FM7AQ (via I2YAE)
- FM0BIA (to F6BIA)
- FR7AI/t (to FR7AI)
- HL9VM (see text)
- HR6SWA (see text)
- IH9XGQ (via I79RAN)
- JX2HK (via LA3JQ)
- JY9FOC (via G2IO)
- KH6GI (via W3HMK)
- KS6EF (via W6KLI)
- LUI7R (via IJ2AFH)
- LX1JR (via I.X1RB)
- OD5JJ (via W3HMK)
- P29RJ (via JH3HPK)
- PY1CZL (via W3HMK)
- PY4AKZ (see text)
- PY0ZAE (to PY1ZAE)
- SV0WMM (see text)
- TL8LJ (via F6BFFH)
- VK2BZM/9 (via VE3GUS)
- VP2FFC (to K2FI)
- VP2LA (via VF3TL)
- VP2MRA (to VERRA)
- VP2SG (see text)
- XT2AJ (to F5LC)
- XY5AC (via K4ASI)
- XW8GV (via W3HMK)
- XW8HR (via JA1XMS)
- YN4FC (via K8ONY)
- YS1JWD (via W3HMK)
- ZF1DU (to W2BVN)
- ZF1JH (via WA6VNR)
- ZF1TT (to W8TRZ)
- 4M6AG (via RCV)
- 4M7AA (to YV7AA)
- 4S7UD (via JA1OJB)
- 5H3KG (via I1IMC)
- 5Z4RT (via DJ9ZB)
- 6V8FID (to 6W8AAD)
- 6Y8NY (via WB6PYD)
- 9G1GE (via G3USE)
- 9H3P (via G4JA)

For the preceding datums we're much obliged to Ws 1CW 1NJM 1SWX 2MIG 6DTY 7LR 7YF 8KAJ 8SSL 9DY, Ks 4SD 0DEQ, WAs 7CIP 7UZU 9UES, WBs 41WN 4WRK 8LUI, VO1KE, KH6CF, 12CBM, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Belmore rd., Norwich, NR7 OPU, England), International Short Wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15 5JE, England), Long Island DX Association *DX Bulletin* (K2KGB), Newark News Radio Club *Bulletin* (M. Witkowski, Rt. 5, Box 167, Stevens Point, Wisconsin, 54481), Northern California DX Club *Dxer* (Box 608, Melno Park, California, 94025, Southern California DX Club *Bulletin* (W6EJJ), VERON's *Dxpress* (PA0TO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). We could use your input, too - QRP, even. K!

W h e n c e :

† † †

E U R O P E - W3EKT, 16NO, K4GMH, Is SWT 1YTLL 1BAY, IT9ZWS, OZ4FF, ON5WG and 15CW in that sequence were the top ten entries in the 1974 RTTY DX test sponsored by Denmark's SARTG. Other Yank participants in scoring order include Ws 4CQI 5EUN 1GZN 4EGY, WB4MAV, W3KV, K6WZ, W3CRG, WA9WJE, K0QJP, W8UNB, WA1s SCX and PWF with VEs 7YB 3BPM and 7BDQ the Canadian 1-2-3. This year's SARTG radioprinter race comes off the third weekend of August. (OZ2CJ) . . . At 0800-2000 GMT on the 16th of this month RSGB schedules a Ten-Meter Activity Day, all reports large and small welcomed at my address, (D. Whitaker, BRS25429, Hillcourt, 57 Green Ln., Harrogate, North Yorkshire, England) . . . Followed ten pleasant months in Lisbon as CT1PC with a stay in Portugese Africa (W3YY) . . . I still seek W/K/VE friends on several bands, mostly 20 and 80, with trusty Gelson gear, 40-foot-high wire center-fed with tuned line, cw or sideband. I also find QRP DX work an exciting challenge. (YO7NA) . . . DL7OK, awarded ARRL's 5BDXCC No. 383 in November, does it with a three-element tribander for 10/15/20, a Delta Loop for 40, and an inverted-V dipole on 80, (W1CW) . . . Quite a little hamfest with DJs 1AX 8RR 9KZ, DKs 3AJ and 7KS at the latter's pad while I visited Bonn on business. (WA2CEP) . . . Getting organized Stateside once more after three years on Crete as SV0WMM. (WB2JGZ) . . . DXers are invited to try for Association of Sheffield Amateur Radio Clubs' "Sheffield" and "South Yorkshire" certifications based on sufficient QSOs with Gs in those areas since 1974, s.a.s.e. to my address for full info. (G3PHO) . . . W3QBO and I have become great personal friends through mutual interest in QRP DX. I schedule Ed regularly on 14,010 kHz. His homespun two-watter works Europe easily on an open-wire center-fed dipole. (HB9AQZ) . . . On my visit to the Vatican I found HV1CN being moved to avoid local RFI from Radio Vaticana. Brother Ed of HV3SJ is becoming interested in Oscar DX possibilities and is often found near 14,280 kHz at 1200-1300 GMT. (K2YFF) . . . SV0WE reminds us that 80 and 160

are still off limits in Greece. (WCDXB) . . . Malta's 9H gang regained use of 160 meters with a stringent 10-watt maximum. (DXNS)

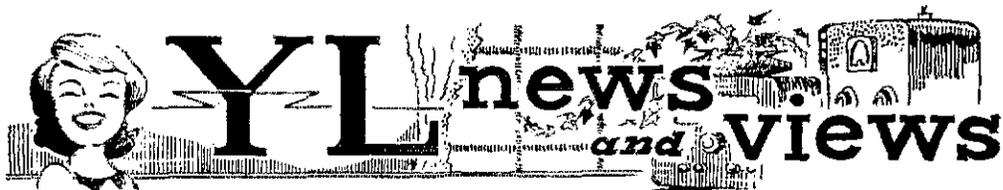
N O R T H A M E R I C A - December 6-7, 1974, was a hot night on 160. I knocked off an eight-hour WAC with 9L1JT, 4X4NJ, GD4BEG, FY0BH, HH2WF and KH6CHC. The first five continents were worked in about three hours but there was a five-hour wait for Hawaiian sunset before 1.8 MHz opened in the Pacific. The Haiti QSO in that string was 160-meter country No. 95 here. A 300-foot broadcast tower is used for transmitting and various wire configurations for triple-diversity reception. (KV4FZ) . . . Target time for our coming DXpedition to Cocos Island (T19) is April 20th-25th. (HB9AQM) . . . W8YEK's 2XSSTV QSO with EA6BQ in November was slow-scan country No. 100 for Gene, probably an amateur radio first. (J. Hawkins) . . . Long time since I operated VOs 3HGE 5EHG and 5GHE for the Gatti-Hallcrafters Expedition in the late '40s. Also did tricks at old NPG, NPI and KSF. Just applied for DXCC with my old-style relay rack 700-watter and Super Pro. (W7LR) . . . Great QRP success as ZF1JH in late '74. (WA6NVR) . . . I depart Gitmo and KG4NY for Florida this month. (WB2UNB) . . . Let's have more Novice DX news from the WN gang, please. (WN0FNV) . . . Back to DX again after a two-year hiatus involving QTH change, antenna hassles and general inertia. Most noticeable changes on the DX front are the nighttime demise of 14 MHz and 80 cw's big improvement for QRP transoceanic work. (W8KAJ) . . . After a February fling as VP2EC I'll finish up from Dominica early this month with 160-meter operation intended. (K2FJ/VP2D) . . . I doubt that propagation is as bad as we're painting it. Between October 5 and November 30, 1974, I worked 103 countries with my five-watt TenTec. No super-antennas, either, just a 40-foot-high Classic-33 and a 137-foot center-fed wire. (K8MFO) . . . Our KC4NI gang had expected top-heavy results in favor of ssb but 7321 Navassa QSOs were 47-percent cw. We also managed 89 contacts on 160 meters. (W2s FYS ORA PAU, K2s FT KA, WB2BXX) . . . Handed out six thousand VX1KE contacts last year. (VO1KE) . . . DX conditions have been intermittently good in rural Illinois but hearing 'em is one thing, raising 'em another. (WA9URS) . . . Conditions grow poorer on 15 and 20 but true DX hounds cope with circumstances. (W1OPJ) . . . To help improve DXpeditionary operation practices at both ends we're promoting an essay competition among our newsletter readership. Winners will be announced in June. (L1DXA) . . . A reminder that WWV's prop forecasts, now updated almost hourly, are heard at fourteen minutes past each hour. (WWDXC) . . . SP9PT/VE8 collected 1040 contacts during last September's mountaineering expedition. (WCDXB) . . . Plan now to attend this year's Fresno International, a DXtravaganza scheduled for the 19th-20th of next month. (NCDXC)

Q5F

YS1WPE gives scores of DX chasers their first El Salvador contacts on several bands. Bill teaches college in San Salvador and hails from Michigan. (Photo via W5QPX)



YL news and views



Ladies of Air Force MARS

THE PREFIXES may be AFW, AFA, AFB, or AFC, but they mean that these gals are members of the Air Force MARS activity and cover every call area in this country where women are serving in many capacities, with quite a few in official positions.

Martha, WA4IFA/AFB4IJA, is State MARS Director in Alabama. Josephine, WB4DNH/AF44DNH, in Region 2, has the official job of compiling the participation time in the five states where she is Operations Analysis Manager. Equally active in tallying the participation hours in Georgia is Carolyn, WB4SWR/AF44SWR. YLs are support team members, public relations coordinators, base support members, and as net control stations, in their individual states.

The gals of AFS MARS have been extremely active in phone patch work between members of the armed services and their homes. Barbara, WA7HUP/AFB7HUP, "Sis" K7TLP/AFA7TLP, Margaret, WA7JFA/AFB7JFA, Helen, K7JUV/AF7JUV, are participants at the Barry Goldwater club station AFA7UGA that recently completed 150,000 phone patches from servicemen overseas. In California, Dorothy, WB6OSP/AF66OSP, Marguerite WWB6SJI/AF66SJI, and Margaret WA6PZO/AFB6PZO, have assisted their club station AFC6YPX of North American Rockwell in their record total of 170,000 phone patches while other YLs are busy in the AFS MARS cw and phone traffic nets.

Mildred, W6HTS/AFW6HTS is, without a doubt, one of the hardest-working YL members serving as Base MARS Director at McClellan Air

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

Force Base, and is now a member of TRANSCON the national level traffic net.

There are the many, many YL net members who will always remember the sharing of a personal pleasure when they delivered the messages that seem commonplace to any traffic operator, but represent a very special touch with a member of the family who is located halfway round the world. They have had the unique experience of helping during emergencies, the recent Honduras disaster, and of putting in hours of their time to keep communications open in the aftermath of the tornadoes that struck Xenia, Ohio just a year ago.

YLs in all three MARS services have made great contributions over the past half century. They have provided a communications assistance that has been marked by two World Wars, Korea and Viet Nam, since the military affiliate was started.

By their activity of training, and participation in the MARS program, they are daily giving their skills and time as a service to assist in these very personal communications links for families, and to help in disaster operations, and to lend the necessary additional facilities so often needed by the service communications networks.

Many of the YLs with the distinctive prefixes that indicate their particular MARS service will be helping to celebrate the 1975 Golden Anniversary of MARS at the Tri-Service MARS meeting to be held as a part of the ARRL National Convention in September, and at the many other special meetings that will commemorate this event.

1975 Powderpuff Derby Plans

The "Powderpuff Derby" that was canceled in 1974 because of the energy crisis will be resumed in 1975 with Carolyn Currens, W3GTC, who will be observing her 18th year as communications chairman for this event.



Members of the YLs in Japan who attended the JLRS meeting held in Kyoto in July, 1974.
(Photo courtesy W2EEO)

1974 YLRL Anniversary Party Results

The Winners

CW

| | | |
|--------|------|-------------|
| 13MQ | 506* | Gold Cup |
| DJØEK | 136 | Certificate |
| WA2DMK | 136 | Certificate |

Phone

| | |
|-------|-------|
| DJØEK | 6192 |
| W7JYX | 5573* |
| FG7XL | 5482* |

Corcoran Award: K6DLL
 World Wide DX Award: DJØEK
 North and Central American
 Hager Award: No Award

CW Scores

| | |
|--------|------|
| WA2DMK | 136* |
| W2HFR | 24* |
| W3CDQ | 9 |
| K6DLL | 1 |
| K8ITF | 31* |
| DJØEK | 136 |
| F2SQ | 4 |
| G8LY | 15* |
| HC2YL | 4 |
| 13MQ | 506* |
| OK2BBI | 24 |
| PY2SO | 4 |

Phone Scores

| | |
|--------|--------|
| W1CEW | 3105* |
| WA1NXR | 2964 |
| WA1JYO | 1006* |
| WA1KMP | 30 |
| WA2DMK | 665* |
| W2EEO | 336 |
| WB2YBA | 44 |
| WA3HUP | 3393 |
| W3CDQ | 2 |
| WB4NKO | 1566 |
| W4TVT | 1054 |
| K5OPT | 2583 |
| K6KCI | 4600* |
| K6DLL | 3256 |
| WA6OZS | 96.25* |
| W7JYX | 5573* |
| K7UBC | 4147* |
| W7WLX | 1188 |
| K7NZO | 800 |
| K8ITF | 3098 |
| K8NGR | 3040 |
| WA8AHU | 1980 |
| WA8EBS | 551 |
| WA9TVM | 2412 |
| WB9MFC | 1120 |
| WØZWL | 1333 |
| KØBTV | 266 |

*Denotes low power multiplier.

Congratulations to the winners. Note: This is the first time that there has been no winner of the North American Hager Award.

W3GTC, Carolyn Currens, communications chairman of the 1975 "Powderpuff Derby" for the 18th consecutive year.



Although there is an award for the high score Novice participant, no logs were submitted.

The race is scheduled to begin July 4, 1975, with Riverside, California as the take-off point. The route will include stops in Phoenix, El Paso, Plainview (Texas), Tulsa, Lincoln (Nebraska), Moline (Illinois), Toledo and the termination point will be Boyne Mountain, Michigan. Myrtle Cunningham, WA6ISY, 1975 YLRL Vice President, has been appointed chairman of communications at the take-off point.

There will be a great need for amateur radio operators to man the stations at each of the scheduled stops along the route. Those who are interested in assisting at this event are requested to contact Carolyn Currens, W3GTC, P.O. Box 523, Norristown, PA, 19404, by mail, or by amateur radiogram.

WA1NXR, Connie Owens

Connie Owens, just received SSTV WAS No. 10. Connie is not only the first YL to receive this award, but is also the first operator in the first call area to work WAS on this mode. She has also worked 70 different countries on SSTV with 47 of them confirmed, in addition to her DXCC on ssb.

A member of YLRL, YLISSB, and WRONE, where she has recently been elected secretary-treasurer, she is also Communications Officer for the U.S. Coast Guard Auxiliary, Division III, First Coast Guard District. Connie can usually be found on 20 meters swapping pictures with other SSTV operators, and hunting more countries to try to complete DXCC through that form of emission.

The Owens are a family where radio is the main topic of conversation with the OM, WA1NXS, and their son, WN1TOL. There are only six YLs listed



WA1NXR, Connie Owens, first YL, and first amateur radio operator in the first call area to work WAS via SSTV. (WA1PEL photo)

as active in SSTV besides WAINXR: WB2HAV, WA2LKC, W4LAS, WA4YRG, W5TXK, and K6OPS.

YLRL "Mid-Conventions."

The YLRL Board has voted to plan "Mid-Conventions" of YLRL to implement the quadrennial International Conventions of the club. Under the newly approved plan, conventions of eastern and western Divisions of YLRL are to be held every four years, occurring two years after the International Convention of the entire membership.

The Seventh International YLRL Convention has been scheduled to be held in Texas in 1976 with the BAYLARKS as hostesses of the event. At that time an eastern and a western convention site will be chosen to be held in 1978.

Morse Telegraph YLs

There are many organizations within amateur radio that are made up of special interest groups based on former communications experience. The Morse Telegraph club members have on the air nets using the old code and, as with most groups, the feminine touch is added in the east by Bea Eld, K4JYQ, a member of the Tidewater Morse Telegraph Club.

Bea has been working the "old" code on the air for over 15 years when, through curiosity, she asked Irving Vermilya, W1ZE, now a silent key, about it. He and several others taught Bea the code during special on-the-air lessons that resulted in her membership in the East Coast Morse Net, and the Morse Telegraph Club.

On the west coast, Linda Pettit, WB6ZSE, also learned American Morse because she "liked the sound of it." She is a member of the East Coast Morse Net, Morse Telegraph Club, the Toledo Morse Telegraph Club, and she also collects telegraph instruments.

W3WRE has been a member of the Morse Telegraph Club since 1960, and is now affiliated with the Alfred Vail Chapter. "YL News and Views" is interested in learning how many other YLs in this country, and Canada, are former telegraphers, or, through their interest in the old "landline code," are active in the Morse clubs.

1975 YL Convention Plans

The only YL meeting on a national scale in 1975 will be the CLARA convention in Calgary, August 1-3, as a part of the Canadian Division ARRL Convention. This will be the first convention of the nationwide YL club of Canada. The annual Hamvention in Dayton, Ohio will have the regularly scheduled YL meeting and luncheon that may take the 1975 place of a midwest YL gathering as it did in 1974.

The ARRL National Convention in Reston, Virginia, September 12-14, has announced advance plans for a ladies program for those ladies who will be attending with their OMs, as well as a meeting for the YL operators under the leadership of the WAYIARCS. For other YL interest all state and division ARRL conventions, and major hamfests plan special meetings for the YL amateur radio operators who will be attending. **QST**

Strays HOW

No, it's not the beginnings of a coffee-can vertical, it's a two-meter amplifier.

When Bill Strattan, W2KBH, stopped by ARRL Headquarters in September, he had his pet project with him. This developmental model is a 4X150 amplifier with a 1/2-wave coaxial plate line. The tube is located in the second can from the bottom. The plate line, of aluminum tubing that will just fit the anode, extends up to about the middle of the second can from the top, where it is tuned by a variable capacitor inside the can. The top can is an extension to help contain the rf field, and is open to allow free air flow. A thermometer in the top container monitors exhaust air temperature. An old hair-dryer, minus the heater, forces air into the bottom can, which also houses the grid circuit. A movable link, mounted at the center of the assembly, couples power out of the line.

A good solution to recycling the cans, but what do we do with all those grounds?



No QSL, but rather this handsome certificate is available on request if you contacted WH4DOC, Atlanta Stadium, last April 8 through 18.

The World Above 50 Mc.

12.15-13.00 13.00-24.50 24.50-27.00 27.00-59.25 59.25-10.500 10.500-12.500 21.000-22.000 50.000-9

CONDUCTED BY EDWARD P. TILTON,* WIHDO

THIS COULD BE the last appearance of the column under the above by-line, so the writer, pondering this, checked back on the first column, in December, 1939, *QST*. Things have changed some since then (we started on page 29, and have moved closer to the back of the book steadily!), but one thing has been nearly constant - a healthy interest in the means by which vhf signals are propagated to distant points. Our lead material was propagation then, and the theme has been the same, more often than not, through the intervening years.

Our first column included a guess as to the "uhf" record for nonskip communication - something over 400 miles - when W8CIR, near Pittsburgh, worked stations in western Connecticut and Massachusetts on 56 Mc. He was heard as far east as W1DE1, near Boston, over 450 miles. Not much 50-MHz tropo goes much farther, 36 years later.

Later arrivals on the vhf scene may not know that 1939 was the first year that "uhf" amateurs operated under new FCC Rules which required stabilization of amateur transmitters on all frequencies up to 60 Mc. It was a landmark year; one in which great strides were made in extending reliable ranges on 56 Mc., and one in which simple-gear experimentation moved to 112 and 224 Mc, paying great dividends on those bands, as well. There was a 150-mile QSO (Pikes Peak to Cheyenne) on 112 Mc. reported in that first column, too.

Every edition of "On the Ultra-Highs" carried stories of work beyond the visual horizon, and attempted to show how these contacts were possible, on frequencies where propagation was assumed to stop where hills or earth curvature intervened. Even today we're still combating the line-of-sight myth to some extent, having seen a resurgence of it in the over-use of vhf and uhf repeaters for some communication that could be handled as well, or better, by direct methods.

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

There was much show-me resistance to the idea of vhf communication beyond a few miles, especially in areas where even people, let alone hams, were often many miles apart. The great American Southwest, much more sparsely populated then than now, was hardly prime vhf territory when, with the column barely a year old, we dropped a propagation bombshell, reporting the work of W6QLZ, Phoenix, and W6OVK, Tucson, in breaking down the 100-mile rough path between those cities on 56 Mc, in December, 1940. Everyone had *known* that this couldn't be done, but Clyde and Jim did it daily for months, and then repeated the trick on 112 Mc, as well.

There was a good ham yarn in connection with their first QSO. After many tests with no signals heard, W6QLZ decided to check out his receiver and antenna. Characteristically, he took the receiver up into a cottonwood tree that served as a support for one of several beam antennas he had aimed at Tucson. The idea was to adjust the antenna on a local signal that he could hear, for sure. No sooner had the receiver warmed up than there was the signal of W6OVK, calling on schedule. What to do now? Fiddle, and maybe lose what might be a one-in-a-million chance for a QSO, or scramble down the tree and back to the transmitter. Clyde chose the latter course, and the propagation book on the Southwest was rewritten, thereby. But not without some considerable scrambling up and down that old cottonwood at Mission Ranch!

We have a special reason for exhuming this old story, once more. A thousand times, this writer has heard "Sure, that vhf stuff is great for you guys back east, but out here (or 'down here,' or 'up here') it doesn't work." Would-be vhf operators of



Bill Shaw, WB2LAI/4, is a 6- and 2-meter regular in the Tidewater area, Chesapeake, Va.

50-MHz WAS

| | | | | | |
|----|-------|----|--------|-----|--------|
| 1 | W0ZJB | 43 | W6ABN | 84 | K6YIL |
| 2 | W0BJV | 44 | VE3AET | 85 | K6GMV |
| 3 | W0CJS | 45 | W9JFP | 86 | K7BAG |
| 4 | W5AJG | 46 | W0QIN | 87 | W7ZOW |
| 5 | W9ZHL | 47 | W0WWN | 88 | K7ZPS |
| 6 | W9OCA | 48 | K9ETD | 89 | K6EPT |
| 7 | W6OR | 49 | W0FKY | 90 | K7HKW |
| 8 | W0INI | 50 | W8LPD | 91 | W5WAX |
| 9 | W1HDQ | 51 | W0ZTW | 92 | WA7FPO |
| 10 | W5MJD | 52 | W6GCG | 93 | WA6HXW |
| 11 | W2IDZ | 53 | W2RGV | 94 | W6NIT |
| 12 | W1LLL | 54 | W1DEI | 95 | K7ICW |
| 13 | W0DZM | 55 | W1HOY | 96 | K6EJO |
| 14 | W0HVW | 56 | W6ANN | 97 | W6NLO |
| 15 | W0WKB | 57 | W1SUZ | 98 | K7BBO |
| 16 | W0SMJ | 58 | W1AEP | 99 | K6ZXS |
| 17 | W0OGW | 59 | W5LFH | 100 | K7MUR |
| 18 | W7ERA | 60 | W6N LZ | 101 | K5EFW |
| 19 | W3OJU | 61 | W7MAH | 102 | WA6JRA |
| 20 | W6TMI | 62 | W8ESZ | 103 | WB6WAX |
| 21 | K6EDX | 63 | W2BYM | 104 | W7FN |
| 22 | W5SFW | 64 | W7ACD | 105 | WB6IMV |
| 23 | W0QRE | 65 | K6PVH | 106 | WB6OKK |
| 24 | W9ALU | 66 | W4HOB | 107 | K7ZOK |
| 25 | W8CMS | 67 | K0JJA | 108 | WA6GLE |
| 26 | W0MVG | 68 | K6RNQ | 109 | W6PO |
| 27 | W0CNM | 69 | W9QWT | 110 | K6JJU |
| 28 | W1VNH | 70 | W6EDC | 111 | K9BDJ |
| 29 | W0OLY | 71 | K6VLM | 112 | WA5FPS |
| 30 | W7HEA | 72 | K6GOX | 113 | K6IBY |
| 31 | K0GGG | 73 | W0EDM | 114 | K6QAX |
| 32 | W7FFE | 74 | W9JCI | 115 | WA6QZC |
| 33 | W0PFP | 75 | W0LLU | 116 | WA6HXM |
| 34 | W6BJI | 76 | W7RT | 117 | K7CIN |
| 35 | W2MEU | 77 | W7RDY | 118 | WB6NKO |
| 36 | W1CLS | 78 | W6KIN | 119 | WA7GCZ |
| 37 | W6PUZ | 79 | W6OKR | 120 | WA7ZBS |
| 38 | W1ILL | 80 | K6GMX | 121 | WA7FLB |
| 39 | W0DDX | 81 | W7DYD | 122 | WB6HQU |
| 40 | W0DO | 82 | K6ZEE | 123 | WA6AOX |
| 41 | K9DXT | 83 | K6HCP | 124 | WB6BMB |
| 42 | W6BAZ | | | 125 | K6QHC |

No. 20, 22, 34, 60, 68, 70, 71, 72, 74, and all after 75 are for 50 states. No. 125 issued August, 1974.

the Southwest, particularly, had a point. Rarely do they have anything resembling the coastal tropospheric effects common to the Atlantic Seaboard, the Gulf of Mexico, or the California crescent from Santa Barbara to San Diego. Perhaps they will never see a tropospheric duct, such as guides signals occasionally from the Mississippi Valley to New England.

But with infinite patience and use of optimum techniques in every aspect of the game, isolated vhf enthusiasts have demonstrated that there are few "impossible" locations. Years ago W7LFF worked out on 144 MHz from Parker, Arizona, on the east bank of the Colorado River. W5LO, first from an ordinary residential site in Albuquerque and later from a choice high spot east of the city, near Edgewood, New Mexico, still does well on 144 and 220. K7ICW, Las Vegas, Nevada, looking at mountains in every direction, put his city on the vhf map. These are some of the people who demonstrated that our world above 50 MHz can be made habitable — even exciting — for anyone willing to "do the necessary."

We were inspired to make these comments by a recent letter from K7ICW, in which he reported a December 144-MHz QSO with W7RUC, Sierra Vista, Arizona. To appreciate the significance of

this event it probably helps to have read or listened to the years of "we can't do it here" complaints that have come this writer's way. Get out a map of Arizona, preferably one with terrain features marked, and spot these two locations. Sierra Vista is a few miles from the Mexican border, southeast of Tucson. Las Vegas is northwest of the corner bulge of Arizona, beyond Lake Mead. The over 400 miles in between is desert and mountains all the way. If there ever was an "impossible" path for vhf signals, this must be it. Fittingly, about one-fourth of it is exactly the route first covered by W6QLZ and W6OVK 34 years ago that very month.

OVS and Operating News

WIWEE says that a-m serves the Meriden (CT) Amateur Radio Club well. Their net uses 145.35 MHz Mondays, 2400 UT, and this spot is a rallying point for other purposes, as it has been in many parts of the country in years past.

Why not now? There has been an encouraging dusting off and reactivating 2-meter a-m gear of late, and there could well be more. We hear that a-m usage is coming back in a number of areas of high population density, where repeater-type operation inevitably reaches the saturation point in the more active hours of each day. Nassau County, Long Island, an early bastion of 2-meter a-m activity, is getting back to it again, to the point where a-m transceivers, long-time nonmovers on dealers' used-equipment shelves, are selling again.

WA1OLK, Spencer, MA, reports into the Yankee SSB Net, 50.175 MHz, Sundays 1430 UT; the East Coast 2-Meter SSB Net (see January QST); and the New England SMIRK Net (February column).

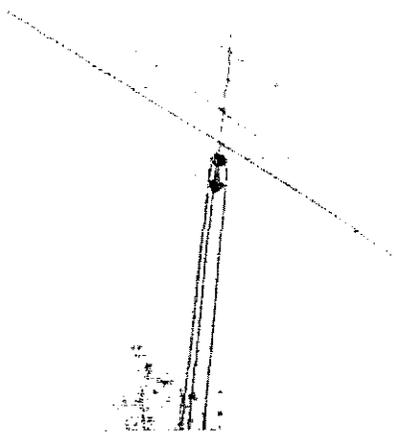
Your temporary column editor caught the SMIRK Net under ideal weather conditions Sunday night, Jan. 12. What had been described by TV and radio weathermen as a classic winter weather pattern dumped heavy snowfalls across the northern border states, and then moved northeastward along the St. Lawrence River, while another storm pumped very warm air up toward it from southwest. On Saturday this produced excellent tropo to the south and southwest, from New York and New England. Then, by Sunday night, just before heavy rain hit Connecticut and Massachusetts, the airmass boundary was over those states. When WA1NNW called up the SMIRK Net at 8PM local time, signals had that strong steady quality that makes winter tropo so pleasant. This was no DX session, but it is doubtful that the net will ever operate better than it did that night.

W1EUI, Pelham, NH, would like it known that he is now operational on 50, 144, 220, 432, and 1296 MHz. He hopes to be able to give NH contacts on all these bands in contests, having done it the first time in the September VHF Party. Presently he has 30 watts cw power on 1296.03.

W1JAA, Chelmsford, MA, has been working through Oscar 7, Mode B, and by the end of December had 25 states, 8 countries, and about 80 different stations. Warning to New England 2-meter men: W1JAA is setting up for business on that band. Look for a new entry near the top of the 2 meter states-worked box soon.

WB2WPA, Rochester, NY, is working with WB2JRX in organizing a 2-meter fm traffic net. Interested amateurs can contact him via the Rochester 28/88 repeater, WR2AEL, or at 183

Antennas at WB2LAI/4; 11-elements 28-foot boom for 50 MHz, at 55 feet; stacked 11-element Yagis for 144-MHz cw and ssb; and, barely visible, a groundplane for 2-meter fm at 70 feet.



Snug Harbor Court, Rochester 14612. All WNY and VE3 stations within reliable range are welcome.

WA3NDQ, Bloomsburg, PA, has had good response to his December *QST* plea for late-night 50-MHz skeds. Seems there are other 6-meter night owls, encouraged perhaps by freedom from prime-time TVI problems. Other after-11:30-pm skeds are welcome.

WA3SEE, Bethesda, MD, observed the following openings on 50 MHz in December: 1 - New Orleans area, 2100 - 2130; 8 - Kentucky, Arkansas and Oklahoma, 1750 - 2100; 9 - Texas and NE Arkansas, brief and spotty, 1800 - 1900; 25 - good opening to central Texas, 1130 - 1215, and brief to Florida, 1330 and 1515; 26 - Arkansas, 1730. All times EST. Carl says anyone wanting to do touch-up work on ham gear should try automotive-type paint, available in small bottles with built-in brushes, to match most colors; neater than spray method for scratches and nicks.

K4MSG, Petersburg, VA, observed aurora on 6 and 2, beginning 0130 UT January 3. Signals with buzz (1, 2, 8) gave way to E_s -type propagation from same areas and also 9 and 0, through about 0300. Shorter opening on 144, 0130 to 0150, but signals stronger than on 50. Paul announces the formation of a State-Seekers Net, meeting Monday nights at 7:30 local time, on 145.025 MHz, cw. Net speed will be approximately 10 wpm. Purposes will be to foster increased activity above 145 MHz, and to provide experience in use of the code and net procedure, as well as to offer opportunities to work into areas they might miss under random operating conditions. Standard net and Q signals will be used, along with conventional abbreviations, in the interest of brevity. Net Control will call to the north at 1930 local time, to the northwest at 1945, west at 2000, southwest at 2030, and south at 2030. Check-ins will be advised periodically as to stations and locations represented, and will be given opportunities to arrange schedules.

WB4NCN, Huntsville, AL, observed double-hop E_s the night of Nov. 30, to W6 and 7. Sam also enjoyed the Geminids meteor shower, hearing and/or working 1, 2, 3, 8, 9, and 0 on 50 MHz, Dec. 13-14. WB4EOQ, same city, worked several stations via the meteors, with 100 watts.

WB4BSZ, Pensacola, FL, caught E_s skip on Dec. 1 (2-hop for him, also), 2, 4, 13, 14, and 16. Antenna work kept him off the rest of the month.

WB4PXW, Naples, FL, found the 50-MHz band open on 17 of the 33 days that he could be on, between Nov. 18 and Jan. 5. He concurs in the excellence of the Dec. 1 session, saying that everything from New Hampshire to California was in. Bob got a surprise Jan. 5, when he began to hear Spanish-speaking fm stations between 50.075 and 50.125, at about 2100 UT. The calls were amateur, but the conversations more commercial in nature, with mentions of Columbian and Vene-

zuelan cities. After about 30 minutes the fm signals dropped out. Then the TI2NA beacon was heard strongly, but there was no indication that Eric was available for QSOs. TI2HL was worked, and Bob learned that he is the former OA4C, long active on 50 MHz. Around 2300 the fm stations came back in and the TI signals were gone, but the situation reversed again at 2400. Between 2250 and 0340 on the 6th, US call areas 3, 4, 5, 9, and 0 were worked. The TI2NA beacon was heard again for an hour, beginning at 0015 UT, Jan 9.

WA4VQD, Montgomery, AL, got set with 80 watts output on 2 meters, to two 12-element KLM Yagis, in time for the VHF SS, but was able to work only WA4CQG and W4WDH. He's set for skeds, however, and will have higher power before long.

WB2LAI/4, Chesapeake, VA, would like to correct the information given on the Tidewater Sideband Net in this space, January *QST*. The net operates at 2000 local time, Tuesdays, on 50.15 MHz, ssb; WA4GPM (ex-WA3SKT) or WB2LAI/4,

Terrestrial Two-Way Records

- 50 MHz: LU3EX - JA6FR
12,000 Miles - March 24, 1956
- 144 MHz: WA6JRA - KH6GRU
2591 Miles - July 29, 1973
- 220 MHz: W6NLZ - KH6UK
2540 Miles - June 22, 1959
- 420 MHz: W0DRL - K1PXE
1210 Miles - August 16, 1971
- 1215 MHz: WA2LTM - W9WCD
770 Miles - Oct. 26, 1972
- 2300 MHz: W6FZJ - WA6HXW
330 Miles - Feb. 6, 1974
- 3300 MHz: W6IFE/6 - K6HIJ/6
214 Miles - June 18, 1970
- 5650 MHz: K6HIJ/6 - W6OYJ/6
214 Miles - June 18, 1970
- 10,000 MHz: W7JIP/7 - W7LHL/7
265 Miles - July 31, 1960
- 21,000 MHz: G3BNL - G3EEZ
45 Miles - Nov. 12, 1972

EME Two-Way Records

144 MHz: SM7BAE -
ZL1AZR 11,055 Miles -
March 4, 1969
220 MHz: WB6NMT - K2CBA
2650 Miles - March 16, 1970
420 MHz: VK2AMW - G3LTF
10,530 Miles - March 30,
1974
1215 MHz: WB6IOM - G3LTF
5492 Miles - April 27, 1969
2300 MHz: K4RJ - W6YFK
1975 Miles - Nov. 22, 1972

NCS. The antenna picture, herewith, is no longer strictly correct, as there is a vertical 11-element Yagi for 2-meter fm, in between the stacked horizontal ones. Bill finds consistent coverage to well-equipped fm stations to be about 100 miles, with up to 200 or more occasionally.

Bill regrets that so many good 2-meter stations are now "hung up on fm," feeling that they have lost some vhf potential thereby. As proof, he cites regular communication with WA1NGR, Chester, CT, 350 miles, on ssb. Two-meter ssb will consistently go more than twice as far as fm, and there need be no "channeled QRM" on the ssb mode. If you tend to think that there is nothing doing on 2-meter ssb these days, try making some noise (cw or ssb) on 145.025 MHz, an eastern calling frequency now widely used. Winter tropo: between 0150 and 0300 UT, Jan. 12, WA2VFA (Long Island South Shore) was S9-plus in the Tidewater area, 320 miles, with only 3 watts. (See 6-meter note earlier in this section for same period).

For those who like to try working out on fm (and the number is growing all the time) WB2LA1/4 suggests using the alternate simplex frequency, 146.49 MHz, for DX, 146.52 having become thoroughly jammed every time propagation is good at all, of late. (Conductor hint: VFOs, especially the heterodyne variety, also work. Trying to build up DX potential with fixed-frequency stations entirely is a sure way to chaos, but you have to tune the receiver, too, if the problem is to be properly solved.)

WB5MHA, Shreveport, LA, would like to hear from anyone in that area interested in fm on 220 or 420 MHz. He came from the Chicago area, where there was growing fm use of these bands, but has found none in his new home territory. Write Jim McClure, 429 Stephenson, Shreveport 71104; phone 318-868-2694.

Our apologies to K5PTK, Hitchcock, Texas, whose call ran in our 2-meter states-worked box as PIK, for some time. We can almost guarantee that it will be right next time, Sam. With this, we ask all listees to check their calls and records each time a box appears, which they are going to do fairly regularly, we hope, from here on. Such tabulations are more difficult to keep in proper shape than running text. Please help, with updating and corrections, when needed.

WASIKU, Dallas, says that there is interest in getting regular a-m activity going again on 2 meters in his area, this having been a big fm area for some years. The trend to greater use of repeaters for autopatch service tends to rule out ragchew-type QSOs, but there is plenty of time and frequency

space for leisurely communication in other parts of the band.

The frequent E openings on 50 MHz, especially the ones to the Florida peninsula, a path where high signal levels are common, make for severe interference problems, with everyone working near 50.11 MHz. No excuse for this, gang, with vfo-controlled transceivers in universal use by the ssb fraternity. There's plenty of room higher in the band. Let's use it!

K5ZMS, San Antonio, reports 50-MHz openings on at least 17 days in December, despite not being able to be on the air every day.

W51YX observed 28 separate E_s openings on 15 days during December. The total time the band was open was approximately 3 times the record of 1973, and 9 percent better than the previous December high, 1969. 1974 as a whole exceeded the best previous year in Pat's experience, 1965, also by about 9 percent. By months, the days-open figures for 1974 are: January - 8, February - 3, March - 6, April - 14, May - 22, June - 28, July - 25, August - 15, September - 2, October - 10, November - 13, December - 15. Multiple-hop E_s was logged 31 days in 1974. All 48 contiguous states were heard. Delaware, Montana, and North Dakota were rarest, each appearing only once in the WA51YX log. Arizona and California (the pipeline states) show 78 times, with Florida and Ohio tied for second at 54 each. 46 states were identified in June, 42 in July, and 37 in May. It is worth noting that Pat observed TV DX on 35 days in 1974, when no 50-MHz amateur signals were logged. Many other times TV DX appeared as much as 30 minutes before any amateur signals were heard. Quite obviously, "everybody listening" and "nobody listening" are still 50-MHz problems!

Thanks to quick reporting by K5VWW, we have details of a fine winter tropo opening across and along the Gulf, Jan. 26-7. This involved at least three bands, including 50-MHz contacts, rather rare at such distances by other than E_s. WASHNK, Houston, and W5QDB, San Antonio, worked WA3BSZ/4 in Florida at about 0300 UT Jan. 27. A series of contacts over shorter distances along the Gulf Coast indicates the tropospheric nature of the work.

On 2 meters the long-haul activity was similarly spread over wide areas. K5VWW, Houston, worked WA4VQD, Montgomery, AL, W4WDH, Atlanta, W4VCI, Valrico, FL (north of Tampa), and WA3BSZ/4, as did W5UPR, WASHNK, and K5JRH. W5QDB, running one of the new 10-watt KLM transceivers, worked several of the Florida stations. W5UPR and W5LDV, Houston, worked K4NTD, Oakland, FL (Orlando area) on 432. This is a path of over 850 miles. Some of the contacts from the San Antonio area were upwards of 1000 miles.

K5VWW also tells us that there are other above-145 moonbouncers (we had suggested that K7BBO might be alone in that category) including WA7BJU and himself. Orville has worked WA7KYZ and W6PO via the EME route.

K6ZMW, Fresno, has some good 1296-MHz news: work with K6UQH, Saratoga, 140 miles, Joe runs 2 watts, cw and ssb, from a high-level 2C39 mixer designed by WA6NRV, feeding a quad-helix at 80 feet. The receiver is a K6UQH-style trough-line converter (July, 1973, QST) working into a sideband transceiver. K6UQH runs 10 watts output, also into a quad helix. The first QSO, Jan. 19,

(Continued on page 176)

Operating Events

de W1YL

MARCH

- 1-2 DX Competition** phone, p. 56 Dec.
- 6 W6OWP Qualifying Run** (W6ZRI, alternate) 10-35 wpm at 0400 UTC (Universal Coordinated Time, calculated as per GMT) on 3590/7090 kHz. This is 2100 PDST the night of March 5. Please note that dates are always shown at least 2 months in advance and times are always the same local "clock time," i.e. 9 PM local Pacific time. Underline one minute of the highest speed copied, certify copy made without aid (typewriters OK), and send to ARRL for grading. (Note: ARRL Form CD-9 shows qualifying run schedules for both W1AW and W6OWP, as well as the complete W1AW code practice schedule.)
- 8-9 YL/QM Contest** cw, p. 88 Dec. *BERU*, p. 101 Feb.
- 14 W1AW Qualifying Run** (10-35 wpm at 0130 GMT/UTC), transmitted simultaneously on 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. This is 2130 EDST (9:30 PM local eastern time) the night of March 13. Underline one minute of top speed copied, certify copy made without aid, send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. A legal size s.a.s.e. would be appreciated.
- 15-16 DX Competition** cw, p. 56 Dec.
- 17 CWA High Speed Code Test.** Speeds of 40 through 60 wpm will be transmitted for certification, five minutes of plain English at each speed at ten minute intervals. Important instructions at 0130 UTC, 40 wpm at 0150, 45 wpm at 0200, 50 wpm at 0210, 55 wpm at 0220 and 60 wpm at 0230. Look for WINJM on 363 and 7085 kHz, K6DYX on 3690 and 7025 kHz. Don't forget, this is the evening of Mar. 16 if you use local time!
- 22-23 Tennessee QSO Party, Prairie Dog QSO Party, BARTG Spring RTTY Contest**, p. 101 Feb.
- 24 W1AW Morning Qualifying Run**, 10-35 wpm at 1300 GMT. This is 9 AM EDST. Same frequencies/details as under the March 14 listing.
- 29-Apr. 6 Worked All States Week Contest**, p. 101 Feb.

APRIL

- 1-May 1 Calgary Centennial Alberta QSO Party**, 0700Z April 1 to 0700Z May 1. Calgary and Alberta hams will work the rest of the world. One contact per band per mode. Scoring for points outside Alberta: 1 point per Alta. contact, 2 points per Calgary contact with special prefix, 5 points per club station contact (CY6AO and CY6NQ), 5 points per Oscar contact. Scoring for Calgary and Alberta stations: 1 point per contact, 5 points per Oscar contact, 0 points for Alberta contact. Mult. for Calgary and Alta. stations: 1 for initial contact with each Canadian, U.S., N.Z., VK and JA call district, and for each country exclusive of these as per ARRL Countries List; initial contact only regardless of band/mode. Alta. counts for multiplier only, but not for points. Awards to highest Calgary score, highest Alta. score (outside Calgary), high in each VE province and territory, etc. Send full log data. Logs to be posted by June 1 for Alta. stations, July 1 elsewhere. Certified logs by QSL Mgrs. OK. Mail to CC QSO Party, Box 592, Calgary, Alberta, Canada T2P 2J2.
- 2 W6OWP Qualifying Run.**
- 5-6 Florida QSO Party**, 10th annual, sponsored by Florida Skip, the all-Florida Amateur Radio publication. All amateurs invited to participate. Florida amateurs may work amateurs both out of state and in state. Periods: (all times GMT) Sat., 1500-2000; Sun. 0000-0500, 1400-2359. Suggested freqs.: cw, 1808 3580 7080 14080 21080 28080 (please avoid W1AW - Ed.); phone, 181 3980 7280 14318 21380 28580. No power or time restrictions. Exchange: (Fla. stations) RST and county; non-Fla., RST and state, province or country. Do NOT exchange numbers of contacts. Scoring: all stations, stations may be contacted once on each cw band and once on each phone band. Cw and phone are separate entries and are to be summed for Florida club aggregate entries, only. Florida stations: 1 point per QSO times no. of states/provinces/countries (D.C. counts as MD). Other Fla. stations may be worked but only for contact points, not for a mult. Maximum mult. is 73 (49 states, 12 provinces, no more than 12 DX countries). Club aggregate: Fla. clubs may total their members' single-op cw and/or phone scores and enter the total. The score(s) may appear in only one club aggregate entry. Non-Florida stations score one point per QSO times no. of Fla. counties (67 max). Trophies, certificates,

Logs must be postmarked no later than May 30 and mailed to Florida Skip, Contest Chairman, Box 501, Miami Springs, Florida 33166. A summary sheet with name, call, address, claimed score, category and the customary declaration must be included with your log. If not, the entry will be disqualified. Messy entries will not even be considered. All scores will appear in the June issue of Florida Skip. If you wish a copy, include a 13 cents stamp with your log. Contest Committee decisions are final.

12-13 CD Party, cw. The First Common Market DX Contest, sponsored by the Belgian Society, the U.B.A. The purpose is to increase activity between stations of the Common Market of EU and the rest of the world. Starts 0001Z April 12, ends 2400Z April 13, a full 48-hour period. Call CQ CM on cw, CQ Common Market on phone; 160-10 meters, cw and phone. Classifications: single band single op., multiband single op., multiband multiop. Exchange RS(T) and QSO no. starting from 001. Each contact with a station inside the Common Market counts 5 points, each contact with a station outside the Common Market counts 3 points. Multiplier: for stations located in the 9 countries of the Common Market (Ireland, Belgium, France, Italy, England, Denmark, Netherlands, West Germany, Luxemburg) one point for each country on the ARRL Countries List on each band; for stations located outside the Common Market one point for each prefix of each country of the Common Market on each band worked. Awards. Scoring: single band equals contact points X multiplier; multiband, total of contact points on all bands multiplied by the sum total of multipliers of each band. Results will be in the Dec. 1975 U.B.A. Journal. For a copy enclose one IRC with your log. Contest Committee decisions final. Indicate duplicate QSOs. 3% or more non-indicated dupes will disqualify the participant. Log date/time(Z), calls, exchanges, countries/prefixes (if new multiplier) and points. Include usual declaration. Mail to arrive no later than June 30 to: Timmerman Omer, ONSTO, Boterbekeweg 8, 8290 Brugge, Belgium. **Fourth Annual Country Hunters SSB Contest** sponsored by the Mobile Radio Awards Club, Inc., full 48-hour period GMT. Suggested freqs. plus/minus 10 kHz of: 3935 7240 14290 21390 28580. No credit for contacts on the net frequencies of 3943 7238 or 14336. Mobiles may be worked each time they change counties or bands. Mobiles that are worked again from the same county on a different band count for point credit only. Mobiles contacted on a county line count as one contact but two or more multipliers. Portables changing counties during the contest may be worked for both point and multiplier credit from each new county. Fixed stations may be worked by other fixed stations only once during the contest (no repeat QSOs on other bands). Fixed stations may be worked by mobiles each time the mobile changes counties/bands. Repeat contacts between mobiles are permitted provided they change bands/counties (at least 1 of the mobiles). Exchange report, county and state (country for DX). Mixed mode OK but at least one station must be on sb. To score: contacts with a fixed U.S. or VE station 1 point, with DX stations 5 points, with mobiles 10 points. (Note, KH6/KL7 considered DX for scoring purposes.) Maritime mobiles considered fixed for scoring purposes. Multiplier = no. of counties plus Canadian stations worked (take credit for a county only the first time it is worked.) A VE station counts each time it is worked. Score equals total points times total no. of counties worked plus VE stations. Log date/time, stations, reports, county, state, band, claimed points (1, 5 or 10). Each new mult. must be numbered. Check sheets appreciated on all scores over 100,000. Summary and log sheets free for a no. 10 s.a.s.e. or s.a.e. and IRCs from: James L. Willingham, K0ARS, Route 1, Bevier, MO 63532. Plaques, certificates, single ops. only. All entries must be received by June 1 to be eligible for awards. DX entries should use air mail. **Swiss Contest**, sponsored by the Swiss Society, the USKA, 1500Z April 12 to 1700Z April 13, 160-10 cw to cw, phone to phone. Exchange RS(T) and 3 figure serial starting with 001. Swiss stations will send in addition the abbreviation of their canton. Each contact with an HB station counts 3 points. A station may be worked once per band either on cw or on phone. The multiplier is the sum of Swiss cantons worked on each band making a possible multiplier of 22 per band. (Canton abbreviations are: AG AR BE BS FR GE GL GR LU NE NW SG SH SO SZ TG TI UR VD VS ZG ZH.) Final score is the sum of QSO points multiplied by the sum of cantons worked on each band. Certificates. Postmark log no later than 30 days after the contest and send to: T-M USKA, HB9AHA, im Moos, 5707 Seengen, Switzerland. For the H-22 Award, send QSLs for each of the 22 cantons worked on cw or phone to: Walter Blattner, HB9AIF, Box 450, CH 6601 Locarno, Switzerland.

12-14 Virginia State QSO Party, sponsored by the Sterling Park Amateur Radio Club, from 1800Z Apr. 12 through 0200Z Apr. 14. Exchange QSO no., RS(T) and QTH (county for VA, state, province, country for others). One point per QSO. VA stations multiply total QSO points by the sum of states, provinces, countries and VA counties worked. Out-of-state stations use VA counties for their multiplier (max. of 98). Suggested frequencies: around 60 kHz inside the low end of each cw (and novice) bands; phone, 3930 7230 14285 21375 28575 (check phone bands on the even hour GMT). Very handsome certificates. The same station may be worked on each band/mode. VA stations may work each other. Be sure to make note of each new multiplier in your log, include summary and check sheet. Only QSOs 160-10 count. Logs must be received by April 15. Send to: Gary D. Poorman, W4UPJ, 1114 S. Dickenson Ave., Sterling Park, VA 22170.

15 WIAW Qualifying Run

19-20 CD Party, phone, Bermuda Contest, phone, sponsored by the Radio Soc. of Bermuda, 0100Z April 19 through 0200Z April 20 (similar time slots for cw May 3-4). No details furnished, presume rules same as in previous years. **7th RTTY WAEDC** sponsored by the DARC, the full GMT period, 80-10 meters. Single op, single transmitter and multiop, single transmitter. Only 36 hours operation permitted for single ops. The 12 hours of nonoperation may be taken in one but not more than 3 periods anytime during the contest. The periods need not be of equal duration but must total a minimum of 12 hours and be clearly indicated in the log. Exchange QSO no. and RST. Two-way RTTY contacts with one's own continent count 1 point, with stations outside your continent 3 points. Contacts of non-EU with EU will count 5 points for the non-EU and 3 points for the EU. Work a station once per band. Each QTC given or received counts a point; each QTC must contain the time, call and QSO no. of the station being reported. A QTC may be reported only once and not back to the originator. A maximum of 5 QTCs to a station is permitted per band. Keep a list of QTCs sent. Multipliers are the no. of countries worked on each band plus call areas in JA PY VO VE VK W/K ZL ZS plus UA9 and UA0. Three classifications, up to 200 watts dc input, over 200 watts SWL. A reasonable score is required for one of the several awards. Excessive dupes or unsportsmanlike conduct are grounds for disqualification. Logs must contain all the usual info, plus QTCs sent/received. Separate logs per band. Enclose a summary showing scoring, rest periods, classification, plus your name and address in block letters. Deadline June 10. Contest Committee decisions are final. Send to: WAEDC Committee, D-8950 Kaufbeuren, Postbox 262, West Germany.

19-21 Zero District QSO Party, sponsored by the TRA ARC of Iowa State University at Ames. Stations outside of the zero district will exchange reports with zero stations only. Zero stations may work anyone. Be sure to watch for mobiles changing counties. The contest will run from 2000Z April 19 until 0200Z April 21. All frequencies valid; suggested areas around 3570 7070 14070 21070

28070 3900 7270 14300 21370 28570. Novices try 3725 712 21125. Everyone send RST and QSO no. Zeros also send county section. Non-zero send section. Each station may be worked one per band. (Phone and cw count as separate bands.) If a mobil changes county, he may be worked again. To score: zero station multiply the no. of QSOs by the total no. of ARRL sections plus zero counties plus DX countries. Non-zero stations multiply the no. of QSOs by the total of zero counties plus zero sections worked. Certificates, Logs and claimed score with s.a.s.e. by May 20 to: TR/ARC WA0TKK, Wilson Hall, Iowa State University, Ames, Iowa 50010.

26-27 PACC Contest sponsored by the VERON, from 1200: April 26 to 1800Z April 27, (60-10 meters. Crossband and crossmode not permitted. (Note, PA stations on 160 operate 1825-1835.) Exchange report and QSO no. starting with 001 PA/PI/PE stations will send their province indicator (as follows: G1 Groningen, OV Overijssel, NH Noord-Holland, ZL Zeeland, F1 Friesland, GD Gelderland, ZH Zuid-Holland, NB Noord-Brabant, DR Drente, UT Utrecht, LB Limburg, YP Ysselmeerpolders). These are multipliers for non-Holland stations. Three points per complete QSO. Final score is sum of QSO points on all bands times the sum of multipliers on all bands. Appropriate certificates. Logs must show date/time in GMT, stations, province/country worked, multiple column for each band (to be checked only when the QSO represent a new multiplier), exchanges, points. Send logs by June 30 to Contest Mgr., L. v. d. Nadort, PA0LOU, Hospolderstraat 15 Nieuwerkerk a/d IJssel, Netherlands. Include usual contest statement.

28 Special WIAW Qualifying Run.

MAY

- 1 W6OWP Qualifying Run.
- 3-4 Bermuda Contest, cw.
- 3-5 Connecticut QSO Party.
- 10 Frequency Measuring Test.
- 10-12 Georgia QSO Party.
- 14 WIAW Qualifying Run.
- 17 World Telecommunications Day Contest.
- 17-18 Michigan QSO Party, YI-SSB QSO Party.

- June 14-15, VHF QSO Party.
- June 21-22, W. VA. QSO Party.
- June 28-29, FIELD DAY.
- July 12-13, "Open" CD Party, cw.
- July 19-20, "Open" CD Party, phone.
- Sep. 6-7, VHF QSO Party.
- Nov. 8-9, SS, cw.
- Nov. 22-23, SS, phone.

Strays

On October 19, 1974, commemorative station KD3AFF operated at the Dillsburg Annual Farmers' Fair in Pennsylvania on 2 meter fm, and 20, 40, 80 meters, cw and phone. Two hundred and seventy-four stations were worked, and public interest was very high.

ARE YOU LICENSED?

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



Operating News

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

ASST. COMMS. MGRS.: DXCC, R. L. WHITE, W1CW; Hq. Station, C. R. BENDER, W1WPR
Contests, F. D. NISWANDER, WA1PID; Public Service, W. C. MANN, WA1FCM
Affiliated Clubs, JIM CAIN, WA1STN

WIAW Programs. The history of the ARRL Headquarters Station starts in the early twenties, when a small self-excited rig was set up at the then headquarters offices at 1024 Main St., Hartford, under the call letters IMK. Operation was conducted during the noon hour or evenings, on an unscheduled basis, by volunteer staffers. This little rig went along when headquarters moved to 1711 Park St., but was soon supplanted by heavier equipment, still operated by volunteers. In 1928, a real honest-to-goodness headquarters station was established at Hartford's then municipal airport, and operated successfully therefrom until 1936.

Two great tragedies occurred during that year. The first was the death of our beloved president and founder, Hiram Percy Maxim, W1AW, in February. Following closely on the heels of this came the 1936 flood, inundating W1MK. Devastation was complete, except for a few small pieces of gear rescued ahead of the rising water. These were quickly supplemented by gear made available at the headquarters offices (by now at 38 La Salle Road in West Hartford) and operation continued under the call W1NF. The League, with the approval of the Maxim heirs, applied for and received the call W1AW, which has been the call of ARRL Headquarters ever since.

The Board of Directors at its meeting in May of 1936 authorized the construction of a new memorial station. A site in Newington was selected, construction proceeded and in the early fall of 1938 the new headquarters station was ceremoniously dedicated before a national radio audience.

After over 35 years, rural Newington has become suburban Newington. W1AW is surrounded by homes and apartments and the new headquarters building is in the middle of what was and still is the W1AW antenna farm. The physical station has gone through a complete remodeling in addition to continuous operation as techniques and regulations change. Code practice transmissions and bulletins are now sent simultaneously on eight bands. RTTY is available on five bands. There are 24 code practice sessions, 19 cw bulletins, 13 phone bulletins and 12 RTTY bulletins per week, plus ten cw Oscar up-dates, for a total of over 40 hours per week of on-the-air time.

Many have asked just what kind of gear does all this, and how it stands up — also who built, manufactured or otherwise furnished it. The

“main” station equipment (that is, that used to send code practice and bulletins) starts with a 455-kHz lsb, RTTY or cw signal which is converted to 3 MHz and fed into seven mixer-converters, producing output on each band from 160 through 6 meters. This exciter and the converters were built right here at ARRL headquarters, along with associated gear that gives us usb on some bands. There are five 3-1000Z grounded-grid linears giving W1AW full legal power on 80 through 10 meters; these amplifiers were designed and custom-built for W1AW by W6SAI and cohorts, pretty much at cost. The lower-powered 160-, 6- and 2-meter rigs were constructed at headquarters.

The perfect “fist” at W1AW comes from a teletype-to-Morse converter, using standard 5-unit teletype tape, which then can be used for both cw and RTTY bulletins. Some built-in limitations to this system have resulted in the seeming paradox of our code practice at 13 wpm sounding slower than that at 10 wpm, but somehow harder to copy. The reason is that the characters at 5, 7½ and 10 wpm

DXAC Notes

November, 1974. *QST* (page 108) carried the August 1974 Agenda of the DXAC. Comments were reviewed by the DXAC in its considerations of the items appearing on that Agenda. The following are the results of the DXAC's considerations.

Of the 8 items shown on that Agenda, items numbered 3 (“Should a cw-only DXCC Award be established?”) and 6 (“Should yearly listing of all holders of the SBDXCC Award appear in *QST*?”) were made the subject of recommendations to the ARRL Board of Directors. Items numbered 1, 2, 4, 5, 7 and 8 were not.

At the January, 1975, Board of Directors meeting, the Board reviewed the DXAC's two recommendations and took favorable action on them.

While the details concerning the submission of applications for the new cw-only DXCC Award will appear in an upcoming issue of *QST*, the expected starting date for contacts to be used toward the new cw-only DXCC is January 1, 1975.

W1AW SCHEDULE (effective February 23, 1975)

The ARRL Maxin Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M. - 1 A.M., Saturday 7 P.M. - 1 A.M. and Sunday 3 P.M. - 11 P.M., (all times local Eastern). The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed Mar. 28, May 26, July 4 and Sept. 1, 1975.

| Times/Days CDT | UTC | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|------------------------|-------------------------|--|-------------------------|--------------|-------------------------|------------------|------------------------|--------|
| 0740 | 1340 | ← CODE PRACTICE ¹ (5-25 wpm) MWF, 35-15 wpm TTh) Details Below | | | Oscar ⁹ | → | | |
| 0800 | 1300 | ← CODE PRACTICE ¹ (5-25 wpm) MWF, 35-15 wpm TTh) Details Below | | | 21/28 cw ^{7*} | 2,290* | 21/28 cw ^{7*} | |
| 1200-1300 | 1700-1800 | ← CODE PRACTICE ¹ (5-25 wpm) MWF, 35-15 wpm TTh) Details Below | | | Oscar ⁹ | → | | |
| 1300 | 1800 | ← CODE PRACTICE ¹ (5-25 wpm) MWF, 35-15 wpm TTh) Details Below | | | 21/28 cw ^{7*} | 2,290* | 21/28 cw ^{7*} | |
| 1320-1400 ⁴ | 1820-1900 ⁴ | 14,290* | 14,080* | 14,290* | 14,080* | 14,290* | 14,290* | |
| 1400-1500 | 1900-2000 | 7,080* | 21/28 esb ^{8*} | 7,080* | 21/28 esb ^{8*} | 7,080* | | |
| 1500 | 2000 | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 1530 | 2030 | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 1600-1630 ⁴ | 2100-2130 ⁴ | 7,1 Nov. 5* | 21,1 Nov. 5* | 28,1 Nov. 5* | 21,1 Nov. 5* | 7,1 Nov. 5* | Oscar ¹⁰ | |
| 1630 | 2130 | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 1700-1800 ⁴ | 2200-2300 ⁴ | CPN ⁶ | 14,095 RTTY* | 3,625 RTTY* | 7,095 RTTY* | CPN ⁶ | | |
| 1800-1830 | 2300-2330 | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 1830 | 2330 | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 1900 | 0000† | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 1930-2000 ⁴ | 0030-0100 ^{4†} | 3,7 Nov. 5* | 14,080* | 14,080* | 7,1 Nov. 5* | 14,080* | | |
| 2000 | 0100† | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 2010-2030 ⁴ | 0110-0130 ^{4†} | 3,990* | 50,190* | 145,588* | 1,870* | 3,990* | | |
| 2030 | 0130† | ← CODE PRACTICE ¹ (5-25 wpm (11 Sat/Sun, 35-15 wpm MWF) Details Below | | | → | | | |
| 2130-2200 ⁴ | 0230-0300 ^{4†} | 3,580* | 1,805* | | 3,580* | | 3,580* | |
| 2200 | 0300† | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 2230 | 0330† | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 2240-2300 ⁴ | 0340-0400 ^{4†} | 7,290* | 3,990* | 7,290* | 3,990* | 7,290* | | |
| 7300 | 0400† | ← CODE PRACTICE ¹ (10-13-15 wpm) Details Below | | | → | | | |
| 2330-0000 ⁴ | 0430-0500 ^{4†} | 3,7 Nov. 5* | 7,080* | 3,580* | 7,1 Nov. 5* | 3,580* | | |

¹ CW Bulletins (18 wpm) and code practice on 1,805, 3,580, 7,080, 14,080, 21,080, 28,080, 50,080 and 145,588 MHz.**
² Phone Bulletins on 1,820, 3,990, 7,290, 14,290, 21,390, 28,590, 50,190 and 145,588 MHz.**
³ RTTY Bulletins on 3,625, 7,095, 14,095, 21,095 and 28,095 MHz.** Bulletins at 170 Hz shift, repeated at 850 Hz shift when time permits.
⁴ Starting time approximate, following conclusion of bulletin or code practice.
⁵ W1AW will tune the indicated band for Novice calls, answering on the caller's frequency.
⁶ Participation in traffic nets.
⁷ Operation will be on one of the following frequencies: 21,02, 21,08, 21,11, 28,02, 28,08, 28,11 MHz.
⁸ Operation will be on one of the following frequencies: 21,25, 21,39, 28,59 MHz.
⁹ When an Oscar satellite is in orbit, daily updated orbital data is sent at 18 wpm on cw frequencies.
¹⁰ Oscar orbital data for the coming week, on cw frequencies.
¹¹ Oscar orbital data for the coming week, on RTTY frequencies.
[†] General contact period.
^{**} No 10- or 15-meter activity from 2030-0000 CST.
[†] Indicates following day when UTC is being used.
 All frequencies are approximate.

W1AW CODE PRACTICE

W1AW transmits code practice according to the following schedule. Approximate frequencies are 1,805 3,580 7,080 14,080 21,080 28,080 50,080 and 145,588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

| Speeds | Local Times/Days | UTC/Days |
|----------|---------------------------------------|----------|
| 10-13-15 | 7:30 PM EDST Dy 4:30 PM PDST | 2330 Dy |
| 10-13-15 | 4:00 PM EDST M F 2000 1:00 PM PDST | M F |

| | | |
|-----------------|----------------------|------------|
| 5-7-10-13-20-25 | 9:30 PM EDST Sat Ths | 0130 MWFSn |
| 13-20-25 | 6:30 PM PDST | |
| 5-7-10-13-20-25 | 9:00 AM EDST MWF | 1300 MWF |
| 13-20-25 | 6:00 AM PDST | |
| 35-30-25-20-15 | 9:30 PM EDST MWF | 0130 TThS |
| 35-30-25-20-15 | 6:30 PM PDST | |
| 35-30-25-20-15 | 9:00 AM EDST TTh | 1300 TTh |
| 20-15 | 6:00 AM PDST | |
| Mar. 7: | It Seems to Us | |
| Mar. 11: | Correspondence | |
| Mar. 17: | League Lines | |
| Mar. 20: | ARPS | |
| Mar. 26: | World Above | |
| Mar. 31: | Y.I. News | |

are sent at 16 wpm, then spaced out to get the desired speed. But at 13 wpm the characters are sent at 13 wpm and spacing is normal. This conforms with approved learning methods, is the same principle used by FCC in testing, and thousands of listeners have used it successfully to acquire the needed 5, 13 or 20 wpm code speed for

the various classes of license. It helps avoid the plateau reached by so many beginners at around 10 wpm, where most people find they can no longer count "dots" and "dashes" but must learn to recognize characters by sound alone.

The casual visitor to W1AW will see much manufactured equipment in evidence. Most of this

Great Lakes Division LO Meeting, Nov. 16, 1974. Standing (l to r), OH SEC W8SCOA; Great Lakes Div. Vice Director W8IMI; OH SCM W8CHT; MI SEC W8MPD. Seated (l to r) KY SCM W4CID; Great Lakes Division Director W8ETU and MI SCM W8ZBT (just recently deceased).



is donated, either by a manufacturer (entirely unsolicited and with no strings attached) or by the estate of a ham who has become a silent key and wanted ARRL to have his equipment. These rigs are used as stand-by or back-up for the regular station gear (which does occasionally develop bugs), for use in meeting nets or making general contacts, and for use by visitors.

WIAW services to the amateur fraternity are in general well received and appreciated. We have no method of determining the WIAW audience, but there is every indication that it is in the thousands for each transmission, especially the code practice. Hams, as a rule, are a philosophical lot and tend to put up with the many annoyances such as QRM, QRN, QSB, and generally erratic conditions resulting in weak signals that ought to be strong, or vice versa. Many of our non-amateur listeners just don't understand this. With mufs spiraling downward, more and more reliance is placed on the

lower frequencies, but QRN tends to lessen their value. As a result, we get a considerable amount of mail suggesting changes that would benefit (temporarily, most likely) the particular area of its origination. The headquarters station is expected to be heard just about everywhere with a good enough signal to stand out. It's quite an assignment.

Erratic propagation conditions call for drastic changes in each listener's operating practices. If a band sounds dead (signals fluttery and weak), try a lower frequency. You'll find WIAW code practice 80 kHz inside the "low end" of each band, 80 through 6; a modern well-calibrated receiver will switch from one WIAW signal to another by a flick of the band switch. When skip is long on 80, listeners in the northeast may find 160 coming through well, or locals (outside ground wave but inside the skip zone) may find vhf reception possible.

Suppose all your efforts to find a copiable signal prove futile? Don't despair, there are several transmissions daily, and bulletins are sent by several different modes. The schedule of transmissions is examined carefully and frequently by staff experts with the objective of making them available to the greatest number of listeners; but we hope you all will recognize that a change that will benefit your area may have the opposite effect elsewhere, and these considerations have to be balanced out. If anybody has a solution that will please everybody, by all means let's have it! — *WINJM/WIWPR*.

That 40-wpm Qualifying Run. On Dec. 10, 1974, WIAW stuck a 40-wpm transmission on the end of its regular code proficiency qualifying run and 47 amateurs had a crack at it — that is, 47 that we know about; probably many more than that tried it but never sent in their copy. Of the 47 who did sent it in, 42 qualified and are now the proud possessors of the first ARRL Code Proficiency Certificates at 40 wpm. Congratulations to W1BGD, K1ZND, W2s CVW FR LYH TO, K2s BV KJR KTK, WA2EXB, WB2s EDW RKK, W3s ADE ATQ LE, W4s AKJ PEI, K4s EZL KG, WA4PWF, W5s GHP TI TXA UGE YZ, K5FJE, W6OAT, K7NHV, W8s AN LGT OHO OK SOO, K8IUF, W9s CNY DND ERW FMJ MTT, K9s DDA KHI, and PY2BKO.

A number of letters have been received to the effect that WIAW was not copiable, that the writer

CAC Notes

The ARRL Contest Advisory Committee has divided itself up into subcommittees responsible for recommending changes to various operating activities. Members of the CAC responsible for specific activities include:

W1BGD, VHF Contests; WA2BLV, Novice Roundup; W3BQV, Field Day; K4BAI, Sweepstakes; W5RUB, Guidelines for QSO Parties; W6PAA, CD Parties; K8HLR, DX Competition; W9LT, 10-Meter Contest; WA0CVS, 1976 200th Anniversary Contest; VE7CC, 160-Meter Contest.

If you have suggestions concerning specific contests address them to the proper CAC member above, or have them sent to all CAC members by sending them to W1YL, ARRL, 225 Main St., Newington, CT 06111.

As various changes are brought up for consideration during the year additional information will be issued so that contest participants will be aware of what changes are proposed, and have an opportunity to comment before the changes actually go into effect. — *K7NHV, Chairman*

5-BAND AWARDS

(Updating the February 1975 listing.)

5BDXCC: (Starting with number 384),
KSABV W5UR WB2UKP YU2CBM W5UDK
OF1ZGA.

5BWAS: (Starting with number 195),
WB0EZQ WB4JYX K7RSC W0TYP
WB0GZR K4KA W7WMY.

was unable to be on, that 40 wpm is too slow, that the run should be repeated, that it should be sent in the morning, that it should be sent on the west coast, that even faster speeds be included, etc. So far, nobody has said that it was useless and should not be sent at all.

So we're going to do it again, in June. If the participation stays up, we'll run 40 wpm every six months, or maybe try an even higher speed. But attrition will inevitably set in as the speed demons achieve their higher speed certificates, and we can't keep on grinding out this mass of tape for a small handful of experts. If you want "in" on this, we suggest you shape your plans to be there when the test is run, not wait in the expectation that you will have many other opportunities. We'll try to cover the west coast at a future date, but note that even from WIAW it *can* be done given the proper equipment, the ability and the desire.

Where to get practice at 40 wpm and above? Try WINJM/W1EIA on 3636/7085 kHz Mondays at 0130Z (Sunday at 2030 CDST). Other schedules exist, but details not available at this writing.

Toward a CW-DXCC. Why, ask the cw DXers, is there a special DXCC for phone and nothing for cw? The DX Advisory Committee recently reviewed this matter, made a recommendation to the Board through their director liaison, and lo and behold, at the January Board Meeting, a CW-DXCC was ordered to be put into effect. Since the Board Meeting ended at copy deadline for this issue, only one detail is available at this writing: effective date for QSOs eligible for CW-DXCC is Jan. 1, 1975. Thus, QSLs for contacts made in the 1975 ARRL DX Competition will be eligible for CW-DXCC, and we hope most of you will get this information in time and that it will increase cw participation. See you in the pileups!

On Again, Off Again. Effective with the change back to "Daylight Savings" Time (Feb. 23), the WIAW Spring-Summer schedule went into effect.

Code practice and bulletins will be sent an hour earlier, but will be copied at the same "clock" time if you are located in areas which practice this clock-changing. See details in the WIAW schedule elsewhere. - WINJM

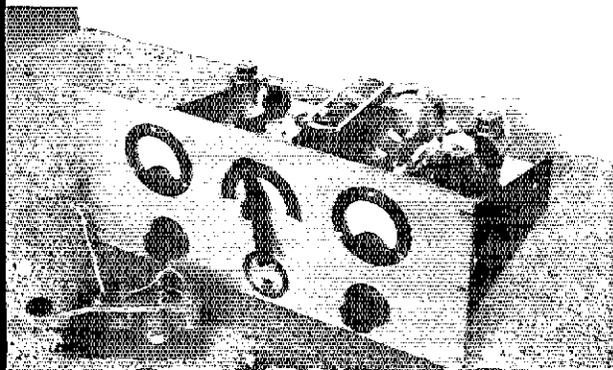
STRAIGHT-KEY NITE W1YL

Wow! After this our sixth SKN (five on New Year's eve, one on July 4) we've got to report that *everything* showed a huge increase. Reported participation was up to 1030, entries totalled 194, Novice activity brisk, best-fist votes to 120! Champion fist of the night belongs to WSADZ (5 votes), followed closely (with 4 votes apiece) by W4KFC K4ON W5QGZ W5BE and W8JO. Your next chance to join the fun will be July 4. Plan ahead!

Soapbox

SKN beats drinking. - K0AZJ. For me, the best part was meeting a nearby ham who interests in amateur radio turned out to be very much like my own. - K3CL. P-L-E-A-S-E don't change the rules. - W2OBJ. A great success, one of the few activities in which you have a chance against the guy with a kW. - WA1S7J. Why don't we have 3 or 4 a year as they do not cause any strain to the ARRL Staff as it is not a contest. - W11R. (Haaaaaaalp. - W1YL.) Let's encourage the ragchew. Without it this becomes one of the same old contests. - W2QUV. Enjoyed meeting old friends but give me 1974/1975 technology as to keying a rig on cw! - W5TWT/3. Thought SKN was going to keep people from drinking. After tuning 40 I had my doubts. - WB5GZG. An unusual QSO was with K0HJ1/4 in Holiday, Florida at 0130 on 1 Jan. - WA3UHH. Both of my SKN contacts this year were two-way via Oscar 7 (W1FTX and K2BZT). Fun! - K2QBW. Wonderful relaxed QSOs. Picked up N.D. and S. C. needed for 5BWAS. Lets not make this a quantity contest, but keep it as a New Year's eve relaxer! - W7YS. Sure enjoyed the leisurely pace but still racked up 55 pleasant QSOs. - W8OK. How about starting at 2300Z instead of 0100Z? - W3HKS. Worked 10 stations from my home QTH. Ever try to send WB6VBG with a straight key after a couple of glasses of grog? - WR6MKH. Seemed that the QSOs got shorter as the night wore on. Guess other arms were also firing. - W8IO. Hope next year is better but don't see how in the Sam Hill the Hq. gang could do any better. - W9RC. I like this function, it is not a rat race. To my delight I encountered three traffic men I've worked with in years past (W3BFF W8IBX and K3HCT). - W3TN. Why not change the date to Jan. 1 instead of Dec. 31? Too many QRL that night. - K2GMF. My first SKN, had fun and worked W7OO in Nevada to complete my WAS. - WA3VJL. This beats a hangover. K9HYE. The QRM was spectacular. -

(Continued on page 101)



"Boston" Key used at W7JY on SKN.

DX CENTURY CLUB AWARDS

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. All totals shown represent submissions received through December 31, 1974.

Honor Roll

| | | | | | | | | | | | |
|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| G3FKM | 321/347 | W9UNM | 320/352 | W3LMA | 318/349 | G2BVN | 316/343 | WRLY | 315/337 | K3UZY | 313/320 |
| GW3AHN | 321/349 | W0KJ | 320/346 | W4BJ | 318/339 | G2AA1 | 316/344 | W9QJ | 315/326 | K4HIJ | 313/318 |
| K2BK | 321/344 | W0SYK | 320/347 | W4ML | 318/347 | G4MJ | 316/342 | W0AUB | 315/332 | K4IKR | 313/321 |
| LU6DJX | 321/354 | G2BDZ | 319/346 | W5QK | 318/338 | G13JM | 316/337 | W0BK | 315/333 | K4MPL | 313/323 |
| W1RH | 321/353 | G3FXB | 319/345 | W5OKZ | 318/334 | 111ZGJ | 316/338 | W0NK | 315/346 | K5AAD | 313/325 |
| W1HX | 321/350 | G3HCT | 319/339 | W6ARA | 318/329 | K2UVU | 316/337 | YV5AIP | 315/333 | K5J1I | 313/320 |
| W2BXA | 321/354 | G5V1 | 319/348 | W6HX | 318/350 | K2YLM | 316/325 | C13AG | 314/346 | K6VY | 313/324 |
| W2CTO | 321/350 | G8KS | 319/344 | W6ISO | 318/334 | K4YYL | 316/325 | DL1IN | 314/339 | K6KA | 313/318 |
| W2DXX | 321/336 | 11ZL | 319/339 | W6RKP | 318/341 | K4VW | 316/334 | DL3BK | 314/336 | K6KH | 313/334 |
| W2NUT | 321/346 | 10AMU | 319/346 | W6ZM | 318/337 | K6QH | 316/325 | DL8NU | 314/319 | K6OH | 313/343 |
| W2OKM | 321/348 | IA1BK | 319/336 | W7SGN | 318/343 | K6WR | 316/331 | I9RM | 314/332 | K6YRA | 313/324 |
| W2RGV | 321/346 | K2BZT | 319/348 | W8JBI | 318/346 | K8OHG | 316/330 | HB9TL | 314/339 | OK1FF | 313/340 |
| W2SFC | 321/346 | K2LWR | 319/342 | W8K1I | 318/333 | LU4DMG | 316/341 | IA1ADN | 314/330 | ON4QJ | 313/327 |
| W21P | 321/339 | K4KO | 319/347 | W8QJR | 318/344 | 1115AO | 316/340 | JA1AG | 314/336 | PY2BKO | 313/323 |
| W3KT | 321/353 | K6IC | 319/344 | W8WZ | 318/349 | OH2BH | 316/327 | JA1BRK | 314/326 | PY7APS | 313/317 |
| W3LMO | 321/343 | K6EC | 319/342 | W9G1H | 318/344 | PA0TX | 316/345 | JA1DM | 314/338 | SM7ANR | 313/331 |
| W3MP | 321/352 | K6LGE | 319/340 | W91UV | 318/345 | SM3BLZ | 316/342 | JA31U | 314/332 | VE3WT | 313/322 |
| W4FX | 321/354 | OH2NB | 319/349 | W9RCJ | 318/339 | W1BPW | 316/334 | K4HD | 314/325 | W2CKY | 313/319 |
| W4GXB | 321/351 | YK4AO | 319/351 | W9RKP | 318/344 | W1DGJ | 316/329 | K4MZU | 314/324 | W4MT | 313/341 |
| W4OM | 321/352 | W1HZ | 319/346 | W91WG | 318/337 | W1GKK | 316/320 | K5OIS | 314/319 | W5FT | 313/339 |
| W4VPD | 321/347 | W2HMK | 319/340 | W9PLI | 318/343 | W2Y5 | 316/347 | K6GA | 314/332 | W5GO | 313/335 |
| W5KC | 321/353 | W2DGD | 319/346 | YU3AB | 318/345 | W2GC | 316/339 | K6ZM | 314/331 | W5HDS | 313/338 |
| W5AM | 321/355 | W2GKZ | 319/330 | YV5AN1 | 318/325 | W2MJ | 316/336 | K6YFT | 314/331 | W5SH | 313/323 |
| W7PHO | 321/348 | W3HTI | 319/344 | 4X4U | 318/342 | W2PV | 316/327 | E9LU | 314/330 | W5MMD | 313/341 |
| W8HF | 321/351 | W21VU | 319/349 | DL71N | 317/342 | W2QK | 316/329 | KP4RK | 314/333 | W6HOC | 313/335 |
| W8DAW | 321/354 | W2QHH | 319/349 | DL7HU | 317/335 | W2D1G | 316/334 | VE1HX | 314/339 | W6LN | 313/342 |
| W8CZ | 321/353 | W2YY | 319/336 | HB9T | 317/350 | W4E1F | 316/341 | PY2PF | 314/324 | W6SOP | 313/337 |
| W8MPW | 321/348 | WA2RAU | 319/329 | K1SHN | 317/330 | W4IC | 316/330 | PY4AP | 314/321 | W6JA | 313/345 |
| W8PHZ | 321/345 | W3FVW | 319/349 | K1PNX | 317/330 | W4MCM | 316/336 | SM6AIK | 314/327 | W7IG | 313/330 |
| W9BG | 321/355 | W3NKM | 319/345 | K2YYX | 317/334 | W4OPM | 316/340 | SM6CKS | 314/319 | W7DPK | 313/327 |
| W9BW | 321/351 | W3GRS | 319/340 | K4JC | 317/330 | W4PTL | 316/340 | VE1VR | 314/322 | W81Q | 313/341 |
| W9DU | 321/352 | W4BYU | 319/346 | K6AN | 317/347 | W5ABY | 316/342 | VE1JM | 314/322 | W8MB | 313/333 |
| W9ELA | 321/353 | W4NJ | 319/331 | K6NA | 317/347 | W5FBW | 316/342 | VE13J | 314/338 | W8ONA | 313/338 |
| 4X4DK | 321/348 | W4SSU | 319/336 | K6OW | 317/334 | W5HJA | 316/334 | W6GON | 314/324 | W9JOD | 313/318 |
| D12BW | 320/346 | W5POA | 319/346 | K6ONV | 317/335 | W61UI | 316/324 | W1ZU | 314/336 | W9QON | 313/323 |
| D13RK | 320/346 | W6CHF | 319/346 | K9RGM | 317/326 | W6PO | 316/339 | W2PC1 | 314/339 | W971D | 313/310 |
| DL90H | 320/340 | W6LTV | 319/329 | OK1ADM | 317/331 | W7ADS | 316/343 | W25AW | 314/340 | W97BJ | 313/340 |
| HR9MO | 320/347 | W6ONSU | 319/340 | PY2CK | 317/349 | W8DMD | 316/346 | W2WJK | 314/334 | Y130Y | 313/321 |
| K21L | 320/345 | W6WQO | 319/345 | PY2CO | 317/327 | W8NGO | 316/342 | W2ZN | 314/341 | Z13Z | 312/322 |
| K41NM | 320/343 | W7AUB | 319/340 | PY2PA | 317/321 | W9HUZ | 316/344 | WR21MK | 314/324 | DL3OH | 312/318 |
| K6ZO | 320/353 | W7KH | 319/351 | PY2SO | 317/327 | W9NDA | 316/349 | W3GAI | 314/346 | I3A1 | 312/334 |
| OH1ER | 320/351 | W91W | 319/334 | W1GL | 317/329 | W0AIB | 316/340 | W4BI R | 314/331 | G2FYI | 312/333 |
| VE12NV | 320/347 | W951R | 319/343 | W2AGW | 317/350 | W0GKL | 316/337 | W4HOS | 314/324 | G31C | 312/319 |
| W1AK | 320/352 | W0MLY | 319/344 | W2CP | 317/332 | W19R | 316/340 | VE13E | 314/338 | JA1ZZ | 312/321 |
| W1AZY | 320/343 | W0QCI | 319/344 | W2GT | 317/345 | YV5BBU | 316/325 | W41YV | 314/343 | JA4ZA | 312/323 |
| W1DK | 320/346 | ZL1HY | 319/352 | W2HO | 317/342 | YV5BPP | 316/326 | W41M | 314/345 | K4SCT | 312/334 |
| W1NU | 320/344 | ZL3IS | 319/341 | W2ZTV | 317/327 | DL7ZG | 315/325 | W4ZXI | 314/320 | K41JI | 312/330 |
| W2AO | 320/346 | DL1HH | 318/336 | W82HXD | 317/327 | DL7YA | 315/346 | W51FT | 314/332 | K5RJB | 312/334 |
| W2BOK | 320/346 | DL1JW | 318/339 | W3DIZ | 317/333 | 12KMG | 315/324 | W5LC1 | 314/334 | OH2LA | 312/333 |
| W2GLJ | 320/342 | DL1KB | 318/347 | W4H | 317/338 | 18KID | 315/337 | W5NMA | 314/340 | OK5MT | 312/336 |
| W2LV | 320/348 | G61A | 318/342 | W5GC | 317/335 | JA1BN | 315/329 | W5OB | 314/334 | OZ3Y | 312/336 |
| W2OM | 320/344 | G1RVJ | 318/342 | W5IO | 317/345 | J321W | 315/335 | W5O1G | 314/344 | VE1DHT | 312/315 |
| W3CGS | 320/348 | 1T9TA1 | 318/343 | W5PWW | 317/337 | K1RQ | 315/323 | W5PM | 314/336 | W1MIJ | 312/329 |
| W3WGH | 320/344 | K11XG | 318/334 | W511Z | 317/338 | K1YZW | 315/323 | W6CAE | 314/343 | W6RAC | 312/337 |
| W4AIT | 320/352 | K2TQC | 318/334 | W61L | 317/329 | K6AIV | 315/328 | W6DOD | 314/322 | W6WZ | 312/344 |
| W4LRN | 320/341 | K3RW | 318/341 | W61PZ | 317/341 | R6CI | 315/343 | W6DZ | 314/345 | W6JDM | 312/317 |
| W4QCW | 320/345 | K4EZ | 318/333 | W61ZI | 317/331 | K3R1W | 315/333 | W61I | 314/336 | WR2UKP | 312/316 |
| W5AO | 320/347 | K4MOC | 318/330 | W6GPB | 317/347 | OH2OV | 315/329 | W6KNH | 314/319 | W8A1P | 312/318 |
| W5MMK | 320/350 | K4PDU | 318/339 | W6HD | 317/345 | PY7YS | 315/335 | W6E1PQ | 314/328 | W81G | 312/338 |
| W5UX | 320/344 | K6RO | 318/337 | W6KG | 317/338 | UR2AR | 315/333 | W6AMWG | 314/324 | W51Z | 312/319 |
| W6ANN | 320/348 | K7GCM | 318/335 | W6REH | 317/332 | VE13S | 315/335 | W7OK | 314/337 | W5WZQ | 312/330 |
| W6BZE | 320/348 | K8IKB | 318/338 | W6GLD | 317/346 | W1BAN | 315/337 | W8CUT | 314/330 | W8E1L | 312/322 |
| W6CYV | 320/347 | K8LSG | 318/337 | W6AGLD | 317/327 | W1HH | 315/335 | W8DA | 314/333 | W85JS1 | 312/316 |
| W6KZL | 320/344 | K9FC | 318/336 | W6G0NP | 317/332 | W2AYJ | 315/343 | W81VZ | 314/326 | W61E1 | 312/320 |
| W6NJL | 320/343 | LA7Y | 318/349 | W7CMM | 317/326 | W2PN | 315/325 | W81IN | 314/348 | W6ONZ | 312/334 |
| W6PT | 320/346 | ON4NC | 318/347 | W7OF | 317/343 | W3RWZ | 315/319 | W8DAS | 314/343 | W61OQ | 312/334 |
| W6ZO | 320/350 | K1CBZ | 318/342 | W8ARH | 317/329 | W3RNO | 315/342 | W91KD | 314/333 | W6Y1V | 312/327 |
| W7MB | 320/353 | W1CKA | 318/337 | W8C1 | 317/330 | W4BQY | 315/338 | W0BL | 314/319 | W7AE | 312/345 |
| W8RT | 320/345 | W1LZ | 318/345 | W8KBI | 317/339 | W4DQS | 315/331 | X1JAI | 314/332 | W81V | 312/339 |
| W81WS | 320/353 | W1JNV | 318/343 | W91KC | 317/346 | W44W1P | 315/323 | YV5AHR | 314/326 | W8XNYB | 312/316 |
| W81KH | 320/348 | W1MV | 318/344 | W9WYB | 317/339 | W5GJ | 315/331 | YV5BNW | 314/320 | W9GB | 312/332 |
| W8OK | 320/340 | W2BHM | 318/341 | W9BN | 317/331 | W5K1W | 315/327 | CR6BG | 313/338 | W9CI | 312/331 |
| W8ZCO | 320/343 | W2CR | 318/345 | W9CJZ | 317/330 | W61OZ | 315/342 | DL1BO | 313/349 | W91OK | 312/333 |
| W9DWO | 320/342 | W21XA | 318/340 | ZS6LZ | 317/339 | W6KZS | 315/326 | G13OQR | 313/327 | W91NUQ | 312/331 |
| W9G1I | 320/341 | W2PDB | 318/338 | 1J1SDA | 316/326 | W6RGG | 315/325 | H9K1B | 313/336 | W0KCC | 312/326 |
| W91B | 320/343 | WA2R1Q | 318/328 | 1J1BKO | 316/326 | W71NW | 315/348 | JA1MIN | 313/320 | W6NVZ | 312/323 |
| | | W3AIM | 318/337 | DL61N | 316/340 | W8KPL | 315/341 | JA8ADQ | 313/322 | | |

Radiotelephone

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| W2BXA 321/352 | W2OKM 318/443 | ZS61W 317/338 | K8RTW 315/333 | W2GKZ 314/324 | W4PDL 313/332 |
| W2RCV 321/344 | W67M 318/332 | DJ2BW 316/335 | SM5BCU 314/334 | W2LV 314/336 | W5PQA 313/336 |
| W21P 321/336 | W8MPW 318/336 | G8KS 316/339 | W2PV 315/326 | W2ZX 314/341 | W5SZ 313/320 |
| W41X 321/353 | W8OJR 318/344 | K2YLM 316/325 | W4IC 315/323 | W3AZD 314/326 | W6CHV 313/335 |
| W6AM 321/353 | W9DWO 318/329 | K4HI 316/333 | W4SKO 315/338 | W3DHM 314/338 | W7QPK 313/326 |
| W8BI 321/351 | YV5AB 318/345 | K5JEA 216/335 | WA4WIP 315/323 | W3IK 314/322 | W9HB 313/344 |
| W8GZ 321/353 | YV5ANF 318/325 | LU4DMG 316/341 | W6KFD 315/325 | W4UWC 314/325 | W95FR 313/329 |
| 4X4DK 321/348 | ZP5CT 318/343 | PA4HBO 316/341 | W9IT 315/325 | W5LZW 314/330 | W0AAA 313/323 |
| DJ9OH 320/340 | 4X4JU 318/338 | SM5CZY 316/328 | W9RNX 315/341 | WA8AJ 314/324 | W0GAA 313/325 |
| G31KM 320/342 | DJ2YI 317/341 | WLDGJ 316/329 | YV5AIP 315/333 | NE1AE 314/332 | ZL1KG 313/337 |
| II2HP 320/351 | K6LGH 317/335 | W2FGD 316/326 | D16EN 314/335 | YV5AHR 314/326 | DL1IN 312/336 |
| W11G 320/344 | K9FCI 317/334 | W2OK 316/326 | F9KM 314/332 | YV5BNW 314/320 | EA4IL 312/317 |
| W2GLI 320/342 | PY2CK 317/348 | W3KI 316/343 | I6HDI 314/330 | YV5BPD 314/324 | EA7ID 312/332 |
| W6GVM 320/350 | PY2PA 317/327 | W3NKM 316/341 | I8AA 314/321 | ZL3NS 314/322 | G3HPC 312/319 |
| W7PHO 320/347 | V13OA 321/340 | W4FTI 316/341 | I8KDB 314/337 | F2MO 313/326 | G13JM 312/331 |
| W8BI 320/345 | W2ZTV 317/326 | W6LL 316/327 | I0ZV 314/330 | HB9I 313/342 | I2KMG 312/321 |
| W0BV 320/344 | W5DIZ 317/330 | W6UF 316/323 | I19GAI 314/319 | HB9TL 313/337 | K2BZT 312/331 |
| 5741RR 320/350 | W3WGH 317/337 | W7SGN 316/331 | I19T 314/319 | I2KMG 313/322 | ON4DH 312/337 |
| I0AMU 319/346 | W4NH 317/328 | W9NDA 316/345 | I4IBK 314/329 | K4HJE 313/318 | PY2PC 312/319 |
| W2HII 319/343 | W4OM 317/342 | W9NZM 216/329 | E9KYI 314/331 | K4TJ 313/330 | W2CKY 312/337 |
| W2YY 319/331 | W4SSG 317/331 | W6GKI 316/336 | K9LUI 314/330 | K5AWR 313/320 | W5LZZ 312/319 |
| WA2RAU 319/339 | W5GC 217/335 | YV5BBU 316/325 | LU9DAH 314/335 | E5QHS 313/318 | W5NMA 312/333 |
| W4QCW 319/340 | W5IO 317/344 | DJ7ZG 315/325 | OK1ADM 314/323 | K7GCM 313/327 | W6KNH 312/317 |
| W5JWM 319/339 | W6NJU 317/334 | DL7E1 315/325 | SM3BZ 314/339 | E8IKB 313/321 | W6YMV 312/326 |
| W9LW 319/334 | W6REH 317/328 | DL7HU 315/331 | VE3MJ 314/332 | ON4DM 313/341 | W7CMO 312/324 |
| G5V1 318/347 | W6RKP 317/335 | K4JC 315/324 | VE3MR 314/326 | OZ3SK 313/327 | W8CUO 312/326 |
| G6TA 318/341 | W9LNM 317/337 | K4MQJ 315/323 | VK5MS 314/342 | PV2PE 313/323 | W9JH 312/337 |
| G15VJ 318/340 | W0CM 317/343 | K4YYL 315/322 | W1RAN 314/335 | WA2DQ 313/322 | W9WHM 312/338 |
| K1HXG 318/334 | ZL1HY 317/349 | K6WR 315/330 | W1ONK 314/339 | W3GRS 313/326 | WA9NUO 312/319 |
| K21L 318/334 | | | | | YV4UA 312/316 |

New Members

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings - December 1-31, 1974

| | | | | | | |
|------------|------------|--------------|-----------|------------|------------|------------|
| OE1ZGA 286 | JA2MYA 161 | VP9HM 116 | WB2KF 107 | TA1BUH 105 | 15HWJ 102 | KP4BDL 100 |
| WB20MU 275 | PA0BH 138 | YU1NTB 114 | DJ5TH 106 | OZ9VO 105 | JA1KJW 101 | LZCKWR 100 |
| IA2BUR 267 | DL1YK 135 | DK1RV 112 | G6RO 106 | W4RKO 105 | K9ERZ 101 | VE2TH 100 |
| OE1GHC 252 | JA25FF 123 | DK7NL 112 | WB2JN 108 | W9MOO 105 | W2YKQ 101 | WB2KBH 100 |
| W5UDK 240 | WA77LC 120 | K1HMO 110 | W4MYM 106 | XI2MX 105 | DL4AK 101 | W6VFI 100 |
| K4QIP 208 | W9GBS 119 | WB9BXX/3 108 | G4BGY 105 | JH3MOC 103 | K4RSU 100 | W7ISG 100 |
| JA2JFQ 201 | | W8C1R 108 | | LA5BF 103 | | WA7FAB 100 |

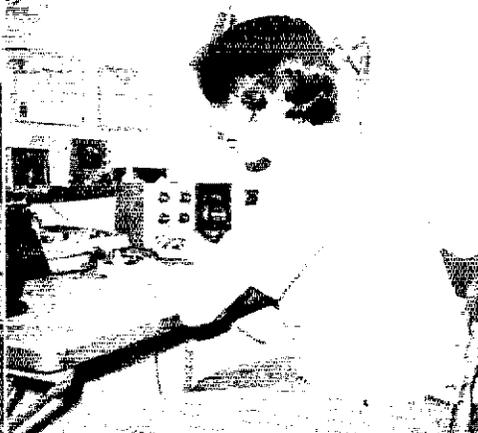
| | | | | | | |
|------------|------------|-----------|------------|-----------|------------|-----------|
| SP8SV 291 | W5UDK 218 | P29V 153 | WA3HRV 119 | VP9HM 106 | HR9AXB 104 | IA1BU 102 |
| OE1ZGA 272 | JA2BUR 177 | 15A1C 141 | W8NJN 118 | WB2JN 106 | JA1TV 103 | G3VLX 101 |
| WB20MU 265 | K4QIP 176 | W7ZH 127 | I1BPI 106 | ZD7FT 106 | JH3MOC 103 | HC2DE 101 |
| | | | | | | KA6WS 100 |

Endorsements

In the endorsement listings shown, totals from 120 through the 240 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.

| | | | | | | |
|-------------|------------|-------------|------------|--------------|------------|------------|
| W5KGX 335 | WA5US 305 | K0HL 270 | G3XF 240 | K2HF 200 | WA4DHO 180 | W2BDE 140 |
| K4RPK 325 | E6ZXW 300 | SM5W1 270 | PY2BBO 240 | K5MY 200 | W7GUR 180 | W6NHX 140 |
| W2NIN 320 | W4SY1 300 | WA4MSU 270 | VF3BS 240 | DL2AA/W1 200 | W8OPG 180 | W6ROZ 140 |
| W4K1C 320 | DK1FW 290 | OK3HM 260 | W8SYR 240 | WB2XE 200 | K1PNS 180 | WB9CUG 140 |
| W61W 320 | W1DXB 290 | WA3RCG 260 | WA0MA 240 | WA3HRV 200 | PY2CDN 160 | K2ER 120 |
| W8KGR/4 320 | W1GRE 290 | WA3DVO 260 | E41BN 240 | W4MHK 200 | VE3DOR 160 | K4WVT 120 |
| W0SMV 315 | W3XH 290 | W8UM 260 | W6PIE 220 | W6AYQ 200 | W2SI 160 | K9UTN 120 |
| K11GO 310 | W4YUU 290 | WA9ZC/P 260 | W6LVN 220 | W9YXZ 200 | W4WXZ 160 | VE2AFU 120 |
| W9OW 310 | DK3GI 280 | WA2AUB 250 | W6OA1 220 | W9RBJ 200 | W85RWH 160 | VE5XV 120 |
| K2AGZ 305 | JA2AH 280 | WA2DYK 250 | DJ4UF 200 | IA65V/P 180 | K4QG 140 | W44LPX 120 |
| W91A 305 | W11OA 280 | W6UA 250 | DK3GK 200 | K0MKD 180 | K8FK 140 | W89IGB 120 |
| | WA3ATX 280 | DK5WL 240 | JY3ZH 200 | SM4AWC 180 | K9YBC 140 | |

| | | | | | | |
|------------|-----------|------------|------------|-------------|------------|-----------|
| W7ADS 335 | W11Z 315 | E5H 290 | I0RDB 250 | DK5WL 200 | K5MY 180 | W7GUR 160 |
| W5KGX 330 | W5QKZ 315 | JA1DM 290 | OE1GHC 250 | HC2TV 200 | W4HNW 180 | W9FXZ 160 |
| K8ONV 320 | W8ARK 315 | K6ZXW 290 | WB9FO 250 | VF3BS 200 | K3FUR 180 | IKFUS 140 |
| K8HOR 320 | W9IQD 315 | W61FI 290 | I1ASM 240 | W4RPI 200 | K3NEZ 160 | ZD8KO 140 |
| VK4QM 320 | K4BFI 310 | JA2AH 280 | 151CK 220 | W89BJ 200 | LA7DR 160 | W8DOG 120 |
| OE21GL 315 | W3NIG 300 | WA9SLD 280 | W4FOD 220 | W0IBZ 200 | VF3FA 160 | 9X5AV 120 |
| JA2JW 315 | DK1FW 290 | FA3CX 270 | W8GJO 220 | IA65V/P 180 | WB2EXK 160 | |



Upper left photo: WN6HPF's SKN "JA Special." Upper right: WA4BKQ's neat SKN setup. Lower right: K4TWJ's SKN rig: 1930 style "TNT" with UX210. Receiver was a simple converter feeding a Cathedral a-m radio, 1930 vintage key.



(Continued from page 98)

W3WI. The key used is an old Boston key which dates back to about 1914. It is part of my historical collection but one that I use most of the time because it has better action and balance than any key I've ever used, I think it would add an interesting touch to SKN to see what the gang could come up with in old keys. - W7JY. The big thing is sending my QTH (Gnadenhutten, Ohio) several times then being asked for my county (Tuscarawas). Try that on your old pump handle! - K8KSN. For next SKN I suggest recommended frequencies for 160. - W8IBX. This fine activity gets better with age (just like the old pump keys). - W4YZC. I believe some of the fellows have been practicing as the sending was darned good. - W2HXT. During SKN ran across W5UH (fellow Morse Net member) so switched to American

Morse on my J-38 to give him a proper HNY. - WB6ZSE. Thanks for a great time. It's nice to see events forming where we Novices can get involved. - WN4HMZ. Worked just enough to know the old glass arm needs more pre-activity practice. - W8GAV. The age span was interesting, from 17 to the mid-fifties. - W1BDV. Thanks to WN1TLI, my long awaited Vermont QSO. - WB8NGA. In a ham career of 51 years of burning interest (but low activity) this is the first operating event I've participated in. Had a real good time. - WSBHD. A fine way to start the New Year. - WA1SCO. W4KFC must have been born with a straight key in his hand. - W5ADZ. Radio Shack sure did a booming business selling keys. - W0HW. Judging by the way a lot of the fists sounded you'd think it was New Year's eve or something. - WN3WOG. Thank God for automatic keyers! - K4VV. CU July 3-4! - W1YL.

Hamfest Calendar (Continued from page 79)

Carolina Trade Mart, corner of Stonewall and College Sts., sponsored by Mecklenburg ARS, Inc., Charlotte.

New York - The 11th annual amateur radio luncheon meeting in connection with the IEEE International Convention is Tuesday, April 8, at the Engineers' Club, 32 W. 40th St., N.Y. Speakers will feature satellite communications including Oscar 7. Contact W2PF or W2AIM for information. Send reservations (\$8.50) to N. Pfeffer, W2AIM, 1085 Park Ave., New York NY 10028.

Ohio - The Canton Amateur Radio Club's auction is Friday, March 14, 6 PM. Check-in on .52 or 19/79. Imperial House at 177 and Easton St., Canton OH 44708.

Ohio - The Spring ham gear auction of the Parma Radio Club is Friday, March 14, 8 PM, at Cardinal Savings and Loan Building, 5839 Ridge

Road, in basement. Talk-in on 146.52 MHz. Contact WB8JSC for more info.

Ohio - The Dayton Hamvention at HARA Arena is April 25, 26, 27. Program brochures mailed March 10th; if you have not attended within the last two years, write to: HAM-VENTION, PO Box 44, Dayton OH 45401.

Texas - The Annual St. Patrick's Day swapfest is 8 AM Sunday, March 23. Located in the County exhibit building, 2 miles east of Midland on U.S. 90. Bring all your goodies.

Wisconsin - The Tri-County ARC Midwinter swapfest is March 16th, 9 AM to 5 PM, at the National Guard Armory, Whitewater. Tickets \$1.50 advance, \$2 at the door (additional \$1.50 reserves one display table). Talk-in on 146.94. Refreshments, free parking, everything indoors. For tickets and details write: Dan Servais, WA9AJW, Rt. 4 Box 309AA, Elkhorn WI 53121. Tel (414) 723-2227 s.a.s.e. 

All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE - SCM, Roger E. Cole, W3DKX - SEC, K3KAJ. PAM: WA3DUM, RM: W3EFB, PSHR: WA3DUM 61, K3KAJ 56. Officers of the newly formed Delmarva ARC are WA4VDI, pres.; W3FBG, vice-pres.; K3KAJ, secy.; treas. K3KAJ states that as of Jan. 1, Delaware has 69 full AREC members, 42 limited members for a total of 111. W3RHG has worked his 36th state on 2 meters with a Kans. contact. New officers of the First State ARC are K3NCL, pres.; WA3INP, secy.; WA3JHV, treas.; WA3THL, act. dir.; WA3PC, pub. editor. The Delaware ARC set a new record of 86 pieces of traffic handled during their Operation Christmas Greetings from Castle Mall in Newark. DEPN QNI 64, QTC 8, DTN QNI 314, QTC 98, Traffic: (Dec.) WA3DUM 309, W3EFB 220, K3KAJ 155, W3SL 86, W3DKX 62, WA3QHF 30, K3YHR 16, WA3GSM 7. (Nov.) WA5KUD/3 2.

EASTERN PENNSYLVANIA - SCM, Allen R. Breiner, W3ZRO - SEC: W3FBF, PAM: WA3PZO, RMs: K3DZB, WA3QLG, W3EML, K3MVO. PENNARC members operated traffic in nine Philadelphia hospitals over the holidays. WA3JOLG received a full scholarship in Engineering. WN3WFR/4X is currently spending two years in Israel. W3SOB is grandfather via son-in-law WA3KDN. W3LC received the 50-year OCWA award. W3ADE was rewarded with a 40-wpm CP sticker. After 20 years W3BNR made his third BPL. WB2RBA/3 is editor of Susquehanna Valley Repeater Assn. WA3UDV was the only station reporting receipt of new gear via St. Nick, while W3ID complains he didn't receive any. WA3CU spent Christmas vacation on home brew projects. Did you know ye editor was an expert on "Home Brew"? WA3MGK spent Christmas Day at Germantown hospital originating traffic. WA3HWZ is instructor of Penn Wireless Assn. Novice class. WA3SJV's inactivity is claimed due to swarming activity (where? In Fla.). WA3TMP is tuning the bands for Alaska to complete his WAS. EC WA3IWX is running "Mini-SFTK" as training program in Lower Bucks. The Penna. Dutch County 6-Meter Net meets Mon. on 50.7 via NCS K3OGX. WA3QNK EC, is urging the net to learn the Penna. Dutch language. WA3IHN has aided the feminine touch as a regular on the EPA EPK 1. WA3SXU is now Extra Class licensee. K3MVO got a shirt w/ast after participating in Strait Key Nite. Want some slow speed cw traffic experience? Join the CMN slow speed net on 3720 kHz at 2300Z. EPA CW Net had 418 QNI and QTC of 351. PTTN had QNI of 171 and QTC 121. EPA FP&T had QNI 330 and a QTC of 219. CMTN had QNI of 97 and QTC of 48. ICCC League affiliated York ARC new club officers are WA3IOH, pres.; WA3SRK, vice-pres.; W3EDO, treas.; K3HWB, secy. The club was honored with a visit from O44AMO, Peru. WA3MKU is now Advanced and K3JZN is General Class. Check the Hamfest calendar for data on Spring EPA section dinner meeting to be held Apr. 19. Traffic: W3CUL 3190, W3VR 1449, WA3QYV 828, WA3ALQ 605, K3DZB 491, WA3PZO 369, WA3RCA 320, WA3OQZ 266, WA3VDO 225, WA3UKZ 217, WA3QLG 216, WB2H-WV 215, W3EML 211, W3BNR 179, K3OIO 157, W3IPX 156, K3MVO 132, W3WRE 128, WA3SXU 126, WA3PHQ 83, WB2RBA 67, W3ZRO 59, WA3THL 55, W3ID 50, WA3CU 45, WA3MGK 38, W3ADE 37, W3VA 32, WA3WIM 28, W3JO 25, WA3YUH 24, WA3HBT 23, WA3HWZ 23, WA3SVE 19, W3OL 17, W3CI 16, WA3NDO 16, WA3SVI 14, W3KH 12, W3CIBH 6, WA3TMP 6, 63HX5 5, WA3HWX 5, WA3RFY 3, WA3QNK 3, WA3UNI 4, K3DID 2, K3CKM 2, K3KEK 2, K3KNI 2, K3YVG 2, K3BFA 1, W3BFF 1, WA3BJQ 1, W3EUI 1, W3GMS 1, W3GOA 1, W3HMR 1, W3NNC 1, K3RDT 1, WA3UDV 1.

MARYLAND-DISTRICT OF COLUMBIA - SCM, Karl R. Medrow, W3FA - SEC: K3LFD, RM: W3OU, PAM: K3TNM, NCM WA3RCL. Be it noted that WA3EOP operating W3CWC makes HPL for Dec. and W3FCS makes PSHR. New net mgrs. are MDD-W3FZY, MDCTN-WA3EOP, and MEPN-WA3LPL. W3DFW continues with the PON system. MDD meets daily 3643 kHz at 7 and 9:45 PM EST. Md. Phone nets daily at 6 PM EST on 3920 kHz, and the PON system week days on 3905 kHz at 5:15 PM EST. K3STU now sporting a new call, W3IK congrats, W5TWT/3 reports the MDC QSO Party a success with 16 counties active and WA0MSX the out-of-state winner and W3CRE the section winner. Next year Sept. 6 and 7. W3BHE retired the end of 1974, and is looking for Novice Crystals for the "West Virginia School for the Blind." WN3YBU a new Novice in the Washington, DC area. WN3YKK has his eye on organizing a Novice Net. W3FZY was on SKN along with W5TWT/3. With the nets: Sessions/Tfc/QNI average PON 26/339/20.8. MDCTN 19/132/17.8. MEPN 21/103/23.3 and MDD 55/250/5.3. MFNP toppers were W3ADO, W3JQN and W3LDD; W3DKX and WA3PRW were runners up. MDD Top Brass were K3DI, K3KAJ and W3EFB. WA3JLV has succumbed to the Fla. sunshine. K3INM looks forward to much work and travel. WA3RVU sees more ham activity in his future. WA3RCI more school and then the Navy. W3JPT is rebuilding his Oscar transmitter. W3OKN joins the retired after 38 years with the govt. W3ZNW wants a bigger boat before taking the 2-meter gear along next time. K0ECCG/3 has new gear and is looking to put Harford on the AREC map. WA3SEF reports the Montgomery AREC net active Mon. 8 PM EST on 146.52 MHz, and lots of 6-meter activity. Congrats to new Generals WA3SXH, WA3IMP and WA3WFP age 14. W3EOV had a ball with the 2-meter mobile in Fla. WA3IUV is back with a hot antenna. WA3SJV trips to Conn. for Christmas. W3CDO describes her month as lazy. W3ADQ visits his daughter for those good meals. WA3URV misses busy WB2NM this past semester. WN3YKK says thanks to his Elmer W3IBW. W3DFW and W3BHF Cumberland were the mainstays during the Dec. 1 snow emergency. WA3QKB ran the special session of MEPN. A well done to you men and all other participants. Traffic: (Dec.) W3CWC 400, W3FA 218, W3FZY 181, K3DI 120, WA3SJV 110, WA3RCL 95, WA3IUM 85, W3OKN 83, W3FCS 66, WA3SJS 42, K3TNM 39, W5TWT/3 23, WA3RVU 21, WA3OYF 18, WN3YKK 14, W3EOV 6, WA3SXH 2, K0ECCG/3 1. (Nov.) K3DI 34, WA3RVU 28.

SOUTHERN NEW JERSEY - SCM, Charles E. Travers, W2YPZ - SEC: W2JL, PAM: WA2DW, WA2DSA, RM: W2JL.

| Net | Freq. | Time(PM) | Sex. | QNI | Tfc. | Mgr. |
|------|-------|----------|------|-----|------|--------|
| NJN | 3695 | 7: Dy | 31 | 427 | 412 | WA2DSA |
| NJN | 3695 | 10: Dy | 31 | 239 | 266 | WA2DSA |
| NJSN | 3730 | 8:15 Dy | 31 | 204 | 71 | WA2DW |

The Delaware Valley Radio Assn. had a very successful holiday traffic program at the Oxford Valley Mall the week ends of Dec. 14, 15, 20 and 21. A total of 865 messages were handled. Two operators were available at all times. The Gloucester Co. ARC reports the following officers for 1975: Doug Gehring, pres.; Rich Netherby, vice-pres.; Harry McCormick, secy.; Della Parker, corr. secy. Best wishes for a very successful year. Under the guidance of WA2DIW, mgr. and WA2PCF, asst. mgr. the NJS Net is making great progress. The average QNI per session is 7.5 as reported by mgr. WA2DIW. The DVRA reports new officers for 1975 as WA3SRU, pres.; WA3RRC, vice-pres.; W2VU, secy.; K2AAR, treas. In the early morning hours a regular round table of mobiles and base stations on two operating thru the DVRA repeater includes K2AAR, WA2WXP, WB2HJ, W2HCR, K2SNK. Pres. W2TUK of ARRL announced the Advisory Committees for the coming year. On the contest committee we find WA2BLY as a member. A recent AREC member is Joel H. Levy of Trenton. Stations are reminded to have appointment certificates endorsed. Send them to your SCM at your earliest convenience. If you wish an appointment, contact this office and application blanks will be sent. AREC has openings for interested members; contact your SEC W2JL. Traffic: WA2TRK 44, W2ERS 34, K2JOU 25, W2YPZ 11, WB2SFX 10, WB2EY 1.

WESTERN NEW YORK - SCM, G.W. Hippisley, K2KIR - Asst. SCM: R.M. Pitzeruse, K2KTK. SEC: W2CFP. For net info, see Nov. '74 column. Net reports: NYS CW: 888 QNI, 644 messages in 62

NBS QUESTIONNAIRE FOR USERS

OF WWV, WWVH SERVICES

To all QST readers:

The questionnaire and this printed covering letter are essentially self-explanatory. We understand that the Bureau will also welcome reports on uses of WWV and WWVH that may not be covered by the questions asked. Use of the various frequencies and/or comparison of the reception of the two stations in propagation studies might be an example. Do not write on the questionnaire for such purposes. A separate letter to the Time and Frequency Division is recommended.

Additional copies of the questionnaire can be obtained from the same address, but they must be returned before May 1. — *W1HDQ*

In response to government-wide efforts to reduce operating costs and conserve energy, we are considering various alternatives for operating radio stations WWV and WWVH. Interested listeners to these stations are being asked to provide information, via the enclosed questionnaire, which will help us set priorities and guide our decision-making processes with respect to these services. Examples of possible changes include the elimination of some broadcast frequencies from WWV and/or WWVH or reductions in transmitted power on some frequencies.

As a result of greatly increased energy costs at our Hawaiian radio station, WWVH, we have already solicited comments from users regarding a proposed 50 percent reduction of power at 5, 10, and 15 MHz from WWVH only. We have received so many objections to this proposal that we have decided to explore other possible means of cost and energy reductions. It is hoped that the responses to this questionnaire will allow us to provide the services needed most within our financial constraints and at an efficient level of energy use. Thus, it is very desirable that you provide us with thoughtful responses to the enclosed questions. The questionnaire may be removed from your QST copy for return. Or, you may photocopy these pages and utilize the photocopies to avoid cutting your magazine. In either case, the questionnaire should be returned to the address shown below.

Your help is greatly appreciated. — James A. Barnes, Chief, Time and Frequency Division, U.S. Department of Commerce, National Bureau of Standards, Boulder, Colorado 80302.

1. TO WHAT EXTENT DO YOU USE THE FOLLOWING FREQUENCIES?

| | FREQUENTLY | SOMETIMES | RARELY | NEVER |
|---------|------------|-----------|--------|-------|
| 2.5 MHZ | | | | |
| 5 | | | | |
| 10 | | | | |
| 15 | | | | |
| 20 | | | | |
| 25 | | | | |

2. HOW IMPORTANT ARE THE FOLLOWING FREQUENCIES FOR YOUR OPERATION?

| | VERY IMPORTANT | SOMEWAT IMPORTANT | RELATIVELY UNIMPORTANT | VERY UNIMPORTANT |
|---------|----------------|-------------------|------------------------|------------------|
| 2.5 MHZ | | | | |
| 5 | | | | |
| 10 | | | | |
| 15 | | | | |
| 20 | | | | |
| 25 | | | | |

3. HOW OFTEN DO YOU USE THE FOLLOWING?

| | FREQUENTLY | SOMETIMES | RARELY | NEVER |
|---------------------------------|------------|-----------|--------|-------|
| WWV | | | | |
| WWVH | | | | |
| TELEPHONE NO. (303) 499-7111 | | | | |

4. HOW OFTEN DO YOU EXPERIENCE HARMFUL INTERFERENCE BETWEEN NBS BROADCASTS AND OTHER TIME/FREQUENCY TRANSMISSIONS?

CHECK ONE:

| NEVER | SELDOM | OFTEN | FREQUENTLY |
|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

(OVER)

5. IN WHAT APPROXIMATE GEOGRAPHICAL AREA DO YOU MAKE USE OF

WWV/WWVH SIGNALS?

6. TO WHAT EXTENT DO YOU USE THE FOLLOWING INFORMATION?

| | FREQUENTLY | SOMETIMES | RARELY | NEVER |
|-----------------------|------------|-----------|--------|-------|
| TIME OF DAY, VOICE | | | | |
| TIME OF DAY, BCD CODE | | | | |
| ONE-SECOND TICKS | | | | |
| STANDARD FREQUENCY | | | | |
| DOT I VALUES | | | | |
| WEATHER | | | | |
| SECALERTS | | | | |
| PROPAGATION FORECASTS | | | | |

7. HOW IMPORTANT FOR YOUR OPERATION IS EACH OF THE FOLLOWING CATEGORIES OF INFORMATION AS SUPPLIED BY WWV/WWVH?

| | VERY IMPORTANT | SOMEWHAT IMPORTANT | RELATIVELY UNIMPORTANT | VERY UNIMPORTANT |
|-----------------------|----------------|--------------------|------------------------|------------------|
| TIME OF DAY, VOICE | | | | |
| TIME OF DAY, BCD CODE | | | | |
| ONE-SECOND TICKS | | | | |
| DOT I VALUES | | | | |
| WEATHER | | | | |
| SECALERTS | | | | |
| PROPAGATION FORECASTS | | | | |

8. HOW WOULD YOU CHARACTERIZE THE SIGNAL WHICH IS TYPICAL FOR YOU?

| | MORE THAN ADEQUATE | ADEQUATE | MARGINAL | USELESS |
|-----------------------------------|--------------------|----------|----------|---------|
| SIGNAL STRENGTH | | | | |
| ACCURACY OF TIME AND/OR FREQUENCY | | | | |

9. PLEASE CHECK THE CATEGORIES IN THE TWO LISTS BELOW WHICH MOST ACCURATELY CHARACTERIZE YOUR USE OF NBS FREQUENCY AND TIME SERVICES.

USER CLASSIFICATION

- GOV'T; MILITARY
- GOV'T; CIVILIAN
- EQUIP. MANUFACTURING
- NAVIGATION
- AVIATION/AEROSPACE
- TELEPHONE INDUSTRY
- ELECTRIC POWER INDUSTRY
- STANDARDS LAB
- SHIPPING/BOATING INDUSTRY
- PLEASURE BOATING
- UNIVERSITY
- COMMUNICATIONS INDUSTRY
- SEISMOLOGY/GEOPHYSICS
- OTHER (PLEASE SPECIFY): _____

PRINCIPAL USE

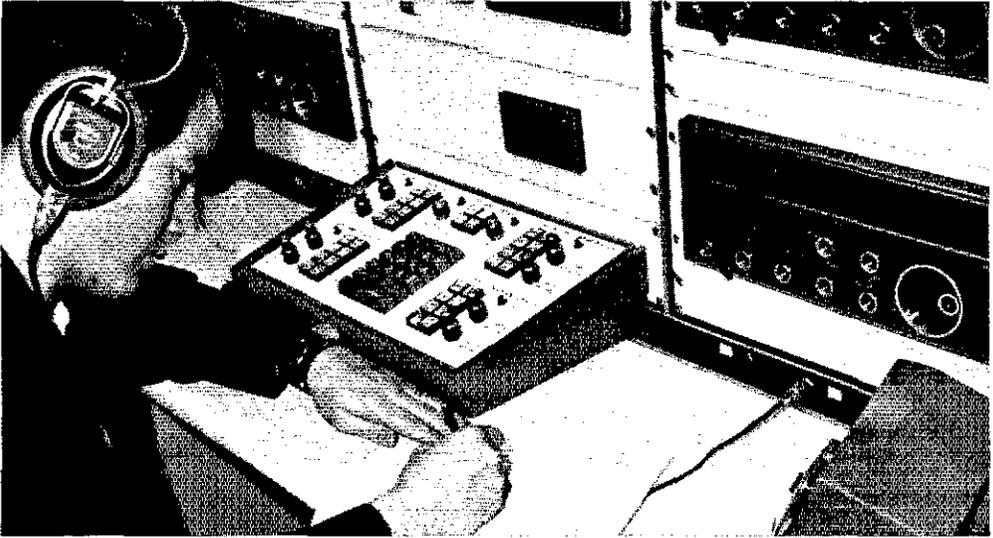
- HOBBY (OTHER THAN AMATEUR RADIO)
- AMATEUR RADIO
- CALIBRATION OF WATCHES/CLOCKS
- NAVIGATION/POSITION LOCATION
- COMMUNICATIONS SYSTEMS
- SCIENTIFIC DATA MONITORING
- INSTRUMENT CALIBRATION
- ROCKET/SATELLITE TRACKING
- STORM WARNINGS
- SECALERTS
- PROPAGATION FORECASTS
- ASTRONOMY
- OTHER (PLEASE SPECIFY): _____

10. ARE THERE OTHER SERVICES WE SHOULD ADD? YES NO
IF YES, WHAT SERVICES? _____

11. DO YOUR RESPONSES TO THE ABOVE OFFICIALLY REPRESENT MORE THAN YOUR OWN PERSONAL INVOLVEMENTS? YES NO
IF YES, PLEASE EXPLAIN _____

12. COMMENTS: _____

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City _____ State _____ Zip _____

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SB-104 SSB transceiver - a new standard for the industry

A revolutionary "new generation" transceiver. It's completely solid-state and totally broadbanded to eliminate preselector tuning. And the output can be instantly switched from 100 watts to 1 watt. The true digital readout offers resolution down to 100 Hz and outstanding tuning accuracy. Receiver intermodulation distortion has been minimized and there are very few active devices ahead of the highly selective crystal filter. Adjacent channel overload is negligible, yet sensitivity is better than 1 μ V (.6 μ V typical) and front-end overload is dramatically reduced. The "104" is 12 VDC-powered for mobility and the optional HP-1144 fixed station supply fits inside the SB-604 speaker cabinet. An optional noise blanker can be installed in the "104" and an optional 400 Hz crystal filter improves CW selectivity.

- Kit SB-104, 31 lbs., mailable 689.95*
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- Kit HP-1144, Fixed station power supply, 28 lbs., mailable 89.95*

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The "634" performs 5 important functions — a 10-minute digital ID timer with visual or visual and audible indicators an RF wattmeter that reads 0-200 or 0-2000 watts with $\pm 10\%$ accuracy, an SWR bridge, a hybrid phone patch that can be used manually or with VOX control, and a 24-hour digital clock that runs independently of all other functions. It's a must for every well equipped station.

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- Kit SB-614, 17 lbs., mailable 139.95*

SB-644 remote VFO

Designed exclusively for the SB-104. It provides split transmit and receive control and you aren't frequency-limited in any way — transmit at one end of the band, receive at the other. The "644" even has two crystal positions for fixed-frequency control. The "644" has a linear dial, but the exact frequency is displayed on the "104's" digital readout. The display automatically changes when switching from transmit to receive.

- Kit SB-644, 10 lbs., mailable 119.95*

SB-604 station speaker — response-tailored to SSB

Designed to match the SB-104 in styling and performance. The "604" uses a 5x7", 3.2-ohm speaker. And there's room inside for the HP-1144 power supply. With connector cable and plug.

- Kit SB-604, 8 lbs., mailable 29.95*



DESIGN NOTES

Mike Elliott
Sr. Design Engineer

Digital frequency readout

Two major problems face the engineer designing a digital readout transceiver like the SB-104. Interfering, on-channel signals must not be generated, and the display must update quickly to eliminate any significant delay between hand and eye.

Several approaches were considered for use in the SB-104. The approach used in the SB-650, that of using up/down counters to digitally compute the operating frequency, was rejected due to complexity and cost. A separate well-shielded set of mixers sufficient to generate an on-channel signal was also considered. The signal level would have to be extremely low to avoid interfering with proper receiver operation, but would have to be enough to drive a counter. This requirement proved to be an impossibility.

The method selected for the SB-104 avoided these problems, without significantly reducing accuracy. Three oscillators, the HFO, VFO and BFO determine the operating frequency of the SB-104. The BFO is crystal-controlled to maintain ± 75 Hz accuracy. Since the digital readout is capable of only ± 100 Hz resolution, the BFO error can be ignored; therefore, the BFO is not counted. The HFO and VFO are mixed to generate what we call the "premix" signal. It is used for transmitter injection, and represents the operating frequency.

To digitally count and display the operating frequency, then, the BFO frequency must be subtracted from the premix frequency,

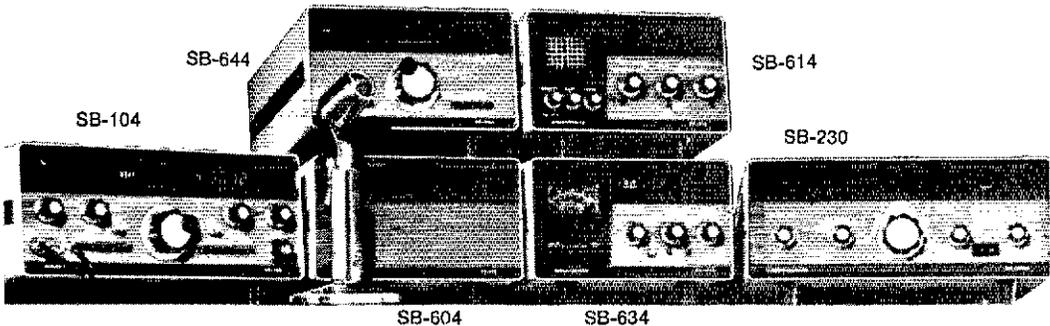
$$f \text{ operating} = f \text{ premix} - f \text{ BFO.}$$

The SB-104 uses a string of programmable decade counters. These devices are quite versatile, since they can be set to start counting from any number. If programmed to start counting at a number below zero, they count up through zero and continue, so that the end result is a form of digital subtraction. Obviously, then, if the counter string is programmed to start below zero by an amount equal to the BFO frequency, counting the premix frequency will result in direct readout of the operating frequency. Readout accuracy is assured by setting the counter time base with WWV. The traditional calibrator is not required, since all oscillators are accounted for by this scheme, regardless of band.

Since the BFO frequency is different for the LSB, USB, and CW modes, the counters are programmed by a diode matrix which is driven by the mode switches. In this manner, the accuracy of the digital readout is automatically preserved in all modes.

Another important consideration was the selection of the readout device used in the frequency display. The device used in the final design is a Beckman planar, gas discharge readout similar to the ones used in Heath clocks and desk calculators. It features high contrast, good visibility in all ambient light conditions (including direct sunlight), a planar (flat) appearance, and minimum segment separation. Considering the wide range of operating conditions experienced by amateurs, this display is by far the best choice.

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sessions. 2RN: 934 messages in 79 sessions. New appointment WA2UUA OO Class 1, WA2ICB ORS; renewal: WA2EAF OP promotion: WB2RXL to ORS 1. A new Advanced Class license: WA2OLA, and WN2UDD expecting a General Class in the mail. Congratulations to W2FR and WB2JRX on making BPL this month the first time ever for the latter. RAGS pres. K2BKU moving to Oswego so he can be closer to those polar DX stations on 20. Gair on Field Day this June? Two clubs already have chimn. appointee W2TQK for RAGS (Syracuse), and WB2OZL for ARATS (Tombawanda). New repeater in town: WR2AGA, Balaia, 16/76. VHF activity includes WA2DRC's K29B rig for 6 meters, WB2WPA raises his antenna 25-feet (he transmits Official Bulletins on 146.52), an K2DNN/WA2TCZ mobiling on both 6 and 2. WA2SMO teaches radio to a Boy Scout troop. K2ISN is the new mgr. of the Western New York Emergency Net (3915 kHz Sun. at 1730Z). K2PI building a 15-meter beam, but WB2ZVU already has his tri-band up. Oscar 7 activity reported by WB2QAU, WA2HUP, W2EOS and W2SBI. The VHF SS was good to K2KIR, who worked three new states and ole buddy K2KNV on 2M CW. Congratulations to WA2LUF on making DXCC and getting an SB-200. Ever notice how conditions on 80 meters get good for the traffic nets just about the time the Christmas rush is ending? Don't forget to request appointment renewal if you haven't done so in the past two years. PSRR this month to W2OE, W2MTA, WB2JRX and W2FR. Traffic: (Dec.) WB2JRX 612, W2FR 506, WA2KCV 375, W2OE 347, WA2ICB 312, W2RUF 292, WA2HSB 285, W2MTA 277, WA2TP 118, W2FZK 117, WB2VND 87, WB2QIX 84, WA2DRC 77, WA2PUU 68, W2KQF 55, W2HYM 50, WB2KUN 50, K2UIR 49, WN2UBW 44, W2PZL 33, WB2WPA 33, K2SPO 32, WA2AIV 30, W2EAF 27, WB2QDN 24, K2OFV 23, WA2TSR 14, K2IMI 11, W2UIF 11, K2KIR 10, WA2LUF 9, WB2THS 9, WA2GLA 4, WB2RXL 4, WB2HGG 2. (Nov.) W2HYM 48, W2FZK 41.

WESTERN PENNSYLVANIA — SCM, Donald J. Myslewski. K3CHD — SEC: W3ZUH. Asst. SEC: K3SMB. PAM: K3ZNP. RM: W2KAT/3, W3LOS, W3KUN. WPA CW Net meets daily on 358 kHz at 7:00 PM local time. Pa. Phone Net meets Mon. through Sat. on 3960 kHz at 5:30 PM local time. Keystone Slow Speed Net meets daily on 3709 kHz at 4:30 PM local time. New appointments and endorsements are: ECs: W3OCR, K3SMB, WA3WGV, K3VYV. ORSs: W3LOD, W3ATQ, W3KQD, W3RUL, W3LOS, W3IDO. WA3SWC; OPS: K3OTY; OVSs: K3CFA and W3KOD; OBS: K3SMB; OOs: W3ZUE, WA3WKS, WA3TGR; RM: W3LOS. Is your station registered with your EC? If not, and you don't know who your EC is, contact W3ZUH for details. The following counties do not have ECs: Fayette, Greene, Fulton, Franklin, Mifflin, Clinton, Potter, Venango, Jefferson, Indiana, Butler. If you live in these counties and would be interested in an appointment as EC, W3ZUH, K3SMB or I can provide you with the details. K3ASI, K3YAK and WA3MPV currently are experimenting on ATV with assistance from K3POS and K3QCZ. W3API lost his TA-33 beam in a severe ice storm. K3CFA reports progress on his 1296 MHz receiver and 15-ft. dish for moonbounce. WA3SWC passed the Extra Class exam. K3CFC now has a TH3MK3 beam up 95-ft. and a new KW linear (SB-220). The Penn State ARC scheduled a chess match with the Univ. of Panama via amateur radio. Congrats to WA3VZN who received the General Class ticket. The Skyview ARC have elected the following officers for 1975: WA3UER, pres.; K3VRV, vice-pres.; WA3WDF, secy.; W3GVI, treas. The Penn State ARC meets the 1st and 3rd Wed. every month at 7:15 PM in Room 208 Engr. Unit E (behind Hammond) on the Penn State campus. The Pa. Phone Net had 2 sessions, 665 stations check in, and handled 818 messages. The WP. CW Traffic Net had 31 sessions, 408 stations check in, and handle 329 messages. W2KAT/3 made BPL and WA3VBM awarded the BP medalion. PSRR credits WA3SWF 44. Traffic: W2KAT/3 500, WA3VBM 277, WA3SWF 187, K3CB 177, K3CR 125, K3HCT 93, W3EGJ 85, WA3IYA 66, W3KUN 38, WA3BKD 36, W3LOS 35, W3RUL 32, WA3OKK 23, W3ZUH 23, K3VQV 18, K3SIN 17, W3SN 16, K3CHD 12, W3UT 10, W3IDO 8, K3LYO 1.

CENTRAL DIVISION

ILLINOIS — SCM, Edmond A. Metzger, W9PRN — Asst. SCM, Harry J. Studer, W9RYU. SEC: W9AES. PAM: WA9LDC. RM: W9NXG. Cook County EC: W9HPG.

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| ILN | 3690 | 0400 Dy | 41 |
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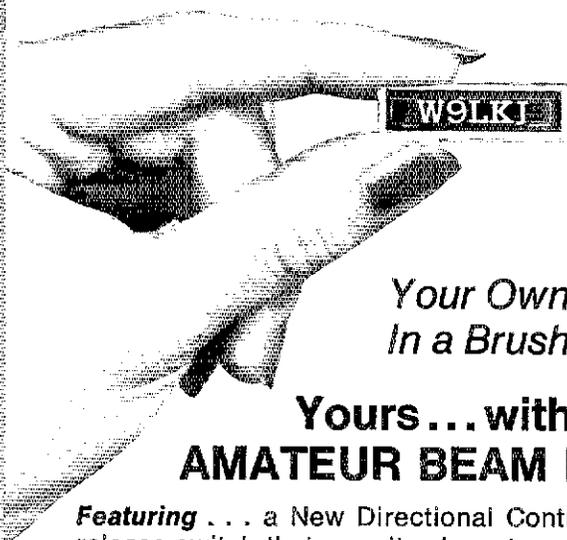
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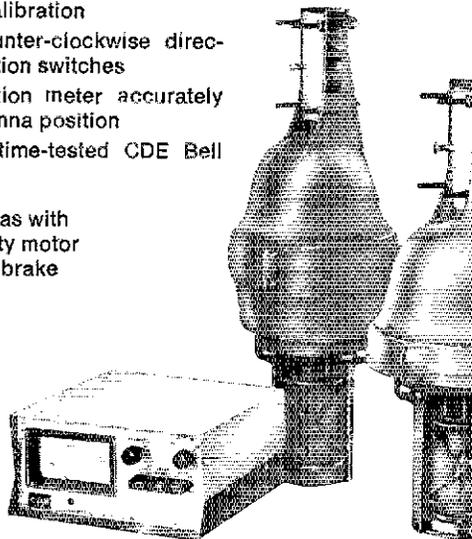
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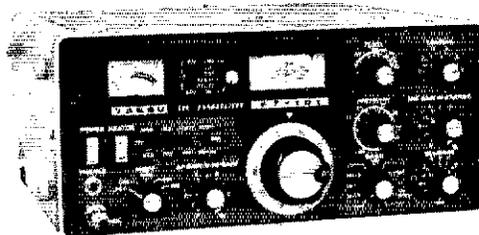
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The new call of the Springfield repeater WB9JCL is now WR9A. New General heard is WB9NLO. WB9LOC has the new Heath TV and reporting FB operation. K9DDA and K9KHI received their wpm stickers for the Code Proficiency award. Our sympathy to families and friends of W9IUI, W9GVO, W9LOO and W9F. W4BZR who recently joined the ranks of Silent Keys. A review now being made of all official appointments. If your certificate expired, please forward for new endorsement. The Wheeling Hamfest held their annual get together and as usual a large crowd attended. Now is the time to make plans and reservations for Starved Rock Radio Club Hamfest, the first Sun. in June. It will be held at the Princeton Fair Grounds, the same place as last year. Hamfesters Picnic will be held on the 2nd Sun. in Aug. at the Speedway park. WA9LDC PAM for the Ill. section is cooperating at home after a siege in the hospital. Reports indicate the Oscar 7 launching and operation has been very successful with many of the gang giving very favorable comments hearing its signal. Mark your calendar now. Expo '75 will be Sept. 7 and 7 the Peoria Hamfest is set for Sept. 14. WN9PYC is a Novice in Decatur. WN9PHM has passed his General and waiting his call. Traffic: (Dec.) W9NXG 475, WB9NOZ 460, K9MWH 3, W9JR 157, K9ZTV 111, W9JXY 102, WA9ULP 102, WA9VGV, W9OYL 73, W9AES 59, WB9DED 58, W9LNO 57, W9RYU, W9HOT 55, K9BGL 27, W9PRN 20, K9KHI 16, WB9LOC, WB9ELP 10, W9VEY 8, K9DDA 6, W9MTT 4, WB9NMA, WN9PHM 2. (Nov.) K9WMP 32, W9MTT 2.

INDIANA — SCM, Michael P. Hunter, WA9EED — 5
 WA9UMH. PAMs: WA9OAD, W9PMT.

| Nets | Freq. | GMT/Day | QNI | Mgr. |
|-----------|---------------|---------|----------|--------|
| ITN | 39101330 | 2300 | Dy417M | WA9OAY |
| | | | 2130 M-S | |
| QIN | 36560100,0400 | Dy226 | | WB9OM |
| IPON | 39101300,2130 | Su250 | | WB9AH |
| EC | 39102230 | 1st T | | WA9UMH |
| Hoos. VHF | 50.58 | 595 | | W9PMT |

The bands continue to be marginal with the decline in the sun activity. At times it's easier to work European DX than it is to get a piece of traffic across the state. Local DXers are reporting so fantastic conditions on both 80 and 40 each evening. The boys are getting ready for the remainder of the season. WB9A announces the formation of IPON VHF net on 50.150 at 0100 daily. You will remember the formal disbanding of IPON a system earlier in '74. Good luck to Ted on this reorganizing. WN9PNP passed his Advanced exam after less than three months in the air. The White Water Valley ARC recently gave ham radio a boost by setting up a booth at a local shopping center. They operated SSB, RTTY and SSTV. The Indy DXers announce plans for the annual W9DXCC banquet are progressing nicely. Details obtained from K9DTB. It was indeed gratifying to hear several warning and emergency nets swing into operation on Jan. 10. A line of potentially severe storms ripped through the area. Minor damage has been reported although some towers were lost. Traffic: WB9OMX 361, WA9OAD 359, WA9UMH 347, W9QLW 2, WB9FOT 267, W9FWH 255, W9JGE 170, WN9PWO 119, WB9C 101, K9UOT 94, W9EH 70, K9JQY 66, K9CBY 58, WA9OKK, WB9EAY 45, W9DZC 35, WA9TJS 33, W9ENU 32, K9RWO, K9RPZ 28, W9MCJ 24, WA9OHY 24, W9UEM 24, K9DVI, K9EFS 22, W9BUJ 21, WA9HVS 21, WA9YGG/0 21, W9RTH, K9YBM 15, W9HUF 14, W9LWL 14, WB9DIX 12, K9KWB, WN9MAM 12, W9PMT 11, W9UOZ 9, WB9MDS 7, WA9MXC, WA9SBR 6, WB9CNS 5, WB9BAP 4, WN9PFZ 4, W9CMT, WB9DNT 3, W9BDP 1, WB9IHH 1.

WISCONSIN — SCM, Roy A. Pedersen, K9FHI —

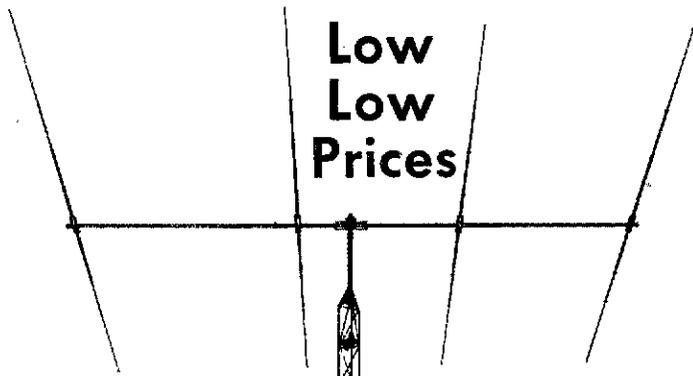
| Nets | Freq. | Time(Z)/Days | QNI | QTC | Mgr. |
|-------|-------|--------------|------|-----|--------|
| BWN | 3988 | 1245 M-S | 444 | 505 | WA9ULP |
| BEN | 3988 | 1800 Dy | 1223 | 228 | WA9OAY |
| WSBN | 3985 | 2330 Dy | 1362 | 257 | K9I |
| WNN | 3725 | 2330 Dy | 93 | 30 | WB9 |
| WSSN | 3662 | 0030 MWF | 60 | 9 | K9I |
| WIN-E | 3662 | 0100 Dy | 380 | 367 | W9M |
| WIN-L | 3662 | 0400 Dy | 237 | 127 | K9I |
| WRN | 3660 | | | | K9I |
| WIPON | 3925 | 1800 M-F | 634 | 87 | WA9 |

SEC: K9PKO. PAMs: WA9OAY, WA9LRW, K9UTO. RMs: K9K, W9MFG, K9LGI, WB9ICH. WSBN certificate to WA9EKO. RE elected W9LUB, pres.; K9FHI, vice-pres.; WB9OCV, secy.-tr. W9YOA, pro. chmn. Put Mar. 16 on your calendar. Tri-County swapfest at Armory Whitewater, co-sponsored by Lake Geneva Repeater group and Tri-County ARC of Fort Atkinson. Geneva Elkhorn repeater on 37-97 good coverage. Yellow Thru Hamfest at Delview Hotel in Lake Delton, May 17. W9KJI a

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- Quality Aluminum
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- Heavy Extruded Element to Boom Mounts

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- **M203** 3 ele. 20, 20', 2" OD **\$ 79.00**
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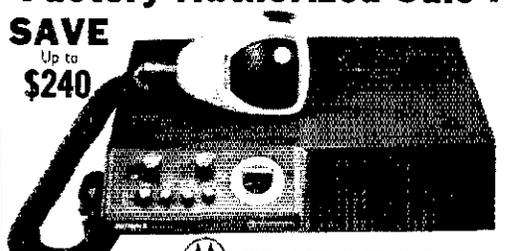
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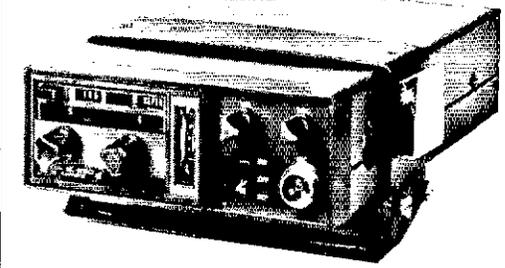
If you purchase a Metrum II on Sale as shown below - We will also sell you a PK-736 Tone Encoder kit for just \$1 (reg. \$45) and, or a T-1670A AC Power Supply for just \$99

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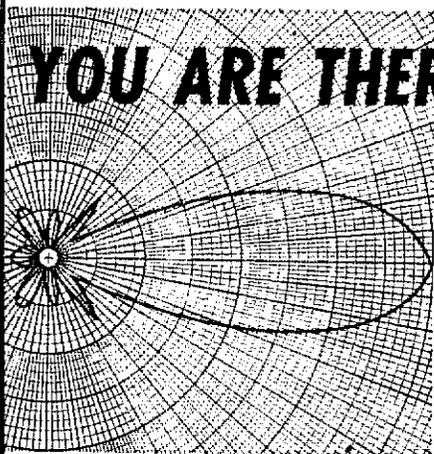
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for 56 years. CWRA banquet in Madison was well attended. Tri-County ARC had banquet at Fireside Inn in Fort Atkinson. WBSN certificate to W9NLE. FLARC sponsoring a Novice class. Red Cross Bldg., started Feb. 3. Sorry to hear the passing of WA9GJU's father, our condolences to the family. WIN-L certificate to W9VBO. WA9PKM new pres. for the WNA. W9AYK new mgr. for BWN. WNA meeting at K9LGU's QTH Dec. 14. Sorry to hear of the passing W9DOO's XYL, our condolences. OPS endorsed W9ESJ. OBS, EC, PAM endorsed K9UTO. MAN net in Milwaukee 50.310 MHz 6 PM local daily, have 98 member stations; contest for most QSOs per year. WB9FZU has 2549 contacts so far this year. Meetings once a month. K9LWV worked cw., SS 753 QSOs 73 sections for a score of 110,000, also modified HW-202; may be operating a Seneca 6&2 transmitter to work into Oscar, Calgary Centennial Ham Convention Aug. 1-2-3, 1975. Write box 592 Calgary, Alberta for details. BPL to W9DND, K9CPM 12 months in a row. WA9QVT. W9NEN on vacation in Bahamas. WB9JGV has new 50-ft. tower. I regret to report W9VOR a Silent Key. Traffic (Dec.) K9CPM 844, W9DND 567, W9CXY 419, WA9QVT 322, WB9KPK 310, K9FHL 164, W9MTG 152, K9LGU 141, WB9KRR 105, W9MDU 95, WB9NME 83, WB9LSS 80, WA9KRF 69, K9VSC 68, WB9ABF 66, W9JHW 58, W9MMP/9 57, WA9LRW 55, K9UTQ 47, W9PD 46, W9BCC 44, WA9PKM 40, K9IPS 36, K9HDF 35, K9KSA 33, W9AYK 30, W9YFW 27, WA9OAY 26, WA9ZAZ 26, WB9HLS 25, WB9KMQ 23, WB9JSW 22, W9VBO 14, W9WJH 14, WB9NKC 13, K9ANV 12, W9ZBD 11, W9BKD 10, WB9LKC 7, WN9PTX 6, W9ROM 6, W9RTP 2. (Nov.) W9CXY 304, W9PD 35, W9NLE 7, W9RTP 2.

DAKOTA DIVISION

MINNESOTA - SCM, Tod Olson, W0IYP - Chief OO: WA0PRS, Chief RM: K0ZXE, Chief OBS: WB0LOR.

The Minn. Calling Frequency is 3925 kHz.

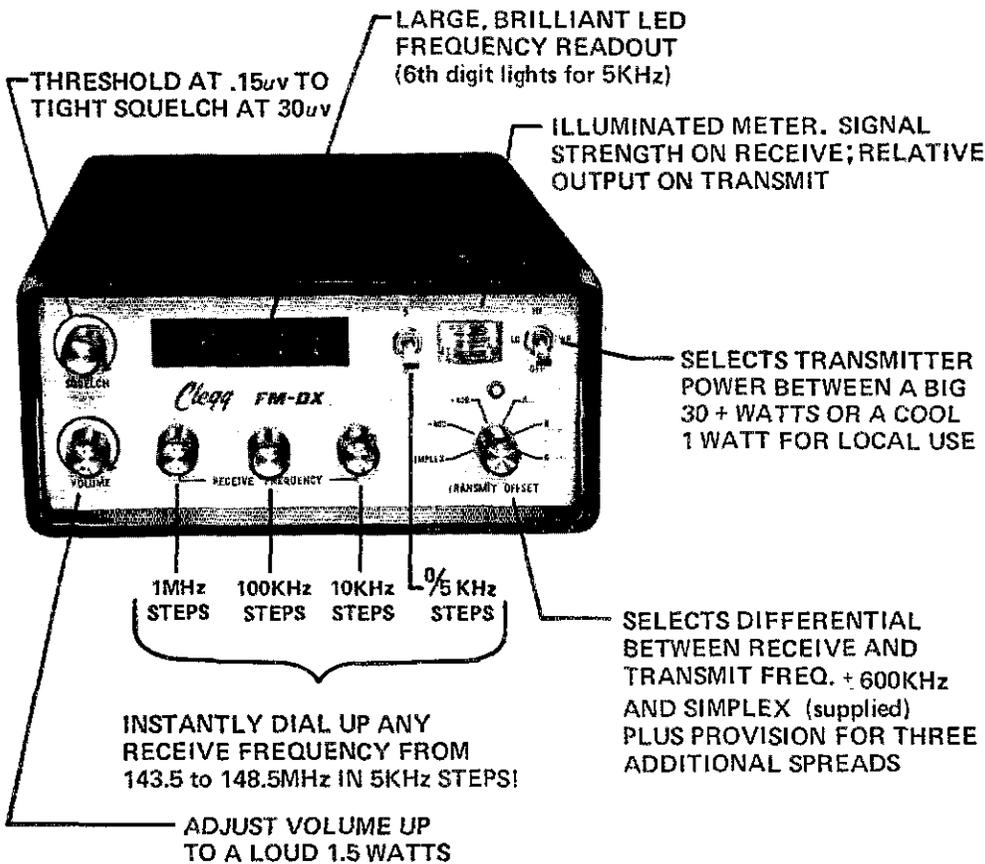
| Net | kHz | Time | Sets | QNT | QTC | Mgr. |
|--------|------|------------|------|-----|-----|--------|
| MSN-1 | 3685 | 6:30 P Dy | 30 | 174 | 141 | K0ZXE |
| MSN-2 | 3685 | 10:15 P Dy | 30 | 98 | 22 | WA0YAH |
| MSPN-N | 3945 | 12:05 P Dy | 30 | 944 | 181 | K0FTL |
| MSPN-E | 3925 | 5:45 P Dy | 31 | 893 | 120 | W0IYP |
| PAW | 3925 | 9A-6 P xS | | | | WA0YVT |
| MWX | 3925 | 6:15 P Dy | 30 | 295 | 292 | K0GNI |

ARRL field appointments in Dec.: OPSs: W0ALW, WB0EKC, W0IPN; OBSs: W0IPN, W0UGR; OO: WA0BWM. Cancellation: WA0DCJ as SEC. WB0JBP passed his Extra. WA0URW has a new FTDX 401-B. New officers for 3M Radio Club are WA0QFO, pres., W0SBO, vice-pres.; W00BEZ, secy.; W00JHC, treas. K0KLY managed a Jan. vacation in KHB-Land. New officers of Rochester RC are W00JCS, pres.; WA0RRJ, vice-pres.; W00JCN, treas. WA00KV, secy. K0LAV has prepared a talk for clubs on FM repeaters. W0LER is working on a slide-tape talk about FM repeaters. W0LER is working on a slide-tape talk about Oscar. Mankato RC Net meets 2 PM Sun. 3925 kHz. WA0IAW is linking coordinator for VHF repeaters in Minn. Repr Council. W00MY was the Minn. winner of the CW CHC in 1974. W0GYYH has a fantastic two-element phased vertical array for 80 meters. WB0HGX, K0GNI and WA0YVT were BPL winners in Dec. Be sure to fill out the Division Director's questionnaire on the restructuring proposals which you will get this month (Mar.). Send it back so he can represent your views at the Board meeting in CT. Traffic: WB0HGX 953, W00MY 420, K0CVD 297, K0ZXE 248, WA0YVT 235, W0ZHN 211, K0GNI 209, WA0GLI 166, WB0LDW 129, K0CSE 85, W0IYP 75, WB0FTL 60, WB0CPC 50, WA0CCA 48, W00JMI 47, W0IPN 46, K0PIZ 46, K0RMX 43, WA0TFC 42, WA0VUP 42, WB0LOR 39, WA0YAH 39, WA0URW 35, K0FTL 31, WB0GMK 29, W0NO 26, WB0DBD 25, WA0RKV 25, WB0MHL 24, W0HZZ 20, WA0JPR 20, WB0MNO 20, K0JTW 15, W0UMX 15, K0WXH 12, WB0MNE 11, WA0YGF 10, WB0MOI 9, WA0YWA 8, WA0IAW 6, K0SXQ 3, WB0GMJ 1, WA0WV 1.

NORTH DAKOTA - SCM, Harold L. Sheets, W0DM - SEC: K0RSA. OBS: K0PVG. RM: WB0HHC. OO: W0BF. The Forx ARC has the following slate of officers for the coming year: K0RSA, pres.; WA0CSL, vice-pres.; K0OSL, secy.-treas.; WA0IJ, act. mgr. Meetings held at the Vocational School in E. Grand Forks the last Tue. of the month. The Forx Club presented a set of ARRL publications to the Vocational School Library for use in their amateur radio classes. WA0IBN is recovering from hand surgery and is doing fine. W0WWL spent the holidays in Seattle. W0DM had the flu, missed some operating and holiday activities. WA0RWL spent the holidays in N.D. with his parents. Another OT is returning to the fold. W0GZD ordered one of the new Heath solid state transmitters, hopes to be on soon. Welcome back, WA0MLE has left

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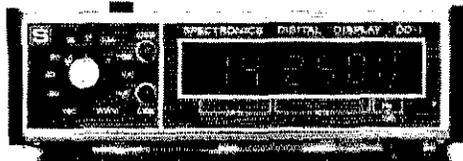
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FTdx401, FTdx560, FTdx570

As fast as you turn the dial, this direct frequency readout displays actual transmit and receive frequencies. The numbers are bright, easy-to-read. The accuracy, pinpoint. There's no room for confusion, no chance of operating out of band or on an unauthorized frequency.

One significant, new development has made such a display practical and reliable for amateur use: the advent of TTL integrated circuits. Spectronics' DD-1 utilizes more than 20 of these advanced devices, in addition to some 70 signal and power diodes. Because of these digital logic devices the performance and reliability of this new unit is nothing short of amazing.

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The price: just \$169.95 completely assembled, calibrated and test run. Operation requires only a 117V AC power source in addition to a signal input from the VFO of the transceiver. No internal connections or modifications to the transceiver are required.



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Enclosed is my check or money order for \$169.95. Please rush my DD-1. My transceiver is Model _____

Please send brochure with complete data on the DD-1 readout.

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the state so WB0HHC will take over as RM. We have a definite need for a CW net in this state. He would like to contact Novices and any slow speed operators wishing to take part in such a net for training and participation in the net. You OT CW men could give a hand to him. How about it? WA0MLE again made the PSHR while WB0HHC made BPL for the first time. Congrats. Word has been received of the passing of another OI from ND, ex-W0AVT (K7GRO) who had retired in Portland.

| Net | kHz | QST-Days | Seas | QNI | QTC | Mgr. |
|-------------|--------|----------|------|-----|-----|--------|
| Goose River | 1990.0 | 0900 Su | 5 | 91 | 1 | W0CDD |
| YL WX | 3995.0 | 0730 M-F | 27 | 432 | 445 | WA0RWM |
| | | 0930 Su | | | | |
| RACES | 3996.5 | 1730 S-S | 53 | 710 | 145 | W0QAT |
| | | 1830 | | | | WA0SUF |

Traffic: WA0RWM 474, WB0HHC 255, WA0MLE 153, WA0SUF 152, WB0UO 46, W0DM 25, WB0BMG 19, WA0PT 17, W0MXF 17, W0WWL 16, W0HSC 12, W0CDO 6.

SOUTH DAKOTA - SCM, Edward C. Gray, WA0CPX - WA0TNM of Colome has made BPL for the third time in recent months and has qualified for BPL Medallion. WA0ARZ of Mitchell is working through Oscar 6 and 7. WA0VY and wife have a new baby boy and K0CCK was recently married, and they are all from Rapid City. The South Dak. Ham Picnic will be held June 14 and 15 at the 4H Grounds west of Mitchell. Anyone interested in details should contact WA0VY, Mount Vernon, 57163. W0GWW is waiting for his Advanced ticket while WB0MUK is waiting for his Extra. Net reports: Morning WX - 262 check-ins and 129 formals; NJQ - 834 check-ins and 73 formals; Early Evening - 990 check-ins and 45 formals; Late Evening - 1536 check-ins and 82 formals; SDN CW - 272 check-ins and 224 formals. Traffic: WA0TNM 589, W0ZWL 496, WB0IUV 175, WA0VRE 136, WA0UBN 116, WA0KKR 104, WA0NZA 72, W0MZI 20, WB0EVO 17, K0CCK 2.

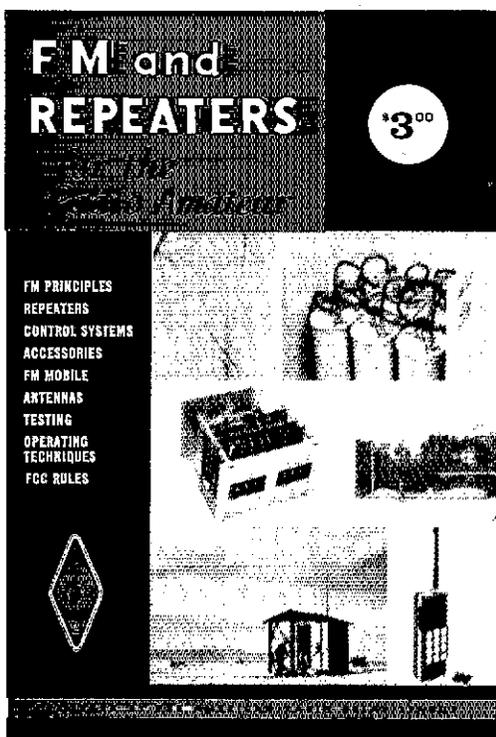
DELTA DIVISION

ARKANSAS - SCM, S.M. Pokotny, WSUAI - SEC: WSRXU. PAMS: WBSFDP, W5POH, RM: WSMYZ.

| Net | kHz | Time/Day | QNI | QTC | Mgr. |
|--------|------|----------|-----|-----|--------|
| ARKN | 3995 | 0030 Dy | | | WBSFDP |
| OZK | 3765 | 0100 Dy | 205 | 49 | WSMYZ |
| ANN | 3715 | 0000 Dy | 82 | 16 | WBSIGF |
| APN | 3937 | 1200 M-S | 812 | 31 | W5POH |
| M-Bird | 3925 | 2130 M-F | 504 | 13 | W5SZW |
| ATN | 3995 | 2330 Dy | | | WBSDRY |

The NWAARC & NWA Repeater Soc. have merged and now called NWAARC with new officers: W5URE, pres.; K5AS, vice-pres.; W5TXA, secy.; W5OEK, treas. Repeater Section, WBSFAN, chmn.; WBSOY, asst. chmn. W3EUQ now WB5NII, W6NIX is W5UNX, WB9KCY is WB5NDR. New calls in Ark.: WB5NCS, WB5NCT, WB5NDP, WB5NEC, WB5NEE, WB5NEH, WB5NEB, WB5NFC, WB5NFD, WB5NFE, WB5NFF, WB5NFF, WB5NFT, WB5NGD, WB5NGH, WB5NGT, WB5NHU. WSKL has 40 beam and twenty-two-element 2-meter beam. W5OWB has new 80-ft. tower, WBSGVE on 15 at La. Tech. Univ. at Ruston, La. WSMYZ new RM for OZK replacing WSEI3; ORS cert to WSEI1. WBSCBZ back home after surgery. PSHR: WBSIGF 49, WSMYZ 47. Traffic: WSMYZ 87, WBSIGF 67, W5TXA 44, WSUAI 36, K5AO 25, WSEI1 9, K5OKG 7, WSKL 4.

LOUISIANA - SCM, Robert P. Schmidt, W5GHP - Asst. SCM: John Souvestre, W5NYY. SEC: W5TRI. RM: W5ZZA. PAM: W5SEKU. VHF PAM: W5KND. Regret to announce the passing of K5KHF and his XYL W5EET. They will be missed by the Leg Pullers club. Congratulations to W5FMO on making the FMT Honor Roll. Also to K5DPO and K5ARH for both placng in the last FMT. W5IQO operated QRP rig on a camping trip to the Ozarks. WBSLHR has new 2-meter rig. WBSIKT new keyer, and is an improvement as noticed on LSN. La. had a very successful SET, thanks to the work of W5NYY, and SEC W5TRI. New Orleans VHF Club 16/76 repeater back on the air. MTA Club of New Orleans graduated 17 Generals, 1 Tech and 3 Advanced from their last class of 1974. WBSJCK back working the traffic nets. W5WXB new Life Member. PAM W5SEKU back to managing the LTN net. Many thanks to W5TQA for his help while W5FKU was unable to be active on LTN. RM W5ZZA advises that LAN has progressed in all departments during 1974. Comparing to 1973, traffic increased 36%, QNI 34%, sessions up 3% and time 42%. W5SAGO new 22/82 repeater is on the air. WBSLBN is the licensee. K5FVA now serving as GNORAC EC. W5MXX new member of Delta DX Club.



This book is a *must* for the fm buff as well as the operator just breaking into fm and repeaters. Everything is covered! Fourteen chapters include: mobile installation, transmitters, receivers and antennas for mobile and base, and fm test equipment. Special sections treat alignment and troubleshooting gear as well as repeater technical problems and cures. Club organization, repeater location planning, and operating under the new regulations are all covered. If you operate fm or are just becoming interested, you cannot afford to be without this book.

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| 222.34 | 223.90 | 146.10 | 146.52 | 52.525 | 52.525 |
| 222.38 | 223.94 | 146.12 | 146.61 | 52.70 | 52.60 |
| 223.14 | 223.98 | 146.16 | 146.70 | 52.76 | 52.64 |
| 223.26 | 224.74 | 146.19 | 146.72 | 52.82 | 52.68 |
| 223.30 | 224.86 | 146.22 | 146.76 | 52.88 | 52.72 |
| 223.34 | 224.90 | 146.25 | 146.79 | 52.92 | 52.79 |
| 223.50 | 224.94 | 146.28 | 146.82 | 52.96 | 52.80 |
| | | 146.34 | 146.85 | 53.15 | 53.05 |
| | | 146.52 | 146.88 | 53.25 | 53.08 |
| | | 146.94 | 146.94 | 53.68 | 53.16 |

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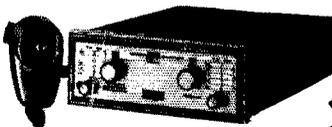


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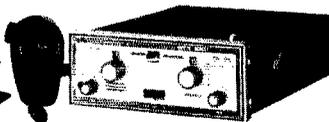


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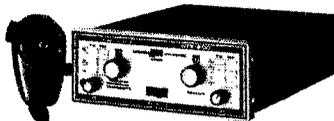


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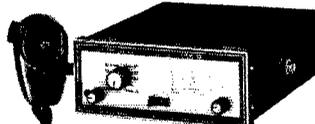


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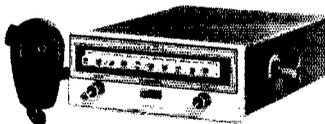


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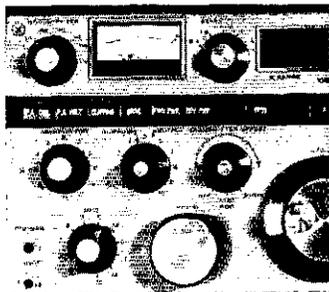
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| Net | kHz | Time(EST) | QTC | QNI | Mgr. |
|-----|------|------------------|-----|-----|--------|
| LAN | 3615 | 7:00&10:00 PM Dy | 233 | 349 | WA5ZZA |
| LTN | 3910 | 6:45 PM Dy | 116 | 317 | WB5EKU |
| LSN | 3703 | 8:30 M-F | 76 | 74 | WA5ZZA |

Traffic: WA5ZZA 440, W5GHP 436, WA5LQU 256, W5MI 227, W5LBR 105, W5TQA 64, W5FZJ 52, WA3AGM/5 34, W5EKU 30, W5IKT 16, W5JZQ 7.

MISSISSIPPI - SCM, W.L. Appleby, WB5DCY - Asst. SCM: C.E. Gibbs, W5LL. SEC: WB5XA. Appointments: WB5EH, WA4KWO/5 OVSs; K8YUW/5 OPS. IARC 1975 officers W5OFE, pres.; W5DPO, vice-pres.; W5KAN, secy.; W5QDC, treas. BP issued to W5SHVY. W5HNR and WA4RVA/5 heard vhf-fm. Welcome to new amateurs W5NSKK, W5NSHI, W5NHHG and W5NSGO. PSHR again to W5SIUS and W5SHVY. K5OAF new MTN mgr.; W5OEB CGCHN mgr.; W5SLPM asst. MSBN mgr. WA4KWO/5 and W5NAB on 6 meters fm. WB5AHZ relocated to Yazoo City. Upgrading classes in progress in Booneville and Gulfport. K5UBL, W5SIRV, W5NGF, K5WSC, W5LEO, WA5KYB, WA5WGK, W5IHP, W5LCL, K5TFV heard regularly on MSBN. WA4RVA/5 and W5KDV on 6 meters am. W59KUZ, WA4BIE relayed MSBN check-ins during long skip conditions. W5NSJE, W5NLAS, W5NLRQ/5, W5NSMTH, W5NSMDR, W5NSMTQ, all active on Miss. Slo Net. ARRL CD Council for Hurricane Carmen efforts. WA4RVA/5 at KAEB. MCARA 1975 officers are K5VOK, pres.; W5MHF, vice-pres.; W5NSMTH, secy. W5SMTX, treas. New repeater WR5AGR 31/91 Lucedale. 6-Meter fm repeater planned for Hattiesburg. K5OBU given award as MCARA "Club Member of Year." W5EJB won QRP rig at IARC Dec. meeting. W4KWI/5 has new HW-16. Echo Repeater Assn. 1975 officers: K5RSI, pres.; K5WSC, vice-pres.; W5FII, secy.-treas. W5RUB now into Oscar 6 and 7 regularly. WB5DCY received 5BWAS No. 192. W5WZ's CW arm should be in shape by now. WA4RVA/5, WB5DCY on RTTY. JCARC 1975 officers: W5UEP, pres.; W5RMS, vice-pres.; W5SIDF, secy.; W5AYRE, treas.; W5UCY, pro. chmn. W5HTV, W5IWI and W5FII again conducted vhf-fm Santa program from Miss. Baptist Hospital. New club being formed in Bolivar Co. K5RFJ, W5AO, W5PWW, W5RUB, W5GWD, WB5DCY, W5THT, W5SNYQ/5 heard operating ARRL 160 Contest. W5EIN now on vhf-fm.

| Net | Freq. | Time(Z)/Days | QNI | QTC | Mgr. |
|------|--------|--------------|-----|-----|--------|
| MSBN | 3987.5 | 0015 Dy | 995 | 193 | WB5BUE |
| MTN | 3665 | 0045 Dy | 158 | 110 | K5OAF |
| MSN | 3733 | 0000 MWF | 64 | 27 | W5SJBW |

Traffic: (Dec.) W5EIT 239, W5SHVY 239, W5SJBW 134, W5SLPM 130, W5YZW 117, K5OAF 105, K8YUW/5 101, W5SIUS 66, W5NCB 39, WB5DCY 35, W5SMM 27, W5BKM 22, W5BUE 21, W5NSMTQ 17, W5SFA 16, W5QDC 14, W5BW 11, W5SFA 8, W5LL 6. (Nov.) W5BUE 17, W5FIN 10, W5SFA 6

TENNESSEE - SCM, O.D. Keaton, WA4GLS - SEC: WB4DYI PAMs: WB4PRF, K4ISP, RM: WB4DJU.

| Net | Freq. | Time(Z)/Days | Sex | QNI | QTC | Mgr. |
|----------|--------|--|-----|------|-----|-------------------------------------|
| EPN | 3980 | 1140 M-F 1245 M-F 0030 T-Su 1400 SSuH | 67 | 3498 | 137 | WA4EWW W4PFP WB4YPO WA4ZBC |
| TCN | 3980 | 0030 M 1300 Su 2200 Su | | | | WA4ZBC |
| TN | 3635 | 0100 Dy | 31 | 273 | 138 | WB4DJU |
| TNN | 3707.5 | 0100 Dy | 30 | 220 | 68 | WA4GAM |
| ETVHN | 50.4 | 0100 TTSS | 13 | 172 | 0 | WA4YKN |
| ETVHN | 145.2 | 0100 WF | 7 | 27 | 0 | WB4GZB |
| ETTMN | 28.7 | 0100 WF | 7 | 77 | 0 | WB4NFT |
| MATTN | 28.8 | 0200 TF | 6 | 43 | 0 | W4EAY |
| KACARECN | 145.28 | 0100 T 145.88 | 4 | 81 | 0 | WB4ZSZ |
| KACARECN | 145.52 | 2230 F | 5 | 38 | 4 | WA4ZBC |

Everyone is reminded that the Tenn. QSO Party will be on the 22nd and 23rd, be sure that you participate. Contact W4OGG for further info. WB4NIR has resigned as RM; thanks Jim for a fine job. WB4DJU is the new RM and would appreciate the cooperation and help from all. Due to conditions beyond my control last month's traffic was not reported; therefore this report includes both months. Traffic: W4OGG 713, K4CNY 519, WB4DJU 233, WB4ZSZ 124, WA4FZU 122, W4CYL 94, W4RUW 61, K4SBV 60, WB4YPO 59, WB4NIR 56, K4YFC 53, WB4MPJ 52, WB4DCO 34, WB4ANX 31, WA4ZBC 25, WA4DAV 17, K4UMW 15, WA4GLS 14, W4SGI 11, WB4PRF 11, WA4BCS 9, WB4DDV 9, K4MZE 6, K4AMC 4, WB4CMQ 4.

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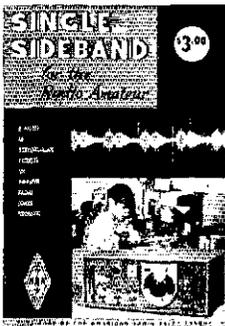
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| Net | QNT | QTC | Net | QNT |
|------|------|-----|-------|-----|
| KRN | 360 | 45 | KYN | 330 |
| MKPN | 1036 | 106 | WKETN | 52 |
| KTN | 1500 | 238 | | |

New officers of the Owensboro ARC are W4OYL, pres.; WA41 vice-pres.; WB4ZSA, secy.-treas. W4YOK has been racking 'em i the FMTs lately. You OOs should participate to upgrade. Some Novices in Elizabethtown are WN4MAS, WN4MEH, WN4 WN4MFR. W4KFB recently won the MD QSO Party for the section. WB4MCC is the first graduate of the Somerset cod theory classes. The KY Repeater Assn. still an active group you're planning a repeater, contact WB4WVH for coordination i As reported earlier, we're going back to court on the call l license plates. We'll need your support, both moral and finan There were 368 plates issued in 1974. Traffic: W4BAZ WB4ZMK 180, WB4ECB 170, WB4IGS 129, WB4EXQ 6R, W4 67, WB4AUN 60, WA4GHQ 57, WB4ZML 36, WA4ENH WB4EOR 48, WA4FAF 33, WB4WCM 27, W4CDA 22, WB4SKT WB4FAT 21, WN4JAV 15, K4HOE 13, K4AVX 10, WB4NHO WB4GCV 7, W4YOK 5, K4HFD 4, W4OYL 4, WB4VBG 3, W41 2, WA4IQS 2, WB4SU 1.

MICHIGAN - SCM, Ivory J. Olinghouse, W8ZBT - Asst. S A.L. Baker, W8TZZ. SEC: W8MPD. RMs: W8JYA, W8W W8RTN, W8GLC, K8KMQ, W8BIM, W8SNL PAMs: K8C K8LNE, W88BYB. VHF PAMs: K8AEM, W88WV.

| Net | Freq. | Time/Days | QNT | Tfc. | Sex. |
|--------|-------|-----------|------|------|------|
| QMN | 3663 | 2300 Dy | 1160 | 456 | 91 |
| WSBN | 3935 | 0000 Dy | 706 | 144 | 31 |
| MACS | 3953 | 1600 Dy | 1030 | 448 | 31 |
| BR/MEN | 3930 | 2230 Dy | 977 | 144 | 31 |
| UPEN | 3922 | 2230 Dy | 700 | 56 | 33 |
| GLEIN | 3931 | 0230 Dy | 508 | 110 | 31 |
| ML6M | 50.7 | 0000 MS | 194 | 24 | 23 |
| MNN | 3720 | 2230 Dy | 350 | 207 | 31 |

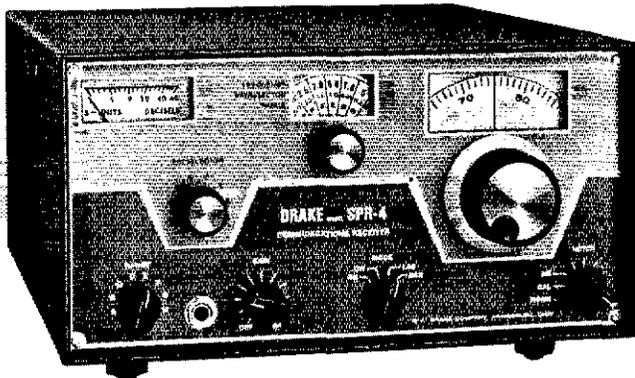
SW Mich. 2-meter nets 128 QNT with 1 traffic in 10 session reported by W8CVQ and W88WV. This month's report is filed Asst. SCM Al. Officers for 1975 for Central Mich. ARC are K8D pres.; W8SIGU, vice-pres.; WA8LTX, treas.; K8ILF, secy.; W8B and W8FSZ, dir. 1975 officers for the Genesee Co. RC are W8W pres.; WA8THK, W8IEK, WA8JND, K8CGO, vice-pres.; W88 secy.; K8KMQ, treas.; W88NVT, editor. Officers of the L Creuse ARC are W8BIL, pres.; W8MOP, vice-pres.; WN8TJC, se WN8ODR, treas.; W8GLC, act. mgr. Livingston ARC elec W88JET, pres.; W88HEQ, vice-pres.; WA8LMR, secy.; WA8A treas. Muskegon ARC Council elected W8BX5, pres.; K8CJ, v pres.; W88OFJ, secy.; W88IXV, treas.; WA8TRO, W88OBF, t tees; WA8OJI, act. mgr. Saginaw Valley ARA: K8BWC, pr K8RFN, vice-pres.; W88LZA, secy.; W88AYW, treas.; W8C Elizabethtown are WN4MAS, WN4MEH, WN4MEF, WN4M W4KFB recently won the via W88AAA. K8MIK got his bu W88BJY was Santa for children in the Grand Rapids area hospi K8SWW was ZFIAG on Grand Chyman for the 10-Meter Cont W8TBZ was ZFIT for the 160-Meter Contest. WN8SAT Novice in Milford area. Whitmore Lake repeater moved to 81 New Wyandotte repeater WR8AFV now on 84/24. K8AMU 100% QNT in all QMN nets. K8KMQ named "Volunteer of Year" by the Genesee Co. Red Cross. I am informed that WA8B and W8WBT have become Silent Keys. With deep sorrow we rep the Jan. 17, 1975 passing of our SCM W8ZBT. Traffic: (D W88IT 548, W8GLC 369, K8LNE 244, K8DYI 219, W88J 212, W8MO 182, W88DKQ 158, WA8WZF 146, W8ZBT 1 W88EUF 128, W8OW 122, W8TZZ 107, W88FBG 100, WA8 86, W88JX 84, W8RTN 76, W8NOH 72, K8WRJ 72, W8SH W8UOQ 62, W8NCD 50, K8SWW 50, K8ZJU 49, W880BR W8EOI 36, W8RNO 35, W8UC 34, W88CKB 28, KRJED W8QOM 24, W88FM 23, K8HGA 23, W8BEZ 21, W8VZ W88APN 19, W88NYO 18, W8TBP 18, W88DJS 17, K8GXV W88IMI 15, W88SD 15, W8RUP 15, W8LFS 14, W88FKA W88RTB 12, W88PFB 11, K8PYN 11, W8OBE 11, K8ACO WA8ENW 10, WA8EQN 10, WA8MDK 10, K8CKD 9, K8JH K8AMU 8, W8ED 8, WA8YPY 8, W8FZL 7, W8LDS 7, WA8ZC K8CKF 6, W8ACUP 6, WA8JFQ 6, WA8WV 6, W88BJY W8JUP 5, W8WYL 5, W88RYB 4, W8JAX 4, W8SCW 4, W8YT WA8MEC 3, K8WLE 3, K8OCP 2, W8HKL 1. (Nov.) WN8ONV K8MIK 3.

OHIO - SCM, Henry Greeb, W8CHT - Asst. SCM: William Shaeffer, WA8MCR. SEC: WA8COA. PAMs: WA8VWH, W8M RMs: WA8WAK, W8RKKI.

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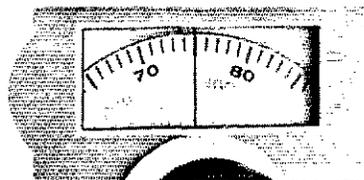
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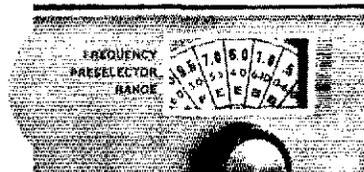
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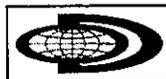
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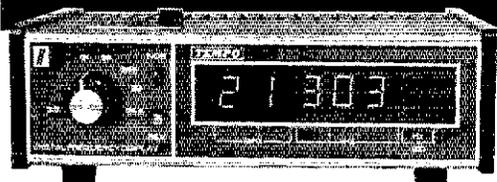


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| Net | QMI | QTC | Sess. | Freq. | Time | Mgr. |
|-------|-----|-----|-------|--------|-----------|-------|
| O6MN | 318 | 85 | 31 | 50160 | 0200 | WABVW |
| BNR | 146 | 401 | 31 | 3605 | 2300 | KRNC |
| OSN | 199 | 111 | 29 | 4577 | 2310 | WBRK |
| BN | | | | 3577 | 2345/0300 | WABWA |
| OSSBN | | | | 3972.5 | 2130/2345 | W8MOD |
| | | | | | 71530 | |

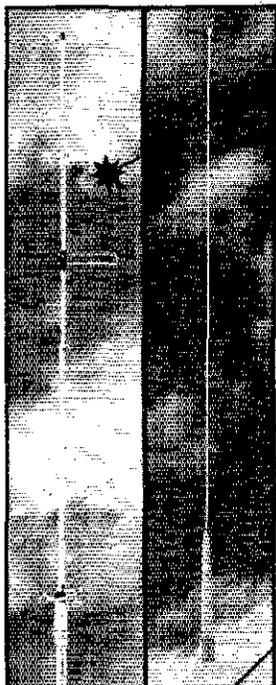
Remember the Dayton Hamvention is Apr. 25 thru 27. Congrats to W8ALW on 50 years of ARRL membership. W8BQIS receives Advanced Class ticket, and has a new tower and tribander. W8IB reports a very good month for Hit & Bounce Slow Net, which meets on Fri. thru Mon. 3714 kHz at 7:30 AM EST and 7140 kHz 8:00 AM EST. Novices are encouraged to check in. W8NUT is interested in forming a late night Six Meter net. W8RXX reports good tropo on 2 meters, with best DX North Carolina. Activity is picking up on 220 MHz FM. New officers of Miami Valley FM Assn. (Dayton) are: KRJXE, pres.; W8KRJ, vice-pres.; W8ZWJ, secy.; W8POI, treas. W8GWO, jr. dir. Thirteen members of the Triple States Radio Amateur Club received Novices licenses WN8TPW thru WN8TOD. They have a net on 3730 kHz at 8:00 PM Thur. and invite any outsiders who are interested. W8RDY worked two new states on meteor scatter Dec. 13 for a six meter total of 3R. K8HLR is new 8th region Contest Advisory Committee member. K8ONA reports successful traffic handling exercise by the Apricot Net prior to Christmas. W8BDMX was Apricot Net's Ham of the Year. New Certificates were sent to members of BN, OSN and O6mtrn. O6EN (Cincinnati) was briefed on disaster survey by Cincinnati Red Cross. Windstorm damaged antennae at W8BHL, W8BIO, W8ITT, W8OUC and others in the Toledo area. RPI's to W8NHG1, W8RXX, W8MCR, WN8PIY, W8OCU, W8BKQJ. 1 traffic: (1 Dec.) W8MCE 805, W8BHG 642, W8ENI 433, W8PTT 395, W8IBX 383, W8DII 344, W8MOK 266, W8OZA 227, W8RKKI 210, W8OCU 177, W8MGA 161, WN8PHY 153, W8BKQJ 150, W8OZK 138, W8RPT 128, W8SSE 108, W8HWE 103, W8LT 98, W8RZX 94, W8DCX 91, W8FGD 80, W8QXN 80, W8JD 75, W8BICW 74, W8BKWD 74, W8CUJ 64, W8IMI 59, W8CXM 58, W8DNL 57, W8MZA 56, W8WEG 56, W8GGR 48, W8SSI 48, W8KLN 47, K8RYR 45, W8R1X 40, W8R1Y 40, W8RQO 38, K8LXA 36, K8MLO 36, W8VWH 36, W8RKA 33, W8TH 31, W8LCC 30, W8BOMQ 30, W8MGW 27, W8RZZ 27, W8GVX 26, K8VMI 26, W8BMH 24, K8OYR 24, W8GCE 23, W8OE 23, W8CJU 20, W8MRR 16, K8DMZ 14, W8RAR 13, W8EFSK 13, W8DYF 12, K8KFI 12, W8CKI 11, W8CXU 11, K8BPX 10, W8MLH 10, W8DPW 7, W8BIB 7, W8RAYM 6, W8RXX 6, W8ETU 5, W8CYK 4, K8GRO 4, W8SHUP 4, W8BHL 3, W8RNT 2. (Nov.) W8OCU 143.

HUDSON DIVISION

EASTERN NEW YORK - SCM, Graham G. Berry, K2SJN - Asst. SCM/PAM: Kenneth Kroth, WB2VJB. SEC: W2KGC. KMs: WA2PJJ, WB2LXW, WA2FRI and K2DN for RITTY only. Nets: NYS 3.675 MHz daily at 0001 and 0300Z; ESS (10 wpm) 3.590 daily at 2200Z; Novice and Training Net 3.728 MHz Mon-Fri at 2200Z; RITTY daily 3.613 MHz at 0030Z; Hudson Division P/R Net is 2nd and 4th Sun. 3.925 MHz at 2200Z. NYSPT&EN daily 3.925 MHz at 2300Z. Watch for change-back to DST soon which will change LOCAL times for all nets. Nets still plagued by out-of-area QRM with resultant slight changes in listed frequencies. Albany ARA held elections in Dec.: W2OOJ reelected pres.; W2FON, vice-pres. W2KLY, secy.; W2DBX, treas.; WA2FAH, WB2DXM, W2ANB, dir. Harmonic Hills ARA starts year with - in usual order - new officers and dir.: K2COG, WN2UYD, WN2SJU, WA2KXM and K2CTI WA2O, W2PCP, dir. Heard presentation on radio controlled modes at Dec. meeting. Schenectady ARA held annual Ladies Night meeting, with program featuring slide talk by Dr. of Schenectady County Historical Society on 200 years of town area history. Joint meeting of SARA and Saratoga County RACES heard Division Dir. K2SJO. Communications Club of New Rochelle elections in Dec., usual order: W2IXW, WA2RAU, WA2VYE, W2MOG; WA2JZE, WA2VEG, K2QJB, dir.; W2HUG, sgts-at-arms. Other club secys. check your mailing lists if you want reports printed. Pearl River HS Clubs reports W2ABJ treas. WN2KYW now WA with Advanced Class license. K2DN and W2SAS got former back on RITTY after he acquired new base station requiring major RITTY changes to match. WA2PJJ found time to work some 75-meter SSB DX - PAO, G3YU2; OZ4 and ST2 (!) in one evening. RPI now has WR2ABZ on 22.82. WB2TGU early NYS rep to 2RN Sun. WA2RAU to West Indies over holidays. New appointments are WA2PAU OBS; WA2CYJ ORS. Year-end saw several appointment cancellations made - reason, failure to make regular reports to SCM or lapse of ARRL membership; how about YOU? All stations be sure to read new FCC proposals on licensing in detail and send your comments

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| ARX-2K | Ranger Kit | | \$10.95 |

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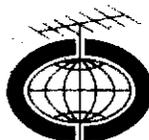
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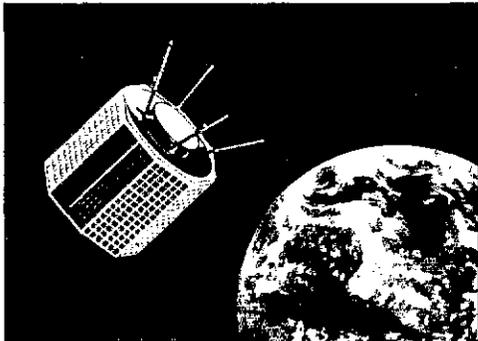
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NEW YORK CITY-LONG ISLAND - SCM, John H. Smal
 WB2CHY - Asst. SCM: Art Malatzky, WB2WFI. SEC: K2HT. RM: WB2LZN. PAM: WB2EDW. VHF PAM: WB2ROF.

| | | | |
|----------------|------------|-----------|----------|
| Bronx | 28.64 MHz | 50.35 MHz | 146.88 f |
| Kings | 28.64 MHz | 50.35 MHz | 146.88 f |
| Richmond | | | 146.88 f |
| New York | 29.5 MHz | 50.48 MHz | 146.88 f |
| Queens | 29.5 MHz | 50.52 MHz | 146.20 a |
| Nassau | 28.72 MHz | | 145.68 a |
| Suffolk(West) | 28.73 MHz | | 145.59 a |
| | (Hunt.) | | |
| | 28.65 MHz | | 147.21 f |
| | (Smith) | | |
| | 28.610 MHz | | |
| | (Babylon) | | |
| Suffolk(East), | | | 146.82 f |

Note: Net times between 2000 and 2100 local, Mon.; also the 10 Meter Internet for Nassau meets on 29.460 at 1930 local, and the 20 Meter Internet for NYC (5 hours) is on 146.88 at 1900 local with WA2UCP NCS. New asst. EC for town of Babylon is WA2TQ. W2PF is arranging the 11th Annual Amateur Radio Luncheon in connection with the IEEE convention, it will be held Apr. 8. For additional info contact W2PF. W2HPB was elected pres. of Pea Harbor Survivors Assn. WA2JZX has been busy chasing DX on 4 cw in the wee hours of the morning. WB2LZN will soon be getting on RTTY. Congratulations to K2RPZ and XYL on their new YL. Congratulations to new Extras WA2BDA and WA2BDB - that's son and father. New officers for the Tu Boro RC are K2HGR, pres. WA2JIV, vice-pres.; WB2FZE, secy.; W2VZQ, treas. New office: for Larkfield are WA2FAK, WB2CIK, WB2ZZR, trustees; WB2RMC, secy.; WB2DFW, treas. K2QMF reports Santa was good to him, he received a new "S" line. Reports like that kinda renews your faith in writing letters to Santa. Lake Success Radio Club made DXCC. WN2PKL passed his General and now studying for his Advanced. Officers for Massapequa RC are WB2MPP, pres.; WA2TPV, vice-pres.; WA2LWX, treas.; WA2TPV, secy. New appointments are WB2QBP, WA2WKH ORSs and WN2PQE ORS/II. WA2JZX reports the new RC for the South Shore is doing fine, anyone interested contact WA2JZX. The Hall Of Science started their winter classes with a fine turnout. K2JFE received his DXCC 200. Officers for the LIDXA are WA2BVU, pres.; WB2HXD, secy.; W2GKZ, vice-pres. WA2RJZ, treas. WB2EDW still looking for stations to check into the slow speed net, he needs help from some of the old hands to get the new members started. WB2EDW is now also working for Heathkit in the NYC store. Traffic: WB2PYM 806, WB2PLF 721, WB2LZ 315, W2EC 513, W2GKZ 278, WB2EDW 177, WB2JJD 134, WA2WKH 116, WB2TPO 79, WA2KVB 66, WB2WEJ 52, WB2VT 48, WB2HFM 47, WB2JFG 42, WB2NEB 25, WA2JZX 17, W2OC 11, W2FVS 10, WN2YAW 9, W2HXT 8, W2PF 8, WA2VPA 4, WN2PKL 4, WA2DGG 2, W2EW 2, WA2KXE 2, WA2PLI 1, WA2TQT 1.

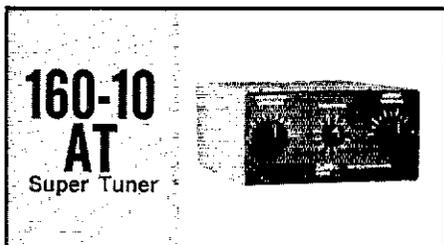
NORTHERN NEW JERSEY - SCM, William S. Keller, II
 WB2RKK -

| Net | Freq. | Time(PM) | Days | Sps. | QNT | QTC | Mg |
|-------------|--------|----------|------------|------|-----|-----|-------|
| NJN | 3695 | | 7 Dy | 31 | 427 | 238 | WA2DS |
| NJN | 3695 | | 10 Dy | 31 | 239 | 145 | WA2DS |
| NJPN | 3950 | | 6 Dy | 31 | 549 | 384 | WA2DV |
| NJPN | 3950 | | 9 AM Su | ? | | | WA2DV |
| NJPON | 146.52 | | 10:00 SuTh | 8 | 94 | 46 | WA2EF |
| /VHF | | | | | | | |
| NJSN | 3730 | | 8:15 Dy | 31 | 204 | 71 | WA2DN |
| PVTEEN | 145.71 | | 8 Dy | 31 | 143 | 16 | WA2OP |

SEC: WB2PBO. PAM: WA2DVE. RMs: WA2DIW, WA2DSA. Q reports received from WA2DNY, WB2IEC, WB2TFH, W2TP, WB2YGK. Congratulations to WA2SOU on receiving his General ticket, and to WN2UCI on passing the Advanced Class exam. W2CVW and WB2RKK were awarded 40 wpm stickers for the De WIAW Qualifying Run. W2CVW managed to work KH6 from indoors using a loop antenna. K2QBW reports working all states but KH6 thru Oscar. NJDXA members have been active on Oscar. WA2GEZ, who operated /4 from Ga. and Fla., reports hearing low and III. on Dec. 14 on 2 meters during the meteor shower. WB2IEC enjoying his new L4B linear. WN2QHN now has an HA800 receiver for standby use. The new antennas at WB2RKK survive the high winds in early Dec., but the 40- and 15-meter antennas at WB2RMK bit the dust. WN2TRS reports a new vertical antenna. WB2HSD is again on after replacing the finals in his SB102. K2ZP

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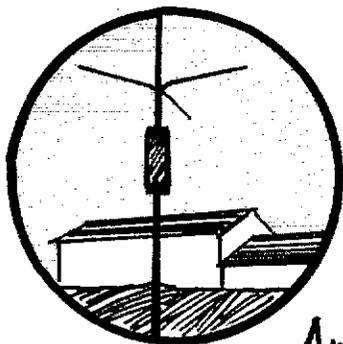


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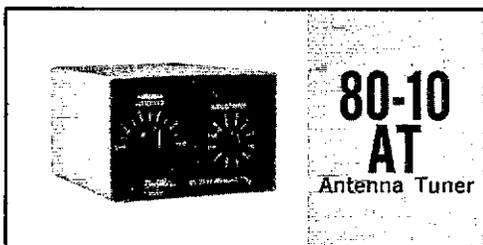
160-10 Super Tuner \$119.50 ppd. USA

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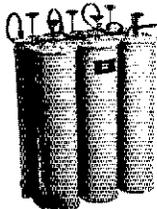
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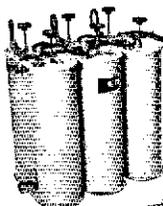
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looking for some inexpensive ssb gear. Wanderers WB2IEC and WB2JGC recently visited SU, OD5, and EA-Lands; meanwhile WA2MVQ put in some operating time from 4U1ITU, and also I and /HB0. WA2GEZ reports excellent QSLing from XE2M 9H1DP, ZS5PG and 9X5KE. WA2DSA and WB2RKK have recently been working much DX on 75 ssb. K2CWF planning on a big effort for the ARRL DX contest. NNJ welcomes 15 year old WA3TYQ formerly of EPA. WA2TYP now in charge of the Union County Communications van. Cranford AREC recently held a meeting plan their organization. We are always looking for people to join AREC. If you are interested in becoming a member of the Amateur Radio Emergency Corps, please contact WB2PBO or WB2RKK for info. Also, WA2DSA is looking for people in Sussex, Warren and other areas to become active on NJN. If you are interested in becoming active on the traffic nets, contact WB2RKK for information on which net would be best for you. Congrats to WA2DSU, WB2RKK, WA2EPI, WA2PCF and WN2UJD/2 on attaining BF awards during Dec. It is with regret that I announce the recent passing of W2ABL, one of NJN's most active members and a charter member of NJN. Traffic: (Dec.) WA2DSA 830, WB2RKK 811, K2BHL 281, WA2EPI 259, WA2PCF 237, WN2UJD/2 197, WB2FIT 96, WB2NOM 92, WB2GAV 87, W2CU 82, WA2DIW 77, WA2BSU 66, WA2SLF 61, WA2DVE 58, W2SWE 57, WB2RKM 55, WB2AEH 53, WB2BKC 52, W2BLM 51, WB2CST 44, K2QOJ 44, WB2RJ 44, W2CVW 34, WB2ELF 29, WB2VFT 25, WA2CCF 22, WA2CWS 22, K2ZFI 22, WA2KFE 20, WA2NPP 20, WB2HSG 1, WA2CAK 17, WA2QJV 12, WA2QJU 10, WA2SRO 9, WA2ASM 8, WB2PBO 8, W2SHM 8, WA2SHT 8, WA2UOQ 6, W2WOJ 6, K2MFF 3, WA2QNT 3, WB2HSD 2, W2NKD 2, WN2QHN 2, WA2RGV 1. (Nov.) WN2UJD/2 389, WB2BK 6, WA2MVQ 5, WB2HSD 4. (Oct.) WB2BKC 8.

MIDWEST DIVISION

IOWA - SCM, Max R. Otto, W0LFF - Iowa has a new Contest Club headquartered in Des Moines. WB0CQO has all the details. W5PWT/3 sends word that WB0MSX was high scorer in Iowa in the Maryland QSO party. WR0ACO at Ames on 146.16/ is testing at WA0KHF and should soon have a permanent location. K0SVW with slides of his overseas operations, WN0NCX speaking about his DX notification program, and K0UJJ showing off the homebrew keyer made up a program for the Cedar Valley AR. Iowa lost three Old Timers. W0CZ, W0MOW and W0FP are Silent Keys. Congrats to WA0ZOE for his General ticket, and to WA0AU for making BPL two months in a row. W0BW reports Ft. Dodge was soon have a repeater. W0EMA says Cedar Rapids will soon have a new ARRL affiliated club. Heard on 75, W0BSR helping WA0DA wire her SB220 while he was mobile in a traffic jam. Midwest D. W0FIR appointed yours truly as Asst. Dir. W0IBH has a new Radiology position in New Orleans. W0IO sporting a new TR22 2-meter transceiver, K0CKX an SB230 and W0LZS an SB220. W0FHE is a new OD. K0UJJ is new pres. of Iowa City ARC. K0DDE has moved to Des Moines for new duties at the cafeteria in the Institute For The Blind.

| Net | Freq. | Time/Days | QNT | QTC | Sess. | Mgr. |
|---------------|-------|-----------|------|-----|-------|-------|
| Iowa 75 Meter | 3970 | 1830 M-S | 1500 | 122 | 26 | WA0VZ |
| Iowa 75 Meter | 3970 | 0000 M-S | 1035 | 77 | 26 | WA0AC |
| TLCN | 3560 | 0030 Dy | 326 | 123 | 61 | K0AJ |

Traffic: (Dec.) WA0AUX 475, K0AZJ 259, W0LCX 138, WA0LK 128, WA0VZH 36, W0MOQ 30, W0LFF 16, WB0AVW 12, K0JGI 1, WA0KHF 7, W0BW 3, W0BFEW 3. (Nov.) WA0TAQ 39.

KANSAS - SCM, Robert M. Summers, K0BXF - SEC: K0JM PAMS: W0B0CL, W0CJ, RM: K0MRI, VHF PAMS: W0B0ED, WA0TRO. Net reports for Dec. QKS-SS: QN1 139, QTC 59, mgr. W00YH. OKS: QN1 444, QTC 279, mgr. K0MRI and ass. W0B0BM and W0CHJ. Mid States Mobile Monitor Service: QN1 1245, QTC 103 serving 62 mobiles. KSBN: QN1 162, QTC 20. KPI: QN1 162, QTC 20, mgr. W0GCI. Mid States Mobile Monitor Service has been having its share of band conditions lately, it would help we could have a few more Kans. stations jump in and give a helping hand more frequently. Mgr. W0B0CL, I am sure will not turn you down when you ask to help. WA0GSG keeping an ear to the D band, has 95 confirmations now and 107 worked. WA0NXXD has again been contesting, this time as a ham - 1st contest was a zone code contest at that, had a ball. W0BMA has been missed on the nets because of a sore arm. I have been noticing a lot of you taking more interest in the PSHR totals, sorry but I cannot list those who do not hit 40 or more. KWN Dec. QNT 573, QTC 166, mgr. W0LBB. Traffic: (Dec.) W0HI 243, W0B0BHM 238, K0MRI 22, W0INH 224, W0OF 209, W00YH 108, W0FIR 82, W0B0CZ 7, WA0LBB 74, W0B0KWI 55, W0GCI 46, WA0YXK 46, W0PB 4



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| | | DOUBLE | 40 | 2.5 | \$18.50 | \$24.50 |
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| | | DOUBLE | 40 | 2.5 | \$18.50 | \$24.50 |
| 144 to 148 | 2 METER | SINGLE | 20 | 2.5 | \$ 9.50 | \$12.50 |
| | | DOUBLE | 40 | 2.5 | \$18.50 | \$24.50 |
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W0ASY 14, W0GSG 11, W0DOWH 10, W0FDJ 8, W0GVR
W0ERQ 7, W0SEV 5, W0KL 4, W0UCY 2, W0EYS
W0NXD 2. (Nov.) W0KL 5.

MISSOURI - SCM, B. H. Moschenross. W0FMD - Asst. SC
Clifford E. Chamney, K0BIX. New appointments: W0LTD
W0LTE as OPS; Endorsements: W0PFA EC; W0FKY OF
K0AHL OPS; W0UD ORS. New club officers for 1975 - KCAR
W0SON, pres.; W0BITA, vice-pres.; K0TLM, secy.; W0KI, tre
PHD ARA: W0SOK, pres.; W0BIVQ, vice-pres.; W0MPH, sec
W0SHC, treas. St. Charles ARC: W0OZG, pres.; W0CV
vice-pres.; W0BE, secy.-treas.; W0ABI, act. mgr. W0BM
replaces W0PBQ as editor of the HARC newsletter. W0OCW
W0NQH are new Novices in the KC area. W0SHD pass
General; W0HVF and W0OZG passed Advanced; W0FYR pass
Extra. W0NUR is a new General. Congratulations to all. K0H
was PHD amateur of the month. St. Louis ARC DX competit
winners were W0TDR, cw and K0SGI, phone. W0JX won t
ASCRA QSL card award. K0UHI has been named to the Misso
board of Podiatry. K0RWL is back on the cw nets after sh
absence. W0SIV has returned to Springfield and resumed his
duties. W0FOE has added St. Francis Co. to his EC coverage. H
been hearing lively discussions of the proposed license restricti
on low bands and repeaters. Please let the FCC know your view:

| Net | QNT | QTC | Net | QNT | QT |
|-------|------|-----|-------------|-----|----|
| MOSSB | 1312 | 93 | MSN | 62 | 1 |
| MEN | 661 | 98 | PHD | 51 | |
| MON | 240 | 100 | ACE | 3 | |
| MON 2 | 140 | 72 | HBN(Nov.) | 341 | |
| SCEN | 67 | 4 | JCJAN(Nov.) | 34 | |

Traffic: K0ONK 1315, K0BIX 215, W0HSP 183, W0BY 14
W0FMD 101, W0UD 77, W0OTF 75, W0LRX 56, W0NUS 5
W0RTW 35, W0EPI 26, W0BJ 25, W0LMW 24, K0ENH 2
W0POM 21, W0YNC 20, K0RWL 12, W0NPY 13, W0KUI
11, W0LTD 11, W0NNL 10, W0FKD 7, W0VZK 4, W0OZG 2.

NEBRASKA - SCM, Dick Dyas, W0JCP - K0PIH took off
on Jan. 1, '75 as Seward County Clerk. Effective Jan. 4, '75, QCW
net will meet on Sat. on 3980 kHz at 0900. Neb. Chapter has 4
members. Eligible members should contact W0QFB, secy. W0GEO
the 1975 pres. In early Dec. the Lincoln ARC club assisted KLI
for a Salvation Army toy pick up. The freq. committe. W0J
W0IIP and W0BHX have been busy making a master plan for th
state. K0GND is the 1975 pres. of the Lincoln ARC. W0FCR is
pres. of the Hastings ARC.

| Net | Freq. | GMT/Days | QNT | QTC | Mr |
|----------|-------|--------------|------|-----|-------|
| NEB I&II | 3700 | 0100/0345 | 52 | 2 | W0QFB |
| NSN | 3982 | 0030/0130 Dy | 1788 | 67 | W0LCO |
| NMN | 3982 | 1330 Dy | 1259 | 35 | W0GWO |
| WNN | 3950 | 1400 M-S | 537 | 3 | W0NII |
| A REC | 3982 | 1430 Su | 251 | 0 | W0IE |
| CHN | 3980 | 1830 Dy | 1240 | 43 | W0GH |
| SHN Wx | 3950 | 1930 M-S | 265 | 15 | W0I |
| NAN | 3980 | 2100 M-F | 276 | 44 | W0QAU |
| 160 MWX | 1995 | 0130 Dy | 361 | 197 | W0Q |
| Lincoln | 16-76 | 0300 M-F | 300 | 10 | K0GN |
| AREC | | | | | |

W0CBJ 62, W0PGF 51, W0HTA 38, W0SGA 34, W0LOY 3
W0PCC 23, W0OCI 22, W0VEA 20, W0VYX 15, W0HOP 1
W0JCP 18, W0QFB 18, W0CSW 17, W0JWQ 15, K0PTK 1
W0ZOU 14, W0AEG 12, W0LWS 12, W0PL 11, W0YFR 11, W0L
10, W0NIK 10, W0QEX 9, W0GHZ 8, W0BGM 6, W0HQ
W0DMY 5, W0GQK 5, W0ZNI 4, K0SFA 3, W0HAL 2, K0O
2, W0RJA 2, W0EEI 1.

NEW ENGLAND DIVISION

CONNECTICUT - SCM, John McNassor, W1GVT - SE
W1DGL, RM: K1EIR, PAM: K1YGS, VHF PAM: W1OYE.

| Net | Freq. | Time/Days | Sets | QNT | QT |
|-------|-------|-----------|------|-----|----|
| CN | 3640 | 1900 Dy | 61 | 516 | 5 |
| | | 2200 | | | |
| CPN | 3965 | 1800 M-S | 31 | 571 | 3 |
| | | 1000 Su | | | |
| VHF ? | 28/88 | 2130 Dy | 31 | 295 | |
| CSN | 3725 | 1730 Dy | 30 | 280 | 2 |

High QNT: CN - W1QME, W1CT and W1RUR, CPN - W1NO
W1RUR and W1QME. SEC W1DGL appreciates your S
activity and would like continued support from all. Contact him
mail or any Net - he is active with most of them! Director W1H
wants contact from all Clubs - please send your meeting sked
include him on mailing list for Club Bulletins, Affiliated Cl



All Robot Model 70A Monitors Now at **SPRING CLEARANCE SALE PRICES!**

Not to be outdone by the auto companies, Robot is reducing the price of our Model 70A Monitor to only \$295, while supply lasts.

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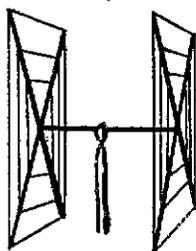
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Thousands sold over the past 25 years. Same design and materials as our contest winner. Unsolicited testimonial: "The Irving ARC has placed No. 1 in the state of Texas for the last three years . . . Most of our points were earned . . . using a Gotham 4 element 20 meter beam."

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; 5/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

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This is the Gotham beam that won the New England contest championship by a margin of 5,982 points, as reported in QST! A marvel of engineering, yet full size in every way and absolutely complete, yet priced far, far below any competitive makes, if indeed any are advertised! Scores of great testimonials are on file, telling of tremendous DX performance!

V80 All band Vertical 24.95

Effective low-angle, omnidirectional radiation, easy assembly and operation, no guy wires needed, occupies little space, can be installed at ground level, exceptionally rugged, broad-banded, low initial cost, no maintenance, proven and tested design. Guaranteed Gotham quality at low Gotham prices.

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All antennas absolutely complete in every respect, fully machined, and with all hardware. Remit with order, shipped collect. Send stamped envelope for literature on our entire line of quads, beams, and verticals, as well as beam and quad gain formulas.

In QST since '53.

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Bulletin has complete info on proposed FCC Rules - comments are in order. OOs should keep latest OO Bulletin on file. CSN Bulletin via WAISHO is excellent and recommended to all - available for SASF and Net Support! Murphy's Marauders should be a MUST for all Contest Operators. With deep regret we add the call of WIKHM to the list of Silent Keys. Congratulations to KILIF and WIPRT for QSO on WTIC; WIEFW retired Bank Pres.; WAISSH for High Conn in Md/DC QSO Party; WNIUHN new Novice; New ECs: WAIRLC for Bristol and WAIOME for Meriden; High QNI CN and CPN WAIOME and WAIRUR; Dec. BPL to WNIUAX and WAISHO and BPL 500 plus to WAIOME and WAIRYL! Clubs thrive during the winter season - thanks for your Club Bulletins - be sure your club and area is represented on all traffic nets and active in all ARRL activities. To my friends on the Green Keys - and all others: Happy Saint Patrick's Day! Traffic: WAIOME 570, WAIRYL 527, WAISHO 384, WIEFW 321, WAIFCM 300, WAISTN 246, WAIGHF 212, WAIRUR 188, WNIUAX 175, WAITGE 145, WICTI 98, WIAW 86, WIDGL 86, WKUW 77, KIYGS 75, WAJCN 69, WAIKN 60, WAITNR 52, WAIQYE 44, KISRf 42, WIGV 38, WAIRXA 38, WAIPJH 36, WIDHT 18, WIOV 18, WAIQOQ 14, WAIRJA 11, WAIOPB 6, WIBDI 5, WAIPJP 8, WAIMBK 2.

EASTERN MASSACHUSETTS - SCM, Frank Baker, WIALP - SEC WIAOG received reports from ECs W1s BAB, UJF; K1s NFW ZUP, CCW; WA1s DXL, PGY. WIAOG is in Fla. WIACI, WA1NR are Silent Keys. W1NF and W1BVL are experimenting on 175 kHz. WIALP and W1BVL had their 50th Anniversary of first USO Dec 19, 1924. W1NJL went to Fiji Islands on business. WB9DSQ is ex-WITKG, W8LLS ex-K1ISH. WISZ has new call W4AAW. WAITFF has General, K1AFFY/VEI on 75. W1YTB has an HW-101. W1UX is mgr. of Clearing House Net. W1HY got married. WIAQW on the MDC QSO Party, WA1PLK back to Lowell Tech. for another semester. South Shore Club had Christmas Party. W1NE received a calculator. W1LE says the new name of net now S.E. Mass. Emerg. Net and will include Westport on 2 & 6 and use Dartmouth repeater WR1ADR. Wellesley ARS, WITKZ solicited traffic at the Natick Mall Traffic Fair, WA1POY new OPS-OBS. W1FH in Fla. WAIRGA on 6. Bellingham repeater WR1ACB has emergency power for AREC group. W1EQH has homebrew colinear antenna for 2. W1NFKD has Drake TR-4. WAITCP has Advanced Class. WAIOMU has Wilson handi-talkie and eleven-element beam for 2, 60-ft. up. W1HH has GLB synthesizer. W1JAA gave talk on FMF communications at the Chelmsford ARA. W1GXT on the ARRL VHF Repeater Advisory Comm. K1TH lost his TR-22 due to theft in Everett. WB2CPV/1 new ORS. K1ZRZ in Hanson. K1GFR retiring from the MCDA. K1EPL in the hospital, has Paemacard. New officers of Dorchester ARC: K1YTC, pres. WNIJWQ, vice-pres.; W1NITCM, secy.-treas.; WA1PLN, net mgr. WA1TCS, editor; WA1TEH, charge of FD. Quannapowitt RA had Christmas gathering, W1OKB is a new Dir. Massachusetts ARA had their MARA nite. Tex. Tower Net on 3938 daily at 12:30 PM had their 6000 continuous session. W1JAA's 10 year old son has his license WNIUHA, on R0 & 15. W1JAA spending time on Oscar 7 Middlesex ARC had Holiday Party and talk by WA1JWQ. K1PNB teaching at Ft. Devens.

| Net | Freq. | Time/Days | QNI | QTC | Mgr. |
|-------------|-------|--------------|-----|-----|--------|
| NENN (Dec.) | 3720 | 1830 MWF | 152 | 64 | K1PNI |
| EM2MN | 145.8 | 2000 M-F | 72 | 35 | K1LFI |
| NENN (Nov.) | 3720 | 1830 MWF | 105 | 63 | K1PNI |
| EMRT | 3660 | 1900/2200 Dy | 531 | 549 | WA1MSR |
| EMRIPN | 3898 | 1730 Dy | 187 | 220 | WA1QJ |
| HHTN | 04-64 | 0330Z Dy | 156 | 82 | WA1MYA |

WB2CPV/1 new ORS. WAIMXV endorsed as OPS/ORS. Wellesley nets: WAR 24 QNI, 11 QTC; WARRN 20 QNI, 6 QTC. WNIKZN in the CSN. WA1TLX has HW-7. WAIOSZ at Lowell Tech. WA1MH has SB-401 & SB-301. WAISA a TR-4C & KV4C. WA1QFV 4 SB-102. WA9TXN in Framingham. W1EMG in Honolulu. Quite a few were on SKN. WA1GLL planning for FD. WA1GPO moved to Falmouth and on 2-40 & 80. Tex. Instruments ARC in Attleboro has repeater WR1AEW. WAIQOE a new jr. op. WAITAM has General. Traffic: (Dec.) WAIQKD 549, WAIMSK 515, WAIPOY 267, WAIMHJ 238, W1EC 199, W1EH 192, WAIRGA 186, WIMX 177, W1OJM 167, W1DMH 123, W1EMG 123, W1DMS 104, W1IIGL 104, WAIMXV 90, WAIQWO 67, WAIQY 62, WAIMYK 48, W1PEX 46, WAIAM 38, W1UX 37, W1AOL 35, WAIPAZ 34, WAIIE 23, W1EQH 8, WAIITP 6, K1LCO 5, W1ATX 4, K1TFX 3, K1UIW 2. (Nov.) K1PNB 109, WAIMXV 90, WB2CPV/1 54.

NEW HAMPSHIRE - SCM, Robert C. Mitchell, W1SWX - SEC. K1RSC. RM: WA1GCE. PAM: K1YSD. Endorsements: W1AJJ OPS.

CW FILTER

The IMPROVED CWF-2BX offers RAZOR SHARP SELECTIVITY with its 80 Hz bandwidth and extremely steep sided skirts. Even the weakest signal stands out.

Plugs into any receiver or transceiver. Drives phones or connect between receiver audio stage for full speaker operation.

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- No insertion loss
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 CWF-2, kit \$14.95

SSB FILTER

The SBF-2BX is a new and different kind of single sideband filter.

Unintelligible signals become readable as you slide the selectivity switch to optimize the audio bandwidth.

IC active filter includes high-pass filter plus selectable cutoff active lowpass filter. Select 2.5, 2.0, 1.5 KHz cutoff.

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- Built-in key with adjustable contact travel
- Sidetone and speaker
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OURS
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Dealer Inquiries Invited

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CMOS-440RS, Deluxe, includes sidetone, relay output \$37.95
 CMOS-440, less sidetone, transistor output \$25.95

(perfect for QRP operation where sidetone is built into rig)

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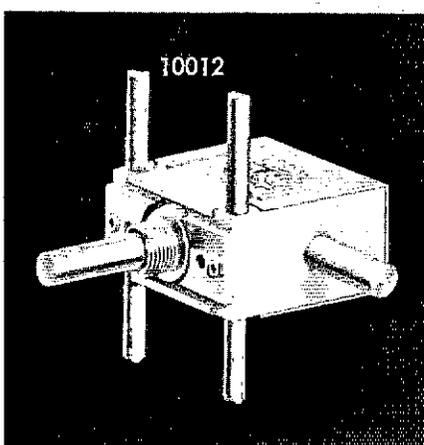
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ORS; W1EUI OVS. Congrats to more new hams, WNIUG, WNIUFW, WNIUHE and WAIUHS. The NHVTN reports shows 78 traffic, 121 check-ins. K1POV's (GRP rig with 2 HEP 24) doing wonders on 80 meters. W1BYS pens he is active in the 1 amp Fla. repeater. W1JSM using both Oscar 6 and 7. WAIPEL no active on SSTV. W1LUD vacationing in Fla. W1EUI wrote computer program to predict Oscar 7 Satellite passes. W6MZW DXing on 160 meters. K1POV needs Alaska for WAS. Thanks to for the nice get well cards. WAI0UB busy working thru the 2-met satellites. Need more reports of your activities. Happy Easter Traffic: (Dec.) K1POV 94, K1LMS 49, WAIPEL 10, W1BYS (Nov.) WAI0CE 64, K1POV 40, W1MHX 6.

RHODE ISLAND - SCM, John E. Johnson, K1AAV - SEC, W1YNE, RM: WAIPOJ, PAM: WAIREF. New appointment WAIPOJ as OBS, W1OP as ORS and W1AM as OO. WAIREF working on a new keyer and a CW rig. He has been working D including 1Y7AA and Y13TPM on his new beam. WAIPOJ has new Drake T4XC R4C for his hamshack. The W1OP Club Providence elected the following officers for the year: WAIPIJ pres.; WAIPOJ, vice-pres.; WAI0OG, secy.; W1KKE, treas. Directors elected were K1HZN, W1EYH and WAI7WF. The W1OP Club of East Providence elected W1FNH, pres.; WAI1UR, vice-pres.; K1AGA, secy.; W1DK, treas. WNIUEJ is a new RI Novice. Traffic: WAIPOJ 546, WAIREF 11.

VERMONT - SCM, James H. Viele, W1BRG - SEC: W1VSA

| Net | Freq. | Time (Z)/Days | QNI | QTC | Mgr. |
|-----------|-------|--------------------|-----|-----|-------|
| VFSB | 3909 | 2300 M-S 1230 S | 678 | 172 | WAI5P |
| Carrier | 3935 | 1400 M-S | 515 | 5 | W2DS |
| Green Mt. | 3932 | 2230 M-S | 479 | 41 | W1L |
| Vt. Phone | 3932 | 1330 Su | 125 | 8 | W1KK |

Welcome new amateurs WNIUGG and WNIUGZ. Tony Gellinas moved back to Burlington from Fla. and is W1HHE. NH-VT CW Net publishing fine news letter at least quarterly. Net mgr. and publisher is WAI0CF in Hollis, NH. Net meets at 2330(Z) on 3685. Vermont Nets Get-Together has been set for June 22 at the Eureka Barn Springfield, Connecticut Valley FM Assn. held annual meeting Jan 18 at K1NIW OTH in White River Jct. K7RAC from Phoenix, Ariz. recently vacationed in Vt., met many local hams and attended HARC Christmas party. Traffic: WAI7XI 37, WILMO 21.

WESTERN MASSACHUSETTS - SCM, Percy C. Noble, W1BV - SEC: WAI0NB, CW RM: W1DVV, 75 Mtr. PAM: WAI0MJ, UHF/VHF PAM: W1KZS, WMFN held 5 sessions with WAI0NB, NCS 4 sessions, QNI 102, traffic 5. WMAREC (ML Lincoln) held 3 sessions with QNI 158, traffic 4. NCS were WAIPLS/1, WAI0NI, WITZZ, WAI0NB (CD officer) received a certificate from the State CD officer for excellent work. Congrats, Bob. WMN held 31 session with QNT 191, traffic 142. Top 5 in attendance: W1BVR, W1ZPI, W1DVV, WITM, WAI0UZ. The amazing 4:30 afternoon WMP held 22 sessions with QNI 317, traffic 72 (with a total of 9 different stations). Berkshire Co. EC net held 4 Sun. sessions with average attendance of 8 thru repeater W1AEY. GO K1ROE set out 14 notices during the month, and now has new Drake C4 static console, Drake Transmatch, and new Hy-Gain. W1BZ a new TA-3 beam. WAI0NB a new GTX-200 feeding into a beam atop the 1st floor while at MIT. VHF: WAI0LK submits a fine report of h activity. UMARA reports K1VHO was speaker of the month. W1IF gets all the ARRL bulletins on teletype. HCRA reports speaker were W1KK and Ted Scott. Regrettably, W1DFE now a Silent Key. MARC says club membership now over 60, and is putting out a tri-bulletin. ML Lincoln says speaker was W1EBW. Members furnished communications for Road Rally in Greenfield. NOBARC report ML Greylock now W1AEY and Spruce Hill W1AEH. Traffic: WAI0JE 187, WITM 118, W1DVV 98, W1BVR 77, W1ZPB 5, W1KK 52, WAI0UZ 25, WAI0NF 20, WAI0NB 14, W1KZS - WAI0XP 2, WAI0LK 2.

NORTHWESTERN DIVISION

ALASKA - SCM, Roy Davie, K17CUK - K17JDO reports the state well covered with ECs and the AREC program is growing. List of ECs are K17AS, K4WLS/KL7, K17HCN, K17EK, K17FPK, K17HMN, K17HNO and K17IBG. Please contact the EC in your locality and register as an AREC member. K17IAS reports running schedule with KH6IAC to handle traffic from Hawaii and the CONUS. She also meets the Alaska-Pacific traffic net on 1429 at 1830 UTC. PAM K17HOV reports 31 sessions, 488 check-ins to ASN (Alaskan Snipers Net) 3920 kHz 7 days a week, at 1400 UTC. K17HDX turning in good traffic counts. K17GCH still working on his new house between snow storms. It is reported Oscar 7



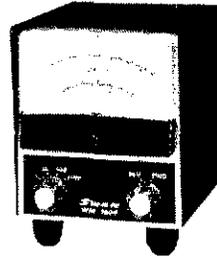
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| 117-X 110V AC Power Supply | \$ 79.95 |
| 510-X Crystal Oscillator | \$ 54.95 |
| 508 External VFO | \$189.95 |
| VX-2 Plug-in VOX | \$ 44.95 |
| FP-1 Telephone Patch | \$ 54.95 |
| Mark II Linear Amplifier | \$749.95 |



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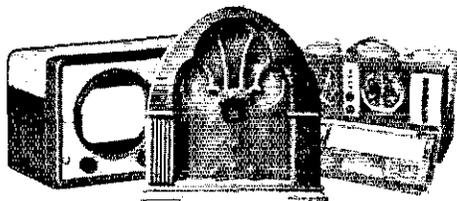
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provided very good QSOs for the Alaskan stations equipped to working the machine. Three repeaters on the air in Anchorage on 16/76, 22/82 and 34/94. The 34/94 machine has just been relocated with antennas several hundred feet high. KL7HMH and KL7HMD keep the vhf spectrum busy in Kenai. They are studying the new license proposal very closely in the Moose Horn Club. Please remember to submit your comments to ARRL or to FCC on this very important issue. FCC requires 14 copies if you submit to them. Traffic: KL7GCH 29, KL7HDX 18, KL7JDO 18, KL7CUK 6

IDAHO - SCM, Dale A. Brock, WA7EUV - SEC: W7JMH
PAM: WA7HOS. VHF PAM: WA7FSL

| Net | Freq. | Time | Sess. | QNT | QTC | Mgr. |
|-----------|-------|----------|-------|------|-----|-------|
| FAARM | 3.935 | 0200 Dy | 18 | 1112 | 48 | WA7RQ |
| IMN | 3.582 | 0130 M-F | 22 | 140 | 72 | W7GHI |
| RACES | 3.990 | 1515 M-F | 22 | 588 | 38 | K7URC |
| Id.Silver | 3.930 | 0115 MWF | | | | W7YI |

Our condolences to W7GGV in the loss of OM K7CXP, a Silent Key WA7CTS a new OBS on the RACES net. WA7CTS building a new linear with 813s. W7FHQ/6 and WA7JFC/6 keeping us posted from Desert Hot Springs. WA7ROT now on 2 meters with an SB 144. There is still time to make your feelings known to the FCC on their proposed restructuring of amateur licenses. Traffic: W7GHT 472, K7LTV 151, WA7CTS 55, WA7EUV 24, W7UJO 1.

MONTANA - SCM, Harry A. Roylance, W7RZY - SEC
WA7IZR. PAM: WA7PZO. Montana Traffic Net had 21 sessions, 77 pieces of traffic and 896 check-ins. The IMN had 22 sessions, 140 check-ins and 72 pieces of traffic. The new call for Mt. Belmon repeater is WR7AFF. New officers of the Butte Amateur Radio Club are WA7FBJ, pres.; K7TIM, vice-pres.; W7ROE, secy. WN7YTQ, treas. WA7IQS is in Mesa, Ariz. but no antennas allowed in apartment. WA7RKK was recipient of the Yellowstone Radio Club, "Ham of the Year" award. WA7PHY has a new F-101B. W7DEO spent a few days in Salt Lake for the government. WA7IZR is busy with the Park County government planning committee. Christmas upped the traffic count. Traffic: WA7IZR 66, K4ROT/7 46, W7NEG 45, WA7KMP 42, WA7PZO 16, K7BMT 8, W7TGU 6, WA7OBH 4, WA7PHY 3, WA7VTD 2.

OREGON - SCM, Leonard R. Perkins, WA7KIU - Asst. SCM
Daniel O'Connell, WA7TDZ. SEC: W7HLF. PAM: K7RQZ. RM
K7OUF.

| Net | Freq. | Time(Z) | QNT | QTC | Sess. | Mgr. |
|----------|--------|---------|-----|-----|-------|--------|
| OSN | 3585 | 0245 | 137 | 215 | 31 | K7OUI |
| BSN | 3968 | 0130 | 634 | 114 | 41 | WA7SSC |
| AREC' | 3993 | 0300 | 246 | 7 | 31 | WA7RWN |
| Pdx AREC | 146.64 | 0330 | 220 | 4 | 72 | |
| Nuclear | 50.250 | | 31 | | 31 | W7FEI |

Meet Dan, WA7TDZ. Dan has been appointed Asst. SCM for Oregon. He is most active on the air in contest and DX work. Also active in the Eugene area trying to get hamdom pulled together and pulling together. Let's hear from all activities not just traffic. K7OUF spent the month of Dec. in bed letting his "saddle sores" heal. Portland Area AREC is working simplex on 146.64 and thru WR7AEY on 146.06 in 146.64 out. WA7RQS reports growing activity on 2.1 stations meeting a schedule for call-up and liaison to AREC net on 80. Many remarks about proposed restructuring. Most effective way to be heard is through the League and comments filed with FCC. WA7s VUN, ZBJ, VLM, YUP are holding slow speed cw practice each evening except Sat. at 0300-0400Z on 21.110 MHz. Lane Amateur Wireless Assn. is the name of an informal group in Eugene that has been very successful so far in getting one 12 minute spot on KVAL-TV and will have a one hour program aired also. W7DAN 214 (Dec.) K7IWD 394, K7QFG 305, W7ZB 222, W7JAN 314, WA7YEU 153, WA7QDC 64, WA7SSO 61, W7IWN 58, WA7UJ 35, WA7K (U) 26, K7YLV 21 (Nov.) K7QFG 155.

WASHINGTON - SCM, Mary E. Lewis, W7QGP - SEC: W7IUF
RM: K7OZA. PAM: K7YRQ. VHF PAMS: K7RBO, K7LRD.

| Nets | Freq. | Time | QNT | QNT | Sess. | Mgr. |
|-------|-------|-------|------|-----|-------|-------|
| NFN | 3970 | 11:30 | 1686 | 155 | 30 | W7PWP |
| NWSSR | 3945 | 18:30 | 549 | 38 | 31 | W7FIR |
| NSN | 3700 | 0300Z | 273 | 121 | 31 | WA7ND |
| WSN | 3590 | 18:45 | 274 | 98 | 31 | K7OZA |
| WARTS | 3970 | 17:30 | 2183 | 187 | 31 | W7QGP |

W7LGI is new net mgr. for WSN. New appointments: K7OZA RM, K7YRQ PAM; W7PWP W. asst. SEC and K7VAS F. asst. SEC. New ECs WA7KGT for Kitsap; K7IEY Garfield; W7HHU Island Cities and WA7FKM has Mason city added to Thurston city. Skagway Hamfest Apr. 19 at Bryant Grange Hall, contact me info and ticket

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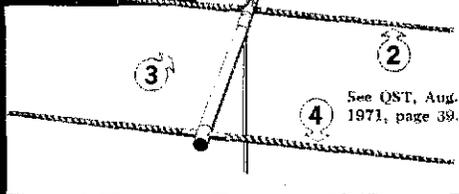
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Apr. 12 is sked. operational shore patrol Wash. ocean shoreline from Columbia River north to Bellingham. Organized by the department of Ecology and the State of Wash. Radio communication will be by amateur radio ops. Radio coordinator will be Wa. SEC W7UEU please contact him for sked and time. OO K7GGD sent along a nice letter received from an OO notice he had sent; as you can see some OO notices pay off. Thanks Rick. Regret K7LBI and K7RNE. an Silent Keys. Heavy wet snow of Dec. 26 broke power lines taking out police and fire call boxes and Amateur Walkie Talkies were called into service for communication from Tacoma to Marysville we switched from repeater as they lost power to 146.76 simplex and stayed in operation until early morning. Traffic: WA7VY 312 WA7BDD 158, W7APS 152, WB7ZNV 341, WA7OKV 126, W7BC 100, K7AIA 65, K7OZA 65, W7SYS 64, W7BUN 54, W7PWP 46 K7VNI 41, K7CTP 40, WA7FDQ 22, W7AIB 16, W7UEU 15 WA7RCR 15, W7HHU 12, W7LG 6, WA7GVB 4, W7AXT 3.

PACIFIC DIVISION

EAST BAY - SCM. Charles R. Breeding, K6IWR - Asst. SCM Ronald Martin, W6ZF. SEC: WB6RPK. Asst. SEC: WB6DSI. WID 300 present the Mt. Diablo ARC had its best Christmas party ever The Silverado AR Society is holding code and theory classes in Napa and Calistoga with excellent attendance. WB6AMB currently active on 2-meter am and fm. WB6BNP going QRP on the low bands while keeping up his activity on 2. W6DNY sold all his old gear and going transceiver. W6HUY has a new 2-meter rig. WB6MRB doing a good job of keeping Napa active on 432. WB6RJW moved to the Eas Coast and is friends would like to know his new call. WA6WAJ going to a new Heath Solid State Transceiver. WA6TRH has a mobil trailer and traveling around the country. WA6OGS and WA6OGK now living in Anbrun, visited the SARS at their last Sun. breakfast W6NOP moved to Oroville, but does well getting into the Napa Valley repeater. WA6SMK keeping Napa active on Navy MARS K6MIS and K6OKO of Vallejo and W6ZL and LaVene Cooper o Napa are on a committee to bring the activities of the NBARA and SARS closer together. W6ZF likes his Christmas present this year, a KWM2A. WA6YCF has a new 2K-4 and putting out an FB signal W6IPW made BPL this month and has a new call, K6IHW Congratulations. W6RFX a new OO for the section. By now mos have looked over the FCC proposal for changes in Amateur Radio Your Dir. needs your help as never before. Take time and write down your feelings and suggestions and send them to, Doc Gemline W6ZRL, 110835 Willowbrook Way, Cupertino, 95014. Traffic W6IPW 574, WA6IPI 149, WA6VEL 7.

HAWAII - SCM. J. P. Corrigan, KH6GQW - SEC: KH6IKB Larry Van Horn passed along news that KH6SP is back with new studios and gear in shape. Hon. DX Club prexy KH6IGJ at N. Ca DXC meeting in Jan. KH6HRG added new amp to other added gear SEC KH6IKB hosted FB work session to plan SET. Who says no traffic in/out of KH6? Check Woody's traffic total below. Also, the fellow Woody was helping to get a ticket is now WH6IMT. KH6IGJ crunched when his FX failed to op for the 160-meter test. KH6IKB continues to get record numbers of AREC members. Got a long newsy letter from KH6BWT who has a new two-element 40-meter beam and finds himself popular on cw in the wee hours. Wally Yaezu gear doing well while other sits idel. He is concerned about FCC restructuring as we all are. We must all write to FCC on this one. Manoa repeater (.16-.76) needs use or it will be deactivated Kauai group finally got their license. Your SCM scored a victory on a sore point. Henceforth all members at APO/FPO's in Pac. will automatically be members of this section instead of S.F. Plans still on SAROC-Hawaii Conv. in Waikiki June 5,6,7. Looking for good year for HARC with KH6BTU at the helm. W6NJU now our rep on DXAC. Traffic: (Dec.) KH6IAC 559, KG6IAQ 121, KH6IG 66, KH6IKB 28, KH6HRG 2, (Nov.) KH6IKB 140, KH6IGJ 39.

NEVADA - SCM. Harold P. Leary, K7ZOK - W7VH is erecting a new tower. W7FJN won a goodie at SAROC. W7JRW going up for Extra exam. He won't plug mike in until he takes exam. On Jan. when Nev. State communications went out the RACES net was activated with participation by W7JRW, W7VX, WA7KNL, W7IDV, W7OK and others. W7HOT purchased AC PS for his Clegg fm rig W7WZL going for General. K7OHX has new home and putting up new antennas. Bob is very active on CW nets. WA7URO has Advanced Class license. WB0GTD now WB7AOB in Las Vegas WA7VEZ has moved into a new home. W7WZL going for General. During SAROC the WR7AEH repeater had unwanted, unsolicited and illegal transmissions pass thru it; so much that it was necessary to shut it off. These operators ?? are not desired in the Las Vegas area. Get LV club Bulletin from distributors in area. Traffic: W7IL 156, WA7UEK 48.

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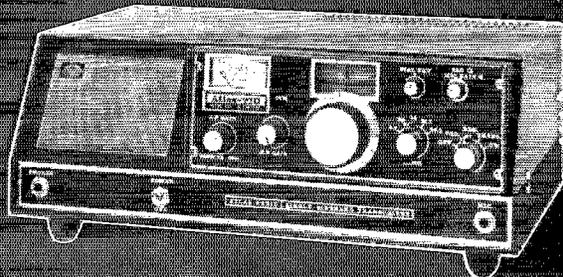
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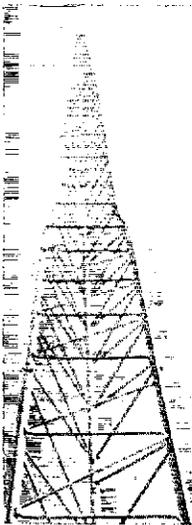
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SACRAMENTO VALLEY - SCM, Norman Wilson, WA6JVD SEC: W6SMU. Congratulations to K6RPN on making BPL. This only the second issued in SV in 10 years! WN6DCF reports much demand for her QSOs in the 10-meter contest. Sorry to lose K6QC who has transferred to Ukiah, WN6HBI now has a Drake 2B as WA6WOX and WA0ZUK/6 are holding 220 MHz transceiver. WB6MDP/6 reports losing all his beams in the last wind storm. K6OM now has over 100 countries on 80/75 meters. WB6QWH equipped with auxiliary battery power for his 2-meter rig. WA6JV was very honored to receive the Northern Calif. Contest Club Contest of the Year award. W1AAR/6 now assists WA6HAL Davis in multi-op contest work. W6ZGM is very active on 16 meters with 6146Bs and a top loaded 50-foot vertical. K9ING and K4KWQ/W9HAS are new in SV compliments of the USAF. Please remember that the SCM must receive all reports before the 7th of the month to include them in the column for the preceeding month. Traffic: (Dec.) K6RPN 347, W6PU 113, WA6OWH 4, WB6MDP/6 (Nov.) W6PU 64.

SAN JOAQUIN VALLEY - SCM, Ralph Saroyan, W6JPU The Fresno Amateur RC held their annual Christmas party on Dec. 18, 1974 with 120 in attendance. WB6VRJ received the Best Award for 1974. K6RI was guest speaker at the party. Those receiving awards are W6WME, K6CZO, K6FRQ, W6YEP, WA6BU W6OSH, W6PKP, W6WYT. WB6CFI is on 20 ssb. WA6NFK has Swan 260. W6HLC operating on 75 ssb. K6OZL has 100 confirmation on 40. He is also working DX on 75 meters with 4X4JN as best DX. W6YKM, W6YKS, WA6CPP operated in the Ten Meter Contest. K6PBT building up a repeater on 13/73. W6HYZ getting back in the air with an 18 AVQ and KWM2. W6YO is on 20 ssb. New officers of the Kern County RC are WA6ABH, pres.; WA6TV vice-pres.; WA6ONI, secy.; WN6VZY, treas.; WA6RXI, dir. Current membership of the Kern RC is 40 members. W6HLC is on 75 ssb. Among those attending the SAROC convention were WB6GT, WA6GIT, W6IRV, W6OWL, WB6OSH, W6JPU, W6QKP, WA6MD W6WXM and others. WA6SZS is on 2-meter fm. WR6AGI is 16/76 in Stockton. The Central Valley VHF FM club hold a General Traffic Net at 1930 every Mon. night on WR6ACV. K6ZMW is 1296. W6DPD has an HRTZ. Traffic: WA6RXI 119, WA6CPP 1.

SANTA CLARA VALLEY - SCM, Jim Maxwell, K6AQ/W6CU - SEC: WA6RXB. RMS: W6REF, W6BVB, BPLs: W6RSY, W6YE and W6RFF, with 19 percent of RSYs total due to KH6 traf alone! PSHR: W6RFF, WB6TYA, WA6SCY and WB6VBG. W6K enjoying ragchewing rather than traffic due to recent eye surgery. speedy recovery is expected and hoped for by all friends on nets. Weekly meetings are planned for a new Novice class in San Cruz. Contact K6QJZ for more info. W6QNB continues to outpace the excellent NCN Bulletin, available to net members gratis, others for an SASE. The Electronic Museum gang, EMARC, has been stirring up 2-meter activity with their weekly net on 145 MHz AM, at 1945 local Tue. Regular meetings are held the 3rd Mon. monthly at Foothill College, Los Altos. Pres. K6ODX has all details. WA6SCY is now among the ranks of Advanced Class ticket holder. Skier W6NLG has traded his mike for the slopes, and urges all THINK SNOW! New officers for the Saratoga Radio Club: WA6UOM, pres.; WN6EMR, vice-pres.; WA6SCY, secy.-tre. W6MMG is the proud owner of a new, bouncing baby Drake R4. The PAARA net (Palo Alto) still holds forth at 2015 local ea. Mon. on 145.24 MHz am. W6AUC has been QRV with Christmas patches to KH6 and KL7. Want info on League Communication Dept. activities? Your SCM (yours truly) will be happy to talk mail info to you. Call 408-353-2094 or write to QTH listed on p. this issue QST. The Ncal Microwave Soc. invites kindred spirits drop by at their monthly meetings on the 2nd Fri. of each month at the Stanford Accelerator. K6LVI is the asst. RO for the San Mateo City operational area of RACES. He, together with WA6ABQ, keeps K6QFO active from City Comm Hq. on the regular Mon. eve drive. W6TFJ continues to be RO for RACES in San Mateo City. NCN (Nov.) QNI 689, QTC 407, 60 sessions. (Dec.) QNI 719, QTC 81, 62 sessions. Traffic: W6RSY 1716, W6YBV 857, W6RFF 26, WB6TYA 166, W6BVB 161, WA6SCY 81, WB6VBG 79, W6QJZ 73, W6ZRJ 60, W6AUC 53, W6KZJ 51, W6DEL 48, W6OIL 2, W6NLG 20, W6NW 19, WB6MXI 12, K6WT 11, WA6NDN W6ISQ 4, K6AQ 2, WB6PWT 2.

ROANOKE DIVISION

NORTH CAROLINA - SCM, Chuck Brydges, W4WXZ - SEC: K4FBG. PAM: WB4JMG. VHF PAM: K4GHR. RM: WB4ETF. new feature after our "leadership heading" will be Emergency Coordinator (EC) of The Month. This way the ECs will be known

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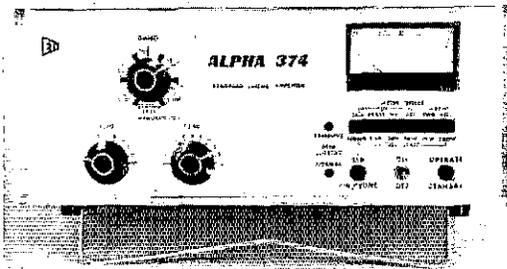
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their area of jurisdiction. Leading off is K4AI, an EC for a lot of time, covering Avery, Burke, Caldwell and Watauga counties. Give him your valuable support. Congrats to K4MC and WB4MXG - BPL. Thanks to all who relayed traffic at holiday time, the totals are outstanding. Two shopping-center operations scared up traffic with "advertising" our hobby, one by the Onslow ARC/Jacksonville and one by the Cary ARC combined with the Raleigh ARS. Thanks to all. WB4QWC has new 14XC/R4C combo. K4FTB reports two haunts in family, KH6IAZ and WN9PYG. W4EHI finds DX easy with 50-ft. tower and three-element beam. WA4BIB works weekends as D-J. W4REZ running patches and was active in 10- and 160-meter contests. Charlotte Hamfest is in Mar. don't forget. At the 3938 "Ham-in" in Mar. Since Docket No. 20282 is stirring up much fuss should we have a state-wide effort on letters to FCC? Let me have your inputs and ideas as to making copies of letters, et al but above all send in the mail. Traffic: (Dec.) K4MC 401, K4FT 238, K4EZH 222, WB4BGL 166, W4OFO 161, WB4MXG 15, WB4KHZ 131, W44EFZ 123, W4WXXZ 112, W4RWL 104, WB4FF 52, W4FMN 44, WA4KSO 40, WB4OXT 31, W4EHI 12, K4VH 12, WB4IMG 10, W44KWC 10, K4VHO 10, W4TYE 9, WA4CBB 7, W4ACY 7, WB4CES 6, WB4TNB 5, W4REZ 3, K4ZKO 2. (Nov.) W4RWL 73, W44EFZ 56, K4FBG 12, WA4KSO 12, W4REZ (Sept.) W4RWL 18.

SOUTH CAROLINA - SCM, Richard H. Müller, WA4ECJ. Asst. SCM: Charles N. Wright, W4PED. RM: K4LND. PAM: K4GQG. This month we're short some mislaid items due to heavy work load and extensive preparations for Jan. SET. Maybe we catch up by next month. Delighted to welcome WA4LOU to the ranks of SC ORS. As W1CHR he was SCM/Conn. in the early 60s a real old-timer in the ORS game, now active in CN. The OE appointed for OPERATION BROADSIDE are continuing to carry on nobly, even though that program hasn't really gotten under way yet. This section is in an uproar over the FCC restructuring. Let's study these proposals very carefully before making up our minds on details. Several of the Greenville and Spartanburg boys recently upgraded their licenses at the new Columbia exam point. Traffic (Dec.) WA4KC 70, K4NJS 16, K4FRX 8, WA4CHR 5, WA4UZA - WA4EGH 2. (Nov.) K4LND 188, K4NJS 18, K4FRX 17, WA4UZA - K4PJW 2.

VIRGINIA - SCM, Robert J. Slagle, K4GR - Asst. SCM: A.J. Martin, Jr., W4THV. SEC: WA4YIU. Asst. SEC: WA4PBG. PAM: WA9NEW/4. RMs: W4SHJ, K4IAF, WB2VYK/4, WA4AVI, WA4DHY. I received the following from the parents of Silent Key WB4HKN: "Our sincere appreciation for your truly beautiful and expressive letter. It meant so very much to us. Steve loved his radio and his ham friends so much. So for Steve let us say his final 7 from WB4KHN" It's a better place because of you, Steve. Regret to announce the resignation of WB4BZX as PAM. Nets QNL/OT/VFN 932/39. (Nov.) 869/47; VSN 336/168; VN 453/333. (Nov.) CVSN 178/24; VNTN 112/24. VMI (W4COP) operated as K14VM in Nov. commemorating 135th birthday of VML. Welcome back W6MQF/4. Counties WA4WQG 3073, W4JUJ 2992, WB4UK 1366. Jan. QST should have shown WB4KCL vice WB2LAI/4. Out of band reports; got an excellent yearly VHP summary from WB2LAI/4. Springfield-Annandale ARC: W4ZDN, pres.; WB4ZU vice-pres.; W4ZM, secy.; WN4IUG, treas. WB4SJK now WB0NZX. St. Paul. K4IKP has TR-22. K4KDJ has new S-Line. W4ZZ secretarizing everything. Kudo on WA4BIX from SCM of Miss. bailing out MSBN during long skip. Vacation hurt WB4ZKG. W4K showing signs of life. W4YZC sweating KL7 QSL for SBWA. WB4FDT to William and Mary. WB4DRB QRPing on 80. WA4CL rewireing station. K4MLD's antenna falls down. W4KFC keeps sked with son in Costa Rica. K4EZL received 40-wpm certification. W4DM is stirring. W4TZC 2FMed through South. Nov. FMT should show W4HU with 5.6 ppm vice W4AU! Santa in Heathkit green K9PIV/4. K4MLC Christmas in Ariz. WB4DRC on 2 FM. WA4GF has ant. probs. K4VVK on 2 FM with probs. W4QDY passed Extn BPL to WB4FDL. Traffic: WA4AVN 393, K4KNP 393, W4UQ 39, WB4FDT 326, K4IAF 260, WB4ZKG 200, W4QDY 198, K4J 151, K4GR 128, K4KDJ 126, W4YZC 105, WA9NEW/4 10, W4SUS 90, K4MLC 87, WB4KIT 82, K9PIV/4 81, WA45MR 7, WA2ICU/4 65, WA4PBG 56, WB4DZL 55, WB4FLT/4 53, K4K 52, WB4QFB 43, WB2VYK/4 42, WB4RZW 31, WA4HUB 2, WA4YIU 18, W4KIF 17, K4VIG 15, K4VVK 15, WB4SCP 1, WA4DHY 11, WB4GTH 9, W4MK 9, WA4CLK 8, WA4QEL, WB4DRB 7, W4KX 7, W4TZC 6, K4EZL 5, W4TMN 5, WA4WQ 4, W2TPV/4 2, WB4GMC 2, WB4RDV 2, W4ZM 1.

WEST VIRGINIA - SCM, Donald B. Morris, W8JM - SEC: WA8NDY. RMs: W8HZA, W8JWX. PAMs: W8DUW, W8IYD. Phon Net Mgr.: W8BDOX. CW Net Mgr.: W8HZA. I am resigning as you

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SCM, due to being elected Vice Director of the Roanoke Division ARRL. Communication Mgr. George Hart has appointed K Anderson, WRDUV as your interim SCM. Your activity reports no go to WRDUV, address on page 6. Your support has been appreciated and I hope to keep in touch by meetings & correspondence. WVN CW Net in 31 sessions with 244 static passed 141 messages. WVN Phone Net in 31 sessions with 10 stations handled 369 messages. WVN Novice Net now meets at 5 P on 3730. I regret reporting the passing of W8AY, W8BPAV & WRHZA made PSHR, State Radio Council held winter meeting St. Albans with pres. K8WMX appointing committees for the St. ARRL Convention, Jackson's Mill, July 5 and 6. Parsons repeater-13/73 may be on air by Mar. 1. W8AUUY now in school WY working thru Oscar 7. Traffic: W88NFZ 193, W8BPAV 19, W88MKL 158, W8HZA 97, W8SQO 77, W8JWX 63, W8BDOX 5, W8LFW 17, W8EUE 14, K8IXO 12, W8JM 12, W8ETF 1, W8CUL 10, K8QEW 10, K8ZDY 10, W8SOX 9, W8THX 9, W8YCD 9, W88SCG 8, K8CFT 7, W8LJW 7, W8ANDY 7, W8CZT 6, W8DUV 6, W8GWR 6, W8BAKR 5, W8GDP 3, W8KV 3, W88PKF 3, W88CD 3, W88SCM 3, W8AHZ 2, K8BFC 2, W8KWI 2, W8UYR 2, W8AKM 1, W8CXK 1, W8ETF 1, W8G8N 1, W8KXL 1, W88MZ 1, K8NYG 1, W8SOPM 1, W8QEC 1, W88RAE 1, W88RUO 1, K8TCM 1, W8DUWU 1, W8BWC 1, W8WHR 1.

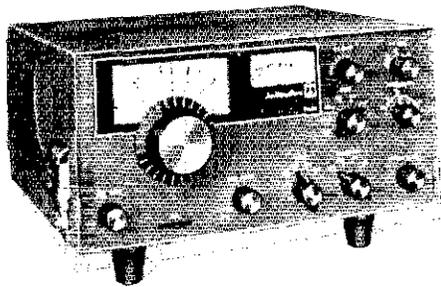
ROCKY MOUNTAIN DIVISION

COLORADO - SCM Clyde O. Penney, WA0HLQ - SE: K0PFLQ, RM: W0B0CK, PAMs: K0CNV, WA0YQO. Newly elected officers for the Southern Colo. State College Amateur Electron Organization are K0QCE, pres.; W0KWS, vice-pres.; W0GGS, secy.-treas. WA0YNO finished up the year 1974 with 47 10-meter stations, and 224 new 10/10 members. 30 stations were heard Denver during the 10-meter contest in Dec. For the month of Dec. 51 individual stations were heard on 10 meters in the Denver area. W0ETT now the proud owner of a new FT101B. Net traffic 1 Dec.: Hi-Noon Net QNI 1118, QTC 59, informals 193, 30 session 884 minutes.; SSN QNI 202, QTC 81, informals 17, 30 sessions, 5 minutes. (Nov.) CCN QNI 97, QTC 69, 25 sessions. Traffic: (Dec) W0WYX 1727, K0ZSQ 868, W0LO 186, W0IW 125, K0SPR 9, WA0YGO 88, W0LAE 66, WA0YNO 48, W0YCD 38, WA0TMA 2, W0HXB 24, K0TIV 24, W0MYB 11, K0PVI 4, WA0HLQ 2. (Nov) W0LQ 130, W0ENA 32, K0SPR 28.

NEW MEXICO - SCM, Edward Hart, Jr., W5RE - Asst. SCM Joe T. Knight, W5PDY. SEC: W5ALR, PAMs: W5PNY, W5DMR. RM: W5UH, K5KPS. NMN meets at 1915 local time daily on 354 kHz. Reports QTC 265, QNI 223. Net has a new name effective Jan 15 to include the Arizona Net. NMRRN meets daily at 1800 local time on 3940 kHz. Reports QTC 98, QNI 754. W5NUI reports to Los Alamos repeater (28/88) is moving to the CD Command Post Farmington amateur group, the Totah Amateur Radio Club elect W5JLB, pres.; W5SB, vice-pres.; W5LWG, (ex-W7HT) secy.-treas. WA5OHI of Gallup is a valuable addition to the repeater as he can reach other repeaters in Ariz. W5HRS still in Colo. but expects to be back at Ute Park soon. W5QNR (ex-K2DOZ) would like to contact his old buddies in WNY. W5KSS now equipped with RTTY. W5SHI had two 40-meter contacts using half watt transistor transmitter. K0KDT/5 has a new tower and beam. W5ZLX building a 150 kHz antenna. W5A0X put his 40-meter dipole in the attic. Traffic: (Dec.) K5MAT 468, W5UH 454, K5KPS 27, W5KSS 195, W5ENI 171, W5RE 85, W5TLK 39, W5NUI 2, W5YQ 20, W5SHI 16, W5MLY 12, WA5OHI 10, W5QNR W5QNO 5. (Nov.) K5MAT 273.

UTAH - SCM, Ervin Greene, W7EU - Our thanks to the many who have cooperated with me while getting acquainted with my new job and for the excellent reports sent in this month. Congrats to the prize winners at SAROC. Noticed quite a few from Utah enjoying the convention, WA7TSB passed his Advanced exam at WAS. W7ZJD now WA7ZJD with Advanced license. W7KHY moved to the east with his work and K7ZVT ably handling the UCN while he is away. WA7GWU reports the Snowbird repeater is about ready to get airborne. John working a lot of DX on 75 ssb. WA7QA operating from Paradise reports good net activity and has 2500-watt power plant for emergency power. Quite a bit of 160-meter operation is appearing due to long skip conditions from local nets on 80. Many new Novices were produced due to the UARC school being conducted at Murray High School. The General Class portion of the school is progressing and applications are already being received for the next class. Congrats to WA7EH on his appointment as EC for Weber Co. Nets: BUN 31 sessions, 10

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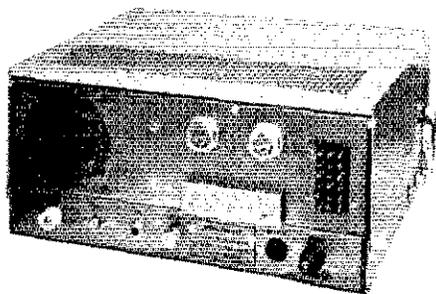
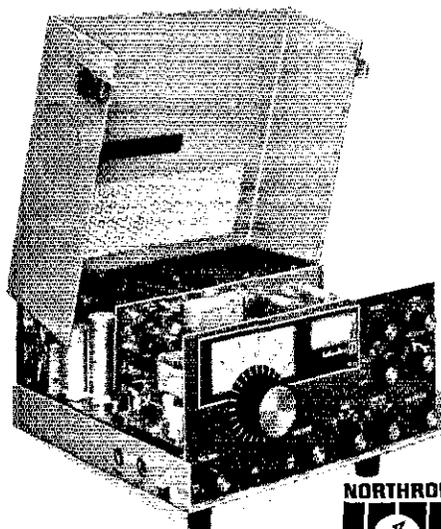
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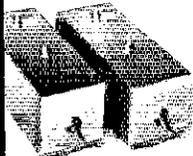


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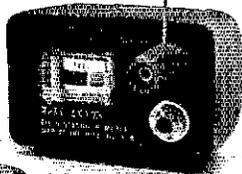
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check-ins, 31 messages. UCN 19 sessions, 44 messages, 94 check-Traffic: WA7OAU 63, W7OCX 40, K7ZVT 33, W7RO 32, W7K 23, WA7TSB 23, WA7TEH 15, W7EU 13, W7UTM 8, WA7HCX WA7GWU 4, W7HOI 3.

WYOMING - SCM, Joe Ernst. WTVB - Wyo. Weather 3 3920 kHz, 6:30 AM MST, M-S. Jackalope Net 7260 kHz, 12:15 MST, M-S. Wyo. Cowboy Net 3950 kHz, 6:45 PM MST, M W7SDA mgr., 19 sessions, QNI 349, QTC 41. New licenses incl Bob Johnson of the Cable Co. in Lander, WB7AHL. Bob is act with an SB-34 and Two Meter Gear. W7TUT is looking forward retirement from the Bureau of Reclamation in the spring, active twenty meters he is now joining the two meter crowd on WR7AI K7ITH has been spending the winter in zero-Land near Greele Colo., but finds time to check into the Wyo. Nets. A reminder ARCS, the ARRL has many fine training films as well as films showing on TV and before Public Service Clubs. Contact your ST for more information. The Wyo. Hamfest is scheduled for Cheyenne the third week end in July. Traffic: K7WRS 83, K7SLM 56, W7T 54, WATTCQ 22, K7VWA 22, W7SQT 20, W7HNI 17, W7SDA W7IRL 7, WA7WEC 4, W7IOI 2, WA7SGG 2, WA7YWA 2

SOUTHEASTERN DIVISION

ALABAMA - SCM, James Brashear, WB4FKJ - SEC: W4DC PAM: W4LNN. RM: W4HFU. Congratulations to W4LNN, new 1 of AENM. Thanks to W4RQS for his work and contributions as 1 of AENM. Officers of the Mobile ARC are K4LXU, pres.: WB4UN vice-pres.; W4MVM, secy.; WB4GYS. treas. WA4JBC waiting for SB-102 to arrive replacing his DX-40, which went up in smoke, put up new antennas for 10/15. K4JYO has new SB200 a two-element triband quad at 60 feet. He reports poor condx for 10-meter contest. WN4IYW passed the General exam and receive Cricket 1 keyer for Christmas. K4CUU reports Colbert a Lauderdale Co. have 15 AREC members. WB4BDW played Santa Birmingham 2-meter repeater allowing kids at Childrens Hospital talk to Santa. K4UMD QRL on AENM, WN4JQZ passed the Gen and Advanced exams. WB4KSL and WB4BUT were in "Who's W in American Colleges and Univ.", WB4KSL was selected outstanding engr. student by the Engr. Society at UAH. Dr. D Fronek, W7SZR/4, was selected outstanding engr. Professor at U by the same group. Appointed W4LNN as PAM and K4LYY as E W4ENW, formerly 5AWX gave a real interesting talk to Huntsville ARC on Jan. 10. WB4UHC, K4FTY, K4IKR, W4R and W4HFU operated stations at the National Weather Service, 6 and Red Cross during the severe weather watch (which included tornado warning) on Jan. 10, '75. Traffic: (Dec.) W4LNN 23 W4RQS 199, WB4EKJ 164, WB4FZQ 155, K4BFT/4 150, WB4K 119, K4AOZ 81, WA4AJA 68, WN4IYW 54, K4CUU 47, WB4SV 31, K4VF 21, WA4BDW 13, WB4RCF 10, WA4ZDW 10, K4UMD WB4BAP 6, WB4FJ 5, WB4TVJ 3, K4HNY 2. (Nov.) WB4R 16.

GEORGIA - Acting SCM, John Englund, K4JJQ - Nov. 1 report. SEC: K4WC. PAM: K4JNL. RM: K4JJO.

| Nets | Freq. | Time(Z) | QNT | QTC | M |
|--------|--------|---------|------|-----|------|
| GSN | 3.595 | 0000 | 276 | 78 | K4J |
| | | 0300 | | | |
| GSBN | 3.975 | 0000 | 1358 | 77 | K4J |
| GTN | 3.718 | 2300 | | | WB4T |
| CVEN 1 | 3.950 | 1830 Su | 76 | 17 | K4Y |
| CVEN 2 | 146.94 | 0230 | 386 | 47 | K4Y |

I sadly report the passing of WB4LHQ, WB4EDD and K4OSE se on Ga. ETV Nov. 9 with FB program on getting started in H Radio. WB4RUA made clean sweep on modes in SS! Sto Mountain FAMvention was well attended and a fantastic success Nov. 9 and 10, WB4SST appeared on stage in "Last of the Red H Lovers!" Road Runner Swapfest was held at Dalton Junior Colle Nov. 17. GSNB now meets at 7 o'clock local time because of ve poor condx at 8 PM. GSN was moved to 6:30 PM so as to provi liaison to GSNB, unfortunately with poor results. New officers Atlanta RC: W4BTW, W4BCD, WA4AKU, W4GKF, WA4VW WA4HNL and W4IXN. Traffic with * indicating PSHR: (No WA4FSL 342, K4JJQ* 86, W4AAV 61, K4NM 17, K4JFY W4CZN 4.

NORTHERN FLORIDA - SCM, Frank M. Butler, Jr., W4RN - SEC: W4IKB. RM: WB4DXN/WA4WIV, PAMs: WA4IZM/W4SDR/40; WB4RSZ/VHF. NFPN attendance growing with avera daily check in of 35 stations in Dec. WA4FBI, WB4GHU earn QFN Net Certificates; FBI also made BPL! New apps: WA4HO ORS/OPS; WB4JHQ ORS/OPS; W4UC ORS. Renewals: W4WHK

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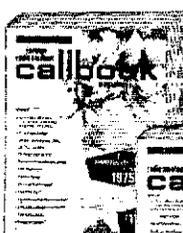
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EC; W4IA ORS. W4GXL now K4CP; the Crown Radio Soc repeater, WR4ALA, now on the air on U1/6L. NOFARS had a fine Christmas party. The latest "Balanced Modulator" contained a new membership list. K4OAC is new pres. of RANGE, W4WHK looking for new AREC members in Clay Co. Dave also chases DX on 16 meters cw. WB4HKP was elected secy. of DBRA WR4ADC, and moving back into traffic handling. WB4GHU playing chess via radiograms on QFTN, and has 4RN slot from QFN. Gainesville ARA aids Sheriff's Dept. in search for escaped prisoners. WB4GKR XYL is now WN4LXI; a graduate of Santa Fe C.C. Novice Class. WN4DXW now WA4DXW; WA4VUY upgraded to Advanced Class. W4KZL & WB4KBL looking for 450 Mhz activity. WA4GX reports the West Pasco VHF Assn. repeater should soon be on from New Port Richey 07/67. Your SCM enjoyed a visit to the Tallahassee ARC; WB4LOQ displayed his new SB-104. W4BKD had a new 150-ft. tower; he and WA4HFG plotting 2-meter bearing patterns. Fort Walton hams aided in tornado damage survey for CL. K4BSS/I seriously ill in Maine. WB4JHQ has RN5 slot from QFN. K4SVX hospitalized by a spider bite. WB4JCV won FFARA "Ham of the Year" award. Traffic: WA4FBI 508, W4LDM 339, WB4GHU 320, WB4DXN 258, W7EM/4 257, K4VND 221, W4WNY 198, WB4OMG 194; WB4JHQ 144, WB4UJI 121, W4KIX 118, K4CVU 87, WB4DAD 72, WA4WBM 64, WA4HOL 63, WA4IZM 60, WB4SKI 58, WB4FYJ 52, W4RKH 50, WB4VDM 36, WA4A 34, W4LSR 33, WB4NJI 24, WB4HKP 19, W4AFT 18, WA4CRI 13, WB4VMP 13, WB4TZR 11, WB4ADL 10, WB4BSZ 10, K4EOR 10, WB4VYU 8, WA4EYU 5, WB4VAP 5, WA4HFG 2, W4UC 1.

SOUTHERN FLORIDA - SCM, Woodrow Huddleston, K4SCL - SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4EBE, W4EH, WA4GBC. PAMS: WA4NBE, W4OGX. New appointments this month: K4TH OBS: WA4ALH OPS. OOs reporting this month: W4AWS, K4JFP, K4NE, K4QG and WA4UVG. OVS WA4ZLW reports K2YRZ/4, Margate, Fla., having several meteor scatter contacts with NY, K2RTB, 1300 miles, and Iowa, K0MQS, 1400 miles, using 1600 W. P.E.P. Input SSB on 144 MHz and twenty-two-element beam up 80-ft. K4QG reports new officers for Gato Chapter QCWA are WRNC/4, pres.; K4QG, vice-pres.; W4QG, secy. W4QG, treas. Two repeater licenses received by K4SCL this month: WR4ALM for the St. Petersburg Amateur Radio Club, now in operation on 147.66 in, 147.06 out, and WR4ALN being outfitted as a portable for emergency service on 146.34/94. K4DAS reports DX now 19 countries with QRP 3 watts or less! At month's end we find club meetings, special meetings and on-the-air discussion over the proposed restructuring of amateur service, Docket 20282. Traffic: (Dec.) W4DQS 669, K4SJK 583, K4SCL 471, WA4GBC 464, WB4KSG/4 241, W4WYR 217, W4EH 209, K4PIE/4 198, WA4IJJ 176, WA4SCK 161, K4BLM 99, WA4EIC 94, W4BCZ 87, WB4ZSO 80, W4OGX 70, WA4UQQ 67, WB4AD 64, W4IRA 50, WB4ALH 44, WA4HDH 44, K4TH 44, K4CFV 35, WA4ATF 32, K4NE 31, WB4HJW 25, K4QG 25, W4GOG 21, W4SMK 13, W4NTE 10, WB4VYU/4 10, W4MML 8, WB4TRI 7, W4LK 5, K4GFW 2. (Nov.) WA4UJH 56, W4MML 19, WB4ZSO 10.

WEST INDIES - SCM, Juan S. Sepulveda, KP4QM - Saludos amigos. The El Gato repeater went into operation last Jan. on 34/94. More than 75% coverage from East to West of KP4-Land. The RCPR Mar. Hamfest will be celebrated in the El Dorado del Mar Hotel in Mar. New KP4s heard on two meters are DRT, DAL, YT, DGV, BAJ. Last Jan. the KP4s visited the Arecibo Ionospheric Observatory. Fantastic installation. KP4DBK flew to the Dominican Republic for short vacation. KP4ANQ travels daily from San Juan to Yabucoa. WP4EDD active on 15 meters. New family arrived to WP4DRX, H18JAM/WP4EAG. KP4DHW on training with Digital in Mass. YV5AUY/KP4 active. The repeater for La Santa on 147.69/147.09 ready for operation and waiting for FCC license. Expected coverage besides Metropolitan Area is the South and East part of the island. K4VBA active on 2 meters thru El Gato repeater. KP4AST mounting a three-element set-up for 160 meters. KP4QM back with high power. Bought from KP4BBK a BT1-2000. KP4BDL married last Jan. The "Fl orullo mini-hamfest" at Guavate a real success with about 150 persons attending. Visitors from Dominican Republic were in the group.

SOUTHWESTERN DIVISION

ARIZONA - SCM, Marshall Lincoln, W7DQS - PAM: WA7JCK. RM: K7NHL. The winter hamfest sponsored by the Amateur Radio Council of Ariz. was re-scheduled for Mar. 16 after previous publicity was sent to QST. It will be in Los Lomitas picnic area in South Mountain Park, Phoenix. New officers of the Old Pueblo Radio Club are WA7KEF, pres.; K7OMR, vice-pres.; WA7HEH,

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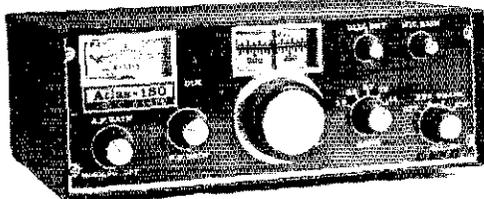
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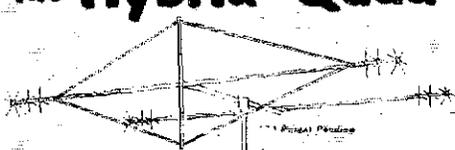
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secy-treas.; WB2WPY/7, W7ENP and W7JTN, board of dir. I officers of the Sun City ARC are W7YR, pres.; W7IU, vice-p W7KBE, treas.; W7JAJ, secy.; WA7SLV, dir. The club had a "Contest" at the Sun City Carnival of Clubs, demonstrating amat radio to the public and awarding prizes to visitors. The dem station included RTTY, TVI-free operation, and showing of ARRL movie illustrating the role of amateur radio in disaster communications. With regret, K7RLT, one of the original mem of the old Ariz. PON, is reported as a Silent Key. NMN (N Mexico-Arizona CW net) now meets at 0215 GMT on 3585 kHz, minutes earlier than previously, Cactus Net traffic: (Nov.) 847 QJ 347 QTC; (Dec.) 920 QNL, 702 QTC. BPL was won in Dec. K7CC and K7NTG. Traffic: K7NTG 593, K7CC 458, K7NHL 4, K71XB 31, W7DQS 30, WB2WPY/7 27, K7RDH 8, W7XX 3.

LOS ANGELES - SCM, Eugene H. Violino, W6INH - St WA6DUC. RMs: WB6QYN, K6UYK. This is the last news for 19 and I hope that 1975 will be a more active year. The Christa traffic was up this year thanks to the fine group on SCN, DRN6 a MTN nets, WB6LTI, K6RIR and K6YFZ back from DXpedition Wallis Is, and New Caledonia. They reported about 10K QS averaging over 500 a day; congrats guys. Any clubs wanting a n program should contact these gentlemen, they have a good one. I Ramona RC had their usual annual Christmas party with a go turnout. The San Fernando RC was well represented in the rec Sweepstakes by WB6OYF, WB6DBL and W6LPI. W6QYE gave update on disaster communications as related to WCARS in th Sentinel. K6YQ is interested in surveying JPL RC mem relative to participation in the next ARRL DX contest. The PAI group recently conducted a very successful Auction. IRW Club r meets on 7.280 MHz Sat, at 10 AM, they need more Ops for t Club station. The So. Calif. VHF RC reported that the barstow Las Vegas motorcycle race was a success with 35 mem participating. They are preparing for the ARRL VHF contest ne this group keeps very active on VHF. WA6GIY recently passed l Advanced Class exam, now active handling traffic. WB6VZI a WB6ZVC claim to have set a new 160-meter record during rec ARRL test. WA6TQA finally received his General after much delay he also is sporting a new 2-meter transceiver. W6DQX reports ma hand openings during the recent 10-meter contest. WA6BCO spe month of Nov, in KH6-Land enjoying the weather. K6EA going SAROC after spending Holidays with Son and Family. I wa congratulate the OOs on their work, its been very rewarding late to hear from the grateful hams who have been helped by the gentlemen. Considerable activity recently on 120 MHz, seems this the coming band, good coverage with a very small beam. W6R made a total of 327 QSOs in the 160-meter contest in Dec. Seems though the 160-meter band is going great guns in our sectio During the pre-Christmas Holidays a group of the Mount Wilso Repeater Assn. conducted an outstanding entertainment for th Children in the local Hospitals. They went to a total of ni hospitals with their walkie-talkies and with the aid of the sta permitted the children to talk to Santa over the local repeate Those unselfish members were WB6EB, W6WPT, K6LIE, W6RWL W6APO, W6GRHW, W6UWP, WA6LLX, WA6WPP, WA6EJL WB6WGT, WA6CNB and WB6OX. The publicity over local TV an Radio was handled by K6SUJ and W6PDE. Congrats fellows, a j well done, WB6ZVC working on new SCN routing guide for the ne WA6WJV trying for WAS using QRP rig. I received my first copy WB6ABN bulletin and find it very informative. Those interested same should contact W6MEP or write Mr. Lee Repeater, P.O. B 1544 Burbank, CA 91507. Traffic: WB6OYN 729, W6INH 34 WB6ZVC 280, K6UYK 152, WA6TLV 142, WB6MKV 131, W6QA 112, W6HLJ 83, W6OEO 79, WA6IDN 70, K6EA 42, WB6OYD 3 WA6BCO 34, W6IVC 33, WA6TCH 16, WB6YD16, WA6GIY 14 WA6ZKI 14, K6CL 5, WA6WJV 4, W6NKE 3.

ORANGE - SCM, William L. Weise, W6CPB - Asst. SCM: Di Birbeck, K6CID. SEC: WA6TVA. PAM: K6YCI. RM: WB6AK The new proposed changes in Amateur Licensing, Operat Privileges and Classes (Docket 20282) will pose many questio Anyone desiring info please drop me a line. Some who attend SAROC may have come home with empty pockets, many w prizes, everyone had a good time. The good weather helped. If y missed the ARRL Forum you missed some important informati which may affect all hams. Check with any Asst. Dir., Affilia Club or your SCM for more info. Sorry to report WA6VIV a WA6GOJ have joined the Silent Key ranks. Harvey was very act in several SW Division conventions and phone patching (via MA from the SEA area. John was formerly EC for Inyo Co. and a v active traffic man. Our condolences to their families. Both w greatly missed. K6YNB finished a new SSB/CW transverter for 144 and 432 MHz (all homebrew) also, a new final for 144 M

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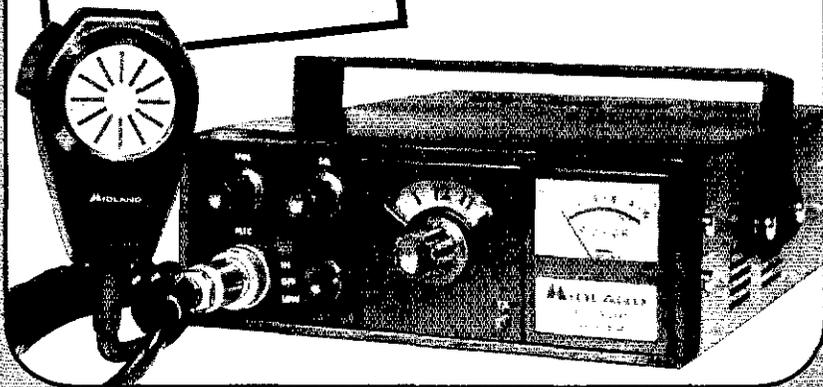
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Congrats Wayne. Sure many will be working you for "how-did-you do-it". Happy to report that our Dir., John Griggs, W6KW is on the mend after surgery. K6CID was on a two week vacation, first part o Jan. to test the new-fallen snow. Take care Dick those skis are quit tricky. K6GMI, mgr. DRN6 says the written traffic for the month c Dec. was over the 1000 mark. Congrats to all who participated, job well done. Traffic: K6GMI 556, WB6AKR 161, WA6TVA 38 W6CPB 26, W6QBD 19, W6WRJ 18, WA6YWS 7, WA6BJO 6.

SAN DIEGO - SCM/SEC, Cy Huvar, Jr., W6GBF - Asst. SCM Art Smith, W6INI. Appointments: K6DBJ as OO; WA6DMB, ORS Imperial Valley has new officers with WB6RMG as pres.; W6JHG vice-pres.; WB6PU, secy.; K6AXU, treas. WB6RMG has new 40/8 loop with big signal. Palomar RC reelected WA6SCV, pres. WA6VYD, vice-pres.; WA6OZS, secy.; K6SLA, treas. W6SE hung up his cloak, good retirement John. El Cajon ARC reelected WA6BDW pres.; WA6RBP, vice-pres.; WA6WWP, secy.; WA6HXB, treas. Club Ham of The Year was K6DS, very active in Oscar and holding class at Orthopedic School in E.N. North Shores ARC elected W6PSI pres.; WA6FOJ, vice-pres.; W6JWU, secy.; WA6QVH, treas. W6JWU presented program on IC application. SOBARS had K6DS and Osca program. SANDRA's short meeting followed Christmas party a Pizza Hut. Poway ARS held their meeting at Shakey's with swag Christmas party. S.D. DX Club had guest W6NIU, new member to DX advisory. Gary discussed ARRL DX matters and talked on hi vacation to South Pacific as YJ8GS. QCWA still quarterly meeting at Campus Buffet. K6PKC holding classes at Mira Mesa College. Upgrading licenses are WA6FUB and WA6WWP. Convalescng a home are K6JP, W6EZ, W6QP, W6PJE, W6ARN and W6IXC WA6JSY was recovering from eye surgery when YF Hilda suffered stroke. Erni called for help on PRC repeater and W6IFH & K6HAA called ambulance. Good luck to all newly elected officers and thanks to outgoing ones too! PSHR: WA6DMB, WB6PVH. Traffic (Dec.) WB6PVH 573, W6BGF 286, WA6DMB 235, W6PZU 43 W6DEY 34, W6GBF 11, K6PM 4, WB6RMG 2. (Nov.) W6VNO 72 WA6BDW 64.

SANTA BARBARA - SCM, D. Paul Gagnon, WA6DEI - SFC WB6HJW. RM: K6QPH. PAM: K6YX. CW Section Net, 3600 daily at 1830; SSB Net: 3935 Wed. 2000. 1975 officers for the Poinsettia ARC are WB6CNO, pres.; WN6WKP, vice-pres.; WN6YMU, secy. WA6ILL, treas. WA6DEI was installing officer and W6VQG and W6NAZ presented a slide show of Apollo recovery at the installation dinner. 1975 officers of the Conejo Valley ARC are WB6WGE, pres.; WB6CHI, vice-pres.; WN6VOI, secy.; W6RML, treas. W6EEG does a good job with the CVARC newsletter each month. W6FYF gave an old time radio show presentation at Ventura Co. Club in Oxnard. WA6VBZ spoke at the Poinsettia ARC on Navigation Systems. K6VFE graduated 7 more from her Novice class making over 35 in 3 years in Ventura. WA6DEI received the Worked All Japan Districts award and WA6TMQ received the JCC200 award for confutations from over 200 major Japanese cities. The Fiesta City Net mgr. WA6MBZ reports FCN has moved to 21150 at 2000 Mon. Everyone, especially Novices are invited to QNI and learn message handling procedures. Thanks to K6EVQ who did an excellent job as PAM the past 4 years. K6YX, Santa Barbara is taking over as our new PAM and will handle the OPS appointments and the section SSB Net. We regret to note the Silent Key of a well known Santa Barbara ham K6EAO. WA6WKP has been running phone patches to the South Pole. Remember send me a monthly report of activities in your area; file comments on the restructuring docket; and invite someone to join the ARRL and AREC. PSHR: WA6DEI 39, W6JTA 35, WA6LBO 32. Traffic (Dec.) W6JTA 331, WA6WYD 268, WA6LBO 43, WA6DEI 28. W6PNM 8, K6QPH 8. (Nov.) W6JTA 158.

WEST GULF DIVISION

NORTHERN TEXAS - SCM, L.E. Harrison, W5LR - Asst. SCM: Frank E. Sewell, W5IZU. Asst. SEC: W5SHN. Thanks Joe for a grand job as SEC for North Tex. RM: W5QU. Endorsements are coming in at rapid rate. W5ARV retired attorney, plus active Merchant Mariner requests renewal OO appt. His son, K5PW same thing. W5GSN's N/L well written. FB on SET. Docket 20282 reports FCC appears want double possibly triple the number of hams. Is this good or bad? Let Roy know "Why." He's gotta have firm data to plead your case. Congrats W5UPO & W5JEH new Temple ARC officers. WA5KHE granddaddy Tex SS Net. Congrats. K5KQG desires OBS appt. Formerly held OPS, OO plus SEC appt. in Ia. RWK applying to Austin for non-profit status. We should all update our QSL Bureau with 2 cent extra stamps. OO poop sheet very interesting to all users. W5URD out from under real serious surgery. WBSKMN desires data on nets. The Dallas tower situation continues.

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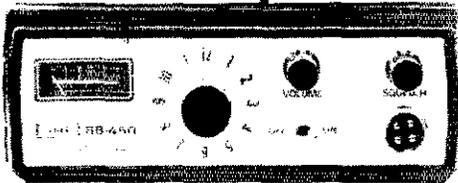
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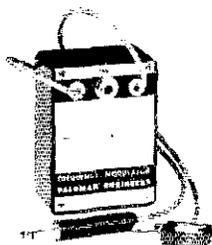
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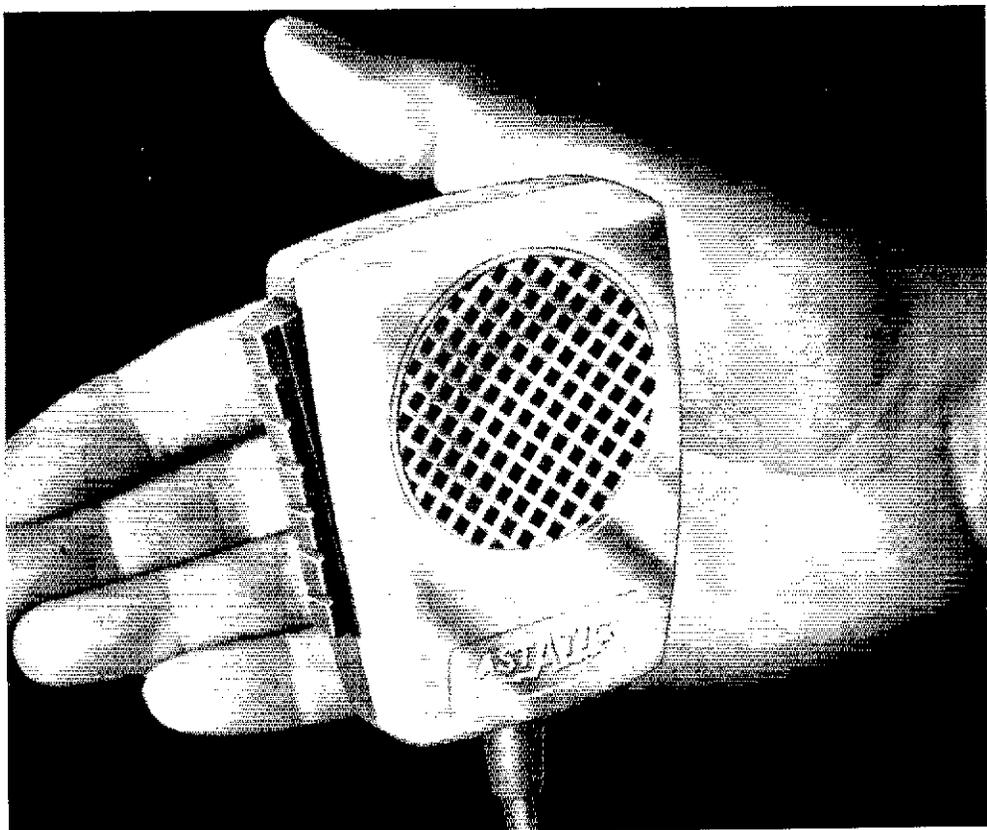
to proceed at normal speed with a low-profile. They refuse to make waves. This is considered the best course of action. The Freq Sheet of Ft Worth Club shows annual Christmas party Dec. 19, covered dish dinner, etc. Civil Defense & KACE's plans are proceeding in well planned manner. Nine new members appeared at the No meeting. Congrats. W5ZU bought a 2-meter Heathkit. The Tex. C3 Traffic Net meets twice daily on 3770 kHz at 7:00 PM and 10:00 PM local time, 0100Z and 0400Z GMT. All stations are invited to participate. Liaison is maintained with Region 5 (RNS), the Tex Tfr Net (TTN) a Phone Net 3961 kHz at 6:30 PM and the Tex Slow Speed Net. These nets are all part of the National Traffic System. Net Mgr. is W5BFW. He has a Metro phone. WB9KPC/5 Paris Tx wishes OVS app. Forms now being prepared. Jerry of Re River Valley ARC active and shows many stations on air including W5KZA, W5CTM, K5AOL, WB9KPC/5 and W5ARET. FB K5WQ an OT among OVSs sends in his report. Panhandle ARC advises FCC examiner doc Amarillo Mar. 13, Traffic: (Dec.) W5T 441, W5SHN 420, W5OWV 354, W5BFW 291, W5QU 25H W5SDXB 102, W5GSN 52, W5DOP 30, W5I-OQ 30, W5MTT 24, W5ABXH 18, W5AZT 14, W5MFO 13, W5NLBZ 11, K5MWA 11, W5TJ 8, W5QZ 8, W5LR 1. (Nov.) W5OWV 66.

OKLAHOMA - SCM, Cecil C. Cash, W5PML - Asst. SCM/SEC Leonard R. Hollar, W5FSN. PAM: STN W5SAZS, OTW W5AOLV, OFON W5ZOO. Net operation was up for the month of Dec., which is normal with the increase of traffic during the holiday season; however, everyone must have been so busy they couldn't take time, just forgot, or didn't have any news to report. got the regular club bulletins and a nice long report of the club activities of the Altus ARC as usual but individual reports were just all the past month. Please, folks I can't report what I don't know about. Get the news in to me at the end of the month so you can at least see your name or call in this column. Didn't Santa drop off a new rig for anyone?, or didn't he bring anyone a new antenna, a two meter mobile or walkie-talkie; he must have for he missed me on his rounds with the ham gear. Oh well, we did have a real nice holiday season anyway for which we should all be thankful. I regret to report that my RMs have all vacated their office for one reason or another so I am looking for someone to fill at least two RM appointments. The 1974 Phone net reports combined for 1753 stations checking in with 319 QTC. The CW nets made a better traffic showing with 251 stations and 207 QNIs. Traffic: W5RB 277, W5GWB 82, W5SELG 45, W5SUG 34, W5FKI 30, W5SAZS 27, W5PML 24, W5ZOO 22, W5OUV 14, W5FSN 13, W5WRC 6, W5JJ 2.

SOUTHERN TEXAS - SCM, Arthur Ross, W5KR - SEC: W5SCUR. RM: W5UGE. PAM: W5HWY. RM W5UGE made BPL this time and has new lone patch from Santa. EC W5FMA and SEC W5SCUR have new BPL medallions. K5FRK has an eleven element 2-meter beam. W5HDS has new HR2-B. OPS W5VBM elected Dir. on board of International Mission Radio Assn. ORS K5EJL was ready for SET, has new AREC plan ready, too. OPS W5SIUT sent in reports for 3 months in one envelope! OO/ORS W5RRB reports new "Houston Area Emergency Net" meets 8 PM Central on 3898 kHz every Wed. to provide liaison between 2 meters and NTS. McAllen bunch still awaiting repeater license. OVS W5GYF reports his new boss is W5SIUF. OOs reporting this month were WASLTO, K5MEN, WASZBN, WASEEM, W5RBB, W5NGW. OVS W5GYF only one reporting this month. OC WASZBN received two real nice replies to OO cards. W5SIBT's high school at Brazoswood won the Class 4A football championship - with him on the team. OBS W5KLV still real busy with 60 readings on 12 nets! EC W5TOP is also a busy traffic handler, having received 1770 messages during 1974. Traffic: (Dec.) W5UGE 508, W5TOP 441, W5FMA 285, WASZBN 223, W5KLV 219, W5VBM 218, K5HZR 98, W5SCUR 95, K5EJL 81, W5AFOE 50, W5HWY 48, W5BGE 41, W5BHO 36, W5RBB 25, W5TFW 25, W5AMN 22, W5SIUR 22, W5SFQU 16, W5SIBT 16, K5ROZ 15, W5GPN 12, W5SIUT 3, W5ACBT 1, K5RVF 1. (Nov.) K5EJL 64, W6BMM/5 16, W5SIUT 4. (Oct.) W5SIUT 6.

CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, CY6FK - Asst. SCM Donez Booth, CY6YL. SEC: VE6XC. PAM: CY6ALQ, CY6? Yes! is the prefix set for the Calgary Centennial, and all the locals are active handing out contacts for the Centennial Award. The CARL Alberta QSO Party during the entire month of Apr. should help this effort. Conditions have been very poor for the APSN and DRN7 but both nets are managing. Perhaps with poor condx on 75 some use of repeaters could be made to handle traffic. I have enjoyed meeting Pablo LU2AZO and helping him sked his Dad LU9AEM. O



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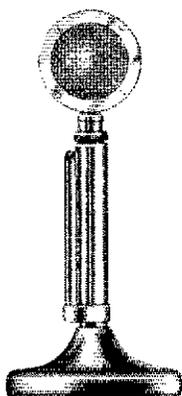
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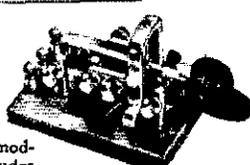
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VE6MJ recovering from the flu. VE6AXH was back in the H during Christmas break from UBC. The Calgary Centennial Convention Aug 1, 2, 3. Full information will be circulated to a Traffic: VE6FK 161, VE6FS VE6CE 8, VE6VF 7, VE6YV VE6AMU 5, VE6JL 4, VE6BL 3, VE6AFJ 2, VE6AUZ 2, VE6AZ 2, VE6PV 2, VE6NU 2, VE6PP 1.

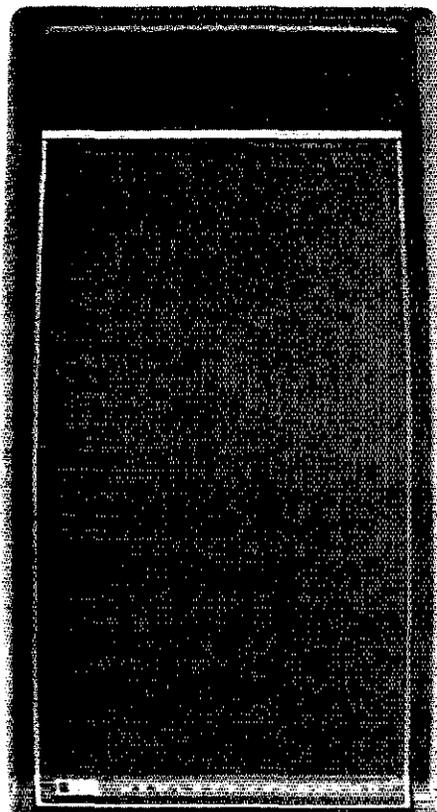
BRITISH COLUMBIA - SCM, H.E. Savage. VE7FB - Repor are flowing in about the tower and antennas at VE7BK. VE7AL has retired and moved to Parksville. Remember way back when, th years he was Net Mgr.? VE7CB is off to Maui for two month VE7XM new rig TS 900. But has not been heard as yet. No nev from VE8-Land this time. Vancouver ARC for the first time had candidates for the Code and Theory Class. Burnaby and La: Kootenay ARC's classes are going full bore. Victoria SWC's cla with VE7TH still carrying on. Freda by the way has long past the 6 years young age. I wonder if Freda could count the number of ham she has produced over the years? Happy New Year. Traffic: (Dec VE7CDF 337, VE7ZK 261, VE7BLO 61, VE7QO 26. (Nov VE7CDF 134, VE7ZK 123.

MANITOBA - SCM, Steve Fink, VE4FQ - We welcome VE4P as our new RM and mgr. of MTN, replacing VE4OW who has left work as a commercial op on a ship. Congratulations to VE4AS c being awarded the QST Cover Plaque award for best article in No QST, and to VE4TR and VE4QM on their marriage. VE4LB a ne Whitecan operator from Boissevain, while VE4GD now sign VE8DX. Last month we reported VE4MA now is VE6JX, and th time we're happy to report VE4MA has been taken by son Barry, now active on VHF/UHF. VE4GB and VE4EF spending the winter in warmer climates down South, while your SCM was active as 7W in Jan. The Winnipeg Repeater, VE4XK, will change output t become 146.46/147.06 May 1. MEPP: 31 sessions, 1188 QNI, 3 QTC. Traffic: VE4RO 68, VE4PG 62, VE4TY 52, VE4VV 5, VE4TR 22; VE4FQ 21, VE4JA 16, VE4QL 16, VE4CR 10, VE4L 9, VE4NE 7, VE4AP 5, VE4UN 5, VE4NM 4, VE4AI 3, VE4FK 3, VE4QK 3, VE4AP 2, VE4HE 2, VE4LN 2, VE4OP 2, VE4YP 2, VE4PA 1.

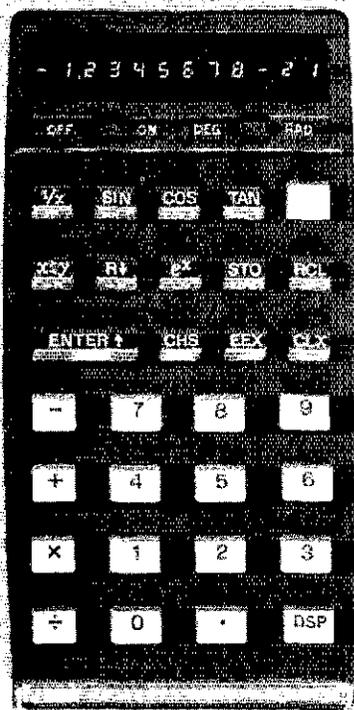
MARITIME - SCM, W.D. Jones, VE1AMR - SEC: VE1SH RM: VE1ARB. It is with deep regret that I report the death o VE1LG. Mr. Rath was in his 100th year and was active on 80 meters. VE1ACU and VE1ASN are moving to Truro. The Truro hams are signing a CH1 prefix for 1975, happy 200th anniversary to Truro. Congratulations to VE1CD on placing 2nd in BFRU. New repeaters VE1LHR 04-64 and VE1SMT 01-61 now operational. The new executive of HARC (Halifax) are VE1FO, pres.; VE1BAD, 1st vice-pres.; VE1AZX, 2nd vice-pres.; VE1APN, secy.; VE1MX, treas. VE1AAC is the current pres. of the NS VHF Assn, with VE1BAZ vice-pres.; VE1AYE, secy.; treas. VE1AZX is winner of the Halifax CBC Clubs annual Tech. Achievement Award. Other repeater scheduled to start operating early in the year are Yarmouth 34-94 Liverpool 46-06, Moncton 13-73. A repeater is planned for Port Hawkesbury. The VE1RPT group in Moncton keeping active with monthly hidden transmitter hunts. The Moncton ARCC group assisted the RCMP in a search for two missing Policemen. Work proceeding on "The Atlantic Canada AR Convention" to be held at The Univ. of Moncton, Aug. 29 to Sept. 1. APN reports QNI 125 QJC 124. Traffic: (Dec.) VE1AMR 216, VE1ZH 171, VE1BAZ 123, VE1AKB 92, VE1AWP 33, VE1GW 33, VE1KR 27, VE1H 12, VE1CK 10, VE1AM 8, VE1AAO 7, VE1AYJ 7, VE1AFM 2. (Nov.) VE1AMR 209, VE1ARB 113, VE1ZH 92, VE1AWP 47, VE1AKB 18, VE1ALB 14, VO1GW 9, VE1AMB 6, VE1AYJ 4.

ONTARIO - SCM, Holland H. Shepherd, VE3DV - Dec. was very busy month for Ont. traffic nets as you will note from the individual traffic totals listed below. No less than seven RPLs were awarded which is a record in itself particularly since it is under the revised book traffic count for originations. During this period activity the SCM had the bad fortune to have his keyer go on the fritz and if anyone has arthritis in the hands you will know that it impossible to switch from keyer to bug or handkey. VE3CRX, L. Ottawa, came to the rescue and the SCM is back in business until he builds the new keyer shown in the Jan. issue of QST. In the meantime 2-metre fm took the brunt of the work and I must thank VE3GJG and VE3GOL for their assistance with my book traffic. Although it was not received until Jan. the ARRL Can. Div. Bulletin saw its first light of day Dec. 5, '74 and should fill an urgent need by providing elected officials and Directors appointees with a means to disseminate items of particular interest to Canadian League members. Your SCM was admonished recently for neglecting to give equal coverage in this column to the foot soldiers of amateur radio.

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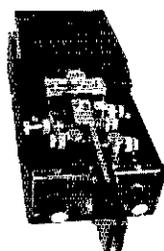
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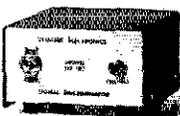
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i.e. those not holding Leader appointments. I do apologize for this shortcoming and trust that I can remedy this in future columns. VE3EHL has agreed to look after the column for Feb. while I visit Barbados early in Mar. VP9CB of Ottawa regularly QNLs the GBN. Has the extension of the US amateur into the top part of our 75-metre band caused you or your net any problems? I mean real problems not the usual ones of finding a clear slot or another time. If so the Can. Div. Dir. would like to hear from you right away. Traffic: (Dec.) VE3SB 60R, VE3GOL 557, VE3EHH 420, VE3GFN 330, VE3GIG 329, VE3FRG 318, VE3FOZ 256, VE3GRR 256, VE3AWE 246, VE3DY 199, VE3DPO 145, VE3GT 116, VE3DVE 109, VE3EWD 80, VE3FGV 76, VE3FGT 74, VE3EHL 39, VE3DH 20, VE3FBC 10, VE3CCG 5. (Nov.) VE3FBC 11.

QUEBEC - SCM, Larry Dobby, VE2YU - Congratulations to VE2IJ and his team for their on-going efforts to prepare for communications during the Olympics in '76. RASO (Radio Amateurs Serving the Olympics) have secured the call C220 for the duration of the Olympics. Congratulations to VE2AS and VE2BEN on their election and appointment as Dir. and Asst. Dir. of RAQI. CARL and RAQI have been talking to each other again. VE2s ALH, DRC and DFA were busy in early Jan. preparing for the SET. Thanks to VE2AB for his short note. We hope that your next 50 years of membership in ARRL will be as enjoyable as the first 50. Congratulations to VE2BDE on his newly acquired degree from Laval Univ. Traffic: (Dec.) VE2ALH 285, VE2DRC 172, VE2DR 144, VE2UN 103, VE2OJ 88, VE2BP 76, VE2APT 23, VE2EC 23. (Nov.) VE2UN 108, VE2ALH 92, VE2OJ 78, VE2DR 68, VE2BP 38, VE2DRC 27, VE2EC 22, VE2APT 20. (Oct.) VE2APT 17.

SASKATCHEWAN - SCM, P.A. Crossthwaite, VE5RP - A white caner VE5HE acted as chairman at the Saskatoon Amateur Radio Club meeting. Herb did a fine job as chairman and we do hope to see more White Caners operate and participate in amateur radio activities. VE5WI while hospitalized in Saskatoon was able to communicate with the local amateurs via two meters. A special thanks to VE5FN for setting up the rig and a special antenna arrangement for Leonard. Traffic: VE5XC 72, VE5TT 64, VE5DN 42, VE5UX 16, VE5RP 6, VE5KS 4, VE5MP 4, VE5SM 3, VE5XY 3, VE5LQ 2.



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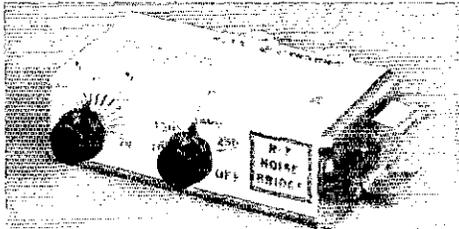
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Double Balanced Mixer

(Continued from page 18)

consisted of two stages of common-gate JFET (E310/U310/2N5397) rf amplification, totaling 20 dB gain, fed to independent DBM/i-f amplifier combinations. Two-section, link-coupled, helical-resonator input filters with rf-image traps were used on the 50-, 144-, and 220-MHz units. A 7-pole interdigital filter for 432 MHz was tried but not needed. All rf amplifiers were tuned for adequate gain and optimum IMD performance, using the laboratory equipment test setup shown in Fig. 3.

Conclusion

A high-performance, small-signal, vhf/uhf receiving amplifier optimized for IMD reduction and useful noise figure is only as good as any succeeding receiving-system stage, in terms of overload. The DBM/i-f-amplifier combination presented significantly reduces common first-mixer overload problems, leaving the station receiver as the potentially weak link in the system. When properly understood and employed, the broadband DBM followed by a selective low-noise i-f amplifier can be a useful tool for the amateur vhf/uhf receiver experimenter.

Appendix

Mixer Terminology

f_{rf} - rf input frequency
 f_{LO} - local-oscillator input frequency
 f_{if} - i-f output frequency

By convention, mixing signals and their products are referred to the LO frequency for calculations. In the mixer system presented, f_{if} is always above f_{LO} , so we will refer our signals to f_{if} , with the exception of Fig. 1 which uses the f_{LO} reference.

Overload

A generic term covering most undesired operating phenomena associated with device non-linearity.

Harmonic Modulation Products

Output responses caused by harmonics of f_{LO} and f_{if} and their mixing products.

RF Compression Level

The absolute single-signal rf input-power level that causes conversion loss to increase by 1 dB.

RF Desensitization Level

The rf input power of an interfering signal that causes the small-signal conversion loss to increase by 1 dB, i.e. reducing a weak received signal by 1 dB.

Intermodulation Products

Distortion products caused by multiple rf signals and their harmonics mixing with each other

and the LO, producing new output frequencies.

Mixer Intermodulation Intercept Point

Because mixers are nonlinear devices, all signals applied will generate others. When two signals (or tones), F_1 and F_2 , are applied simultaneously to the rf-input port, additional signals are generated and appear in the output as $f_{LO} \pm (nF_1 + mF_2)$. These signals are most troublesome when $n \pm m$ is a low odd number, as the resulting product will lie close to the desired output. For $n=1$ (or 2) and $m=2$ (or 1), the result is three (3), and is called the two-tone/third-order intermodulation products. When F_1 and F_2 are separated by 1 MHz, the third-order products will lie 1 MHz above and below the desired outputs. Intermodulation is generally specified under anticipated operating conditions since performance varies over the broad mixer-frequency ranges. Intermodulation products may be specified at levels required (i.e. 50 dB below the desired outputs for two 0-dBm input signals) or by the intercept point.

The intercept point is a fictitious point determined by the fact that an increase of level of two input tones by 10 dB will cause the desired output to increase by 10 dB, but the third-order output will increase by 30 dB. If the mixer exhibited no compression, there would be a point at which the level of the desired output would be equal to that of the third-order product. This is called the third-order intercept point and is the point where the desired-output slopes and third-order slopes intersect (Fig. 5).

Noise Figure

Noise figure is a relative measurement based on excess noise power available from a termination (input resistor) at a particular temperature (290 degrees K). When measuring the NF of a double balanced mixer with an automatic system, such as the HP 342A, a correction may be necessary to make the meter reading consistent with the accepted definition of receiver noise figure.

In a broadband DBM, the actual noise bandwidth consists of two i-f passbands, one on each side of the local-oscillator frequency ($f_{LO} + f_i$ and $f_{LO} - f_i$). This double sideband (dsb) i-f response includes the rf channel and its image. In general, only the rf channel is desired for further amplification. The image contributes nothing but receiver and background noise.

When making an automatic noise-figure measurement using a wideband noise source, the excess noise is applied through both sidebands in a broadband DBM. Thus the instrument meter indicates NF as based on both sidebands. This means that the noise in the rf and image sidebands is combined in the mixer i-f-output port to give a double contribution (3 dB greater than under ssb conditions). For equal rf-sideband responses, which is a reasonable assumption, and in the absence of preselectors, filters, or other image rejection elements, the automatic NF meter readings are 3 dB lower than the actual NF for DBM measurements.

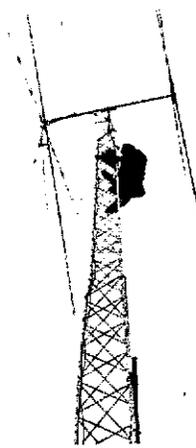
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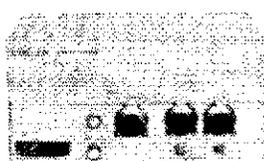
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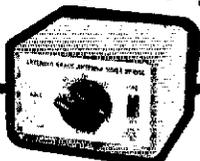
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The noise figure for receivers (and most DBM) is generally specified with only one sideband for the useful signal. As mentioned in the text, most DBM diodes add no more than 0.5 dB (in the form of NF) to conversion loss, which is generally measured under single-signal rf-input (ssb) conditions. Assuming DBM conversion efficiency (or loss) to be within specifications, there is an excellent probability that the ssb NF is also satisfactory. Noise figure calculations in the text were made using a graphical solution of the well-known noise-figure formula:

$$F_T = F_1 + \frac{F_2 - 1}{g_1}$$

converted to dB. The author will provide copies of this graph, along with others useful in system-design NF calculations, upon receipt of an s.a.s.e.

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¹ Flsk, "Double-Balanced Mixers," *Ham Radio*, March, 1968.

² Ress, "Broadband Double-balanced Modulator," *Ham Radio*, March, 1970.

³ DeMaw and McCoy, "Learning to Work With Semiconductors," Part IV, *QST*, July, 1974.

⁴ Oxner, "FETs Work Well in Active Balanced Mixers," *EDN Magazine*, January 5, 1973.

⁵ Oxner, "Active Double-Balanced Mixers Made Easy With Junction FETs," *EDN Magazine*, July 5, 1974.

⁶ Sabin, "The Solid-State Receiver," *QST*, July, 1970.

⁷ Hayward, "A Competition-Grade CW Receiver," *QST*, March and April 1974.

QST-

Public Service

(Continued from page 65)

flooding. They set up a radio link between local c.d. and state headquarters. Despite intermittent power failures, 17 stations were active. — (WA3GSM, EC Sussex Co.)

■ Bentleyville, PA — Dec. 5. WA3APC/mobile 3 was in contact with WA3OKK when he came upon a two car accident. WA3OKK called the police. — (WA3OKK, EC Washington Co.)

■ Birmingham, AL — Dec. 7. W4BKV/mobile 4 witnessed an automobile crash into a guard rail. He called for assistance on the Birmingham Amateur Radio Emergency Service repeater and WB4ZWF answered and called police. — (K4AOZ)

■ Guadalupe, Baja, Mexico — Dec. 8. A call for medical assistance was received on WestCARS from XE2EBE who had an American visitor with a stroke needing evacuation to a San Diego hospital. The patient's doctor was contacted and WB6UFL ran the phone patches. WA6ODQ located a pilot to fly the patient home. — (W6GBF, SCM SDgo)

■ Monroe Co., MI — Dec. 7-9. AREC members were advised by civil preparedness officials to prepare for winds and flooding. Fire departments conducted some evacuations and a snowstorm added to the already difficult operations. Power lines were downed and roads became impassible. Amateurs sent messages for the stranded and the evacuees. — (W4SEFK, EC Monroe Co.)

■ New Brunswick, NJ — Dec. 9. WB2HJH/mobile 2 was involved in an automobile accident and put out an emergency call over WR2ADT. WB2QIC answered and called police. — (WB2PBO, SEC NNJ)

■ Pacific Ocean - Dec. 13. A distress call from a yacht 600 miles south of Oahu, HI, was heard by KS6FF. The boat was leaking in a dozen places. KS6EZ was contacted as was the Coast Guard, who called the Coast Guard unit in Honolulu to get them to fly to the location to drop pumps for the boat. The searchers had difficulty locating the boat and KS6EQ got on the radio to again pick up the captain's distress call. They then relayed more information of its location and directed the rescue. - (KS6FF)

■ Moncton, NB - Dec. 14. Eight area amateurs took part in an area search for two missing policemen who had been following a kidnapping. VE1AUT, EC organized the hunt using two-meter mobiles. The following day the AREC members stayed on alert. - (VE1SH, SEC Mar.)

■ Ocean Springs, MS - Dec. 19. After having car difficulties, WA5FMF/mobile called his wife, WA5MTX, through the WR5ADC. There was no response but WB5MCC/mobile 5 answered and drove to where the disabled car was to help. - (WA5FMF)

■ Birmingham, AL - Dec. 23. K4LGO/mobile 4 arrived at the scene of an accident and called via the BARES repeater. WB4ZWF answered the call and contacted the police. - (K4AOZ)

■ Riverside Co., CA - Dec. 27. WA6CSI was notified that a plane had crashed near Murrieta. He got on the Mt. Palomar Repeater and asked for help. WB6HNZ notified police and K6EJO called the local sheriff. - (W6GBF, SCM SDgo)

■ Birmingham, AL - Dec. 28. A motorcycle accident was spotted by WB4ZWF/mobile 4. A call was put out via two meters and W4ATK responded and called police. - (K4AOZ)

■ San Antonio, TX - Dec. 29. A woman flagged down WB51OR/mobile 5 to get help for an injured driver. WA5NAD was contacted and he called through WR5ADH for an ambulance and police. - (WA5NAD and WB5LOR)

■ Oconee National Forest, GA - Dec. 29-30. The Macon Amateur Repeater Association was activated to help in a search for a missing hunter. Six area amateurs located the cold, hungry man. - (K4SLQ)

■ *Special Activities, October.* The Penn Wireless Assn. provided communications on Oct. 6, for the Levittown, PA, Volunteer Fire Co. Fire Prevention Parade. W3MJH was net control on 146.52. Six area amateurs were mobile in the field. - (WA3IWX, EC) On Oct. 30-31, the Penn Wireless Assn. assisted the Levittown, PA, Volunteer Fire Co. for a Halloween Patrol. A command post was operated and six amateurs were on patrol, using two meters. - (WA3IWX, EC) The Dundee, MI, Police Department was assisted by 10 area amateurs on a Spook Patrol, Oct. 31. Twenty-five incidents were reported from mobile units. - (WA8EFK, EC)

■ *November.* The Bristol (PA) Businessman's Christmas Parade communications were handled by Penn Wireless Assn. members on Nov. 30. Units were set up at the reviewing area and throughout the parade, using two meters. - (WA3IWX, EC)

■ *December.* Christmas gift contributions were collected for the needy of Pierce Co., WA using WR7ACO. Thirty amateurs were involved. - (WA7WMB, EC) Wellesley ARS members set up a holiday message service in Natick, MA, on Dec. 9 and 11. Three stations were operated on 2, 6 and 10 meters; 350 messages were relayed. Fourteen amateurs participated. - (K1YTY) The annual Hawaiian Marathon was held Dec. 15, at Honolulu, HI. Seven stations were established along the 26-mile course and official times and physical conditions were relayed by MARS members. - (WA3UFS/KH6) Christmas greetings were sent across the U.S. for Richmond, IN, shoppers by members of the White Water Valley ARC on Dec. 7-8 and 21. Close to 200 messages were relayed using 2 station set-ups. - (WA9UMH, SEC) A Christmas Hospital Traffic Net was set up in 9 Philadelphia, PA, area hospitals during December.

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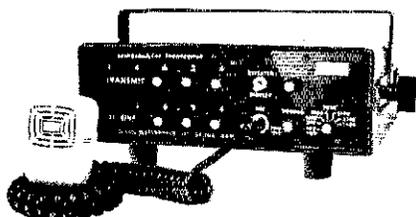
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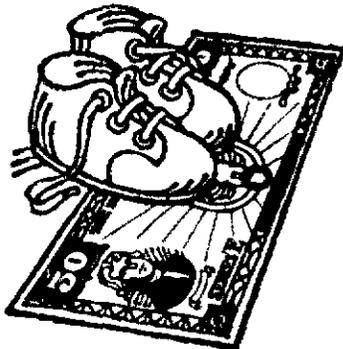
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Happenings of the Month

(Continued from page 73)

| | |
|----------------------|--|
| Membership Affairs | Mr. Haller, Chairman Mr. Gmelin, Mr. Price (Mr. Sullivan, Alternate) |
| Management & Finance | Mr. Egbert, Chairman Mr. Arnold, Mr. Wicker |
| Legal & Regulatory | Mr. Shima, Chairman Mr. Cotterell, Mr. Grauer |

39) Moved, by Mr. McConaghy, seconded by Mr. Price, that due to the alarming increases in the costs associated with the holding of meetings of the Board of Directors annually, and the resultant adverse effect on the financial status of the League during this period of national economic uncertainty, the Articles of Association and By-Laws be amended as follows: Article 4, change the fifth sentence to read "The Board shall meet annually a time and place as provided in the By-Laws." By-Law 20, change the first sentence to read after the word Connecticut - "on the first Thursday in May of each year," effective January 1, 1976, so that only one meeting of the Board will take place unless there is sufficient urgent and important business to require a special meeting under the provisions of By-Law 21. After extended discussion, on a roll-call vote as required, the motion to amend was rejected; number of votes required for adoption: 12; in favor, 11; opposed, 5. All the directors voted in favor except Messrs. Cotterell, Grauer, Griggs, Haller and Zak, who voted opposed.

40) On motion of Mr. Spencer, seconded by Mr. Zak, after discussion, VOTED that the President appoint an Ad Hoc Committee to study the implications of changing the name of the Canadian Division to "The Canadian Radio Relay League."

41) On motion of Mr. Shima, seconded by Mr. Arnold, after discussion, unanimously VOTED that the General Manager make available an appropriate plaque to any amateur who has attained the top of the DXCC Honor Roll such plaque to be paid for by the eligible recipient.

42) On motion of Mr. Arnold, seconded by Mr. Zak, unanimously VOTED to grant approval to the holding of a Tennessee State ARRL Convention in Knoxville on May 24-25, 1975.

43) On motion of Mr. Zak, seconded by Mr. Cotterell, unanimously VOTED that the Plans and Programs Committee report be accepted with the exception of the committee report on Minute 35 which will be continued for further study.

44) On motion of Mr. Grauer, seconded by Mr. Zak, after discussion, VOTED that the General Manager and the Management and Finance Committee study present computer contract with the possibility of renting a small mini-computer.

45) Moved, by Mr. Sullivan, seconded by Mr. Shima, that the first class mailing of QST to Section Communications Managers be suspended for the next 12 calendar months; this motion to apply to all sections excepting, Alaska, Hawaii, and those beyond the continental limits of the United States and Canada. After discussion, moved, by Mr.

Albright, seconded by Mr. Shima, to amend the motion to discontinue first-class mailing to directors also. Moved, by Mr. Price, seconded by Mr. Shima, to further amend the motion to discontinue first-class mailings to officers as well. After extended discussion, on motion of Mr. Gmelin, seconded by Mr. Price, voted that the matter is laid on the table. Mr. Sullivan requested to be recorded as voting opposed to tabling.

46) On motion of Mr. Gmelin, seconded by Mr. Clark, unanimously VOTED that the Board of Directors authorizes creation of a special committee to develop a formal action plan for continued cooperation with the **Sister Cities Program**; committee membership is to be designated by the President, with one member to serve as Board liaison.

47) On motion of Mr. Wicker, seconded by Mr. Albright, after discussion, unanimously VOTED that the League initiate action to solicit suitable donations of publications and documents to be used for the establishment of an **historical library**, located at League headquarters upon acquisition of the necessary facilities.

48) On motion of Mr. Cotterell, seconded by Mr. Shima, unanimously VOTED that the Board does now discuss informally the general subject of League publications.

49) On motion of Mr. Price, seconded by Mr. McConaghy, unanimously VOTED that it is the policy of the Board that, insofar as possible, the President and General Manager of ARRL shall endeavor to maximize the utilization of qualified volunteer services in conduct of League affairs, such volunteers to include the officers, Board of Directors and members of ARRL.

50) On motion of Mr. Griggs, seconded by Mr. Clark, after discussion, unanimously VOTED to grant approval for the holding of an **ARRL National Convention in San Diego, California**, on September 22-24, 1978, under the sponsorship of the San Diego County Amateur Radio Council, Inc.

51) On motion of Mr. Albright, seconded by Mr. Smith, after discussion, unanimously VOTED that when feasible, items constructed in League laboratories which have formed the basis for *QST* technical articles be made available on short-term loan basis to directors for demonstration purposes; transportation to be funded from the division administration allotment.

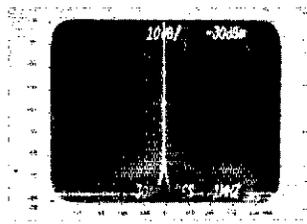
52) On motion of Mr. Zak, seconded by Mr. Arnold, after discussion, unanimously VOTED that the Plans and Programs Committee in conjunction with Headquarters staff, study the preparation of an informational guide and program for assistance to visiting foreign amateurs during the bicentennial year.

53) Moved, by Mr. Grauer, seconded by Mr. Shima, that the *License Manual* be completely rewritten, for the new restructuring, for each element in simple language. After extended discussion, on motion of Mr. Shima, seconded by Mr. Price, unanimously VOTED that the matter is laid on the table.

54) On motion of Mr. Sullivan, seconded by Mr. Zak, after discussion, unanimously VOTED that the Plans and Programs Committee consider the establishment of an amateur radio station utilizing amateur constructed equipment for operation and exhibition at WIAW.

55) On motion of Mr. Gmelin, seconded by Mr. Clark, after discussion, unanimously VOTED

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that the Membership Affairs Committee is directed to study the desirability and need for the establishment of a VHF/UHF/SHF Advisory Committee and, if felt desirable, prepare a petition to establish this committee for presentation at the second Board meeting of 1975.

56) On motion of Mr. Wicker, seconded by Mr. Cotterell, after discussion, unanimously VOTED that the Board of Directors commends the members of the ARRL RFI Task Group and its Secretary, Ted Cohen, W4UMF, for their accomplishments during the past year and calls for continued support of the group's efforts to bring about improvements in the design of home entertainment equipment and added emphasis on the vital subject of RFI in QST and other ARRL publications.

57) On motion of Mr. Cotterell, seconded by Mr. Spencer, unanimously VOTED that the Board does now discuss informally alternative means to increase amateur licensees and League members other than through actions of the FCC. After extended discussion, on motion of Mr. Cotterell, seconded by Mr. Price, VOTED that the Membership Affairs Committee study ideas to bring word of amateur radio to as many prospective amateurs as possible and means to increase League membership. During the course of the above the Board was in recess from 3:00 P.M. to 3:18 P.M.

58) Moved, by Mr. Clark, seconded by Mr. Price, that the by-laws be revised to remove the words "as directed" from the first sentence of Paragraphs 32, 33, 34, 35 and 36, and that the words "... and such supplemental reports as may be necessary" be added to the final sentence of Paragraphs 33, 34 and 36. After discussion, on motion of Mr. Shima, seconded by Mr. Arnold, unanimously VOTED to amend the motion by adding to the language of By-Law 35 the words, "and acts as a Board audit committee." The question then being on the motion as amended, the same was ADOPTED on a roll-call vote, 13 votes in favor to 3 opposed; all the directors voted in favor except Messrs. Grauer, Griggs and Thurston.

59) Moved, by Mr. Clark, seconded by Mr. Albright, that the wording of Paragraph 32 of the By-Laws be deleted and the following substituted therefor:

32. The International Affairs Committee: Monitors the conduct of international liaison by ARRL staff and officer personnel to insure conformance with Board policy and makes appropriate recommendations. Initiates and/or evaluates recommendations for ARRL representation at international meetings and coordinates Executive Committee or Board approval for such representation as required. Monitors and participates in liaison with U.S. government agencies, providing guidance as may be necessary to insure timeliness of action and compliance with the intent of Board policy pertaining to international matters. Encourages, through appropriate channels, the growth and strengthening of IARU, its member societies, and amateur radio worldwide. Directs the performance of appropriate studies pertaining to international affairs, monitors their conduct, evaluates results and makes appropriate recommendations for action. Coordinates and monitors planning and strategy for improving international frequency allocations to the Amateur Radio Service. Monitors expenditures in the area of the committee's jurisdiction and prepares an annual report and such supplementary reports as may be necessary.

After discussion, the motion was ADOPTED on a roll-call vote, 16 votes in favor to none opposed.

60) On motion of Mr. Smith, seconded by Mr. Griggs, after extended discussion, the following resolution was unanimously ADOPTED:

WHEREAS the concept of radio remotely controlled stations in the amateur radio service has been widely implemented and in daily operation for over twenty years in some parts of the U.S. and Canada, and

WHEREAS such stations have proven to be practical, reliable, and secure communication facilities, and capable of being interconnected into extensive networks, and

WHEREAS such stations have provided a technical environment conducive to, and resulting in, the advancement of the state of the art of radio remote control and communication networking techniques, and

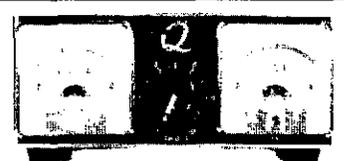
WHEREAS such stations have proven their ability to provide vital public service communications during emergencies which could not be effectively duplicated by other types of amateur stations, and WHEREAS one of the unforeseen consequences of Docket 18803 has been to limit the flexibility of such stations,

Now, therefore, be it RESOLVED that the Board of Directors of the American Radio Relay League does recognize and affirm the desirability of preserving maximum flexibility for stations in the amateur radio service, and therefore supports, in principle, such regulatory considerations as may be necessary to permit amateurs to continue to take advantage of the unparalleled capability of radio remotely controlled stations.

61) Moved, by Mr. Sullivan, seconded by Mr. Thurston, that the President of the ARRL Foundation be elected an Honorary Vice President of the American Radio Relay League, both terms to run concurrently and subject to annual confirmation by the Board. After discussion, moved, by Mr. Shima, seconded by Mr. Egbert, to amend the motion to provide for postponement of action until the election of officers of the Foundation at the January, 1976, Board of Directors meeting. After further discussion, on motion of Mr. Price, seconded by Mr. McConaghy, VOTED, 9 votes in favor to 7 opposed, that the matter is laid on the table. Messrs. Shima and Sullivan requested to be recorded as voting opposed to tabling.

62) Moved, by Mr. Gmelin, seconded by Mr. Shima, that the Headquarters establish a special U.S. bicentennial WAS award to be available for the bicentennial year 1976 only, with a special certificate given for WAS made during that year. After discussion, on motion of Mr. Shima, seconded by Mr. Sullivan, VOTED that the motion is amended to provide for handling charges of \$2 for League members, \$4 for non-members, and no charge for stations outside of Canada and the U.S.; Mr. Haller requested to be recorded as voting opposed. The question then being on the motion as amended, the same was ADOPTED; Mr. Albright requested to be recorded as voting opposed.

63) On motion of Mr. Wicker, seconded by Mr. Arnold, unanimously VOTED that the Board of Directors commends the members of the Emergency Communications Advisory Committee and its chairman, Montie F. "Bud" Cone, WA4PBG, for significant contributions rendered during the past year, noting with appreciation the committee's considerable assistance in the preparation of comments on FCC Docket 19723.



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64) On motion of Mr. Albright, seconded by Mr. Egbert, after extended discussion, unanimously VOTED that the technical staff is requested to investigate the feasibility of developing an automatic calling device for use primarily in alerting selected high frequency net stations prior to or during emergencies, and coordinate the design factors with the Emergency Communications Advisory Committee, with an initial report due at the next Board meeting.

65) On motion of Mr. Zak, seconded by Mr. Price, VOTED, 10 votes in favor to 6 opposed, to reconsider earlier action of the Board in rejecting a proposal to amend Article 4 of the Articles of Association to provide for only one Board meeting per year. After extended discussion, the question again being on the motion to amend Article 4, on a roll-call vote the same was rejected; necessary for adoption, 12; in favor, 11; opposed, 5; all the directors voted in favor except Messrs. Cotterell, Grauer, Griggs, Haller and Zak, who voted opposed.

66) On motion of Mr. Sullivan, seconded by Mr. Grauer, after discussion, unanimously VOTED that photographs of all presidents of the American Radio Relay League, past, present and future, be prominently displayed at the ARRL headquarters.

67) On motion of Mr. Gmelin, seconded by Mr. Wicker, after discussion, unanimously VOTED that the Communications Manager in cooperation with the SCMs involved, study and determine the desirability of making changes in the boundary between the San Francisco and Sacramento Valley sections, and a possible change in the name of the Hawaii section.

68) On motion of Mr. Gmelin, seconded by Mr. Shima, VOTED that the General Manager is instructed to investigate the desirability of establishing a special committee of League members to find and suggest ideas for new ARRL publications and other products to be made available to members.

69) On motion of Mr. Smith, seconded by Mr. Thurston, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1975 in the proper administration of ARRL affairs in their respective divisions, up to amounts as follows:

| | |
|-------------------------|--------|
| Canadian Division | \$2000 |
| Atlantic Division | 4200 |
| Central Division | 2400 |
| Dakota Division | 1600 |
| Delta Division | 3000 |
| Great Lakes Division | 3500 |
| Hudson Division | 3000 |
| Midwest Division | 3000 |
| New England Division | 3000 |
| Northwestern Division | 2500 |
| Pacific Division | 4200 |
| Roanoke Division | 2500 |
| Rocky Mountain Division | 1800 |
| Southeastern Division | 3350 |
| Southwestern Division | 4200 |
| West Gulf Division | 3200 |

70) On motion of Mr. Gmelin, seconded by Mr. Albright, unanimously VOTED that to continue the Board's policy of reimbursing Section Communications Managers and QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1975 a total amount not to exceed \$15,000 under terms

prescribed by the Communications Manager for SCMs, and the General Manager for QSL Managers, following the general pattern established by the Board.

71) On motion of Mr. Thurston, seconded by Mr. Griggs, unanimously VOTED that, to continue the Board's policy of reimbursing Section Emergency Coordinators for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1975 a total amount not to exceed \$8,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

72) On motion of Mr. Sullivan, seconded by Mr. Zak, after extended discussion, VOTED that, to continue the Board's policy of reimbursing National Traffic System officials above the section level for certain approved travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1975 a total amount not to exceed \$6,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

73) On motion of Mr. Thurston, seconded by Mr. Zak, unanimously VOTED that the additional sums of \$522.20 for the Pacific Division, \$365.54 for the Atlantic Division, and \$51.99 for the West Gulf Division, are authorized as reimbursable expenditures during the year 1974.

74) The Board was in recess for dinner from 5:31 P.M. to 8:03 P.M.

75) On motion of Mr. Eaton, seconded by Mr. Albright, the following resolution was unanimously ADOPTED:

WHEREAS, the *Reseau des Emetteurs Francais* representing radio amateurs in France was founded in the year 1925, and

WHEREAS, the *REF* has played an important and dynamic role in the development of amateur radio throughout its long and distinguished history, and WHEREAS, there is a strong tradition of close cooperation by the peoples of France, the United States, and Canada, dating back to the earliest permanent settlements in northern North America, and

WHEREAS, this tradition was carried over into amateur radio by the first two-way transatlantic amateur contact, which took place in 1923 between a French and an American amateur, and

WHEREAS, the International Amateur Radio Union was founded in Paris a half-century ago at a convention hosted by the same french radio pioneers who were instrumental in the founding of the *REF* and

WHEREAS, the ARRL has long taken pride in its excellent relations with its counterpart society in France,

RESOLVED that the Board of Directors of the American Radio Relay League congratulates the radio amateurs of France on the fiftieth anniversary of the founding of their national society, and expresses its fervent hope for their continued participation in the international amateur radio community.

76) On motion of Mr. McConaghy, seconded by Mr. Sullivan, unanimously VOTED that in recognition for faithful service rendered as director of the New England Division, Robert York Chapman, WIQV, is elected Honorary Vice President of the League.

77) On motion of Mr. Haller, seconded by Mr.

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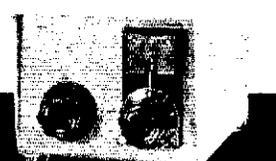
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Griggs, unanimously VOTED that the Membership Affairs Committee continue its study of suggested rules and regulations for technical symposiums.

78) On motion of Mr. Haller, seconded by Mr. Sullivan, the following resolution was unanimously ADOPTED:

WHEREAS, on February 8, 1939, a "yellow-headed ball of fire" joined ARRL headquarters as an assistant secretary after having been secretary of the Chicago Area Radio Club Council, treasurer of the Chicago Radio Traffic Association, SCM of Illinois, and a prime mover in National and Central Division Conventions, and

WHEREAS, he has, since then, represented the League and Amateur Radio at World Administrative Radio Conferences; created the booklet, *Learning the Radiotelegraph Code* and edited the *License Manual*; written for *QST*; served the League as assistant general manager and, since January 1, 1961, as general manager, secretary and editor of *QST*, and

WHEREAS he has also served world amateur radio as assistant secretary, and for the past fourteen years as secretary, of the International Amateur Radio Union, and

WHEREAS, the "yellow-haired" may no longer be true but the "ball of fire" still is, and

WHEREAS, throughout all this time John Huntoon, W1RW, has served the League and amateur radio faithfully, intensely and well, now, therefore, BE IT RESOLVED, that the Board of Directors of the American Radio Relay League, Incorporated, in annual meeting assembled this sixteenth day of January, 1975, do wholeheartedly commend John Huntoon, W1RW on his intelligent devotion to duty, and do present their hearty wishes for

fruitful and enjoyable retirement from the vocation of amateur radio, and for his happy return to the avocation of amateur radio.

79) On motion of Mr. Sullivan, seconded by Mr. Zak, the following resolution was unanimously ADOPTED:

WHEREAS, for 25 years Lewis G. McCoy, W1ICP, has served the League faithfully and well as Assistant Communications Manager Phone, as field technical expert in the television interference field, as Beginner and Novice Editor of *QST*, as repeater advisory liaison, and as the expert in "How to succeed," and

WHEREAS, in his many travels for the League, he wins many friends for the organization, now, therefore,

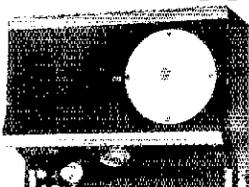
BE IT RESOLVED, that the Board of Directors in annual meeting assembled do hereby commend Lewis G. McCoy, W1ICP, for his valued services to the League.

80) On motion of Mr. Gmelin, seconded by Mr. Shima, after discussion, unanimously VOTED that the General Manager study the desirability and feasibility of publishing a special limited re-printing of the first 15 years of *QST* to be made available to members as an historical memento.

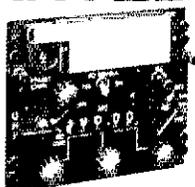
81) Moved, by Mr. Gmelin, seconded by Mr. Albright, that the General Manager publish an updated index of *QST*. After extended discussion, on motion of Mr. Thurston, seconded by Mr. Sullivan, VOTED that the matter is laid on the table; Mr. Gmelin requested to be recorded as voting opposed to tabling.

82) Moved, by Mr. Griggs, seconded by Mr. Smith, to take from the table the motion concerning the minimum qualifications for SCM can-

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didates, but the motion was rejected, 7 votes in favor to 9 opposed.

83) On motion of Mr. Griggs, seconded by Mr. McConaghy, after discussion, unanimously VOTED that Dr. Karl Meinzer, DJ4ZC, and Mr. Werner Haas, DJ5KQ, both of Amsat Deutschland e.v., are named recipients of the 1974 ARRL Technical Merit Award for their work on the Amsat/Oscar 7 satellite.

84) On motion of Mr. Albright, seconded by Mr. Clark, after discussion, unanimously VOTED (Mr. Spencer abstaining) that the General Manager is instructed to file a response to FCC Docket 20271, a Notice of Inquiry relative to the 1979 WARC, expressing the philosophies that have already been developed in ARRL WARC preparatory work — i.e., a return of the 160-meter band, expanded privileges in the hf spectrum, and allocations in the vhf/uhf/shf which will protect the amateur future in space communications.

85) On motion of Mr. Clark, seconded by Mr. McConaghy, unanimously VOTED that the General Manager is authorized to reimburse Amsat, the Radio Amateur Satellite Corporation, for various administrative expenditures during 1975 in an amount not to exceed \$6,000.

86) On motion of Mr. Clark, seconded by Mr. Smith, unanimously VOTED that the Rules and Regulations concerning Advisory Committees be amended as follows:

- a. The final sentence of paragraph 4 shall be changed to read "members may be reappointed for not more than one additional three-year term, but are again eligible for appointment to the committee membership after a lapse of one year."
- b. The first sentence of paragraph 5 will be deleted.

c. The words "the committee members and" will be deleted from the second sentence of paragraph 5.

87) On motion of Mr. Shima, seconded by Mr. Gmelin, and in confirmation of a mail vote of the Board of Directors completed December 16, 1974, the following resolution was ADOPTED:

WHEREAS, The American Radio Relay League as of June 2, 1947, established a retirement program for certain eligible employees.

WHEREAS, the Employee Retirement Income Security Act of 1974 (hereinafter referred to as the "Act") became effective September 2, 1974.

WHEREAS, Part 4, Title I of the Act requires that a written instrument reflect certain fiduciary responsibility provisions required by the Act as of January 1, 1975.

WHEREAS, it is the League's intent to cause, to the best of its ability, its retirement program be in compliance with such provisions as of January 1, 1975:

NOW, THEREFORE, BE IT RESOLVED that the League's retirement program be deemed to include the following provisions effective January 1, 1975 and be operated and administered accordingly.

FIDUCIARY RESPONSIBILITY PROVISIONS

1. The Board of Directors shall appoint one or more named fiduciaries who jointly and severally shall have the authority to control and manage the operation and administration of the retirement program. Unless and until otherwise changed by action of the Board of Directors, such named fiduciaries are the individuals occupying the offices of General Manager and Treasurer respectively.

2. The fiduciaries designated above shall be jointly and severally responsible for establishing and carrying out a funding policy and method

consistent with the objectives of the League's retirement program and the requirements of Title I of the Act.

3. Any person or group of persons may serve in more than one fiduciary capacity with respect to the Plan. A named fiduciary (or a fiduciary designated by a named fiduciary) may employ one or more persons to render advice with regard to any responsibility such fiduciary has under the Plan. A person who is a named fiduciary with respect to control or management of the assets of the Plan may appoint an investment manager or managers to manage any assets of the Plan. The insurance carrier's liability as a fiduciary is limited to that arising from its management of any assets of the Plan held by the insurance carrier in one or more of its separate accounts.

4. Upon appropriate action by the Board of Directors, there may be allocated fiduciary responsibilities (other than trustee responsibilities) among named fiduciaries to designate persons other than named fiduciaries to carry out fiduciary responsibilities under the Plan. If any fiduciary responsibility of a named fiduciary is allocated to any person or a person is designated to carry out any such responsibility, then such named fiduciary shall not be liable for an act or omission of such person in carrying out such responsibility except as provided by the Act.

88) On motion of Mr. Haller, seconded by Mr. Shima, unanimously VOTED (Mr. Spencer abstaining) to confirm the action of the General Counsel in filing League comment in Docket 19555, for a stay of effective date as well as for reconsideration of the provisions, because of the hardship on the Amateur Radio Service.

89) On motion of Mr. Griggs, seconded by Mr. Gmelin, unanimously VOTED (Mr. Spencer abstaining) that the League file comment with the Commission in Docket 20120, which proposed

expansion of Class D Citizens Band, pointing out the relationship with Docket 19759, the Class E proposal, as well as that of restructuring the amateur service.

90) There being no further business, on motion of Mr. Thurston, seconded by Mr. Price, unanimously VOTED that the Board now adjourn, sine die, at 10:29 P.M.

91) (Total time in session, as a Board, 14 hours, 35 minutes; as a Committee of the Whole, 3 hours, 58 minutes; total direct appropriations \$113,389.73.)

QST

Respectfully submitted,
JOHN HUNTOON, W1RW
Secretary

World Above (Continued from page 92)

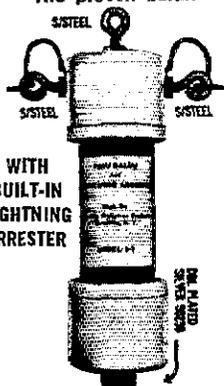
was on cw, but a few nights later they repeated on ssb.

WA6UAM, San Jose, worked K6QEH, Fullerton, several times on 144-MHz ssb during January. This is a path of some 315 miles, and Paul is running only 75 watts PEP output, to an 8-over-8 J-slot beam at 50 feet. On Jan. 17, WA6UAM worked WB6NMT, San Diego, 420 miles, his best 144-MHz tropo DX on 2, to date. The Micronet (1296 MHz) has shifted to Monday nights at 8PM, to avoid conflict with organized 2-meter ssb activity. Several stations are working regularly over distances of 50 miles or better on 1296, in the San Joaquin Valley, WB6JNN is mobile, with 65 mW ssb output on 1296.

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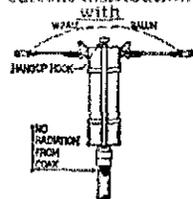
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K7BBO, Tacoma, WA, is out of the 2-meter EME business temporarily as the result of winter storm damage to his big array. The EME array at WA7KYZ also suffered in the same storm, a tree falling on it and breaking up three of the component antennas.

Geminids skeds on 2 meter ssb netted K7CVT, Tucson, AZ, two new states. W7JRG, Billings, MT, was worked on a single burst, at 0625 UT, Dec. 14. Completion with W9PMN, Wichita, KS, required 45 minutes, beginning 0700 the same day. Only partial communication was achieved with W7VEV, 0430 to 0530 on the 14th, and nothing came of similar skeds on the 15th and 16th. 0530 to 0630, the 15th, with K7OFT, was unsuccessful.

K7ICW, Las Vegas, NV, ran Geminids skeds on 144 MHz with W7FN (WA) with contact completed between 0950 and 1030 Dec. 14, for W7FN's first Nevada QSO on 2. Near-misses came on skeds with K5MWH, AR, WB5BKY, OK, WB5LUA and WA5HMK, TX. Only parts of calls were received from W9LER, MN, on one sked at 1300, Dec. 14, which appeared to be the peak day. This is one of those paths close to the magic 1400-mile limit for m.s. Al also reports exceptional tropo Dec. 29, resulting in ssb QSOs with WA6JRA, W6KD, and WA6OOC on 145.005 MHz. These are rough paths, about 260 miles to W6KD and 225 miles to the others.

The Geminids period seemed to K7ZCB, Boring, OR, not to be as good as last year, and the same was said for the November Leonids. Evening results on 50 MHz were good on the 13th and 14th, to California, Arizona, Nevada, and New Mexico. Dave observed December E_s only on the 9th and 27th, but meteor-burst contacts were

made on the 8th and 9th, well before the Geminids peak.

WA8ZUQ, Dayton, Ohio, hopes that the 2-part article by K1ZJH (February and March QST) will spark new interest in 50-MHz QRP work. Elwood ran 5 watts PEP or less on 6 for about two years, and had little trouble making contacts. He has "rave" QSLs from Washington, DC, Massachusetts, Connecticut, Maine, VE1, New Mexico, Nebraska, and Minnesota, to prove it. Not satisfied with results at 5 watts as proof of QRP potential, he made many checks with much lower power. Working WB9FVL, Glencoe, MN, WA8ZUQ started with 2 watts, and then went down to 0.2 watt, but still had an S5 signal on the 650-mile path. With a less-than-ideal vhf site, Elwood had many "local" contacts out to 200 miles with the 5-watt rig. Results like this are worth remembering where TVI tends to be a limiting factor. None of us needs maximum power all the time.

K9OXY found 50-MHz DX on five days of the last half of December. Chuck also used the Geminids for a 2-meter QSO with WA2PKY, at 0645 on the 14th.

WA0MRH, Omaha, NE, observed weak auroral propagation at 0259 UT, Jan. 2 (1975's first au?) followed by winter E' to Connecticut, New York, Ohio and North Carolina, ending at 0400. In about the same time period Jan. 3, John caught more E' to New England, West Virginia, and all coastal states except the Carolinas and Georgia.

Our apologies to K0TLM and W9YZS, whose 432-MHz EME station we put in St. Louis in December QST. We move them, hereby, back to Kansas City, while relaying their willingness to set

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up for 220 EME, if there is active interest in this currently.

WBØIWG, Northfield, MN, says that, though he caught 50-MHz E_s nine days in December, the openings were generally rather poor. He is off for the winter, now, but will return to Minnesota about May 30.

We don't normally devote much space to what people plan to do, but we'll make an exception for WAØFLS/KL7, just in case anyone is going for 432-MHz WAS, via EME. Dave has the equipment, and is working on the antenna, a 20-foot dish. He also has four WØEY-type Yagis, and will put them up if there is interest in tropo work, within 600 miles or so. Address Dave Raymond, 3636 Casper Court, Anchorage, Alaska 99502.

VE2DFO writes that developing and maintaining 144-EME capability is almost a full-time job. Since August, when he got his equipment and antenna in order, Don has worked WA7KYZ and K7BBO, Washington, WA2BIT and K2RTH, New York, W4WNH/S, Michigan, K1WHS, Maine, DK1KO, and VK5MC. These are in addition to a dozen or so QSOs with such regulars as K8111, W8KPY, and SM7BAE, WA7BJU, Oregon, not previously reported, brought VE2DFO to 39 states. In addition, Don has heard K5BXG, K5VWW, K9UIF, W2AZL, and SMØAPR.

Crowding at the low end has become severe, especially during European windows, and more frequency spread seems overdue. Experimentation with ssb is also in order, which means moving out of the first 10 kHz of the band, at least for US stations.

Auroral effects have been observed several times, usually with a strange flutter appearing on EME signals, along with attenuation of 3 to 6 dB.

At times there have been split components, shifted several hundred cycles, possibly the result of meteors.

Oscar News

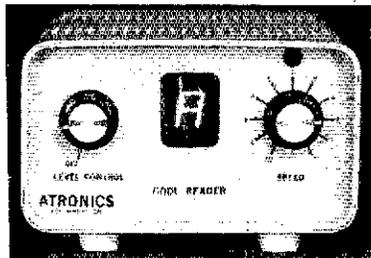
Mode B access to Oscar 7 when the satellite is over the horizon has been mentioned by several reporters. WA9HUV has heard his own signals at almost double the horizon distance, always from the south. Response is generally erratic, possibly from erratic input to the satellite on 432.15. On at least one occasion the down-link signal was fairly consistent, being interrupted at 1 to 2-second intervals, for a few hundred milliseconds each time. On some orbits no beyond-the-horizon response is heard at all, while on others erratic signals up to S9 have been heard.

On orbit 567, Norm tracked the satellite from equator crossing at 122° (4590 miles away), to within 2540 miles (70°) during which time, 9 minutes, the satellite was beyond the horizon. There was fading until visual distance was reached, but the maximum signal was about the same.

W9J1Y, Indianapolis, and WA9HUV, Elmhurst, IL, have probably run tests on over-the-horizon communication via 7 by now. Assuming such work is possible, some interesting prospects appear. Not the least is improved prediction of point-to-point tropospheric openings.

Probably by the time this is read there will have been satellite-to-satellite work as a result of Oscars 6 and 7 having been in close proximity. An early indication of such doings came from W5HN. Leroy was transmitting into 7 on orbit 643B, and listening on the downlink, Oscar 6, orbit 10172,

SEE THE



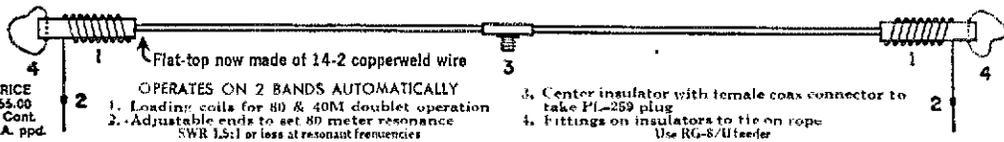
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was also active at this time. W5HN heard K5AXH (15 miles away) by direct path, as the latter was transmitting into 6. (His direct signal and the 7 down-link signals were thus in the same frequency segment.) W5HN called K5AXH on 432, but heard no reply. Later, however, K5AXH told him that he had heard the call via the 10-meter 6 down-link. We should have more of this kind of thing soon, but was this a two-satellite first?

Last month we reported the fax work of W0PHD and VE4AS via 7. WA9HCZ, LaCrosse, WI, ran across a fax signal on 7 Nov. 30, and quickly plugged in his converter. The resulting copy of VE4AS shows the ID and location, Winnipeg, quite clearly. WA9HCZ has also run RTTY and fax checks with W9HWQ to compare the two modes. When the translator is lightly used, both modes give about the same copy. Under heavy use of the translator, fax seems to fare the better of the two. Loss of sync information with RTTY or SSTV "usually means instant disaster," Jerry says. With fax, some detail may be lost under adverse conditions, but copy is good with large block letters or other solid patterns. The Deskfax machine takes about 140 seconds for one frame, so fading effects can be severe. Repeating the frame in a given pass may make composite pictures of good quality possible.

W90H thinks that the 4X150A power tripler in Edition 3 of *The Radio Amateur's VHF Manual* is a good bet for 432 work into 7. It delivers more power than varactor triplers, but not enough to overpower the satellite, as so many KW rigs have done. Using surplus tubes and sockets the cost is low, and construction is simple. As of the end of December, Keith had made 41 contacts, including several with other low-powered stations. His Euro-

peans include G3LQR, G3BNI, and ON6CE. On Mode A, he has found it necessary to use more than the recommended power to make contacts, which include PA0JOZ, T12WD, GW3NNE, DL9AR, and G3IOR.

The partial failure of the 435-MHz beacon on Oscar 7 was a special disappointment to W0LER and W0MJS/WB9MLE, but its signal is still usable, when commanded. No inverted Doppler effects have been observed on 7 thus far. A large area of high ionization out over the Pacific is observed on 7, as it was with 6. Scintillation effects as the satellite passes through the polar region are especially interesting, there being as many as 5 or 6 incoming signals displaced by 10 to 70 degrees in phase at times. "This drives the RTTY machine crazy, and needless to say we don't get much copy when geomagnetic storms are in progress."

John has been surprised at the high absorption on the 146-MHz signal as the satellite passes through the solar terminator. This effect has been observed, as expected, on the 29-MHz signal of Oscar 6, where the absorption runs as high as 15 to 20 dB, and lasts about 90 seconds. The drop in signal level at 146 MHz is somewhat less, running 12 to 15 dB, but its duration is similar to that on 29 MHz.

There has been a tendency to use too-large arrays for the 432-MHz input to 7, John feels. Like excessive power, this complicates matters for everyone, especially if control of the array is not up to the job of keeping the satellite in the main lobe. Moderate-sized arrays with circular polarization and reasonably good control in both azimuth and elevation, combined with the minimum power needed, make life simpler for all hands. W0LER had an impressive list of Europeans worked via 7,

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(Please see the other side of this page for an application for membership in ARRL and 72 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

by the end of December, with OK1MG the best DX.

Via the VERON VHF Bulletin, we learn that TF3IRA, club station of the Icelandic Society, is active through 6, and working on 7, though no contacts had been made through 7 at the time of the VERON report. They were set for only 2-10 operation, but 432 gear will be on soon, probably before this appears in print. They report much trouble with the 29-MHz signal, as might be expected at such high latitudes. European signals tend to blot them out on ascending passes. Then, as their signal begins to get into the satellite well, the repeater is usually switched off before their view of the ascending orbit is completed. It is hoped that 432-MHz input will help with the polar-absorption problems. TF3SF was the only other TF working through the satellite at the report time.

W3KMV Takes Over

ARRL is happy to announce that Bill Tynan, W3KMV, Silver Spring, MD, will shortly take over the preparation of the vhf column in *QST*. Bill is a Fleet Systems Engineer at Applied Physics Laboratory of Johns-Hopkins University. He is former President and General Manager for WHFS-FM, and long-time writer and technical editor for Forecast FM, a Washington area listening guide. Bill is a past president of the National Capitol VHF Society, and was founder and first president of the APL amateur radio club.

The undersigned first met Bill when he was president of the amateur radio club of Rensselaer

Polytechnic Institute, and the writer visited the club as guest speaker many years ago. The friendship formed at that time has been renewed in dozens of radio club and convention meetings, exchanges of correspondence, and on-the-air contacts since then. Most recently our paths have crossed when W3KMV has spoken at conventions and hamfests as a member of the board of directors of Amsat.

It has been a pleasant interlude, serving as temporary compiler of the vhf column these last few months. The hundreds of letters, phone calls, and on-the-air greetings that resulted from the reappearance of the original column by-line are deeply appreciated. I will continue to assist the new editor in every way I can, confident that the column is in capable hands. *W1HDQ*

1296 Hops the Gulf

By telephone, at press time, K4NTD, Oakland, FL, told us that, in addition to the 432-MHz work reported earlier in the column, he arranged to try 1296, but nothing came of that attempt, late Saturday night, local time. Firing up around 1400 UT Sunday, Jack found 432 still open, and better than ever. A second try with W5LDV on 1296 succeeded, and was soon followed by a contact with K5LLL, also of Houston, but some 10 miles farther west, and therefore a second new record. It is of interest that K4NTD had trouble with his 1296 amplifier, and had to make the test with his 2039 tripler, delivering only a few watts output. The antenna is a 7-foot TV-type dish, modified for effective work at 1296.

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Contacts were made in the Dallas area, around 1000 miles, on 432, between 1400 and 1600 UT. Unfortunately, W5AJG/W5HN was hospitalized at this time, and no other 1296-MHz prospects could be raised, for attempts at pushing the record beyond the approximately 900 miles represented by the Houston QSOs. More details next month, we hope.

QST

QRP Transceiver

(Continued from page 32)

stage, before flat-topping occurs. This was 150 mA, on voice peaks, in the author's transceiver. The 2N3632 draws 350 mA in cw operation. The two-tone test will also provide a good indication of spurious oscillations, which sometimes occur only at certain power levels, or with mismatched loads.

Collector current in the 2N3632 is monitored across R8, the value of which is adjusted to give full-scale deflection with 500 mA, with the 5-mA meter used by the author. A suitable shunt can be made by winding fine wire on a low-value resistor experimentally. The meter circuits shown also allow monitoring of the supply voltage and relative-signal strength.

A spectral analysis made at the ARRL Lab showed a very clean output from the transmitter. Only the second and third harmonics of the output frequency, and a 90-MHz spurious signal, were evident, and in all cases these were better than 50 dB down, referenced to the carrier.

Results

A brief summary of on-the-air experience with the transceiver may be of interest. During a recent VHF Party, 11 ARRL Sections were worked from the author's home in North-Central Connecticut. These included all New England except Rhode Island, and Eastern Pennsylvania, Northern New Jersey, Eastern New York, NYC-Long Island, and Delaware. Not bad for three watts! Under normal conditions ssb contacts are made regularly with New York, New Hampshire, and the Boston area, at distances out to 100 miles or more, with little difficulty or fanfare, and out to 200 miles or so when the conditions are good. We've even had some success during auroras, which should help to dispel concern about low power and auroral communication. When the band opens for sporadic-E skip, it is only a matter of finding a clear space to jump into — and there's usually plenty of room above about 50,125 or so. Almost anyone heard well can be worked, with a little perseverance, skill, and old-fashioned luck. Locals are often skeptical of the claimed low-power level, but running this way has been a great boon to neighborhood TV reception.

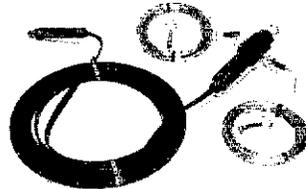
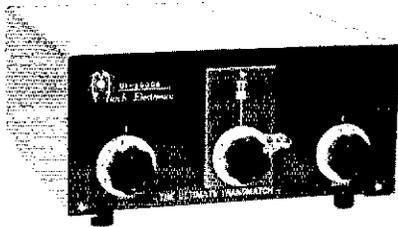
As is likely to be the case with construction projects, this one has generated ideas for improvements and accessories. A recent addition is a 12-volt solid-state amplifier, capable of delivering up to 30 watts. A matching high-current power supply has also been added. A 2-meter transverter has been completed, and is now in use at K1ZJH.

QST

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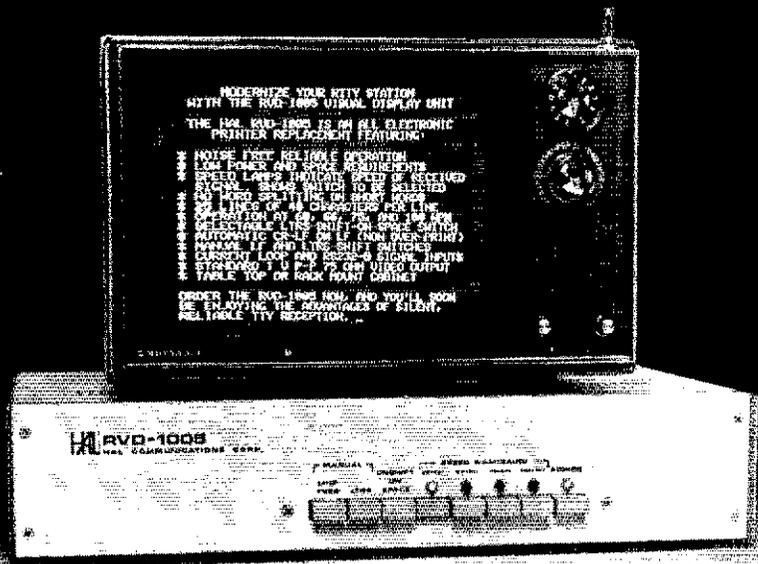
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WANTED: Squires Sanders SS-1R receiver, in mint condition at a realistic price. G. Ginzman, 7525 Mountbatten Rd, Montreal Que., H4W 1J9 Canada.

SIDESWIPER Fans: Beautiful Scandinavian-styled, hand-made sideswiper on teak base, only \$13.00 airmailed. KUNGSINFOR, Box 257, Kungsbacka Sweden.

VACATION Land Hamfest - Sunday, May 18, 1975, Erie County Fairgrounds near Cedar Point, Huge Flea Market area. First prize - Regency HR-2B. Tickets - \$1 advance, \$1.50 at the gate. Information: Hamfest, P.O. Box 2037, Sandusky OH 44870.

MOULTRIE Amateur Radio Klub 14th annual hamfest April 27, Wyman Park Sullivan, indoor, outdoor market. Tickets \$1, advance; \$1.50 at gate. Write MARK, P.O. Box 327, Mattoon IL 61938.

RADIO Expo '75: September 6&7, Fair Grounds, Grays Lake Ill. Seminars, Fleamarket, Manufacturers exhibits, camping. Information: Write EXPO Box 1014, Arlington Hts. IL 60005.

NORTHWESTERN Pennsylvania Swapfest, May 3, Crawford County Fairgrounds, Meadville, Flea Market begins 10 a.m. Free admission, refreshments available, indoors if rain. Talk-in 146.9A, 146.04-64, 29.0 MHz. Map and details: RAE, Box 844, Erie PA 16512.

"FM Bash", Dayton Ohio - while at Hamvention, come relax with us at Imperial House North, 9PM till, Friday, April 25. Free admission, snacks, COD bar, entertainment, tables for ladies. Miami Valley FM ASS'n., K8SNJ, 725 Parkview, Dayton OH 45403.

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Hazeln, Orlando FL 32806.

NOTE: New Ham-Ads rates effective with the April 1975 issue. Non-commercial rate 20c word. Commercial rate 60c word

WANTED: An opportunity to quote your ham needs. 35 years a ham gear dealer. Collins, Drake, Ten-Tec, Swan, Kenwood, Tempco, Clegg, Regency, com. Hy-Gain, and all others. Also \$25,000 inventory used gear. Request list. Chuck, W8UCG, Electronic Distributors, Inc., 1960 Peck St., Muskegon MI 49441. (616) 726-3198. Telex 22-8411.

SWAP-N-Sell ads free in Tradio. Box 4391, Wichita Falls TX 76708.

THUMPING Keggers Net meets every night 3927 ko.

WANTED: Hallcrafters SX-88 for parts, any condition considered. K0MNA, 4805 Sullivan, Wichita, KAN 67704.

NOW PAYING \$2000 and up for ARC-94/618T ARC-102/618T, \$1200 and up for ARC-51BX \$1600 and up for 490T-1 antenna couplers. We also need these control boxes-C-6287/ARC-51-BX, C-6476/ARC-51BX, C-714E-2. We also need RT-1051 receivers, RT-662/GR-106 transceivers. We buy all late aircraft and ground radio equipment. Also pack radios. We are buyers not makers. Bring your equipment in you are paid in the spot. Ship it in you are paid within 24 hours. We pay all shipping charges. If you want the best price for your equipment, call us. D&R Electronics, R.D. 1, Box 56, Milton PA 17847. Phone 717-742-4604, 9:00 am - 9:00 pm.

MOBILE Ignition Shielding gives more range, no noise. Kits and custom systems. Literature. Estes Engineering, 543-A West 184th, Gardena CA 90248.

WANTED: Master mobile matcher and micro Z-match. S. Kriso K2OMP, Box 3538, Wallington NJ 07057.

AMSAT/OSCAR 6-7 slides, set of 5 - \$1.25 Lift-Off and Equipment. Proceeds AMSAT, K6PGX, P.O. Box 463, Pasadena CA 91102.

WANTED, Make, Model and Serial Numbers of stolen ham gear, for big list. W7UD, 3637 West Grandview, Tacoma WA 98466.

WANTED: Heath SB-640 in good shape and condition, with manual and cables. S.R. Arzujos, 1 Amy Court, Verona NJ 07044.

CLEGG FM-27Bs at prices I dare not publish. W9NGS, Bob Smith Electronics, 1226 9th Ave. North, Fort Dodge IA 50501. (515) 576-3886.

160 METER top loading section for vertical antenna. Have a big signal on top band. Adjustable anywhere in 160 meter band. Mounts on extendable mast or any 1 1/4" section. Highest quality materials. 50 ohm feed. Rated 1 kW. Satisfaction guaranteed. Send \$34.50 ppd or write for free information to Bill Turney, WA9RFF, 1414 East 9th, Hutchinson KS 67501.

SURPLUS bargains. Priced to sell. Most items new. FGC-60 TTY, MN-266, components, sockets, electrolytics, silver mica, variable capacitors, relays, write your needs and send gear for our list. Middlesex Electronics, 21 Freestone Ave, Portland, Conn. 06480.

TOWER, 80 ft. crankup, tiltover, steel galvanized, free standing. \$2149. Was \$1200 new. Save for data. See in Dana Point CA 92628, Jim, K6ALP, 34022 Blue Lantern. Asking - \$395.

RAY Area Repairs. Signal/One, etc. K6BE 415-548-1889.

FOR SALE: 100' T-26 Tri-Ex tower, 5 each 20' sections. Handles 50 sq. ft. of ant. at 100 MPH. Complete with guys, hardware, etc. except base. Biscuit in storage. \$1650 FOB. Late model Signal One/CXA, excellent condition, \$895. Write with phone number, W7UR, P.O. Box 1047, Bend OR 97701.

WANTED to Buy: Bolex or Bell & Howell 16 MM film Editor/Viewer, Excellent condition thruout; Also, new DVM, Model IM-2. Cashiers check for lowest dollar. WA9GYX, George, 1107 N. Scott St, Belton MO 64012.

COLLEGE forces sale. Station and test equipment. Drake T4XB, R4B, MS4/PS, Hallcrafters HT3-B linear, Hygain 204BA, 402BA, Ham-M, Triex tower LM354, Heath HD-10, HO-10, Tektronix 513 scope, AP200C, plus much more. Send \$ASE for complete list - W8GUG.

MOTOROLA HT220, HT200, Pageboy and Voice Commander service and modifications performed at reasonable rates. Other makes, inquire. Hatfield, WA4FRV (804) 272-8403.

HEATHKIT SB-401, \$275; 2 EA SB 301 - \$225 ea. All crystals. Excellent condition. William L. McVey, Box 623 Sitka AK 99835, Phone 747-8598.

WANTED: Collins 180S-1 antenna tuner. Also want Gonset HT-20 meter, 11 20 meter, or Gonset 903A or 903B MK2, 2-meter linear. Prefer 903A model, but must be in excellent condition. Sell, or trade Johnson 6N2 Transmitter, \$50. Write, or call collect, Dean Pollock, WA3SSU, RD9, Box 702, Greenburg PA 15601. (412)837-7411.

ATTENTION hams from Arkansas, Conn. Del. D.C., Hawaii, Idaho, Maryland, Montana, New Mexico, Oklahoma, and Rhode Island: I need badly an auto license plate with Ham call from your state. If you can furnish, or even supply a lead, please write. Thanks, John Thomas, K4NMT, Box 198T, Gallatin TN 37066.

COLLINS KWM2 transceiver, PM2 AC power - 351-02 mobile mount 516E-1 mobile AC supply - \$760, Bert Shapiro, Apt. 81D - 2076 South Ocean Drive, Hallandale FA 33009. Phone 923-3233.

FM receiver, preamp, scanner, UHF converter kits. Hamtronics, 182 Belmont, Rochester NY 14612.

FOR SALE: Collins 75A-2 - \$160. Heath HW-12 AC-DC p/s - \$125. Central Electronics 100V - \$295. Cash and Carry. A. Hutchins, WA2LHC, c/o 18 Central Street, Foxboro MA 02035.

WANTED: Yaesu FTV 650 six meter transverter. Give price and condition. Killoran, 8451 13th So., Minneapolis MN 55420.

PC Boards QST projects, S.A.S.E. List. Richard Bondra, RD 3, East Stroudsburg PA 18301.

GONSET G-28 10M transceiver, excellent condition - \$90. Polycomm 6M transceiver, Excellent condition - \$130, J. H. G. Gardner, K1UAF, Apt. D-20, 1189 Washington St, Middletown, CT 06457. (203) 347-2464.

SWAN: 500CX with SS-16B Swan 1200W linear. Both used 5 hrs. Best offer. WA1FNS, Ira Deutsch, P.O. Box 324, Charles St. Sta., Boston MA 02114.

HEATHKIT SB-303 solid state receiver, works perfect, never on air - \$320. E.J. Jones, Box 40, Pomfret Hall, Univ. of Arkansas, Fayetteville AR 72701. (501) 575-2835.

WANTED: TRI-EX tower model HZR471N (71' rotating tower) and must be galvanized and complete with rotating rings. Paul G. Wadlock, 60 Northwestern Dr., Bristol CT 06010. (203) 582-4885.

WANTED: Collins 62S-1 transverter. Condition? Price? W6ISQ, 82 Belbrook Way, Atherton, CA 94025.

STATION W8QOA is helping to celebrate the 12th annual Lawrence Institute of Technology Open House. All stations worked during the open house will receive special QSL certificates. Hours of operation will be, in GMT, 1400-15 March to 0200 16 March, and 1400 to 2300, 16 March, 1975. Will be at plus or minus 15kc, 7.125 or 7.26 or 14.31 or 14.11 MHz. 75.

HALLCRAFTERS twins, SX-117 rev - \$185; HT-44 and PS-150-120 power supply - \$230. Package - \$400. Excellent with manuals and cables. Two meters, Motorola base station transceiver, 25W output, 2 channels, Simplex or Duplex. Kits for 74 and 93. With preamp probe, Model FMTRU-G1-B-C2 - \$110. K4JW, R. Goodwin, 106 Perry, Goldsboro NC 27530. (919) 735-1741. Cert. check or m.o.

SELF-SEALING plastic laminating: (4) 10" x 12" sheets - \$3. New, heavy gauge metal laminating. Federal 1214 Fibert St., Philadelphia 19107.

WANTED: "Sideswiper" key, good condition. Also Model X upright vertical Martin Bug. WN1SPM Box 329, Southbury CT 06488.

FOR SALE: KWM-1 owners, mobile-mount with wiring harness - \$25. W3VDA, P.O. Box 1333, Harrisburg PA 17105.

BTI LK-2000 linear amplifier, HD floor model - \$425. Also, Drake R-4B, T-4XB, MS4, AC4 - \$760; Heath SB-610, SB-630, tuner B4-S. All equipment (except BTI) installed in metal cabinets with light and fan. Package price - \$1,000 (except BTI). Shipping extra. Russ Melching, 3980 Telegraph Rd., No. 22, Ventura CA 93003. (805) 642-7308.

HEATHKIT HW-10/sidetone volume control, HP-23R, HM-102, Mobile mic, 4x-20 dipole/coax - \$25. You ship. Glen Roberts, 2417 E. Campbell No. 5, Phoenix AZ 85016.

HAVE QSTs 1931 to 1972 with about 8 issues missing. Make offer. Clinton Hoar, 32 Cumberland Ave, Verona NJ 07044.

SELL: One 250 Hz xtal filter for Drake R-4C rev - \$35. C. Relavitz, 56 Cedar Avenue, Highland Park NJ 08904.

HW-7 Heathkit QRP transceiver, 3 months old - \$55 including shipping in U.S. Mike Blazier, 1209 E. Florida, Apt. 14A, Urbana IL 61801.

FOR SALE: Hallcrafters SX-111 - \$100; Heath HW-16 with crystals - \$75, both excellent, with manuals. Leonard Weber, Box 134, Irvington IL 62848. (618) 249-8366.

WANTED: TR-4C transceiver. State price, condition, WA2VPA, 41 Bluespruce, Levittown NY 11756.

WANTED: Yaesu FR 101S FL101 SP101, all connecting cables. Art Guido, K8RCU, 1804 Summit Ave., Rosedale MD 21237. (301) 866-4676.

YAESU FT-101B with CW filter, fan, mobile mount - less than one year's use, in excellent condition - \$600. WB8NMP, Alderson-Broddus, Philippi WV 26416.

SALE: Collins MP-1 DC power supply - \$50; Collins 341D mobile mount - \$25; Ham-M rotor box (new) - \$25; Electronic "Jaguar Elec" tenna switcher (new) - \$15; Coaxial switch box B&W376 (new) - \$5; March field strength meter FSL3 (new) - \$6; Turner mike SR90D - \$20; Drake low pass filter TV1000LP (new) - \$10; Drake TV3000HP filters (2) both - \$7; Estes electronic shield, mobile - \$5; Earphones, Cleveite Brush - \$2; W2A RALDS (2) - both \$10. John Rohrbach, K3VZT, P.O. Box 275, R.D. 1, Schuylkill Haven PA 17972.

FOR SALE: Yaesu FT-101B, immaculate, 75A4 serial no 4043. Best offers. Don Miller (703) 434-8630, 407 Lee Avenue, Harrisonburg VA 22801.

SB200, - \$199 FOB. Don Bishop, 11655 Logan, Northgleann CO 80233.

HALLCRAFTERS FPM-300 w/blower - \$350, can be heard 80 thru 15, like new, Tom Howey, R-2 Coachman Manor Apts., Lindenwood NY 08021. (609) 627-3199. WB2IML.

HEATH SB 102 - mint condition. Seldom used. Never abused - \$450. Paul J. Preston, K7ANG, 1611 East 19th Street, Cheyenne WY 82001.

WANTED: Clegg Venus and power supply or Swan 250C complete. For Sale: Globe HI-Bander, J330 mike manual - \$45. H24-B complete manual - \$45. Both F.O.B. W1UEO, Box 6, Sterling MA 01564.

KNIGHT T60 - \$30; Hallcrafters SX117 receiver - \$175; Heathkit HR10B receiver - \$30; Q Multiplier - \$7. Write or call W8NKN, Neal Winston, 800 Kimball Road, Highland Park IL 60035.

WANTED: Schematic or manual Beckman Counter Model 7160. Ed. Taffe, W2IGR, 222-3rd St., Palisades Park NJ 07650.

P.C.'s. Send large s.a.s.e. for list. Semtronics, Rt. 3, Box 1, Fellaire OH 43906.

SB-102, HP-23A, SB-600 - \$360, SB-301 - \$240, WB2TJR/3, Box 1382, Gallaudet, Washington DC 20002.

SELLING complete Swan 500 station, 117XC, VXII, VFO 410, model 22 VFO meter, spare tubes, Ashing - \$300, WA2CXQ (212) 726-1318, 21-45 32 St., Astoria NY 11105.

HEATHKIT SB220 linear amplifier, excellent - \$350. Prefer local pickup, John O'Rourke, WA5WRC, 4142 East 36th Place, Tulsa OK 74135.

SELL: National NCX-5 MKII, A.C. and D.C. pwr. supplies, excellent - \$335; SP600JX and cabinet, excellent - \$190. Dale Gagnon, Route 8, Hinsdale MA 01235, (413) 655-8033.

\$500 - TR4, AC4, RV3 spkr, mic, Gouset patch, Knight SWR, Hunter wattmeter, Buck up sets, Navy freq. Equipment LM-18, K10ZR, Lynn, MA 598-4138 6PM.

WANTED: Two National type B velvet vernier dials. Siter, 488 Marshall, Paxton, MA 01612.

HW-12A (AC power, spkr, mike) - \$120; EICO 753 (AC power) - \$100; Heathkit K-2009 calculator (AC charger, case) - \$50; National NC-5515 Special receiver - \$30; Gruen precision electronic wristwatch - \$50; Vixoprolex bug - \$15; Heathkit IM-17 voltmeter - \$20. WB9FZL, Sheens Tractor Court Lot 46, Kearney NE 68847.

WANTED: Old toy trains of all types. Also, want old radio items. W2GHF, 45 Allen Dr., Woodstock NY 12488.

DRAKE 2B with 2BQ multiplier and manual. Excellent condition - \$150. George Skinner, 2100 S. Ocean Lane, Fort Lauderdale FL 33316.

2M 60W Progress line, PL section, receiver needs alignment - \$150; Plus Motorola TXCVR included, not converted. No shipping. K2VYD, 110 Sycamore Circle, Stony Brook NY 11790.

COLLINS: For Sale, 328 & xmttr, 516 F-2 ps., top condition - \$375. Local pickup, Frank Stolpen, 2060 E. 19 St., Brooklyn NY 11229. Phone (212) 998-2743.

NOVICES: Worked 43 states, 15 countries with this rig! Heathkit: DX-60B, HG10-B, HR-10B - \$160. Scratchless, chipless, driftless working condition. Wanted, Drake T-4X - \$260. Alan Pond, Liberty IL 62547.

HEATH SB310 w/CW filter - \$200; HW16 - \$75; Lafayette HA700 - \$35 or trade, David Carroll, 468 Genesee St., Trenton NJ 08611.

NICE Clean NCX-5, Mk. 2, NCX-A - \$295. You ship. Fred Jackson, W4CEH, 1717 Meredith Lane, Belleair FL 33516.

NATIONAL NCX-5 with A.C. supply, excellent - \$300; Heathkit HW-32A, both supplies, excellent - \$125. Want: Drake 2C and accessories or two meter mobile, Michael Benavate, 204 S. Colonial Homes Circle, Atlanta GA 30308, (404) 355-8238.

HEATH DX40, HG10, 80/10 Novice pair - \$69; HQ129X all wave receiver, original panel, chassis, homebrew aluminum cabinet - \$57; Galaxy 300 transceiver 80, 40, 20, SSB/CW PSA 300 console retaining alignment cost - \$81 by High-Sale - \$169. You ship, Cope, WA5PFX, 5011 F St., Litterlock Ar 72206.

SELL: Steco 1520 varac - \$45; Wagner Xfmr, 3.6 kVA CT with dual pri. - \$45, K9ZPJ, 4542 N. 105 St., Wauwatosa, WI 53225.

DRAKE T-4XR, R-4, MS-4, AC-4, Heath HW-16, SB-200, Mosley TA-33 w/CDE, UR-44 rotator. All in good mechanical & electrical condition. Will accept reasonable offer, J. Larson, W4LLVW, P.O. Box 901, N. Campus Res., UCONN, Storrs CT 06268.

TRADE Bell & Howell Film-O-Sound movie outfit for Swan, Drake or Heathkit transceiver of equal value. Cost \$500 new. WN9ODH, 1716 N. 24th Street, Terre Haute IN 47804.

SELL: Very reasonable, NMTRS, RCVRs, S.a.s.e. for list. WB9AZQ, 404 E. Emmons, Robinson IL 62454.

COLLINS 75S3B/C, 3283 516F2 wanted for cash, will pick up 300 miles from Philadelphia. Also, 402BA wanted. Bruce Bouvier, W2RHE, 2609 Finlaw Ave., Pensauken NJ 08109. (609) 662-6575 after 9 PM.

WANTED: Instructional tapes. Good condition. Will pick up Chicago/land area. Sid Ross, W9ISY, P.O. Box 336, Lombard IL 60148.

WANTED: VLF converter or receiver, solid state 9 or 12 volt, tuning down to 10 KHz. John Behrens, Route 1, Sterling NE 68448.

SELL: Heath expertly wired, aligned and used only 2 hours. SB-220 - \$350; SB-401 - \$325; SB-303 & CW filter - \$350; SB-600, Classic 33, 64 tower etc. Ralph Queen, 7818 East Oak St., Scottsdale AZ 85257.

FOR SALE: Drake TR4 with noise blanker, MS-4 speaker, AC-4 power supply. Perfect condition, recently factory serviced - \$495. Herbert Tannis, WB9AAQ, 18527 Rose St., Lansing IL 60438.

CONVERTER wanted - Drake 4-LF 10-1500kc. Paul McGrath, 130 South Lake St., Hamburg NY 14075.

QUAD kits - \$14.50 to \$25. Boomless spider mount - \$12. Send SASE for information. WAC, 404 Sanders Rd., S.W., Huntsville AL 35802.

PENN State Alumni: Send your name, call, class and any comments to Penn State Amateur Radio Club, 102 Hammond Bldg., University Park PA 16802 for a free copy of our 86-year history.

DIMONT scope - \$75; new Eico grid dip meter - \$50; ARCS-TX and revr and power supply - \$40. Ken Hand, WB2EUF, Bridgehampton NY 11932, (516) 324-4066.

DRAKE R-4 and T-4X pwr supply, spkr, Johnson match other accessories. Xmttr and Revr recently factory reconditioned. This is a complete station on the air. - \$600. Bill Em WA1EVD, 115 Westgate, Wellesley MA 02181. Tel. 235-8086. Will ship ppd.

FOR SALE: SB6-34 and mini products 3-element tri-mini-beam. Best offer, WA1MBF, Steven Radoff, R3, D NH 03060.

HEATH HX-10, HR-10B, and Lafayette HA-800. All condition. Must sell. Best offer, Mack Avery, WA5ZKI, Meadowcrest, Crowley TX 76035.

BELMONT BC-348-L Army signal corps receiver, best Heath HR-10-B - \$75 with calibrator. Ed Kobos, P.O. Box Clark Mills NY 13321.

HQ-110C - \$120; Knight T-60 - \$35; Heath Sixer and supply - \$40; Lafayette HE-40 receiver - \$25. All very National NC-60, CDR TR-4 torot, BC459-A - need ref. \$30. Manuals. Everything - \$210 or trade for high Q general coverage receiver, WB2BFD/1, Konrad, 799 Elm Haven CT 06511. (203) 562-9377.

SELL: Complete Heath station SB-102, SB-220 and HP-43750; HW-12A and HP-23A - \$125. All mint. Operate shack or will deliver within 100 miles. No shipping, price: Frank Britt, WA9VV1, Route One, Princeton IN 47670.

FREE: 12 Extra Crystals of your choice with the purchase new Kenyon HR-2R at \$229. Send cashier's check or 1 order for extra-day shipment. For equally good deals on C Drake, Ten-Tec, Kenwood, Swan, Atlas, Standard, Clegg, Genave, Tempo, Midland, Alpha, Hy-Gain, Mosley, Cush and Hustler, write to Hoosier Electronics, your headquarters in the heart of the Midwest. Become one of many happy and satisfied customers. Write or call today for low quotes and try our individual, personal service. H Electronics, R.R. 25, Box 403, Terre Haute IN 47802. 894-2397.

SELL/Swap, 2 meter HB 1-kw amp, worked 19 states on \$200. Knight TR-106 - \$50. Need 6 meter SSB rig. Lambert, Smith Center KS 66967. (913) 389-7833.

DRAKE R-4A with MS-4 speaker, excellent condition - E.C. Watters, WB4ZKV, 3633 Dairaida Pkwy, Montgome 36109. (205) 272-3231.

WANTED: Johnson Viking Valiant, good operating condition, Viking Challenger, Johnson 122 VFO, James Miller, VFO. State condition and price, including shipping. KR 51625 Chestnut Road, Granger IN 46530.

SBE 34, excellent - \$240, SB2L4 - \$160, new tubes a manuals, package - \$370. Leica M3 with 50 MM F2, w/ meter strobe, filter and case, excellent condition with o manuals - \$310; also, Minolta STR 101 with 35-135 S zoom, as new - \$220 with case and manual. H. Miller, W 21 Hamilton, Weehawken NJ 07087.

FOR SALE: Hamm Rotor and TH6-DXX Thunderbird Wally Leonard, 7216 Rosewood Dr., Gladstone MO 64118.

WANTED: Sony SRA-2L recording amplifier. Cash. R 2900 Maison Way, Sacramento CA 95825.

TRADE antique Westinghouse 307189 and 307190, transmitter. Hartzell, Route 2, Mifflinburg PA 17844.

IBM Electric typewriter, Model B, good condition, cleaning. As is, - \$95. K3MNI, 8351 Langdon, Phila, PA 1

MINICOMPUTER For Sale. DEC PDP-8L minicomputer 4000 word by 12 bit memory, manuals, schematics, and programs. - \$1500, or best reasonable offer, David Kohl, Bedford Ave., Brooklyn NY 11210.

CANADIAN Expedition - Contesters wanted for TR-VER-land to operate July Open CB Party. Have airplane, transceiver, etc. Share expenses, bring fireplace. For information write Bob Williams, WA9BZY, 230 Stanley St., Chippewa WI 54729.

FOR SALE: Best offer by 15th of month. Used EV 729 P&H AR1 switch, Used tubes - 6 866A and 5 4-400A. Wa Reid, W9CDD, 9023 Philo Ave., Affton MO 63123.

WANT: Ghirardi's "Radio Physics Course Book" and P Science's "Radio for the Millions", Ed Howell, Folly Bea 29439.

WANTED: Collins 62S-1 converter in absolutely mechanical and electrical condition. George Hall, WB2TF Miller St., Saddle Brook NJ 07662. (201) 843-5130.

COMPLETE 8-Band SSB station; Central 20A spkr w/ Heath HR-10B RCVR; Antenna tuner w/SWR, mic, key, p - more! - \$150/offer. Carey Witkov, 9110 LaCrosse, Sko 60076.

ROBOT 80-A SSTV camera like new with 25 mm lens, m original Box, \$225. K.S. Lewis, W4WLY, Box 17666, B 1104 33612.

SELL: Hallcrafters HT32 transmitter - \$199; Drake 1A re - \$119; Central Electronics 10B exciter with BC455 V 899. All excellent and on air. All manuals. You pay shipping, moving K2BU, 10 Cunningham, Glens Falls NY 1 (518) 792-2307 evenings.

SELL: HW22A, HP23, HP13, resonator, mast, bumper n microphone, speaker HM-15 - \$150 firm, WB2OMH, 78 Ave, Elmont NY 11003. (516) 437-4147.

COLLINS 8-1 line, with power supply HB console. Ex condition - \$800. Call Mike, WB5CEU, (918) 932-1969.

WANTED: Cabinet for Hammarlund SP600 receiver. Transistorized Grid-dip meter, Midland 23-120 - \$70. 1513 Bayshore Blvd., Apt. 7, Dunedin FL 33528.

FOR SALE: Yaesu FT101B transceiver 160-10 meters with microphone, 115VAC and 12VDC cables, like new, \$545 or trade for HW32A and cash. W9VYD John Robinson, 286 Ingram St., Northfield IL 60093.

INSTRUCTION manuals - Thousands available for test equipment, military electronics. Send \$1 (refundable first order) for listing. A service of Tucker Electronics, Box 1050, Garland TX 75040.

WANTED: Henry 8K, Henry 4K-Ultra or Alpha 77. A Kyrakin, 6057 Hefner Dr., Los Angeles CA 90022.

SELL: Drake 2-B receiver with 2-BQ spkr / Q-Multiplier. - \$150 plus shipping. WA2WOR/L, 1133 Flencmann Road, Farmington CT 06032.

DISCOUNT prices plus full warranty. All items new, guaranteed. CDE HAM-2 - \$117; Belden 9448 rotor cable 12c/ft. 20% discount THGDIX, 204BA, Classic 33, Classic 38; 15% discount tries W, MW, super mast - FOB Calif. Sprague 500PF/20KV doorknob cap - \$1.95; CDE .001/10KV - \$1.95; Rotron Nugget blower fan - NTH2 - \$7.95; Raytheon 811A - \$7.95 ea, \$15/pr; Sorensen ACR200VA AC regulator - \$150. Write specific quote TS520, KLM echo 2MSB; RG62B/U 8c/ft; RG71 8c/ft; new panel meters, old tubes (UV 7V, etc) - write: Prices FOB Houston, Madison Electronics, 1508 McKinney, Houston TX 77002. (713) 224-2668, Nite (713) 497-5683.

IMPROVED ham seeks transceiver. Willing to work on anything. \$25 max. Dick Peterson, 104 Ave. Delmar, San Clemente CA 92672.

COLLINS 75A4 mint - serial 2646, gear reduction with 3.1, 2.1, and 5 Hz mech. filters - \$395. SP600, X, Hammarlund, good - \$200. T. Liffand, W2RFU, Donmoor Road, Lawrence NY 11559.

COLORADO Ham Directory. Over 4,000 listings by call, name and Zip. Also, repeaters and nets. - \$2.50. Colorado Council of Amateur Radio Clubs, Box 242-C, Longmont, CO 80501.

BUY-Sell-Trade. Write for monthly mailer. Give name address and call letters. Complete stock of major brands, new and reconditioned equipment. Call us for the best deal. We buy Collins, Drake, Swan, etc. SSB & FM-Associated Radio, 8012 Conser, Overland Park KS 66204. (913) 381-5901.

COLLINS KWM-2A, power supply, 30L-1 linear. Very good condition. Selling together - \$1500 firm. Mike Sparkman, P.O. Box 120, Miami Beach FL 33139.

MUST sell kw amplifier, pp 813s, 80-15 meters, heavy duty power supply, fully metered, well constructed - \$85; aluminum quad mounts - \$4 each, RG8/U .05 cent/ft. FOB Albany NY. Write K2IRO, Jim Singleton, 9 Apple Tree Lane, Liverpool NY 13088.

SERVICE - professional repair and calibration of all makes of oscilloscopes, V.T.V.M.'s, V.O.M.'s, T.V.M.'s, etc. Fast turn around. Our standards traceable to N.B.S. Reasonable rates. Use U.P.S. if possible, pack well if mailed. Shields Laboratories, Inc., 7436 S. Cricket, Cleveland OH 44131. (216) 524-0190.

HT-37 Hallcrafters - \$125; 600L Central Electronics linear - \$125; TMR-RH Regency scanner - \$70; ST-3 - \$35; Teletype model 15 with cabinet - \$50. Will ship. Joe Hoener, K0FYL, 1421 North Main, Hutchinson KS 67501.

FT101B, mint condition. Original packing, cables, microphone and connectors - \$540. Will ship. Going into military. WA1HMU, Michael Zak, 777 Stewart Avenue, Ithaca NY 14850.

FOR SALE: Heath HW22A with HP23, mint condition - \$135. WB2ALJ, RD2 Box 288B, Calton NJ 07830. (201) 832-7748.

DRAKE ML-2 with encoder, Dycomm amplifier, eight positions control. Manual, power mobile - \$125. Base or mobile 1.8 volt supply or Dycomm - \$39 Motorola base, Senstone receiver and 30 watt transmitter (PA-8664-B) crystalized, operating 146.16-76 power supply, encoder, cables, control head - \$53. Motorola Dispatcher (5V) mobile, control head, cables, cabinet - \$45. Motorola sheets and schematics included. Health reasons force sale. W0NFV (408) 623-4630.

HEATHKIT SB301 with CW and SB crystal filters and SB600 speaker. Like new. Easily worth \$250. Must sell. Fred Lignar, 1009 W. California, Urbana IL 61801.

LATE R4B, T4XB, AC-4, MS-4, all absolutely mint - \$750; 160-10 R4X Ham-A, 70 feet Rohm 25G cables and guys, etc. 18 months old, you take down - \$435. WA4BTK (615) 588-2745.

WANTED: Drake MC-4 mobile console. Send description and price to John Mathis, 2412 Pierce 310E, Nashville TN 37212.

DRAKE TR-3, AC-3, DC-3 - \$360. David Klimaj, 5637 Heming, Springfield VA 22151.

VERY inter-esting! Next 5 big issues \$1. "The Ham Trader." Sycamore IL 60175.

QST from 1932, CQ from 1941; handbooks from 1928. Send see for lists. W4NI, 3600 Old Vineyard Road, Winston-Salem NC 27103.

HALLCRAFTER SX-115 receiver, HT-32B transmitter-exciter, HT-33-B amplifier - \$750. Louis Theroux, WB1ER, 1812 Gunn Rd., Holt MI 48842. (517) 694-3491.

TELETYPE Model 28RSR, excellent condition - \$200. K3YVP, Gene Marcus, Locust Ridge Rd., Pocono Lake PA 18347. (717) 646-3069.

WANTED: Waters rejection tuning unit for 7581 receiver. Jim Cain, R5, Box 23, E. Hampton CT 06424. (203) 267-9995.

SELL: Drake TR-4, AC-4, and MS-4. Excellent condition - \$425 firm. New Vibroplex "original" key - \$22.50. Call or write Frank Tarantino WB2JFJ, 107 Somerset Road, New Rochelle NY 10804. (914) 632-6165.

UPGRADE your ham license now! Beat the change and preserve your privileges. Let Post-Check help you. Original, expertly devised, multiple choice questions and diagrams covering all areas tested over in FCC exams. IBM sheets for self testing. Keyed answers with explanations. Extra Class - \$4.90; Advanced Class - \$4.65; General Class (including latest rules and regulations) - \$5.10; Novice - \$3.35. First class postage prepaid U.S. Air mail \$25 extra per copy. Send check or money order to Post-Check, P.O. Box 3564, Urbandale Station, Des Moines IA 50322.

GONSET communicator IV 6M - \$95; Swan 500 w/ac - \$320; Ranger II - \$135; Galaxy V w/ac - \$275; Hallcrafters SR500 Fordo w/ac - \$225; Cleg 99 - \$59; 4-1000 new - \$60; 4CX1000A - \$80; 4CX250B - \$20. List available. W2FNT, 18 Hillcrest Ter, Linden NJ 07036. (201) 486-6917.

WANTED: tubes, transistors, equipment, what have you? Bernard Goldstein, W2MNF, Box 257, Canal Station, New York NY 10013.

FOR SALE: Heath SB-303 receiver - \$275; Heath TX-1 transmitter - \$90; Heath HX-10 sb transmitter - \$140. J. Helme, W2BNY, 18 Tildaan Lane, Bayville, L.I. NY 11709. (516) 625-6556.

SELL: SB-34, factory reconditioned - \$225. KR5 electronic keyer, updated at factory - \$25. J. Garber, 1715 Wilshire Dr., Rochester MN 55901. (507) 288-7867.

HP 400-C VTM - \$60; TR 413-B Sig Gen - \$130; 40 years old tubes. SASE list. Fitch, W3AW, 9406 Evans, Phila PA 19115.

SELL: F455J-05, F80M-03. Want: F455J-08, W8QBY.

NEED Heath Ham Scan, SBE34. R. Jones, 111 Hillside Rd., Farmingdale NY 11735.

WANTED: 10M FM transceiver. WB0GAZ.

FOR SALE: Swan TB-1000 beam, Tri-Bander for 20. 15 + 10 meters. Excellent condition. Great for DX. Must sacrifice - \$55 (no ship). Chuck Cibik, WA3UIQ, 1260 Grove, Pittsburgh PA 15234.

SELL: Swan 500CX, VX2, 117XC. WB2IWH (201) 523-1437.

COMPLETE station, Heath Apache TX-1, SB-10 sideband filter (Hammarlund FG-110), receiver, good cond. All manuals - \$150. Wanted, used tri-band beam and tower. Bob Czajkowski, WN1TA, 13 Fifth Ave., Worcester MA 01607.

ARRL Handbooks, 1945, 1959, 1964 and 1968. QST, 1961 through 1965. Excellent condition. - \$12 for all. WA2EIT, 13 Linden Place, Summit NJ 07901.

BEST offer, package deal only. SR2000, P2000, HA-1 paddle, Shure 44, Drake L.P., Viking KW matchbox, 20 m beam, Hygain Hy-Tower, cables, switches, misc. All mint-will sked. K9RGH, Day (312) 499-2282, Night (312) 636-4248.

WANTED: 51J4 or 9A10 receiver in 1st class condition. Will pick up and pay cash in southern California. E. Coune, 122 Bob St., Monrovia CA 91016. Tel (213) 359-7255.

COMPLETE Novice station. Drake 2NT Xmitr; Drake 2B Revv, with 2B multiplier; Heath HG-108 VFO; Lafayette SW7 Bridge, Vibroplex Bug Ameco, note practice; oscillator with 2 code practice records. All equipment in top mint condition, with original manuals, cables, sytl. Package deal for \$335. WN1TPR, Bruce Egalka, 226 Knollwood Drive, New Haven CT 06515. (203) 397-2281.

WANTED: Manual for Eldico SSB-100M transmitter or schematic and power supply information. North K. Osbrink, WA4ZEM, 112 Coloma St., Santa Cruz CA 95060.

SP-600 Super Pro Revv in excellent condition with manual. Asking \$175. FOB, Paul Bayvin, WB9PEL, 3540 Deerfield Pl., Columbus IN 47201. (812) 379-9628.

FOR SALE: CX7-A, 300, 1200 Hz - \$195; 30S-1 - \$1200; KW-1 - \$1500; 32V-3 - \$150; 75A4 No. 5267 - \$450; R-388 - \$295; Valiant-I - \$125; Johnson desk kilowatt - \$450; Newtronics CD-40 - \$100; Dycomm 10-4-72 M - \$175; Apache 885; IC-21, VFO - \$399; IC-21A - \$419; IC-230 - \$449; B&W 334-A - \$129. Measurements-95 - \$300; Measurements 140-A - \$225; 1975 Callbooks; U.S. - \$11.95, foreign - \$10.95 - Both \$21.95, prepaid. Craig Radnor, P.O. Box 615, Portsmouth NH 03801. Store (207) 439-0474; Home (603) 436-2884.

YAESU FT-101 and Murch UT-2000 - \$600. Cuccio, 78 Rochelle Parkway, Saddle Brook NJ 07662. (201) 843-9197.

WANTED: Drake C-4 station console. Contact G. Hawrysko, WB2GWU, P.O. Box 568, Boro Hall Station, Jamaica NY 11424.

CRYSTALS airmailed: Nets, Marx etc. - Novice, active FT-243, all frequencies, minimum five, 40M, 15M, 10M - 99c each, 80M \$1.75. Cover bands inexpensively, rock solid - less than five 80M - \$1.90, other \$1.50. Novice, eight crystal - four band, edge calibrator and QSO package (also good with VFO) - \$9.95. General Purpose: FT-243 .01% - \$2p; 350 - \$600 kilocycles - \$1.90. (five \$1.75 ea.); 8601 - 1300 fundamentals, 1000 - 3000 overtones - \$2.95; 160M, four/\$9.80, single \$2.95. Add 45c for AST-6 (Thin FT-243, fitting HC-6/u socket above 3000). For .005% add 50c each. Airmail 20c/crystal, 1st-cl 15c. Free Hugs, Bob Woods, W4LFS. "Crystals Since 1933". C-W Crystals, Marshfield MO 65706.

MOTOROLA X53 2M trunkmount, 60 watt, 4 freq., w/accessories - \$125 or deal for monitorscope, wattmeter, speech processor or ricebox. Bender, WA2VOF, 1678 Northgate, Merrick NY 11566.

GONSET G-63 Ham Receiver, 80m-6m, vy good, w/manual - \$55; Communicator IV, 2-meters, exc., w/manual - \$110; SWR bridge, exc. - \$10; BC-342-N, exc., w/a.c. - \$50; BC-221-AK, works, w/a.c. - \$20. You pay shipping. Wanted: R-392. WA7ZYQ, 210 Lauder, Moscow ID 83843.

WANTED: Brown paddie, any condition, Anthony J. Casco, 5321 Greenbrier La., Madison WI 53714. (608) 222-1788. WN9PVEH.

GONSET Communicator IV 2 meter AM transceiver - \$65. K. Redden, WB2ZLF, Englewood NJ 07631. (201) 569-2290.

COLLINS, KWM2A Winged emblem, plug in relays, all bulletins applied. Waters Q Mult with PM-2 and CC-2 nice. \$775. KWM2A, very recent with plug in filter dial lock, waters Q mult like new with PM-2, 136B-2 blanker, MP-1 mobile PS, 351D-2 mount MM-1 mike. \$1500. 518-1 round emblem, perfect. \$1100. G2S-1 never been on air, found in dealer's show room, perfect. \$575. 399C-1 Wattmeter, installed - \$200; 180S-1 antenna tuner. Paint faded, scratched, mech elect. perfect - \$175; DL-1 dummy load, scratches, dents - \$25. F456FA3.1 filter - \$15. Certified check or money order, please. WA7ESD, (206) 456-2731, RR-12 22 El Rancho Madrona, Olympia WA 98506.

WANTED: Swan 500 or 500CX with power supply. Also: tower, Triband beam, and rotor, reasonable. Cheryl Bortland, 1019 S. 8th St., Watertown WI 53094. (414) 261-0458.

WANTED: Crystal phasing unit for NC300. W8BJN, Gene Kirby, RD3 Marysville OH 43040.

62S-1 wanted for cash. Ted Dames, W2KUW, 308 Hickory St., Arlington NJ 07032. (201) 998-4248.

RADIO desk console for less than \$100. Build your own. Appearance and functional use equals that of expensive console. Selling for \$300 or more. Illustrative package includes drawings, list of materials and photographs. Send - \$4.75, to Bill Morris, WA8RSC, P.O. Box 20302, Oklahoma City OK 73120.

FOR SALE: Heath Dual trace scope (10-106) - \$300. Heath digital multimeter (IM-102) - \$150; Heath frequency counter (15-1101) - \$150; B&K transistor tester (162) - \$100. All operational. Send M.O. or Certified Check. Wanted: BC 211 AK, Ad or AL in working condition. Richard N. Matassa, 941 Army Trail Rd., Addison IL 60101.

SB-220 - \$375 (exc.) or trade SB-200 - \$200 (exc.) cash diff. Ham II & 100 ft. cable. W12R, W6RQZ, 1330 Curtis, Berkeley CA 94702. (415) 526-7345.

HEATH HW-1R, used one year. Got General and bought new rig - \$85. Will ship. WB5MSX 745 East Irby, Beaumont TX 77705.

NOVICE equipment Drake 2-C revr - \$185; Heath Mohawk revr - \$150; Heath DX-608 xmt'r w/VFO - \$85. All manuals, you ship. 6 MTR AM Knight-TR-106 w/VFO, T-175 linear amp., less than 50 hours use, all manuals - \$150. WB4ERI, 205 Glyndon St., SE Vienna VA 22180.

STANDARD SR-6826M 2 mtr transceiver complete with AC power supply; microphone; 12 channels of xtals; manuals. In original shipping cartons. Like new - \$250. W2AX, 18 Adrian St., E. Northport NY 11731. (516) 368-6932.

SELL or trade: Apollo innoh stop VHF/UHF tracking receiver system. (RTR 5000B1A) FM/AM/PM Demod. - 100 MHz counter (8N1XIES) - CRT Spectrum display - 100% solid state. Prematurely superseded - cost about 40 kilobucks. FB Moonbounce/Satellite receiver for advanced UHF Ham, club or lab. Have manuals. Want: cash, quality ham or test gear. SASE for details. Ernie Marko, K4MP, 1510 Bayshore, Cocoa Beach FL 32931.

COLLINS 75S-1 with 500 Hz and Waters Notch filters; 32S-1 with 516 PS; all in excellent condition. H.W. Richardson, 1328 East Bennett, Springfield MO 65804. (417) 862-6997.

3-NT Drake xmt'r, very good condx - \$90. WA3SAX Simon Labov, 204 N. 35th St., Philadelphia PA 19104. (215) 386-0161.

FOR SALE: Mint Heath HA-202 - \$65 post paid. Also modified Two TR-7100 xcvr (similar to SBE SB-144) with 6 xtal pairs. Works fine - \$150. WA3GVQ/2, 17 Clove Drive, Rochester NY 14825. 385-3779.

SELL: Heathkit HW101, HP23A, SB200, Drake 2C - all mint condition. Basil Thompson, Box 234, Winslow IN 47598. Phone (812) 354-8452.

WANTED: SPR-4, SB-144, or ST-6, W5PIL, 726 Teal, Grand Prairie TX 75050.

SELL: Two Motorola HT-220 with Touch-Tone. Private line, six freq. Many extras. S.A.s.e. David Rogers, 1914 Blair, Nashville TN 37212 (615) 385-3496.

WANTED: Johnson KW Matchbox No. 250-30, prefer without SWR. SB-200, WB4GTW, 3417 Mynatt Rd., Lot 52, Knoxville TN 37918. (615) 687-3605.

KYOKUTO Denshi 2m FM 1-10W 8494 34/94 22/82 16/76 with tone burst encoder and 10 button touch tone pad. All presently in use - \$135. Dycorn Super E 3WIN - 40WOUT - \$50; Heath HM-12 SWR meter - \$10. WB9OAZ, 2833 SW Caulder, Des Moines IA 50315.

SWAN TV2 mint cond - \$175. National NCX500, good cond - \$175; Topaz AC supply for NCX500 - \$35; Collins 75A2, good cond - \$150. Philip Schweiber W9GCG, 4536N 50 St., Milwaukee WI 53218.

WANT: Nems Clarke IFM-10, IFM-30/50, PDT-100 plug-ins for 1456/1456 receivers. WA5NQE, 701 Carolyn Ave., Austin TX 78705.

RTTY picture tapes, 16c stamps for catalog. WA3UGE, 601 S. Dodson, Urbana IL 61801.

CIE First Class FCC Radiotelephone License Course. Absolutely perfect condition. Originally cost \$300, asking - \$125. Artie Carapola WB2JHR, (212) 892-2305.

HALLICRAFTERS HT-37 SSB XMT'R - \$130. National NC300 - \$75. (215) 347-2175 WA3RPQ, RD4, Box 464, Coatesville PA 19320.

SELL: Mint Collins. 75S-1, 32S-1, 516-F2 - \$800; KWM-2 312B-5, 516-F2 - \$1150. Both just completely went through a factory. Collins 30S-1 linear - \$1300. Might do some trading Richard Scharf, 417 North Ferry, Ottumwa IA 52501. Ph. (515) 682-5741.

SWAN 500cx, new matching speaker power supply - \$449. Ric Heckert, Box 426, Elwood KS 66024.

MECHANICAL components, P.C. boards, blank or etched. To your spec's. See also our Feb. ad in QST. Edward A. Stoltzfus Beacon Light Rd., Parkersburg PA 19365.

FOR SALE: HR-10B with calibrator - \$80; SB-600 - \$15. Both brand new and working perfectly. HP-23B - \$45. Never even been plugged in, checks out perfectly, I converted to solid state before I got a chance to use it. W1UBT, 4 Monadnock Road Newton MA 02167. 332-0969.

FOR SALE: SB100 SB303 HW32 2 meter transceiver. Details by base. Charles W. Cragle, 613 W. Mulberry, Shamokin PA 17877.

SELL: National 200 (5 band ssb transceiver) and NCKA supply - \$185; HW-12A - \$60. Wanted: L4B and 75S3B or 75S3C W8PH, 505 Roxbury Court, Ft. Wayne IN 46807.

TEMPO one, excellent condition - \$230; p/s and spkr - \$50; Hygain 80-10 vertical, \$20. Etter, (516) 261-2901.

WANTED: Expired Ham Radio license plates. Collector desire plates from all states for collection. Offering \$2 each. Please write or send to Joe Franko, 1101 Evmar, Midland MI 48640.

ANTFARM at 170 feet, bring your own XMR - Sun, swimming, QSO from VP7-land, for license and ham rate information visit Oceanus Hotel Group Sales Office, 8101 Biscayne Blvd., Miami FL 33138.

220 MHz FM transceiver, E.F. Johnson Messenger 380, with 223.50 simplex and 223.34/224.94 crystals - \$160. Unit has squelch, 6 channel positions, hi/low power switch. Ed Kallir, WA1JZC/1, 410 Memorial Drive, Cambridge MA 02139. (617) 494-8812.

RCA 3-inch scope kit, new - \$65; RCA VOM WV-38A new - \$50; Tektronics scope camera model C-12, used, make offer. QST 1960 through 1972, missing June, July 1971, April December 1972. Make offer. RCA WR-50B RF signal Gen. new - \$35. W2LXD, 1381 Richmond Court, East Meadow n. 11554.

GALAXY full set GT550, RF550 RV550, SC550. Three elements Mosley Beam, 80 meter Trik SHI, bug, phone patch, desk mike and accessories. Gary Straach, 7930 Lake June Rd., Dallas TX 75217. (214) 391-5555.

"HOSS" Trader Ed February Sale. We refuse to be undersold. Remember, if you didn't buy it from the HOSS, you paid too much! Demo Atlas 180 if you didn't buy it from the HOSS, you paid too much! Demo Atlas 130 - \$469; FM-27B Clegg transceiver - \$349; New Genave GTX-200's - \$168; 200' rotators. New Roho 50' foldover tower, prepaid - \$339.95; New Hy-Gain TH3-MK3 antenna and Demo Ham-rotor - \$265; Hoss Trader Specials: Used equipment: Drake TR-4 - \$379; R-4C - \$448; T-4XC - \$479; 700CX - \$449; Swan 350 - \$239; Factory-reconditioned Galaxy GT550-A - \$319; transceiver - \$249. Some left - new Collins at old prices. Moory Electronics Company, P.O. Box 506, DeWitt Arkansas 72042, Tel: (501) 846-2820.

DXers DC-100 preamplifier; MOSFET, 20 dB gain, 5 dB n.f. 10-30 MHz - \$39.95. DC-200 logarithmic speech processor; dc increase in average power, with level meter - \$49.95. 1 cabinet, Dynacomm, 1183 Wall Road, Webster NY 14580.

WANTED all types of electronic equipment and ham gear for new A.R.C. Send details and offers to Northeast Phila. P.A.R.C. c/o W3NSVA, 8506 Kendrick Place, Phila PA 19111.

BEAM headings, computerized to your QTH, 100% of circle worldwide, put your sig where they are! SASE for info K2KVS 5615 Truscott Terrace, Lakeview NY 14085.

MOBILE OPS. Please send SASE for info on shielded ignition systems. Summit Enterprises, 20 Elder Street, Yarmouthport MA 02875.

FOR rent: 2 weeks, month or season - furnished ground-floor bedroom apartment in chalet "Rivers End" overlooking Bass River, Cape Cod. Five band horizontal and vertical antennas available. Secluded wooded location with beach rights on river. W1HGH, 20 Elder Street, Yarmouthport MA 02875.

LOW prices. Yaesu FTDX 560 - \$344; HQU10A - \$125; SX101A - \$119; DX50B - \$99; HW17A & FM adapter - \$84; HW32 - p.s. - \$42; power with level meter - \$49.95. 1 cabinet. Cushcraft, Hustler, Bomar, 2MTR FM NTALS, "W2APU", Callbook and many others. Now in Detroit area to serve all. Ferris Radio, 308 E. Harry, Hazel Park MI 48033. (313) 398-6645.

WANTED to buy, police radio equipment made prior to 1941. Also, many literatur, ads, or books on radio equipment of the period. Ronald Phillips, 1925 Baltimore, Kansas City MO 64101. (816) 842-9009.

SALE: Drake 2B, Calhri and Heath Q-Multiplier - \$160. Steve Westall, 202 - 1885 after 7PM, 165 Field Point Road 43 Greenwich CT 06830.

CLEANING out shack for fun and profit! All types of equipment for sale at hamfest prices including CW, SSB, ATV, SSTV, RTTY, FM, HF/VHF/UHF and even radar as well as station accessories, antennas, and test equipment. A huge assortment of tubes, vacuum variable capacitors, capacitors, transformers, blowers, resistors, relays, high power component and other rare goodies too numerous to mention. Send large S.A.S.E. for list to: WABONG, 311 N. Marshall Road, Middletown OH 45042.

TELETYPESWRITER parts, manuals, supplies, equipment. Toroids, S.A.s.e. for list. Typetronics, Box 8873, Ft. Lauderdale FL 33310. WANVF. Buy parts, late machines.

COLLINS Owners: Why pay \$200 for 200 Hz xtal filters? I have 300 Hz cw/xtal filters for 75S1, 75S3B, 75A2, 75A4, or any 455 kHz LF, receivers. Collins number X455KF300. These are mil-spec Collins xtal filters metal case in sealed Collins boxes. Spec sheet included. No receiver mods in early 75S3B (before 1968). Few minutes work in other cases, instructions included for 75A4. Tested and guaranteed. Shipped UPS to your door — \$42.95. W. F. C. Gary Patrick, 40 Pflugim Trail, Woodbury CT 06798, (203) 263-3138.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY NY 10012.

SPIDERS for boomless quads. Helicar welded aluminum. Al's Antennas, 1339 So. Washington St., Kennewick WA 99336.

MANUALS for ham gear before 1967. Large s.a.s.e. for quote on specific manuals. W0JJK, Hobby Industry, Box Q864, Council Bluffs IA 51501.

NOVICES: Need help for General ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, PO Box 6015, Norfolk VA 23508.

WE BUY electron tubes, diodes, transistors, integrated circuits, semiconductors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. (201) 354-2420.

FOR SALE: Heath SB-101; HP-23B p.s.; SB-610 monitor; all in perfect condition — with manuals — \$400. Gary Bostright, WB5KNR, Box 306, Vinita OK 74301.

SELL: Hustler 4BTV — \$40. Local only. WB21WH (201) 523-1437.

HAVE Yaesu FT-101, Icom, miscellaneous, Want Lionel, American Flyer, etc. trains — various models and years. K9CGM, 333 E. Howell, Milwaukee WI 53207.

DISCOUNTS—discounts—discounts, on top quality Midland VHF gear. Why pay more for a fancy name? Full info and quote promptly sent. Discount Electronic Supply, Inc., Dept. M3, 999 Asylum Ave., Hartford, CT 06105.

SELL: Measurements, Model 82 signal generator — \$75; Measurements, model 210A FM signal generator — \$60; Telonic, SN3UHF sweep generator — \$90; Telonic, SV13 VHF sweep generator — \$90; Also, Adjust-A-Volt, 0-140 V ac variable voltage transformer, PRI: fused 5 A., output ckt. bkr. in series, 150 V ac meter across output — \$20. Glenn Schmidt, W9AQQ, 3123 N. Chester, Chicago IL 60656.

FOR SALE: one pair of Hallicrafters hand-held transceivers model CB-11. 100 mW input, superhet receiver, requires 9-volt battery, weight 10 oz. less battery. Original cost \$80 pair. Best offer. F.O.B. Hartford, Box DH, ARRL, 225 Main St., Newington CT 06111.

SONY solid state TV recorder — \$250; Sylvania camera/monitor — \$150. Both excellent. List VHF/UHF gear SASE. WAAPT, Box 4095, Arlington VA 22204.

SELL: Aerocom 446-21 commercial AM, CW, RTTY transmitter, 2-16 MHz, 600W carrier input, 240 VAC, w/manuals, complete, s.a.s.e. brings detailed specifications. WB2JJD, 141 Van Name Ave., Staten Island NY 10303.

COMPLETE 80m mobile outfit, HW 12A, HP-13B supply, HS-24 sweeper, GH-12A mike, 400mA charging. New condition — \$140. W7KAL, 1427 May, Shelton VA 98584.

FOR SALE: Model 19 TTY — \$75; HT37 — \$125. Kenwood R 599 with 2 and 6 meter converters, like new. Local buyer preferred. W2MBB (516) 352-1164.

DRAKE model 2-C receiver in original carton. Mint condition. Barely used. \$189 firm. Call 203-561-3437 or write 60 Gillett St., Hartford CT 06105.

SELL: excellent Kenwood TS511S with AC spare tubes, original packing boxes — \$370; National NCX-3 with AC, clear — \$190. WB6ZQZ, 6233 Montecito No. 27, Santa Rosa CA 95405.

NEW Drake: R-4C, MS-4, plus 500 Hz & 4 kHz filters, plus 19, 31, 160 meter xtals — \$550. WA2SQZ, R.N. Taylor, 205 Bergen Pike, Ridgefield Park NJ 07660, (201) 641-1472.

FOR SALE: EZWay RBX50 crank-up tilt over 51' galvanized tower with ground post. Holds 18 SF antennas. TA35 beam & Ham M rotor. Pick up only — \$500. Paul Neveu, Jr., W1CKA, 60 Northwestern Dr., Bristol CT (203) 582-4885.

QSTs from April 1922 to present date. Very few missing. Make offer. W1TK, Westport Point MA 02791.

SALE: Collins 75S3 mint — \$425; CE 200V better than new — \$325; hb Xmtr 4/1000A pg final, 4 KW dc power supply with all commercial components in 6ft. rack — \$325. Dr. M. B. Kassel, K3MLR, 7561 Overbrook Ave., Phila, PA 19151.

CLEAN KWM2, PM2, CC2 station delivered personally by owner within 125 mile radius New Haven. For your approval and \$795 cash. K1PSL (203) 669-9310.

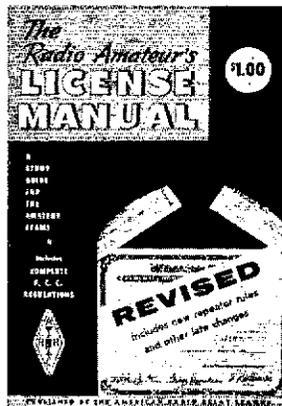
SELL: Collins MP-1 power supply — \$75. WA5RGX, Box 254, Southaven MS 38671, (601) 393-0858.

HAM with general class license, high school graduate minimum. To teach radio to campers at outstanding CO-ed camp. Write for application to New Jersey YMHA-YWHA Camps, 589 Central Avenue, East Orange NJ 07018. Phone (201) 878-7070.

WANTED: Electronic instructor. General Theory, workshops. Summer science camp. Write: Epstein 4B, 440 Westend Ave., New York NY 10024.

Jobs for Hams

Small electronic service company in tropical island town is looking for a good technician to assist owner. Send resume to Bill Zammit, K4MJZ, 10937 Overseas Hwy, Marathon, FL 33050.



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| 2N3903 TYPE GP Amp & Sw to 100 mA and 30 MHz | \$1.50 |
| 2N3904 TYPE GP Amp & Sw to 100 mA (TO-92/106) | 6/\$1.00 |
| 2N3919 TYPE RF Pwr Amp 3-5 W @ 3-30 MHz | \$3.00 |
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| ● FET's: | |
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| 2N4416 TYPE RF Amplifier to 450 MHz (TO-72) | 2/\$1.00 |
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| 555X Timer 1 μ s-1 hr, Dit. pinout from 555 (DIP) | \$.85 |
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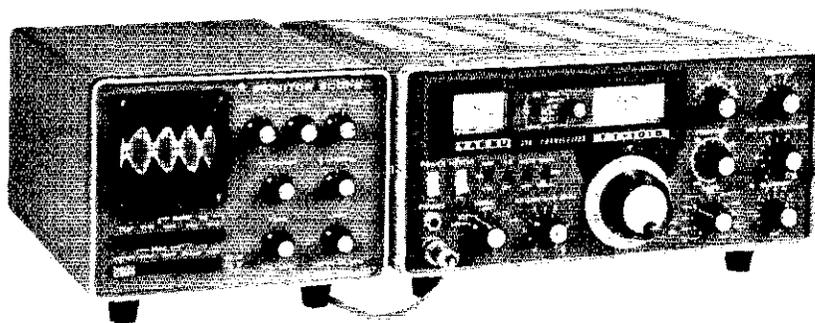
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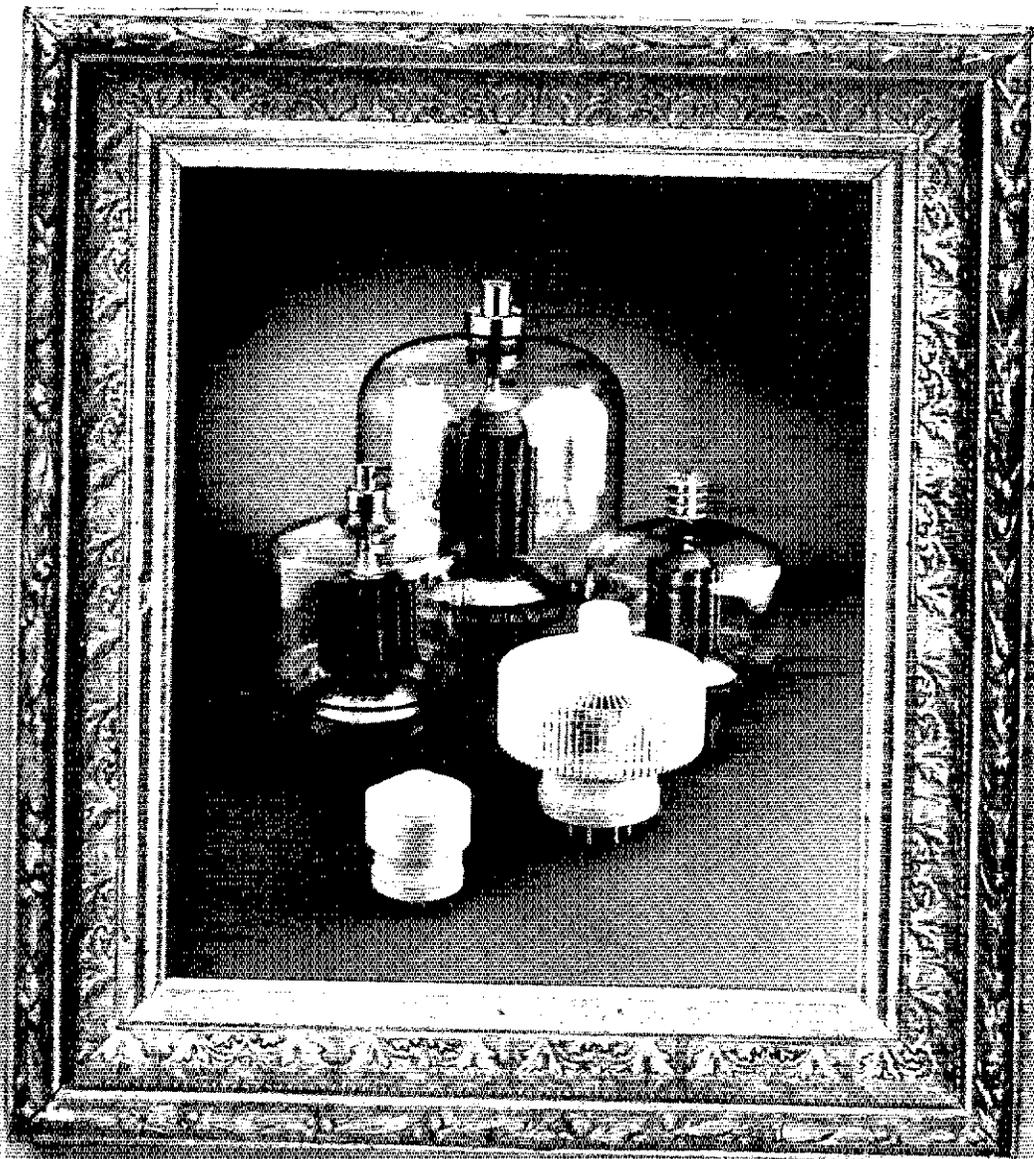
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